TABLE OF CONTENTS

TABLE OF FIGURES

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TABLE OF TABLES

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LIST OF ADDENDUMS

2.6 Geology

All figures and table discussed in Sections 2.6-1 through 2.6-4 are presented in Addendum 2.6-A at the end of Section 2.6.

2.6.1 Regional Geology

The Antelope/JAB property lies within the northern portion of the Great Divide Basin. The Great Divide Basin is an oval shaped hydrologically closed basin bounded on the north by the Granite Mountains and the Wind River Mountains, on the south by the Wamsutter Arch, on the west by the Rock Springs Uplift, and on the east by the Rawlins Uplift (Figure 2.6-1). The Great Divide Basin was developed during the Laramide Orogeny followed by Tertiary basin fill. These Tertiary deposits constitute up to 15,000 feet of sediments overlying Cretaceous and older rocks within the Basin.

The Tertiary Paleocene Fort Union Formation unconformably overlies the Cretaceous Lance Formation. The Fort Union consists of up to 6,200 feet of interbedded lacustrine shales, and fluviatile siltstones and sandstones and can contain local lignite beds.

The Tertiary Eocene Battle Springs Formation unconformably overlies the Fort Union Formation. The Battle Springs consists of some 6,500 feet of alluvial fan type sediments, primarily being fine to coarse grained arkosic sandstones, shales, siltstones and some conglomeratic units. The source of the sediments is believed to have been the Granite Mountains to the north.

The Battle Springs Formation is gradational and interfingers with the Wasatch Formation in the western Great Divide Basin southwest of the JAB area. The Wasatch Formation consists of lacustrine and paludal sediments of shales, siltstones, and sandstones.Figure 2.6-2 shows the stratigraphic column of the Great Divide Basin. Pliocene pediment deposits are present within the northern portion of the Great Divide Basin.

The JAB and Antelope properties lie along the southern flank of a long anticlinal fold in the northeast corner of the Great Divide Basin known as the Antelope Arch. The Antelope Arch is an extension of the Wind River Mountain uplift to the west and contains a number of large scale deep seated normal and reverse faults. These large scale faults are mostly masked by the Tertiary sediments covering the basin and are not usually projected to the surface.

Smaller scale faulting does occur within the Tertiary sediments throughout the basin and one such fault occurs at the JAB Project with as much as 80 feet of displacement. No faulting has been observed at the Antelope property, but that is not to say that some shallow faults do not exist within proximity to the permit area.

2.6.2 Site Geology

The Eocene Battle Springs Formation is the host of the uranium deposits at the Antelope/JAB project area. It is approximately 6500' thick and is comprised of alluvial fan sediments primarily being fine to coarse grained arkosic sandstones, shales, siltstones and some conglomeratic units. The source of the sediments is believed to have been the Granite Mountains to the north.

The Battle Springs Formation is gradational and interfingers with the Wasatch Formation in the western Great Divide Basin southwest of the JAB area. The Wasatch Formation consists of lacustrine and paludal sediments of shales, siltstones, and sandstones. The Battle Springs Formation dips at a low angle 2-5 degrees toward the south in both areas.

2.6.2.1 JAB Area Site Geology

The JAB Permit Area is located near the north-central part of the Basin. Geological cross sections throughout the Permit Area are shown in Figures 2.6-3 through 2.6-6. Figure 2.6-7 contains copies of a typical geophysical log from the Permit Area.

The primary stratigraphic unit in the Permit Area is the Battle Spring Formation, which is the host to uranium mineralization. The Battle Springs Formation is overlain by erosional remnants of the Laney Member of the Green river Formation and the Bridger Formation in the far southwest portion of the Permit Area. The Battle Spring Formation in the Permit Area was deposited by a large alluvial fan system, consisting of deposits of very fine to very coarse grained arkosic sandstones with interbedded thin shales, mudstones, and localized conglomerates. The lithology of the Battle Springs Formation varies greatly, both laterally and vertically, which is typical of an alluvial fan deposit. For the purpose of this report, the discussion of the local Permit Area site geology will be limited to five units: The Underlying Sand Unit, the Lower Confining Unit, the Mineralized Unit, the Upper Confining Unit, and the Overlying Sand Unit. They will be discussed, starting with the Lower Sand Unit and progressing upward in the sequence.

The Underlying Sand Unit is a fine to coarse grained arkosic sandstone with thin, interbedded shale and mudstone layers. This unit ranges from two to thirty four feet thick in the Permit Area, with approximately fifteen feet in thickness the average. The Underlying Sand Unit is a typical alluvial fan channel deposit. The variations in the sand thickness are indicative of the channels of the alluvial fan moving laterally and vertically over time. The interbedded shales and mudstones represent lower energy flood plain and sheet flow deposits, more distal from the main channel deposits.

The Underlying Confining Unit is a carbonaceous shale. The carbonaceous shale is a member of the Wasatch Formation that is inter-tongued with the arkosic sands of the Battle Springs Formation. The carbonaceous shale is a lacustrine – plaudal deposit, indicating a period of non-erosion from the ancestral Granite Mountains to the north, and a concurrent period of regional subsidence, allowing the expansion of the ancient lakes to the south of the Permit Area. This theory is supported by the thickening of the carbonaceous shale unit to the south and southwest of the Permit Area. In the Permit Area the carbonaceous shale is between six and thirty feet thick, with ten to twelve feet thick the average. The carbonaceous shale may also be the primary reducing agent responsible for the formation of the roll-front deposit.

The Mineralized Zone is a typical alluvial fan channel deposit consisting of fine to very coarse grained arkosic sands. The Mineralized Zone ranges from twenty-two to fifty four feet thick in the Permit Area, with thirty five to forty feet thick the average. The sand units are fairly thick, with the lowest sand unit ranging from eight to 10 feet thick. The remaining sands are separated by thin interbedded clay and mudstone units.

The Upper Confining Unit is a thinly interbedded sandstone, shale, and mudstone unit. This unit represents the over bank and sheet flow deposits that are deposited away from the main channel deposition areas. It is part of the normal, fining upward sequence of an alluvial fan depositional sequence. The Overlying Confining Unit ranges from three to thirty three feet thick in the Permit Area, with ten to fifteen feet thick the average.

The Upper Sand Unit is a typical alluvial fan channel deposit consisting of fine to coarse grained arkosic sands. The sand units are separated by thin shale and mudstone layers. This unit ranges from four to twenty three feet thick in the permit area with ten feet being the average.

There is little geologic structure of the Permit Area. The regional dip in that part of the Great Divide Basin is approximately five degrees to the southwest. There is one fault that has been identified in the Permit Area. It is a normal, high angle, scissor fault, with displacement that ranges from zero to eighty feet in the Permit Area. The fault has a trend of east – west, with the displacement increasing to the east. This fault may be associated with the Chicken Springs Fault System located to the east of the Permit Area. The fault serves as the northern boundary of the mineralized zone, and may be a controlling factor in the formation of the roll front deposit, however, it is not clear at this time what role the fault had in the formation of the deposit.

The fault appears to act as a hydrologic barrier. Pump tests performed in 1981 and 2008 showed little to no water lever change across the fault and that the underlying sand north of the fault is not readily connected to the production sand. The extent and magnitude of hydraulic communication in this area will be further defined during wellfield specific testing and additional operational controls and monitoring in the underlying area may be proposed based on results of those tests.

Isopachs of the underlying sandstone, underlying shale, production sand, overlying confining unit and overlying sandstone are shown in Figures 2.6-8 through 2.6-12.

2.6.2.2 Antelope Property

The mineralized units at Antelope are also contained within the fluvial sandstones of the Battle Springs Formation. Some of the individual sand units had been assigned alphabetic designations by Teton Exploration on their Lee Claims during the 1970's and 1980's. The letter designations decrease with depth. These units, as well as shallower and deeper units have been re-designated with a numbering system from 0-250 by Uranium One. Many of these units have been lumped together as sand packages with underlying and overlying confining units.

The sand packages are designated the 40-10 Sand, 90-50 Sand, 140-100 Sand, 190-150 Sand, 240-200 Sand from lowermost unit to the uppermost respectively. The confining units are designated the 05 Shale, 45 Shale, 95 Shale, 145 Shale, 195 Shale and 245 Shale from lowermost unit to uppermost respectively. See Type Log in Figure 2.6-13.

The 05 Shale confining unit is composed of green-grey shale and some siltstone. It is 8-18' thick, averaging 14' and is presumed to be continuous throughout the Antelope property (Figure 2.6-14).

The 05 Shale is overlain by the 40-10 Sand. It is 257-314' thick, averaging 287' and consists of very fine to coarse grained arkosic sandstone with interbedded green-grey shale and siltstones (Figure 2.6-15). It often contains abundant pyrite.

The 45 Shale overlies the 40-10 Sand and is 5-25' thick, averaging 14' and appears to be continuous throughout the Antelope area. It is composed of green-grey shale and siltstone (Figure 2.6-16).

The 90-50 Sand overlies the 45 Shale and is 233-371' thick and averages 284'. It consists of arkosic, very fine to coarse grained sandstone with interbedded green-grey shales and siltstones, and can contain abundant pyrite. Figure 2.6-17 shows the isopach map of the 90-50 Sand.

Overlying the 90-50 Sand is the 95 Shale. It is 3-35' thick, averaging 14' and consists of green-grey shale and siltstone. It is laterally continuous throughout the permit area (Figure 2.6-18).

The 95 Shale is overlain by the 140-100 Sand. It is 219-405' thick, averaging 291' and consists of arkosic and quartzose very fine to very coarse grained sandstsone with interbedded shale and siltstones. The shale can range in color from green-grey to pale purple. Minor black chert and pebble conglomerate layers can also be present and the unit often contains some pyrite. (Figure 2.6-19).

The 145 Shale overlies the 140-100 Sand and is 4-30' thick, averaging 12' and consists of greenish-gray shale. It is laterally continuous throughout the permit area (Figure 2.6-20).

The 190-150 Sand overlies the 145 Shale and is 167-322' thick, aveaging 252'. It consists of arkosic very fine to very coarse grained sandstsone with interbedded shale and siltstones. It contains minor black chert, and minor to moderate pyrite. Along the northern edge of the permit area, the 190-150 Sand is exposed at the surface and the top portion has been partially eroded (Figure 2.6-21).

The 195 Shale overlies the 190-150 Sand and is 4-43' thick, averaging 14' and consists of greenish-gray shale. It is exposed on the surface and has been eroded in the northernmost edge of the permit area. Where it has not been removed by erosion it is laterally continuous (Figure2.6-22).

Overlying the 195 Shale is the 240-200 Sand. It is 205-298' thick, averaging 254' and consists of arkosic very fine to very coarse grained sandstsone with interbedded yellow, purple, and greenish-grey shale. Pebble conglomerate can be present at the base of the individual channel sand units. Minor chert and pyrite can also be observed. A complete section of the 240-200 Sand is present in the southern two-thirds of the permit area, but becomes an erosional surface in the northern third (Figure 2.6-23).

Overlying the 240-200 Sand is the 245 Shale. It is 5-25' thick, averaging 12' and consists of gray shale and siltstone. Color can vary from green-grey, pale purple and yellow. The 245 Shale is present in the southern portion of the permit area, but has been removed by erosion in the north (Figure 2.6-24).

Units above the 245 Shale are arkosic very fine to very coarse grained sandstones with interbedded shale and siltstones. These units are present in only the southern portion of the Antelope permit area as they have been eroded in the northern portion.

Figures 2.6-25 through 2.6-33 show cross sections through the Antelope Project area.

2.6.3 Ore Mineralogy and Geochemistry

Uranium mineralization within the Battle Springs formation generally occurs as roll front and tabular type deposits within the Great Divide Basin. Oxygenated groundwater carrying dissolved uranium migrates down dip through the sandstone units. It oxidizes the contained pyrite as well as alters the feldspar minerals to clay minerals, typically kaolinite, and changes the sandstone color from gray to a buff, pink, yellow or greenish gray. Uranium minerals are then precipitated out of solution as the groundwater encounters reducing conditions. Reducing conditions occur where the sediments contain organic matter, or through the migration of hydrocarbon bearing solutions.

Typical uranium minerals for these types of deposit include uraninite and coffinite and occur as sub-microscopic grains intergrown with pyrite, as coatings on individual sand grains and as interstitial pore fillings.

The mineralization at the JAB and Antelope area occurs from near surface to 1,200 feet deep. At JAB the primary deposit is from 150-310 feet deep and averages approximately 225 feet deep. The mineralization at JAB averages approximately 10 feet thick with an average grade of .065% U3O8 at a 0.10 GT cutoff.

The mineralization at the western portion of the Antelope property varies from 300-600 feet deep and averages 430 feet. Mineralization is primarily contained within the 240-200 Sand, 190-150 Sand and the 140-100 Sand units, although potential for deeper mineralization exists. The thickness of the mineralization averages 7.5 feet with an average grade of .089% U3O8.

The mineralization at the eastern portion of the Antelope property varies from 200-400 feet deep averaging 300 feet. It is primarily contained within the 290-150 Sand and 140-100 Sand units, again with deeper potential.

2.6.4 Drill Holes

The JAB property was extensively explored in the 1970's and 1980's with the principle exploratory work and drilling completed by Union Carbide Corporation Mining and Metals Corporation (UCC). UCC conducted extensive drilling on the lands currently held by Uranium One including the delineation of 3 mineralized areas with drilling on 50 foot centers and/or on 50 by 100 foot centers. The available historic data includes radiometric and chemical assay data from some 1,560 drill holes completed on the property. It is not known if these holes were plugged in accordance with Wyoming statutes in effect at the time.

Several other companies explored through drilling in the area as well. Wold Nuclear, Climax Uranium, Kerr-McGee Nuclear and possibly others. Climax Uranium drilled a number of holes in the area including 11 holes within the permit area. Apparently Wold Nuclear acquired the property from Climax, and had washed out some of their holes and re-logged them. Wold either washed out or drilled a total of 15 holes within the JAB permit area as well as additional holes outside the permit area. Teton Exploration drilled 7 holes on their DJ claims just north of the permit area and Kerr-McGee drilled at least one hole within the permit area. It is not known if these holes were plugged in accordance with Wyoming statutes in effect at the time.

At least 56 other holes were drilled in the southwest portion of the JAB permit area, as seen from field observation and Google Earth satellite photos, but the company or companies involved are unknown at this time. It is not known if these holes were plugged in accordance with Wyoming statutes in effect at the time.

Uranium One conducted verification drilling at JAB in 2007 totaling 264 drill holes, 1 core hole, and 2 monitor wells. The drilling was conducted under WDEQ-LQD Drilling Notification #353 and all drill holes were plugged in accordance with Wyoming Statue WS35-11-4-1 as documented.

The Antelope property was explored in the 1970's through early 1990's by several companies. These include Teton Exploration/NEDCO, Newpark Resources, Kerr-McGee, Uranerz, and Cameco Resources.

Teton Exploration drilled 1153 holes primarily in the southwest part of the permit area on their Lee Claim area. It is not known if these holes were plugged in accordance with Wyoming statutes in effect at the time.

Newpark Resouces drilled primarily in the northwest part of the permit area on their Junction orebody with minor drilling on their GO claims in the southwest part of the permit area. In total, 915 drill holes were completed by Newpark but it is not known if these holes were plugged in accordance with Wyoming statutes in effect at the time.

Kerr_McGee drilled 822 holes on their Ross-Rox claims in the central portion of the permit area and 1055 holes on their Osborne Draw project in the eastern part of the permit area. It is not known if these holes were plugged in accordance with Wyoming statutes in effect at the time.

Uranerz drilled 108 holes in section 16, T26N, R92W. One of these holes was used by them as a water supply well. It is not known if these holes were plugged in accordance with Wyoming statutes in effect at the time.

Cameco Resources drilled one monitor well in section 13, T26N, R93W, but it is not known if any additional holes were drilled in the area.

Uranium One conducted verification drilling in 2007 totaling 27 holes and 16 monitor wells. The drilling was conducted under WDEQ-LQD Drilling Notification # 353 and all drill holes were plugged in accordance with Wyoming Statue WS35-11-4-1 as documented.

Table 2.6-1 lists all drill holes known to Uranium One in the project area. Figure 2.6-34 is a map of the JAB property and Figure 2.6-35 is a map of the Antelope property showing these known drill hole locations.

2.6.5 Soils

The Energy Metals Corporation, Antelope and Jab Uranium Project, was evaluated by BKS Environmental Associates, Inc. (BKS), Gillette, Wyoming in 2007. All the tables discussed in Sction 2.6.5 are presented in Addendum 2.6-B at the end of Section 2.6.

A total of 14,647.21 acres were included in the final soil mapping of the Antelope and Jab License Area. However, soils were only sampled within the 2,482.93 acres of the Antelope and Jab License Area which is based upon the proposed disturbed area as defined by initial estimates of the ore body, facilities and major roads. Soils mapped by BKS Environmental Associates, Inc. are illustrated on Addendum 2.6-G.

Stripping depths for the Antelope and Jab License Area were evaluated during mapping and sampling. Soil depths within a given mapping unit will vary based on any combination of the five primary soil forming factors, i.e., climate including effective precipitation, organisms, relief or topography, parent material, and time. Subtle differences in any one of the previously mentioned factors will impact development between series and within series designation but may not be as noticeable as when topography is a major factor. The proposed topsoil salvage depths for the Antelope and Jab License Area are based on laboratory data of the samples found within the borders of the unit, as well as field observations and knowledge of the soils in Sweetwater County, Wyoming.

Soils in the Antelope and Jab License Area are typical for semi-arid grasslands and shrublands in the Western United States. Parent material included colluvium, residuum, and alluvium. Most soils are classified taxonomically as Typic Torriorthents, Ustic Haplargids, Ustic Torriorthents, Ustic Calciargids, and Aridic Ustifluvents.

All soils have some suitable topsoil. The primary limiting chemical factor within the Antelope and Jab License Area is likely electrical conductivity (EC) (based upon lab analysis) and calcium carbonate in calcareous soils (based upon field observations). The majority of soils, however, were noncalcareous. The primary limiting physical factors are texture and coarse fragments (based upon lab analysis).

The mapping and reporting for the Antelope and Jab License Area incorporated map unit information from the previous NRCS soil surveys. Soil sampling needs were determined from WDEQ Guideline 1 (August 1994 Revision).

Refer to Addendum 2.6-C for the Soil Mapping Unit Descriptions. Refer to Addendum 2.6-D for the Soil Series Descriptions. Refer to Addendum 2.6-E for the Original Laboratory Data Sheets. Refer to Addendum 2.6-F for the Prime Farmland Designation and Addendum 2.6-G for soils maps.

2.6.5.1 Methodology

Review of Existing Literature

The nearest NRCS Order 3 mapped soils to the project area are Soil Survey Eden Valley Area, Sweetwater and Sublette Counties, October 1990 and Soil Survey of Fremont County, East Part and Dubois Area, Wyoming, July 1993. In addition to these NRCS surveys, historical soil mapping was available for the Jab License Area. Baseline Soil Assessment of the A-C Project Area was mapped in March 1999 in anticipation of an in-situ operation. Generalized NRCS soil series information is available on the internet at www.nrcs.usda.gov.

Project Participants

BKS performed the 2007 soil survey field work and compiled the resulting report. All soil analysis was handled by Energy Laboratories. All samples were taken to Energy Laboratories in Gillette, Wyoming. Regarding the Antelope Area, the samples were shipped to Casper, Wyoming and analyzed. The Jab Area samples were analyzed in Gillette, Wyoming; however, metal analysis was completed in Billings Montana and Total Organic Carbon analysis was completed in Casper, Wyoming.

Soil Survey

Construction of the Antelope and Jab License Area soil map was completed according to techniques and procedures of the National Cooperative Soil Survey. Guideline No. 1 (original November, 1984 and updated August, 1994) of the Wyoming Department of Environmental Quality, Land Quality Division (WDEQ-LQD) was followed during all phases of the work.

A total of 14,647.21 acres were included in the final soil mapping of the Antelope and Jab License Area.

Refer to Tables 2.6-2 and 2.6-3 for soil mapping unit designations and associated acreage within the Antelope and Jab License Area. Tables 2.6.1.1 and 2.6.1.2 also describes the soil map units in terms of actual map designations and slope percentages.

Field Sampling

Soil series were sampled to reflect recommended sample numbers in WDEQ Guideline 1 (August 1994 Revision) based on mapping acreage.

Series were sampled and described by coring with a mechanical auger, i.e., truck-mounted Giddings. The physical and chemical nature of each horizon within the sampled profile was described and recorded in the field. Although numerous holes were augured for series and map unit verification, only the field locations of profiles selected for laboratory analysis are plotted on the soils map included with this report. Sampled soil material was placed in clean, labeled, polyethylene plastic bags and kept cool to limit chemical changes. Samples were kept out of direct sunlight and transported to Energy Labs for analysis. A total of 26 sites on the Antelope area were sampled for analysis; all had corresponding soil profile descriptions written. A total of 34 sites on the Jab area were sampled for analysis; all had corresponding soil profile descriptions written. Refer to Tables 2.6-4 and 2.6-5 for the Antelope and Jab Soils Series Sample Summaries and Tables 2.6-6 and 2.6-7 for the Antelope and Jab Soil Sample Locations.

Laboratory Analysis

Samples were individually placed into lined aluminum pans to air dry. Coarse fragments were measured with a 10 mesh screen prior to grinding; the entire sample was then hand ground to pass 10 mesh. An approximate 20 ounce subsample was obtained through splitting with a series of riffle splitters and subsequently analyzed. A second subsample was maintained in storage at Energy Laboratories. Approximately 10 percent of the samples are run for duplicate analysis. Actual laboratory analysis follows the methodology outlined in WDEQ-LQD Guideline 1 (August 1994 Revision). In general, samples were analyzed within 45 days of receipt of the samples at the laboratory. All analytical data is presented in Addendum 2.6-E, Original Laboratory Data Sheets.

2.6.5.2 Results and Discussion

Soil Survey - General

General topography of the License Area includes rolling hills and ridges, as well as drainages. The soils occurring on the Antelope and Jab License Area were generally a sandy loam texture throughout with patches of loam and gravelly textures. The project area contained deep soils on lower toe slopes and flat areas near drainages with shallow and moderately deep soils located on upland ridges and shoulder slopes.

Soil Mapping Unit Interpretation

The primary purpose of the 2007 fieldwork was to characterize the soils within the Antelope and Jab License Area in terms of topsoil salvage depths and related physical and chemical properties. The total number of samples per series was established in line with WDEQ Guideline 1 (August 1994 Revision) recommendations based on estimated acreage of soil series known within the Antelope and Jab License Area. Refer to Addendum 2.6-C and 2.6-D for soil mapping unit descriptions and soil series descriptions, respectively.

Analytical Results

Analyzed parameters, as defined in WDEQ Guideline 1 (August 1994 Revision), are in Addendum 2.6-E, Original Laboratory Data Sheets. Laboratory soil texture analysis did not include percent fine sands. Field observations of fine sands within individual pedestals as well as sample site topographic position were used in conjunction with laboratory analytical results to determine series designation. Where applicable, field observation of fine sands is also included in the textures found in the soil series descriptions in Addendum 2.6-D. In several sampling locations, noncalcareous variants were found. This is unusual as these series were typically calcareous in many or all horizons. Noncalcareous variants were found in the following soil series: Blazon, Bluerim, Carmody, Cragoson, Cushool, Lechman, and Rock River.

Topsoil Volume Calculations

Based on the 2007 fieldwork with associated field observations and subsequent chemical analysis, recommended topsoil average salvage depths over the Antelope area were determined to be 1.07 feet. The recommended topsoil average salvage depths over the Jab area were determined to be 1.05 feet. Refer to Tables 2.6-10 and 2.6-11, Approximate Soil Salvage Depths.

In accordance with WDEQ Guideline 4, suitable topsoil shall be salvaged from permanent or long-term Antelope and Jab facilities areas. All long-term topsoil stockpiles will be constructed and maintained in accordance with WDEQ-LQD Rules and Regulations, Chapter 2.

Topsoil is not stripped from wellfield areas, and no other large structures such as tailings disposal ponds, evaporation ponds, or overburden piles will be constructed at the site that would require salvage of topsoil.

Soil Erosion Properties and Impacts

Based on the soil mapping unit descriptions, the hazard for wind and water erosion within the Antelope and Jab License Area varies from slight to severe. The potential for wind and water erosion is mainly a factor of surface characteristics of the soil, including texture and organic matter content. Given the sandy loam, loam, and gravelly texture of the surface horizons throughout the majority of the Antelope and Jab License Area, the soils are more susceptible to erosion from wind than water. See Tables 2.6-12 and 2.6-13 for a summary of wind and water erosion hazards within the Antelope and Jab License Area.

The Antelope and Jab License Area is underlain by soils with a slight potential for water erosion and a severe potential for wind erosion. All topsoil will be stripped, stockpiled and maintained in accordance with WDEQ-LQD rules and regulations, the surface will be graded, and stormwater will be routed. These measures will help reduce the effect of construction on soil erosion.

The soils underlying the proposed wellfields are at a moderate to severe risk of erosion from both wind and water. Though no topsoil will be stripped from the wellfields, construction may result in an increase in the erosion hazard from both wind and water due to the removal of vegetation and the physical disturbance from heavy equipment. All areas are reseeded as soon as possible to keep the duration of bare soil to a minimum. Reseeding will help mitigate the increased erosion potential from the construction disturbance.

Prime Farmland Assessment

No prime farmland was indicated within the Antelope and Jab License Area based on a reconnaissance survey by the NRCS in Riverton, Wyoming. Refer to Addendum 2.6-F, Prime Farmland Designation, for the NRCS letter of negative determination.

2.6.6 Seismology

The discussion of seismology within the Permit Area and surrounding areas includes: an analysis of historic seismicity; a deterministic analysis of nearby faults; an analysis of the maximum credible "floating earthquake;" and a discussion of the existing short- and long-term probabilistic seismic hazard analysis. The materials presented here are mainly based on the seismologic characterization of Sweetwater, Carbon, Fremont, and Natrona Counties by James C. Case and others from the Wyoming State Geological Survey (Case, et. al., 2002a, 2002b, 2002c and 2003).

2.6.6.1 Historic Seismicity

The Permit Area is located in the north-eastern portion of the Great Divide Basin, in south-central Wyoming. Historically, south-central Wyoming has had a low to moderate level of seismicity compared to the rest of the State of Wyoming. As shown in Figure 2.6-36, most of the historical earthquakes occurred in the west-northwest portion of Wyoming. Significant historical earthquakes adjacent to the Permit Area are described below, and are organized by areas in which they occurred.

Town of Bairoil Area

Bairoil is located about 15 miles northeast of the Permit Area. Historically, there have been only a few earthquakes that have occurred within 20 miles of Bairoil. On August 11, 1916, a non-damaging intensity III earthquake occurred approximately 17 miles northwest of Bairoil. On June 1, 1993, a non-damaging magnitude 3.8, intensity III earthquake occurred four miles north of Bairoil, and was felt by some residents. On December 10, 1996, a non-damaging magnitude 2.6 earthquake occurred approximately ten miles northwest of Bairoil. A few residents also felt that event.

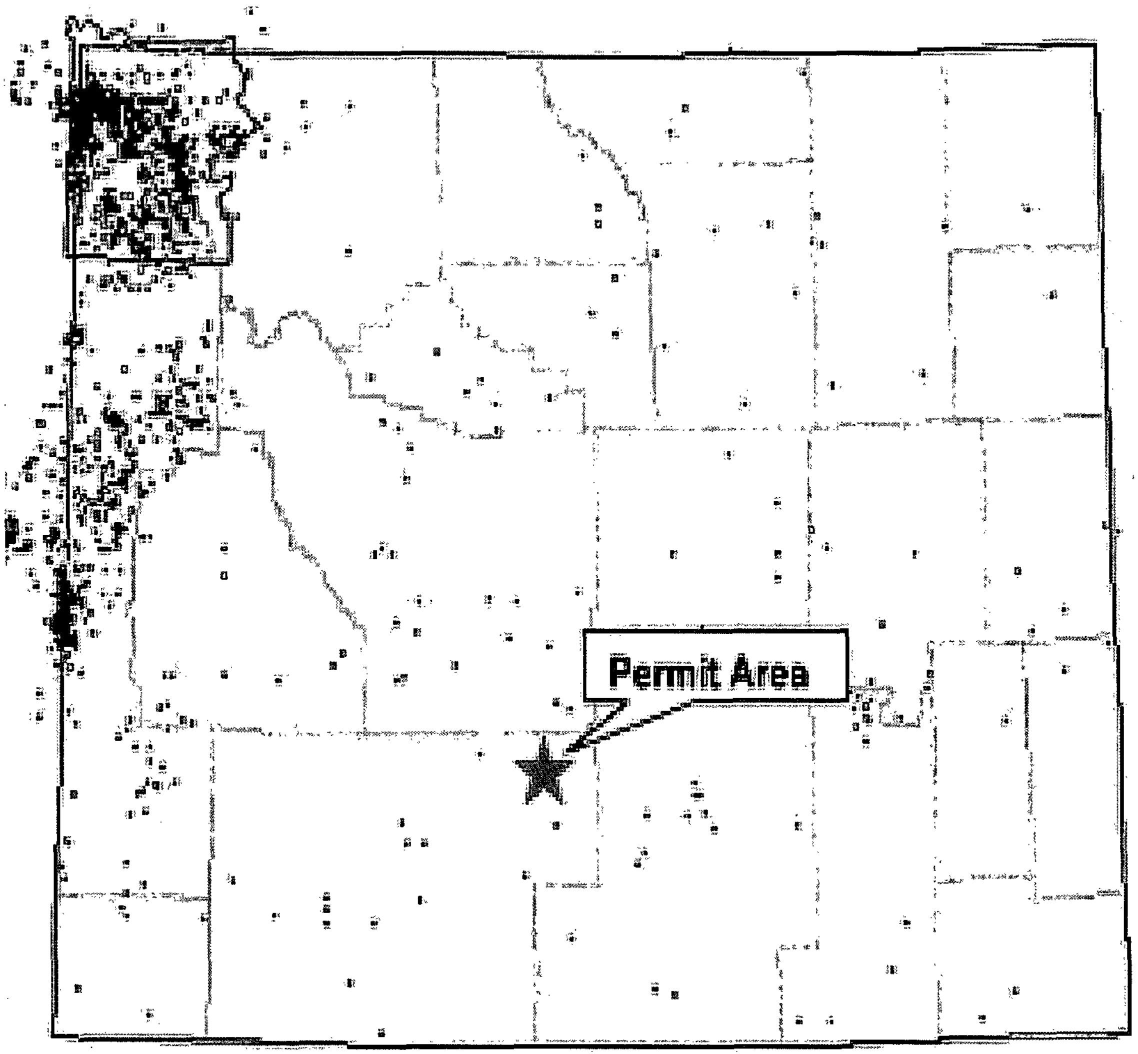
Two recent earthquakes were recorded near Bairoil in 2000. On May 26, 2000, a magnitude 4.0 earthquake occurred, followed by another (magnitude 2.8) four days later, on May 30, 2000. Both earthquakes were located about 3.5 miles southwest of Bairoil. Most residents in Bairoil felt the first earthquake. No significant damage was associated with either seismic event (Case, et.al, 2002a).

Town of Jeffrey City Area

Jeffrey City is located approximately 20 miles north of the Permit Area. There have been few recorded earthquakes in the Jeffrey City area. On August 11, 1916 an intensity III earthquake, centered approximately 6 miles south of Jeffrey City was recorded. No damage was reported from this event (Case, et. al, 2002b).

Figure 2.6-36 Historical Seismicity Map

Historical seismic activities in the State of Wyoming.*



* Red dots are locations of epicenters for those magnitude > 2.5 or intensity > 11 earthquakes recorded from1871 to present. (Wyoming Water Resource Data System Web Site, http://www.wrds.uwyo.edu/, Online Data, Cooperative Projects, Wyoming Earthquake Database, April 2008)

On April 22, 1973 a magnitude 4.8, intensity V, earthquake centered approximately 12 miles north of Jeffrey City was recorded. This event rattled dishes and disturbed pictures hanging on walls in Jeffrey City (Case, et. al, 2002b). On March 25, 1975 a magnitude 4.8, intensity II earthquake was detected approximately 18 miles northwest of Jeffrey City. A mobile home, 35 miles southeast of Riverton was reported to have been moved one inch off of its foundation by the event (Case, et. al, 2002b). On December 19, 1975 a magnitude 3.5 earthquake, located approximately 25 miles northeast of Jeffrey City was recorded. There was no report of damage from this event. On August 19, 2000, a 3.2 magnitude earthquake was reported approximately 25 miles west-northwest of Jeffrey City (Case, et. al, 2002b).

City of Rawlins Area

Rawlins is approximately 38 miles southeast of the Permit Area. The first recorded earthquake that was felt and reported immediately southwest of Rawlins occurred on March 28, 1896. The intensity IV earthquake shook for about two seconds. On March 10, 1917, an earthquake (intensity IV) was recorded approximately one mile northeast of Rawlins. The earthquake was felt as a distinct shock that caused wooden buildings to noticeably vibrate. Stone buildings were not affected by the event (Case, et. al, 2002a).

On September 10, 1964, a magnitude 4.1 earthquake occurred approximately thirty miles west of Rawlins. One Rawlins resident reported that the earthquake caused a crack in the basement of his home in Happy Hollow. No other damage was reported (Case, et. al, 2002a).

Small earthquakes were detected, on April 13, 1973, May 30, 1973, and June 1, 1973, approximately six miles west of Hanna. No one reported feeling these events. On July 11, 1975, Rawlins residents felt an intensity II earthquake event that was centered near Seminoe Reservoir. On January 27, 1976, an earthquake, magnitude 2.3, intensity V, occurred approximately 12 miles north of Rawlins. Several people reported that they were thrown out of bed. (Case, et. al, 2002a). On March 3, 1977, an intensity V earthquake was reported approximately 18.5 miles west-northwest of Encampment. Doors and dishes were rattled in southern Carbon County homes, but no significant damage was reported (Case, et. al, 2002a).

On April 13, 1991 and April 19, 1991, magnitude 3.2 and magnitude 2.9 earthquakes, respectively, occurred near the center of the Seminoe Reservoir. A magnitude 3.1 earthquake occurred on December 18, 1991, approximately 15 miles northeast of Sinclair. There was no damage reported from these Seminoe Reservoir area earthquakes. On August 6, 1998, a magnitude 3.6 earthquake occurred approximately 13 miles north of Rawlins. Residents in Rawlins reported hearing a sound and then feeling a jolt. On April, 1999, a magnitude 4.3 earthquake occurred approximately 29 miles north-

northwest of Baggs. It was felt in Rawlins and residents reported that pictures fell off the walls (Case, et. al, 2002a).

City of Rock Springs Area

Rock Springs is located approximately 80 air miles southwest of the Permit Area. The first recorded earthquake in Sweetwater County occurred on April 28, 1888. This intensity IV earthquake, which originated near Rock Springs, did not cause any appreciable damage. On July 25, 1910 an intensity V earthquake occurred at the same time that the Union Pacific Number One Mine in Rock Springs partially collapsed. On July 28, 1930, an intensity IV earthquake, with an epicenter near Rock Springs, was felt in Rock Springs and Reliance (Case, et. al, 2002c). The earthquake awakened many residents; and some merchandise fell off of store shelves.

On March 21, 1942, a non-damaging, intensity III earthquake was felt in Rock Springs area. This event was followed by an intensity IV earthquake on September 14 1946. On October 25, 1947, a small earthquake with no assigned intensity or magnitude occurred southeast of Rock Springs. Two intensity IV earthquakes occurred in the Rock Springs area on September 24, 1948. These events rattled dishes in Rock Springs area.

A magnitude 3.9 event was recorded on January 5, 1964, approximately 23 miles south of Rock Springs. The University of Utah Seismograph Stations detected a non-damaging, magnitude 2.4 earthquake on March 19, 1968. This event was centered approximately 17 miles southeast of Rock Springs. A magnitude 3.2 event occurred on May 29, 1975, approximately 13 miles northeast of Superior. A week later, on June 6, 1975, a magnitude 3.7 earthquake was recorded in the same area. No damage was associated with any of the 1975 events.

The University of Utah Seismograph Stations recorded a non-damaging, magnitude 2.7 earthquake on June 5, 1986. This event was located approximately 14 miles southwest of Green River, Wyoming.

On February 1, 1992, the University of Utah Seismograph Stations recorded a non-damaging, magnitude 2.3 earthquake approximately seven miles north of Rock Springs.

City of Lander Area

Lander is located approximately 70 miles northwest of the Permit Area. The first reported earthquake occurred on January 22, 1889, and had an intensity of III to IV. This was followed by an intensity IV event on November 21, 1895, during which houses were jarred and dishes rattled. On November 23, 1934, an intensity V earthquake was centered approximately 20 miles northwest of Lander. For a radius of ten miles around Lander, residents reported that dishes were thrown from cupboards, and that pictures fell down from the walls. Cracks were found in buildings along two business blocks and the brick chimney of the Fremont County Courthouse was separated from the building two inches. The earthquake was felt at Rock Springs and Green River, Wyoming (Case, et. al, 2002b).

There were a series of earthquakes in the Lander area in the 1950s that caused little damage. On August 17, 1950, there was an intensity IV earthquake that caused loose objects to rattle and buildings to creak. On January 12, 1954, there was an intensity II event and on December 13, 1955, there was an intensity IV event near Lander, with no damage reported from either event.

On June 14, 1973, a small earthquake was reported about eight miles east-northeast of Lander. The earthquake has been recently interpreted as a probable explosion. On January 31, 1992, a non-damaging magnitude 2.8 earthquake occurred approximately 20 miles northwest of Lander. This event was followed, on October 10, 1992, by a magnitude 4.0, intensity III earthquake centered approximately 22 miles east Lander.

City of Casper Area

Casper is located about 90 miles northeast of the Permit Area. Two of the earliest recorded earthquakes in Wyoming occurred near Casper. The first was on June 25, 1894, and had an estimated intensity of V. In residences on Casper Mountain, dishes rattled and fell on the floor and people were thrown from their beds. Water in the Platte River changed from fairly clear to reddish, and became thick with mud, due to the river banks slumping into the river during the earthquake. On November 14, 1897, an even larger event was felt. This intensity VI to VII earthquake, one of the largest recorded in central and eastern Wyoming, caused considerable damage to several buildings. As a result of the earthquake, a portion of the Grand Central Hotel was cracked from the first to the third story, and some of the ceilings were also severely damaged (Case, et. al, 2003).

On October 25, 1922, an intensity IV earthquake was reported in the Casper area. Dishes were rattled and hanging pictures were tilted near Salt Creek. No significant damage was reported in Casper (Case, et. al, 2003). On December 11, 1942, an intensity IV earthquake was recorded north of Casper. Although no damage was reported, the event was felt in Casper, Salt Creek, and Glenrock (Case, et. al, 2003). On August 2, 1948, another intensity IV earthquake was reported in the Casper area, again with no damage reported (Case, et. al, 2003). On January 24, 1954, an intensity IV earthquake near Alcova did not result in any reported damage (Case, et. al, 2003). On August 19, 1959, an intensity IV earthquake was felt in Casper. Most recently, on October 19, 1996, a magnitude 4.2 earthquake was recorded approximately 15 miles north-northeast of Casper. No damage was reported from this event (Case, et. al, 2003).

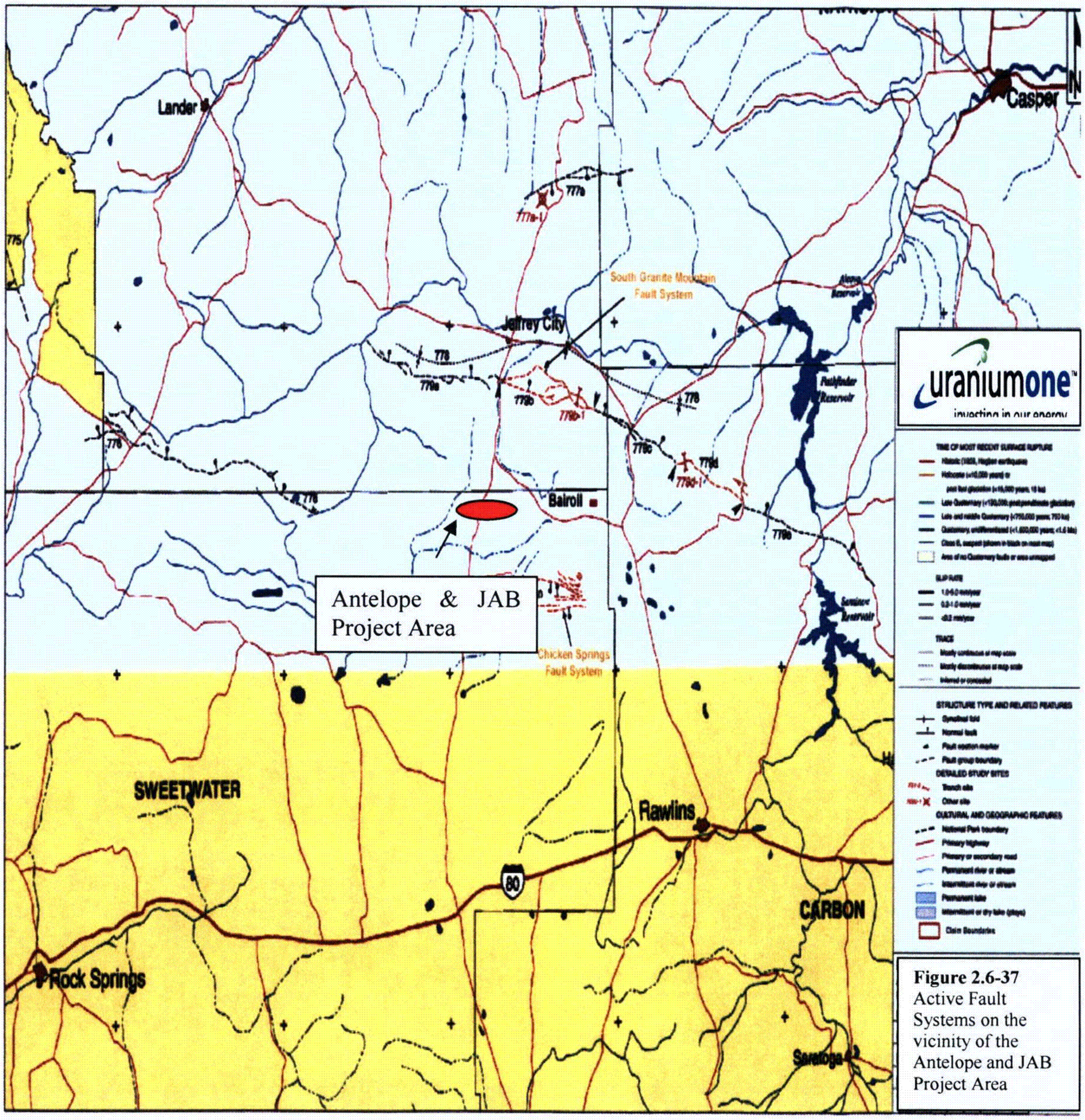
2.6.6.2 Deterministic Analysis of Active Fault Systems

There are two active fault systems in the vicinity of the Permit Area, the Chicken Springs Fault System and the South Granite Mountain Fault System (Figure 2.6-37).

The Chicken Springs Fault System, located six miles east of the Permit Area, is composed of a series of east-west trending segments. In 1996, the Wyoming State Geological Survey investigated this fault system, and determined that the most recent activity on the system appears to be Holocene in age. Reconnaissance-level studies indicated that the fault system is capable of generating a magnitude 6.5 earthquake (Case, et. al., 2002a). A magnitude 6.5 earthquake on the Chicken Springs Fault System would generate peak horizontal accelerations of approximately 4.8%g at Rawlins (Case, et. al., 2002a). This acceleration would be roughly equivalent to an intensity V earthquake, which may cause some light damage. Bairoil, however, would be subjected to a peak horizontal acceleration of approximately 23%g, or an intensity VII earthquake (Case, et. al., 2002c). Intensity VII events have the potential to cause moderate damage.

The South Granite Mountain Fault System is located about 14 miles northeast of the Permit Area. This fault system is composed of several northwest-southeast trending normal and thrust faults in southeastern Fremont County and northwestern Carbon County. The active segments of the system have been assigned a maximum magnitude of 6.75, which could generate peak horizontal accelerations of approximately 34%g at Jeffrey City (Case, et. al, 2002b), 20%g at Bairoil, and 6.1%g at Rawlins (Case, et. al., 2002c). These accelerations would be roughly equivalent to an intensity VIII earthquake at Jeffrey City, an intensity VII earthquake at the Bairoil, and an intensity V earthquake at Rawlins. Jeffrey City could sustain moderate to heavy damage, Bairoil could sustain moderate damage, whereas minor or no damage could occur at Rawlins.

Figure 2.6-37 Site Fault Systems



2.6.6.3 Floating or Random Earthquake Sources

Many federal regulations require an analysis of the earthquake potential in areas where active faults are not exposed, and where earthquakes are tied to buried faults with no surface expression. Regions with a uniform potential for the occurrence of such earthquakes are called tectonic provinces. Within a tectonic province, earthquakes associated with buried faults are assumed to occur randomly, and as a result can theoretically occur anywhere within that area of uniform earthquake potential. In reality, that random distribution may not be the case, as all earthquakes are associated with specific faults. If all buried faults have not been identified, however, the distribution has to be considered random. "Floating earthquakes" are earthquakes that are considered to occur randomly in a tectonic province.

It is difficult to accurately define tectonic provinces when there is a limited historic earthquake record. When there are no nearby seismic stations that can detect small-magnitude earthquakes, which occur more frequently than larger events, the problem is compounded. Under these conditions, it is common to delineate larger, rather than smaller, tectonic provinces.

The USGS identified tectonic provinces in a report titled "Probabilistic Estimates of Maximum Acceleration and Velocity in Rock in the Contiguous United States"(Case, et. al, 2002c)., In that report, Sweetwater County was classified as being in a tectonic province with a "floating earthquake" maximum magnitude of 6.1. Geomatrix (Case, et. al, 2002c) suggested using a more extensive regional tectonic province, called the "Wyoming Foreland Structural Province," which is approximately defined by the Idaho-Wyoming Thrust Belt on the west, 104 degrees West longitude on the east, 40 degrees North latitude on the south, and 45 degrees North latitude on the north. Geomatrix (Case, et. al, 2002c) estimated that the largest "floating earthquake" in the "Wyoming Foreland Structural Province" would have a magnitude in the 6.0 to 6.5 range, with an average value of magnitude 6.25.

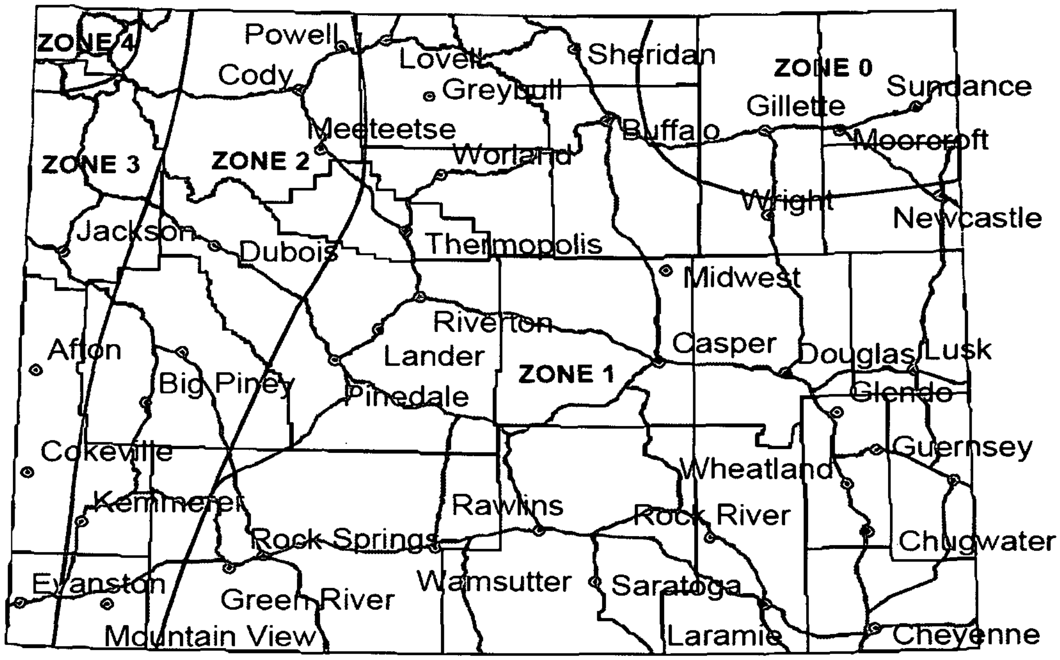
Federal or state regulations usually specify if a "floating earthquake" or tectonic province analysis is required for a facility. Usually, those regulations also specify at what distance a floating earthquake is to be placed from a facility. For example, for uranium mill tailings sites, the Nuclear Regulatory Commission requires that a floating earthquake be placed 15 kilometers from the site. That earthquake is then used to determine what horizontal accelerations may occur at the site. A magnitude 6.25 "floating" earthquake, placed 15 kilometers from any structure in Sweetwater, Fremont, or Carbon County, would generate horizontal accelerations of approximately 15%g at the site. Critical facilities, such as dams, usually require a more detailed probabilistic analysis of random earthquakes. Based upon probabilistic analyses of random earthquakes in an area distant from exposed active faults (Case, et. al, 2002b), however, placing a magnitude 6.25 earthquake at 15 kilometers from a site will provide a fairly conservative estimate of design ground accelerations in the Permit Area.

2.6.6.4 Probabilistic Seismic Hazard Analyses

The U.S. Geological Survey (USGS) publishes probabilistic acceleration maps for 500-, 1000- and 2,500-year time frames. The maps show what accelerations may be met or exceeded in those time frames by expressing the probability that the accelerations will be met or exceeded in a shorter time frame. For example, a 10% probability that acceleration may be met or exceeded in 50 years is roughly equivalent to a 100% probability of exceedance in 500 years.

The 500-year map provides accelerations that are comparable to those derived from the UBC and from the deterministic analysis on the Green Mountain Segment of the South Granite Mountain Fault System. It was often used for planning purposes for average structures. Based on the 500-year map (ten percent probability of exceedance in 50 years), the estimated peak horizontal acceleration in the Permit Area is approximately 6.5%g, which is comparable to the acceleration expected in Seismic Zone 1 of the UBC (Figure 2.6-38). The estimated acceleration in the Permit Area is 20%g on the 2,500 year map.

Figure 2.6-38 Wyoming UBC Seismic Zones (Case, et. al, 2002a)



The USGS has recently generated new probabilistic acceleration maps for Wyoming (Case, 2000). Copies of the 500-year (10% probability of exceedance in 50 years), 1000-year (5% probability of exceedance in 50 years), and 2,500-year (2% probability of exceedance in 50 years) maps are attached. Until recently, the 500-year map was often used for planning purposes for average structures, and was the basis of the most current Uniform Building Code. Recently, the UBC has been replaced by the International Building Code (IBC), which is based upon probabilistic analyses. The new International Building Code, however, uses a 2,500-year map as the basis for building design. The maps reflect current perceptions on seismicity in Wyoming. In many areas of Wyoming, ground accelerations shown on the USGS maps can be increased due to local soil conditions. For example, if fairly soft, saturated sediments are present at the surface, and seismic waves are passed through them, surface ground accelerations will usually be greater than would be experienced if only bedrock was present. In this case, the ground accelerations shown on the USGS maps would underestimate the local hazard, as they are based upon accelerations that would be expected if firm soil or rock were present at the surface. Intensity values and descriptions can be found in Table 2.6-14.

Based upon the 500-year map (10% probability of exceedance in 50 years) (Figure 2.6-39), the estimated peak horizontal acceleration in the Permit Area would be 20%g which is comparable to an intensity VII earthquake (18%g – 34%g). Intensity VII earthquakes can result in slight to moderate damage in well-built ordinary structures and considerable damage in poorly built or badly designed structures, such as un-reinforced masonry. Chimneys may be broken during an intensity VII event.

Based upon the 1000-year map (5% probability of exceedance in 50 years) (Figure 2.6-40), the estimated peak horizontal acceleration in the Permit Area would be 10%g. This acceleration is comparable to intensity VI earthquakes (9.2%g – 18%g). Intensity VI earthquakes can result in fallen plaster and damaged chimneys.

Based upon the 2500-year map (2% probability of exceedance in 50 years) (Figure 2.6-41), the estimated peak horizontal acceleration in the Permit Area would be 6%g, which is comparable to an intensity V earthquake (3.9%g – 9.2%g). Intensity V earthquakes can result in cracked plaster and broken dishes.

As the historic record is limited, it is nearly impossible to determine when a 2,500-year event last occurred in the Permit Area. Because of the uncertainty involved, and based upon the fact that the new International Building Code utilizes 2,500-year events for building design, it is suggested that the 2,500-year probabilistic maps be used for the Permit Area analyses, unless the deterministic analysis on faults exceed the probabilistic analyses. This conservative approach is in the interest of public safety.

Table 2.6-14: Modified Mercalli Intensity and Peak Ground Acceleration

Modified Mercalli Intensity	Acceleration (%g) (PGA)	Perceived Shaking	Potential Damage
I	<0.17	Not felt	None
II	0.17 – 1.4	Weak	None
III	0.17 – 1.4	Weak	None
IV	1.4 – 3.9	Light	None
V	3.9 – 9.2	Moderate	Very Light
VI	9.2 – 18	Strong	Light
VII	18 – 34	Very Strong	Moderate
VIII	34 – 65	Severe	Moderate to Heavy
IX	65 – 124	Violent	Heavy
X	>124	Extreme	Very Heavy
XI	>124	Extreme	Very Heavy
XII	>124	Extreme	Very Heavy

Figure 2.6-39. 500-year probabilistic acceleration map, 10% probability of exceedance in 50 years (Wyoming State Geological Survey, 2002).

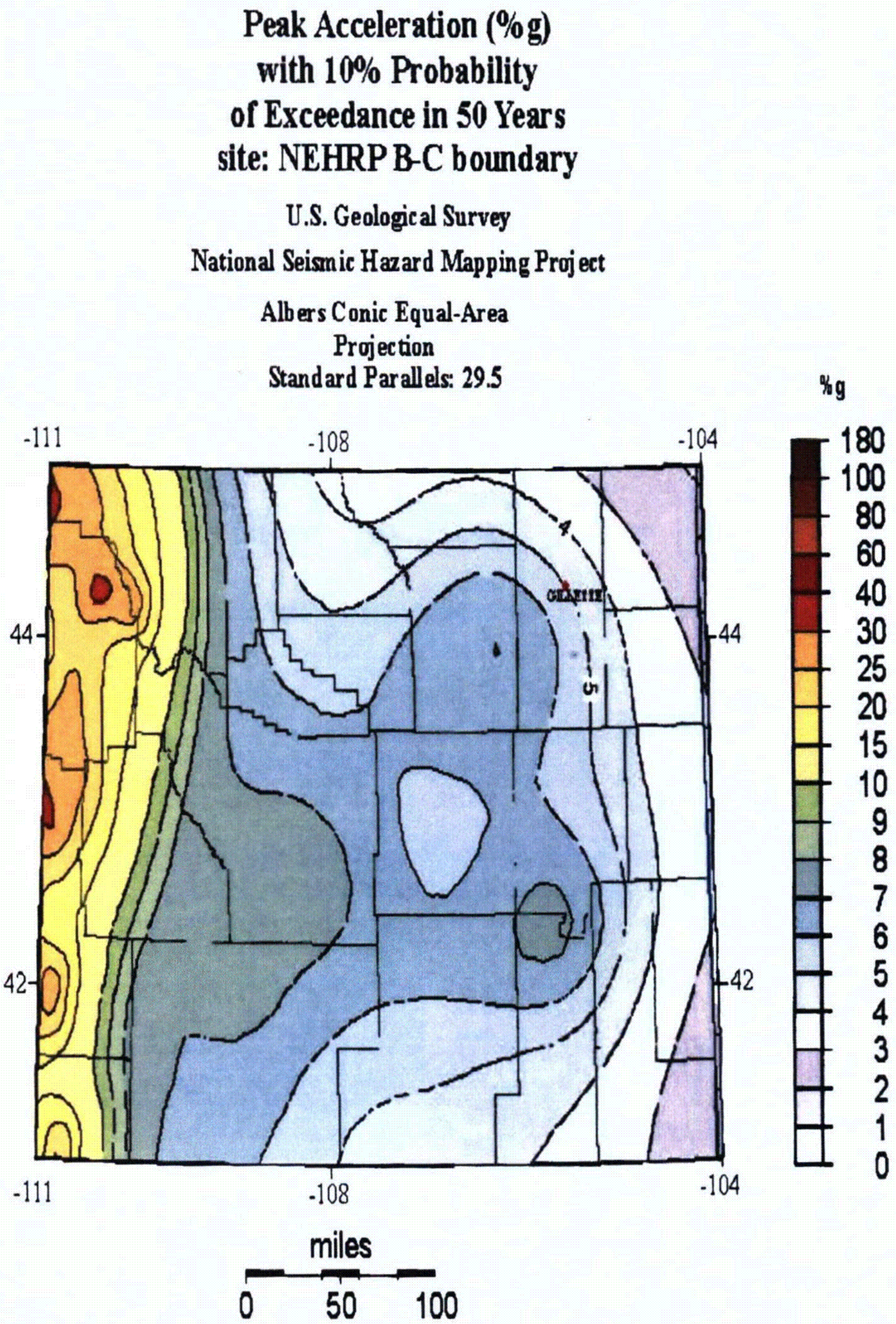


Figure 2.6-40. 1000-year probabilistic acceleration map, 5% probability of exceedance in 50 years (Wyoming State Geological Survey, 2002).

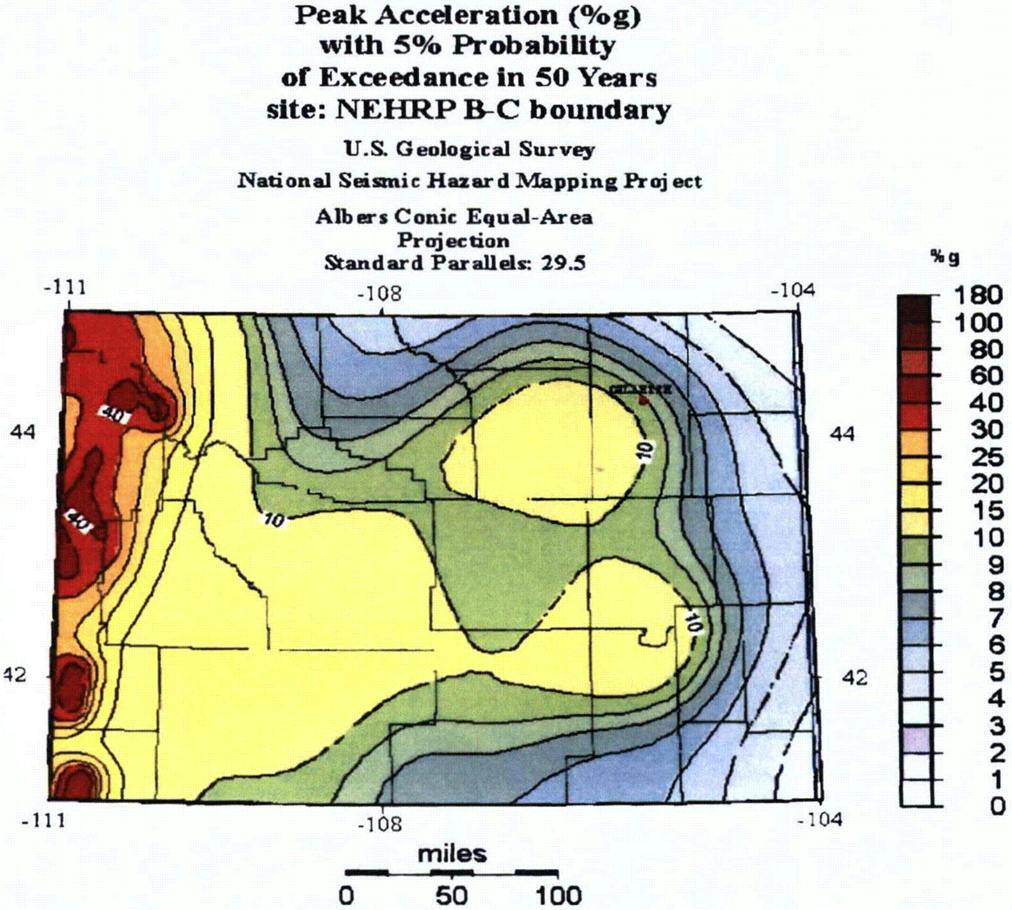
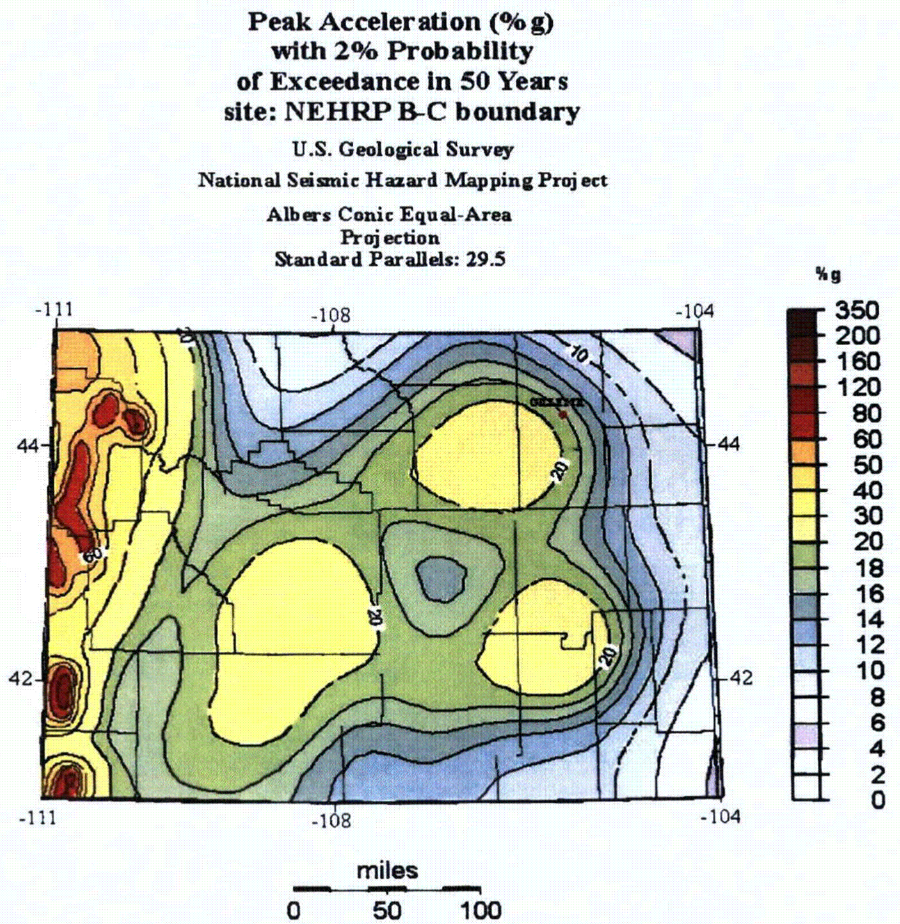


Figure 2.6.-41. 2500-year probabilistic acceleration map, 2% probability of exceedance in 50 years (Wyoming State Geological Survey, 2002).



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2.6.6.5 References

Case, James C, and Toner, Rachel N., and Kirkwood, Robert, *Basic Seismological Characterization for Fremont County, Wyoming,* (Wyoming State Geological Survey, September 2002)

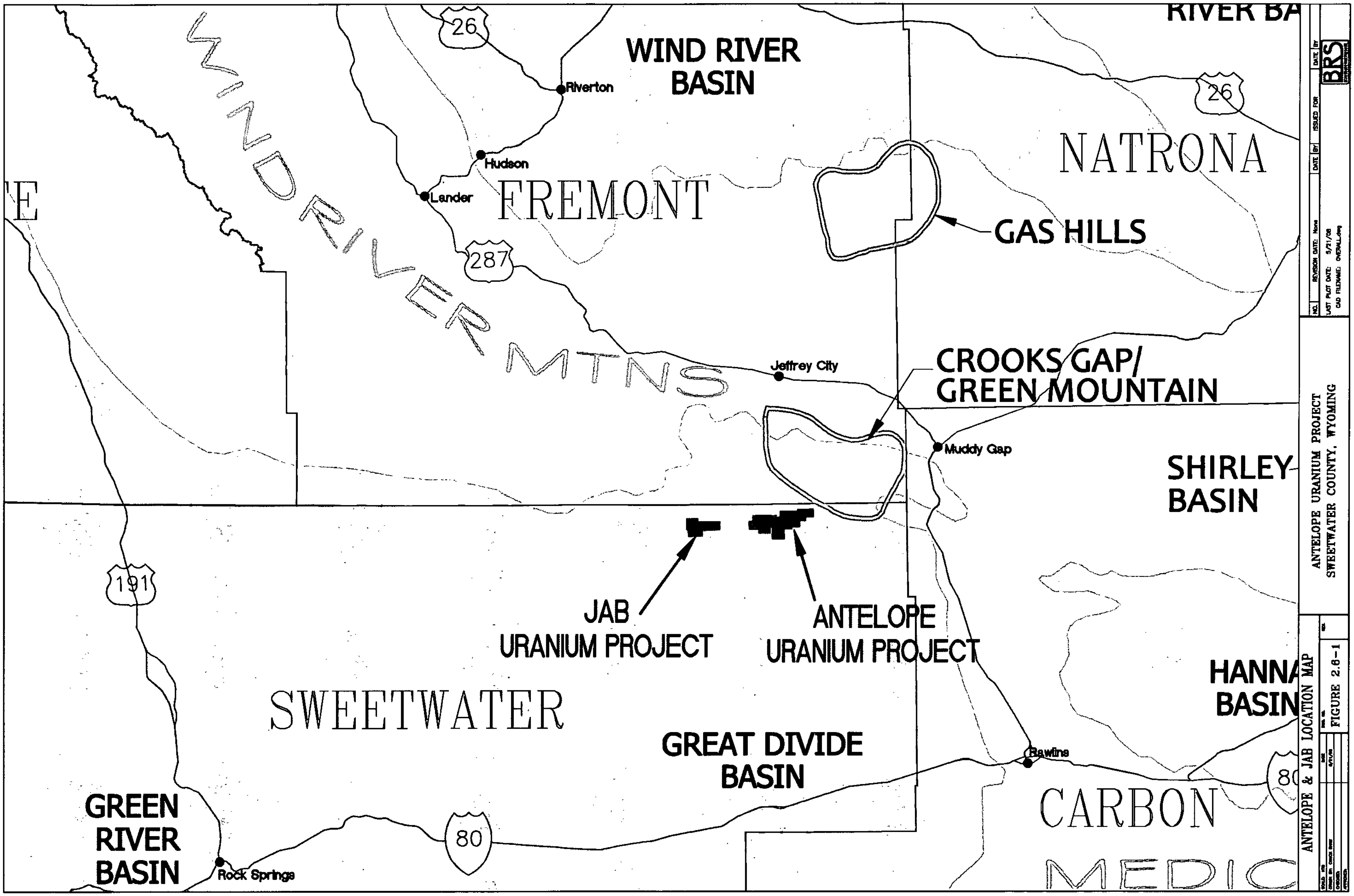
Case, James C, and Toner, Rachel N., and Kirkwood, Robert, *Basic Seismological Characterization for Carbon County, Wyoming,* (Wyoming State Geological Survey, September 2002)

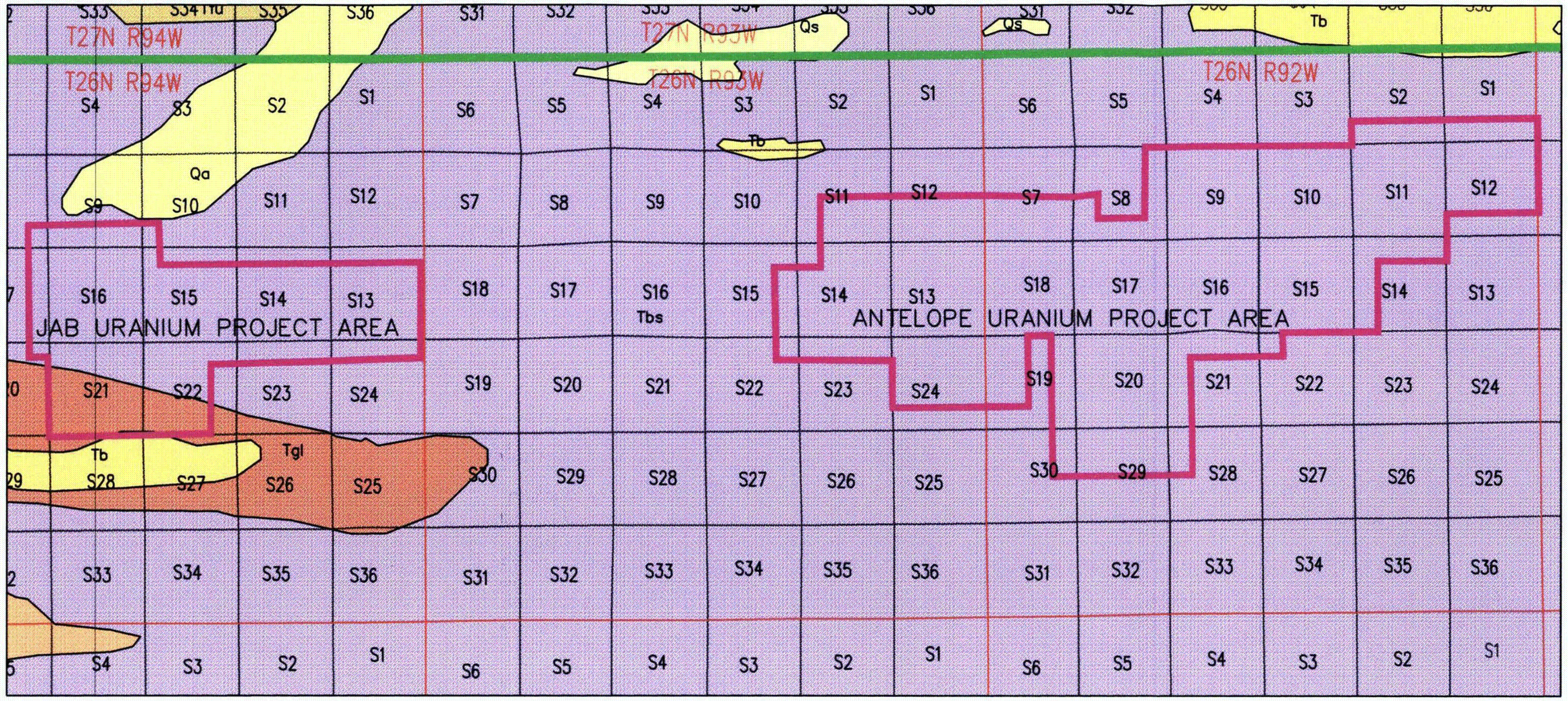
Case, James C, and Toner, Rachel N., and Kirkwood, Robert, *Basic Seismological Characterization for Sweetwater County, Wyoming,* (Wyoming State Geological Survey, September 2002)

Case, James C, and Toner, Rachel N., and Kirkwood, Robert, *Basic Seismological Characterization for Natrona County, Wyoming,* (Wyoming State Geological Survey, January 2003)

ADDENDUM 2.6-A

GEOLOGY FIGURES and TABLE


WIND RIVER
BASIN
WIND RIVER MTNS
Riverton
Hudson
Lander
FREMONT
NATRONA
GAS HILLS
26
287
Jeffrey City
CROOKS GAP/
GREEN MOUNTAIN
Muddy Gap
SHIRLEY
BASIN
JAB
URANIUM PROJECT
ANTELOPE
URANIUM PROJECT
191
SWEETWATER
GREAT DIVIDE
BASIN
HANNA
BASIN
Rawlins
CARBON
GREEN
RIVER
BASIN
Rock Springs
80
ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING
ANTELOPE & JAB LOCATION MAP
FIGURE 2.6-1
BRS



GREAT DIVIDE BASIN

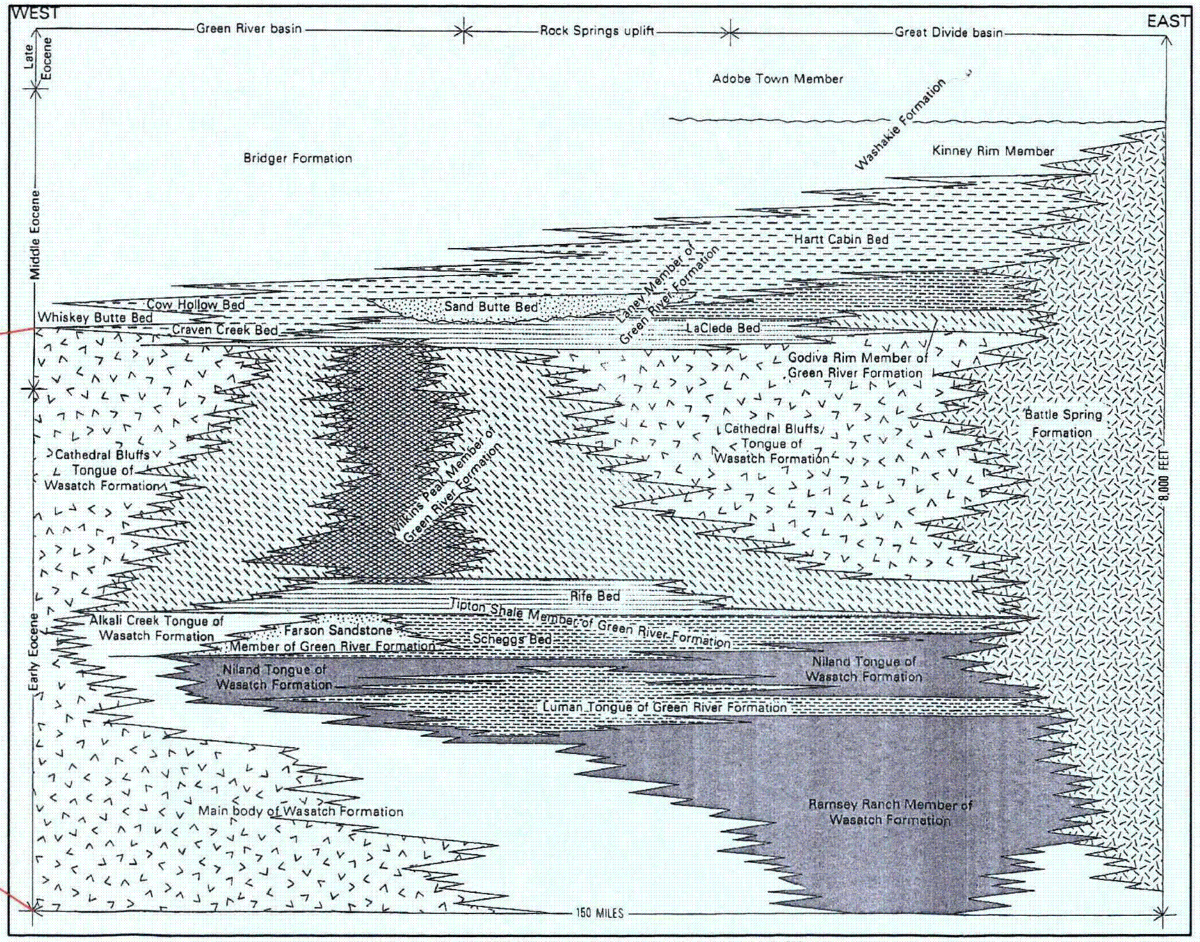
T&R LINE
SECTION LINE
COUNTY LINE
PROJECT AREA BOUNDARY

8000' 0 4000' 8000'
1 inch = 8000'

Key to Geologic Formations

Quaternary alluvium	Qa
Quaternary Dune Sand and Loess	Qs
Bridger Formation	Tb
Laney Member, Green River Formation	Tgl
Tipton Shale Member, Green River Fm	Tgt
Battle Spring Formation	Tbs
Fort Union Formation	Tfu

ERA	PERIOD	EPOCH	
CENOZOIC	TERTIARY	PLEISTOCENE	POST-OLIGOCENE UNITS REMOVED BY EROSION
		PLIOCENE	
		MIOCENE	
		OLIGOCENE	WHITE RIVER FORMATION
		EOCENE	WASATCH FORMATION / BATTLE SPRINGS FORMATION
		PALEOCENE	FORT UNION FORMATION
MESOZOIC	CRETACEOUS		LANCE FORMATION
			FOX HILLS FORMATION
			MESAVERDE (WEST SIDE OF BASIN) OTHER CRETACEOUS UNITS CLOVERLY FORMATION AND INYAN KARA GROUP



U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1506-D

ANTELOPE AND JAB URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

GEOLOGIC MAP & STRATIGRAPHIC COLUMN

FIGURE 2.6-2

uraniumone investing in our energy
BRS ENGINEERING

REVISION DATE: None
LAST PLOT DATE: 5/20/08
CAD FILENAME: Overall Base.dwg

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED:

"FIGURE 2.6-3, STRATIGRAPHIC CROSS SECTION A1-A1."

WITHIN THIS PACKAGE... OR BY SEARCHING USING THE

D-04

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THAT CAN BE VIEWED AT THE RECORD TITLED:

"FIGURE 2.6-4, STRATIGRAPHIC CROSS SECTION Q-Q."

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D-05

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THAT CAN BE VIEWED AT THE RECORD TITLED:

"FIGURE 2.6-5, STRATIGRAPHIC CROSS SECTION C-C."

WITHIN THIS PACKAGE... OR BY SEARCHING USING THE

D-06

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THAT CAN BE VIEWED AT THE RECORD TITLED:

"FIGURE 2.6-6, STRATIGRAPHIC CROSS SECTION 4-4."

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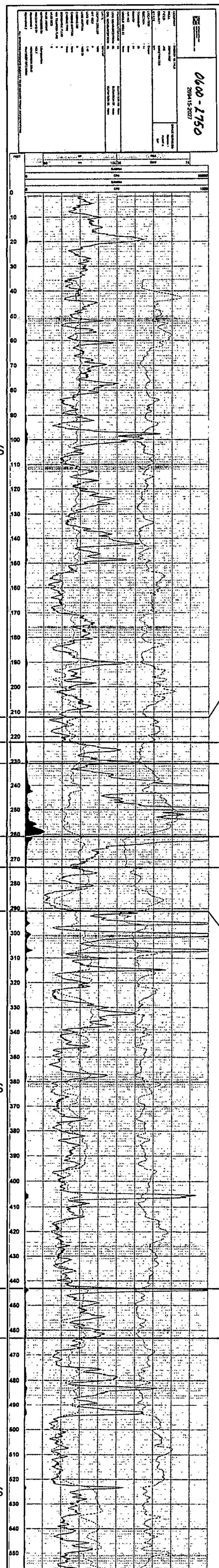
2694-15-2027



Overlying Undifferentiated Units	Sandstone, v.fn–v.crs, arkosic, with interbedded shales and mudstones
Overlying Sand	Sandstone, fn–v.crs, light green to gray–green, arkosic
Overlying Confining Unit	Shale, dark green, with thinly interbedded sandy zones
Production Sand	Sandstone, fn–v.crs, grayish green, arkosic, minor limonite, with thinly interbedded mudstones
Underlying Confining Unit	Carbonaceous shale, black–dark gray
Underlying Sand	Sandstone, fn–v.crs, grayish blue–light green, arkosic, with thinly interbedded shales and mudstones
Underlying Undifferentiated Units	Sandstone, v.fn–v.crs, arkosic, with interbedded shales and mudstones
Underlying Confining Unit	Shale, light orange, with thinly interbedded sandy zones
Underlying Undifferentiated Units	Sandstone, v.fn–v.crs, arkosic, with interbedded shales and mudstones

JAB TYPE LOG

SCALE: NTS | DRAWN BY: CMS | DATE: 5/21/2008 | CHECKED: | APPROVED: | DWG. NO. | REV.

FIGURE 2.6-7

JAB URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

NO. | REVISION DATE: None | DATE | BY | ISSUED FOR | DATE | BY

LAST PLOT DATE: 5/21/2008
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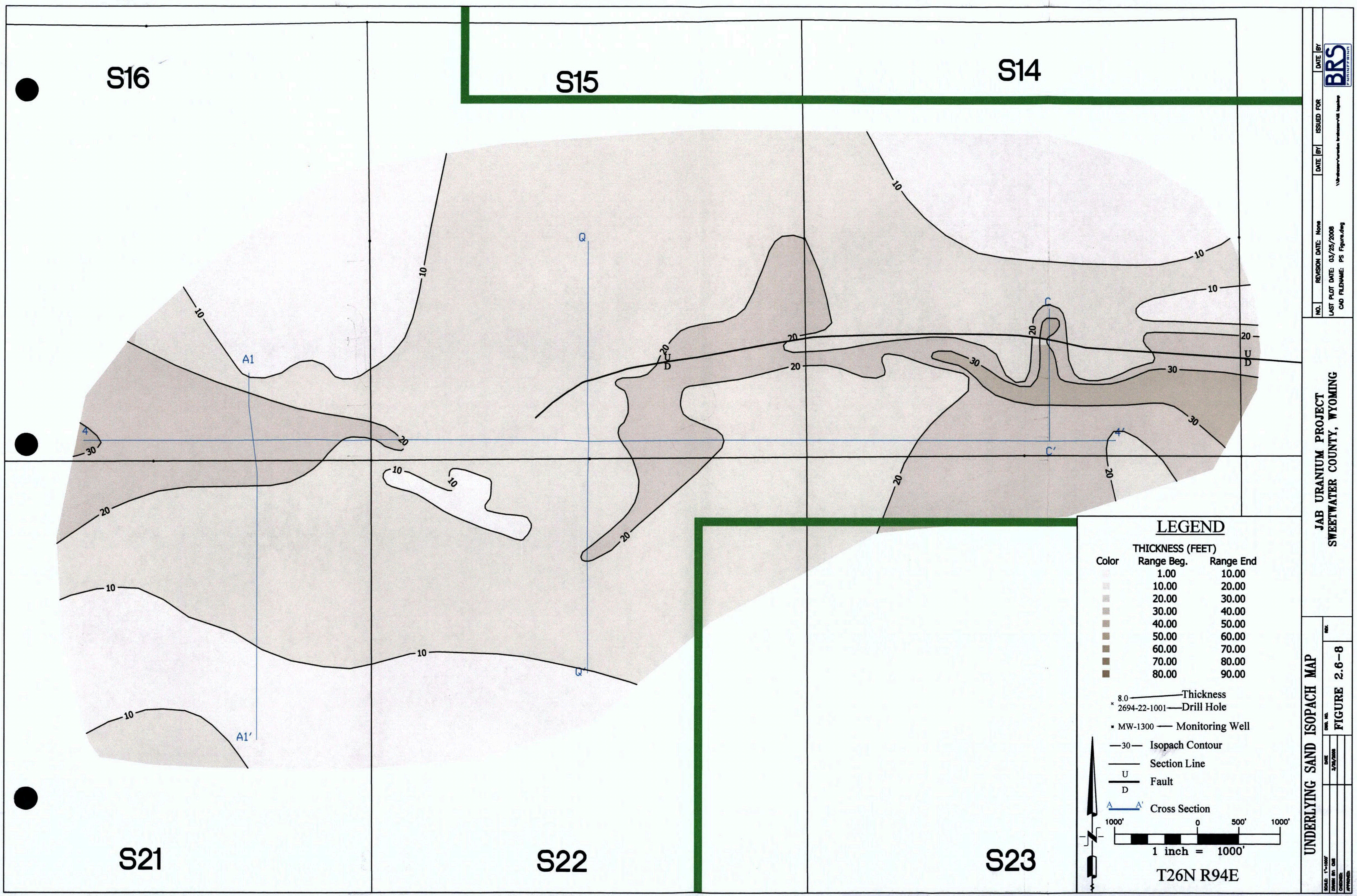
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S15
S14
S21
S22
S23
A1
A1'
Q
Q'
C
C'
A
A'
U
D
10
20
30
LEGEND
THICKNESS (FEET)
Color Range Beg. Range End
1.00 10.00
10.00 20.00
20.00 30.00
30.00 40.00
40.00 50.00
50.00 60.00
60.00 70.00
70.00 80.00
80.00 90.00
8.0 Thickness
2694-22-1001 Drill Hole
MW-1300 Monitoring Well
30 Isopach Contour
Section Line
Fault
Cross Section
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1 inch = 1000'
T26N R94E
NO. REVISION DATE: None DATE BY ISSUED FOR DATE BY
LAST PLOT DATE: 03/25/2008
CAD FILENAME: PS Figure.dwg
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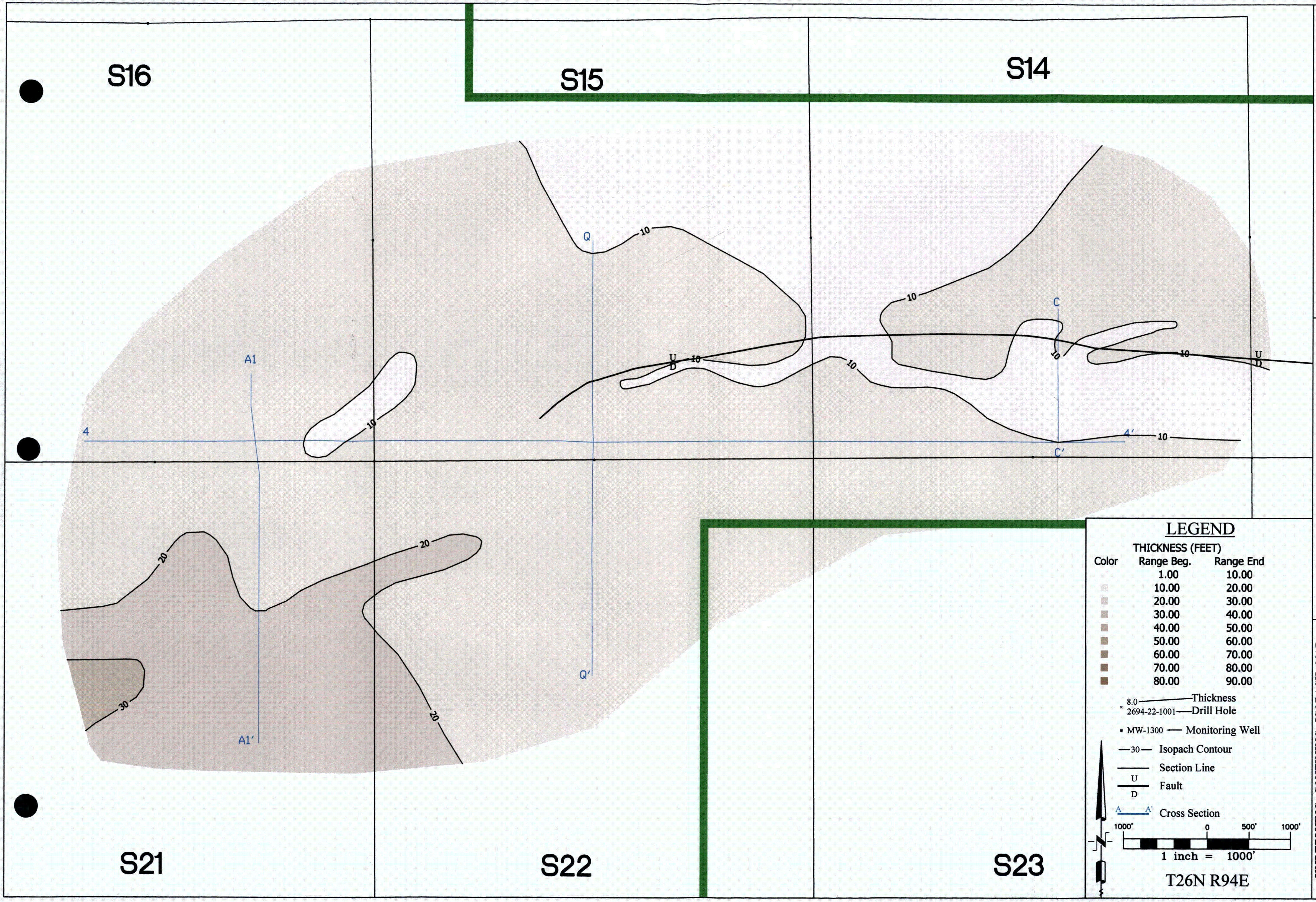
JAB URANIUM PROJECT
SWEETWATER COUNTY, WYOMING
UNDERLYING SAND ISOPACH MAP
FIGURE 2.6-8



UNDERLYING CONFINING ISOPACH MAP

FIGURE 2.6-9

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APPROVED:

JAB URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

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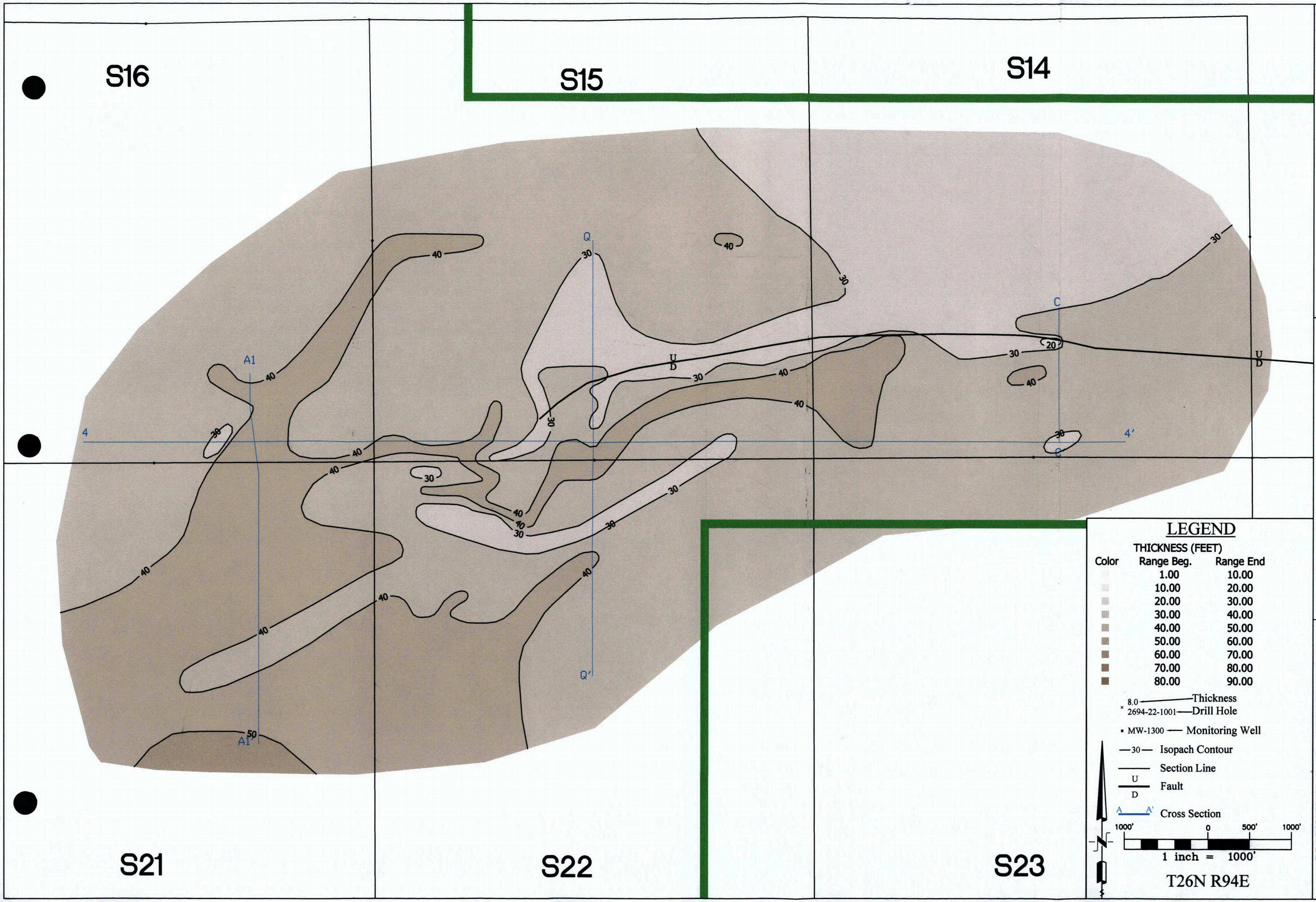

JAB URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

PRODUCTION SAND ISOPACH MAP

FIGURE 2.6-10

NO.	REVISION DATE: None	DATE	BY	ISSUED FOR	DATE	BY

LAST PLOT DATE: 03/25/2008
CAD FILENAME: PS Figure.dwg

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DATE 3/25/2008
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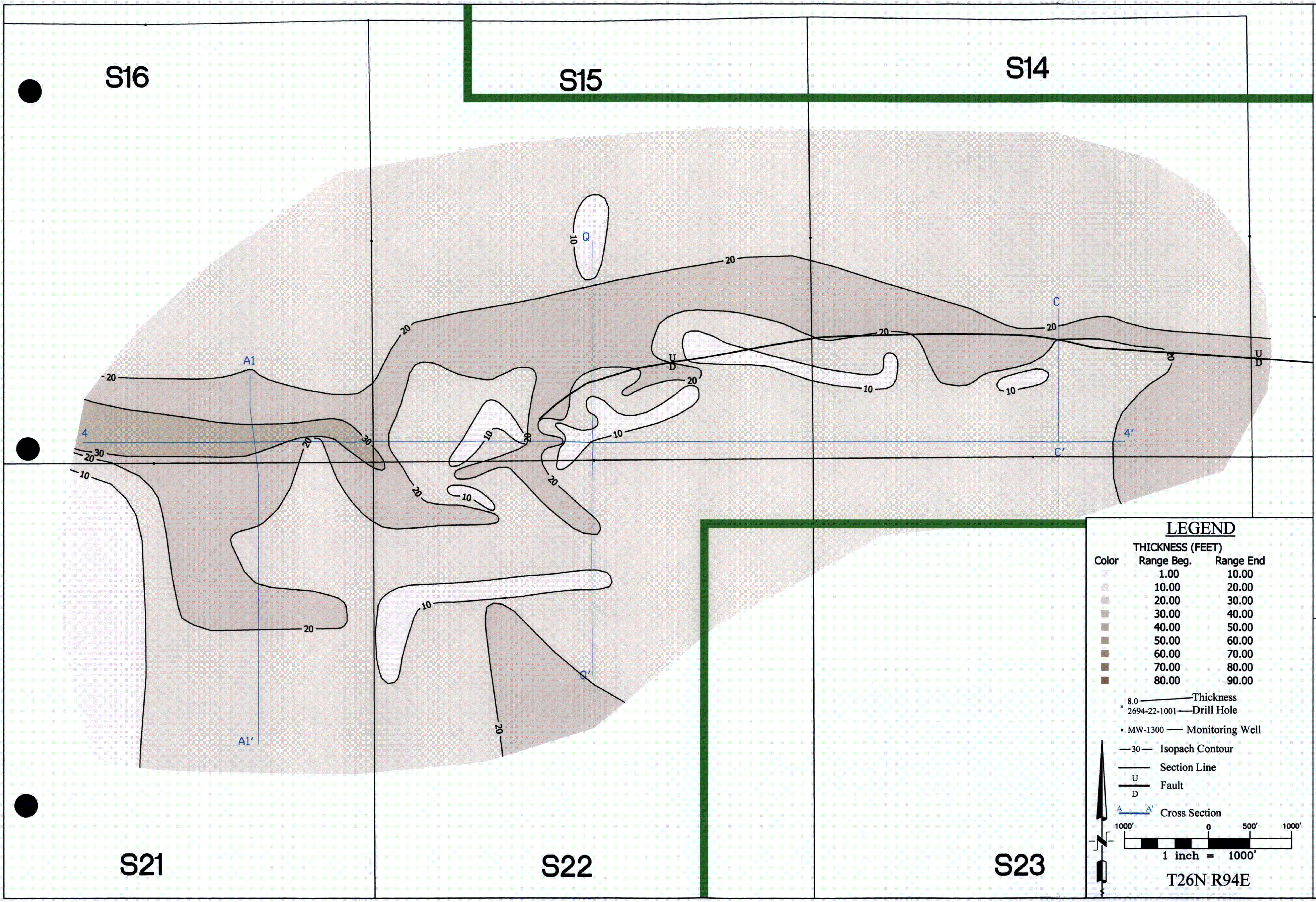

JAB URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

OVERLYING CONFINING ISOPACH MAP

FIGURE 2.6-11

LAST PLOT DATE: 03/25/2008
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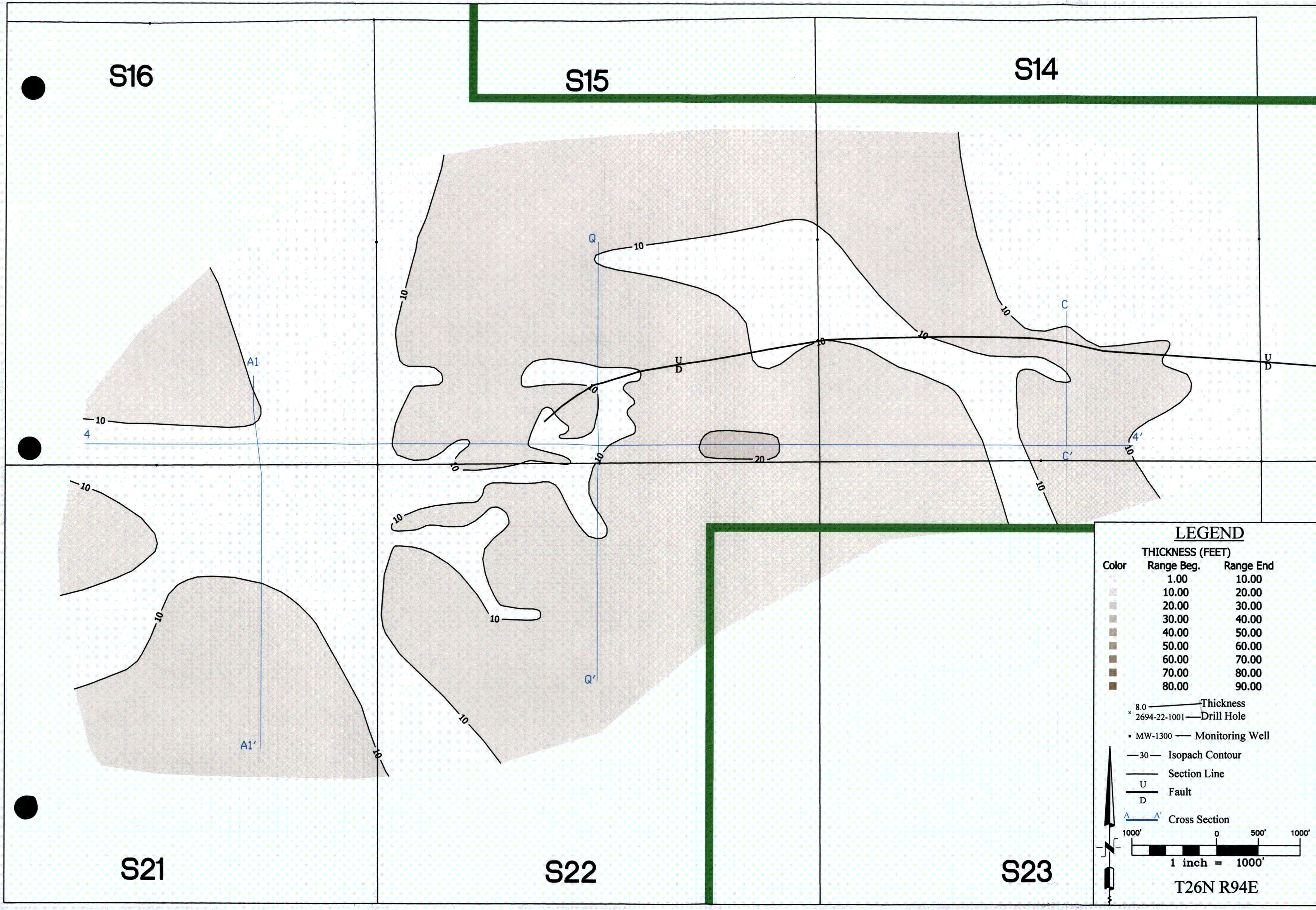

JAB URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

OVERLYING SAND ISOPACH MAP

FIGURE 2.6-12

REVISION DATE: None
LAST PLOT DATE: 03/25/2008
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ANTELOPE TYPE LOG

269313–LX–132

290–250 Sand	0'–50'	Sandstone, v.fn – crs with abund fn sand and silt
290–250 Sand		Shale, micaceous, pale purple with yellow clays and silts
290–250 Sand	100'	Sandstone, fn–v.crs, arkosic with minor silts & yellow clay
245 Shale	150'	Shale, pale purple, micaceous with yellow clays and silts
240–200 Sand		Sandstone, fn–v.crs, arkosic with minor silt
240–200 Sand	200'	Shale, yellow and pale purple, with minor fn–med arkosic sand
240–200 Sand	250'	Sandstone, f–v.crs, arkosic, pebble cgl at base, greenish tint
240–200 Sand	300'	Shale, greenish–gray with minor fn–med sand
240–200 Sand	350'	Sandstone, v.fn–v.crs, arkosic w/minor chert, pyrite
195 Shale		Greenish– gray shale
190–150 Sand	400'	Sandstone, v.fn–v.crs, arkosic with minor pyrite, greenish–gray shale
190–150 Sand	450'–550'	Sandstone, v.fn–v.crs, arkosic with moderate pyrite, greenish–gray shale
190–150 Sand	600'	Sandstone, v.fn–v.crs, arkosic with minor black chert
145 Shale		Greenish–gray shale
140–100 Sand	650'	Sandstone, v.fn–v.crs, arkosic with minor black chert
140–100 Sand	700'–750'	Sandstone, v.fn–crs, quartzose with minor felds, pyrite, interbedded greenish–gray shale and siltstn
140–100 Sand	800'	Sandstone, v.fn–crs, qtzos, with minor felds, with abundant pyrite, minor shale & siltstn
95 Shale	850'	Green–gray shale and siltstone
90–50 Sand	900'–950'	Sandstone, v.fn–crs, qtzos, with minor felds, with abundant pyrite, minor shale & siltstn
90–50 Sand	1000'	Shale, greenish–gray, with minor pale–purple shale, minor sand v.fn–pebble arkosic
90–50 Sand	1050'–1100'	Sandstone, v.fn–crs, arkosic, with abund pyrite, minor green–gray shale and siltstone
45 Shale		Green–gray shale and siltstone
40–10 Sand	1150'	Sandstone, v.fn–crs, arkosic, with abund pyrite, minor green–gray shale and siltstone
40–10 Sand	1200'	Silty sandy shale
40–10 Sand	1250'–1350'	Sandstone, v.fn–crs, arkosic, with abund pyrite, minor green–gray shale and siltstone
05 Shale	1404'	Green–gray shale and siltstone

ANTELOPE TYPE LOG

SCALE: NTS | DATE: 5/21/2008 | DRAWN BY: CMS | CHECKED: | APPROVED: | DWG. NO. | REV.

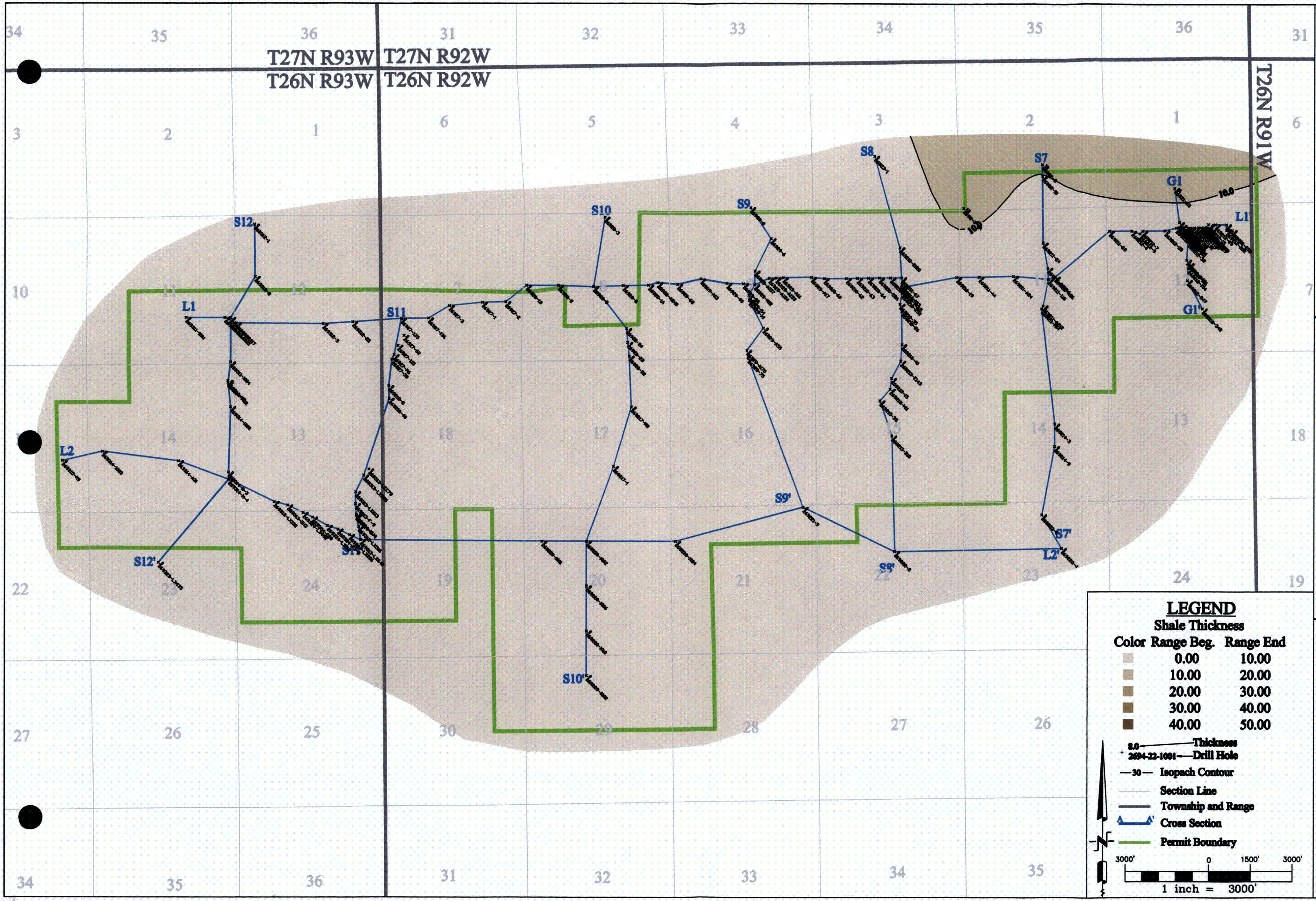
FIGURE 2.6–13

ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

NO. | REVISION DATE: None | DATE | BY | ISSUED FOR | DATE | BY

LAST PLOT DATE: 5/21/2008
CAD FILENAME: Type_Log_Antelope.dwg

BRS



ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

05 SHALE ISOPACH

FIGURE 2.6-14

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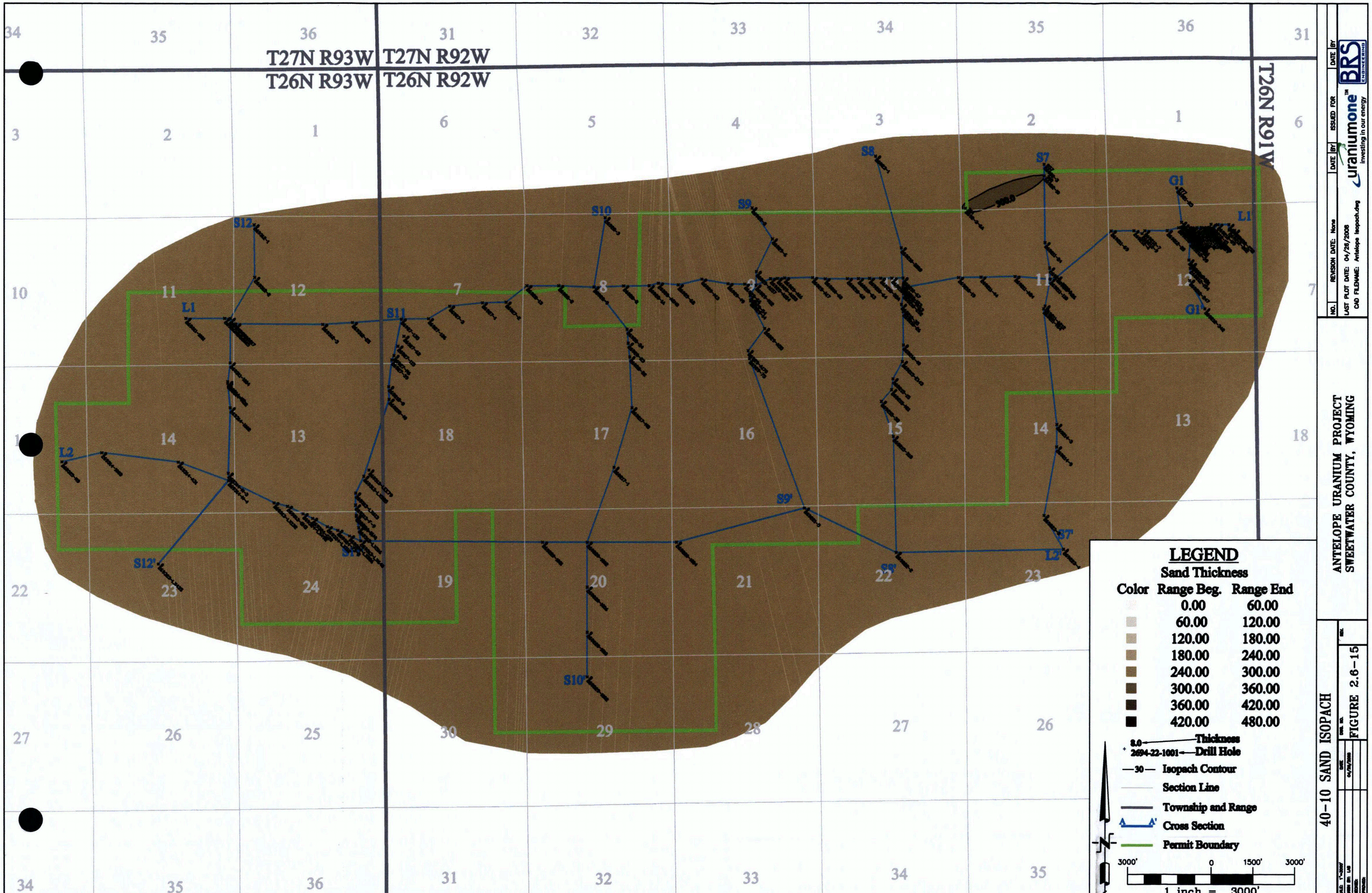
LAST PLOT DATE: 04/28/2008
CAD FILENAME: Antelope isopach.dwg


T27N R93W
T27N R92W
T26N R93W
T26N R92W
T26N R91W
LEGEND
Sand Thickness
Color | Range Beg. | Range End
0.00 | 60.00
60.00 | 120.00
120.00 | 180.00
180.00 | 240.00
240.00 | 300.00
300.00 | 360.00
360.00 | 420.00
420.00 | 480.00
Thickness
Drill Hole
Isopach Contour
Section Line
Township and Range
Cross Section
Permit Boundary
1 inch = 3000'
ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING
40-10 SAND ISOPACH
FIGURE 2.6-15
REVISION DATE: None
LAST PLOT DATE: 04/26/2008
CAD FILENAME: Antelope Isopach.dwg
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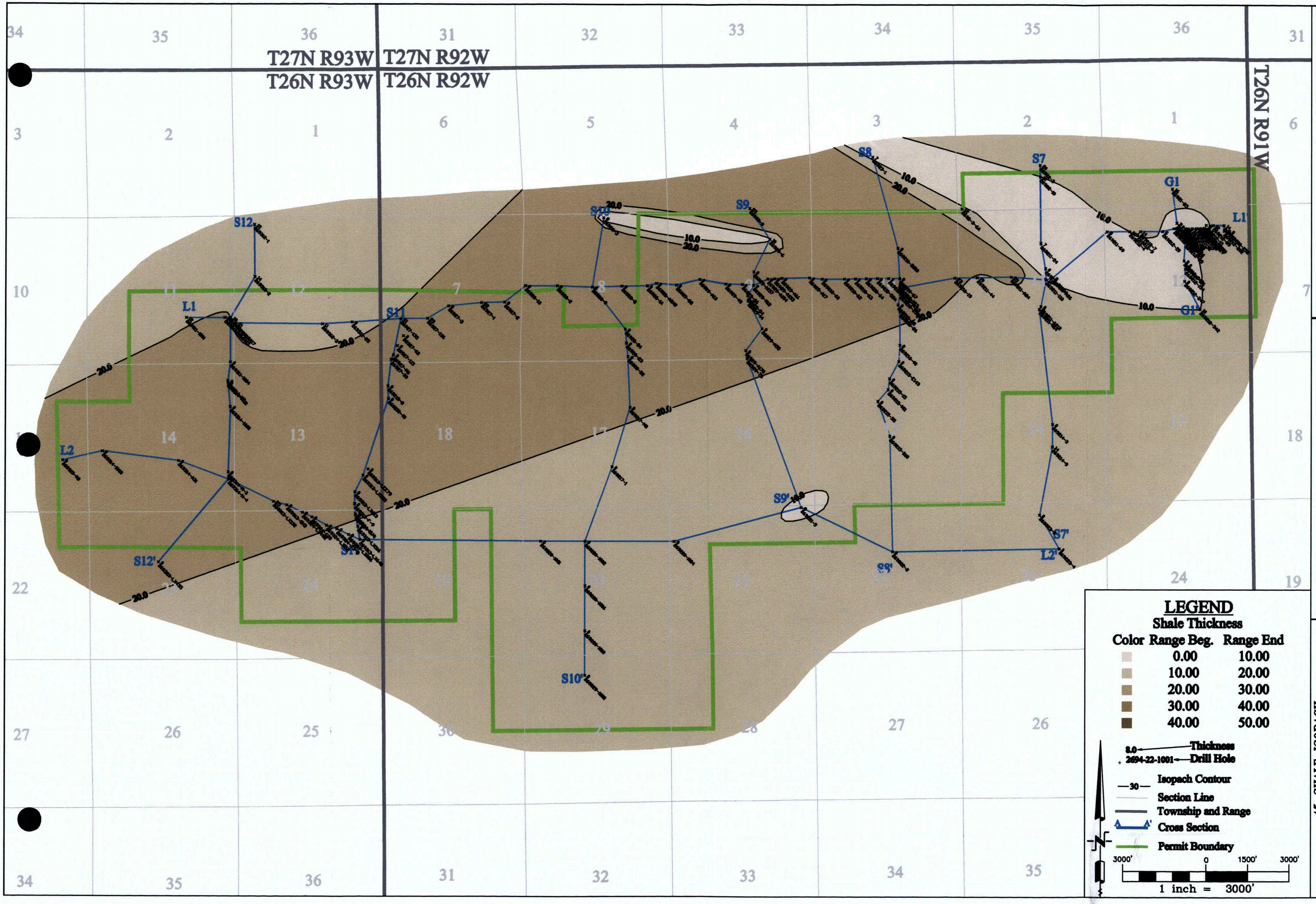

LEGEND

Shale Thickness

Color	Range Beg.	Range End
	0.00	10.00
	10.00	20.00
	20.00	30.00
	30.00	40.00
	40.00	50.00

8.0 — Thickness
2694-22-1001 — Drill Hole
—30— Isopach Contour
Section Line
Township and Range
Cross Section
Permit Boundary

3000' 0 1500' 3000'
1 inch = 3000'

NO. | REVISION DATE: None | DATE | BY | ISSUED FOR | DATE | BY

LAST PLOT DATE: 04/26/2008
CAD FILENAME: Antelope Isopach.dwg

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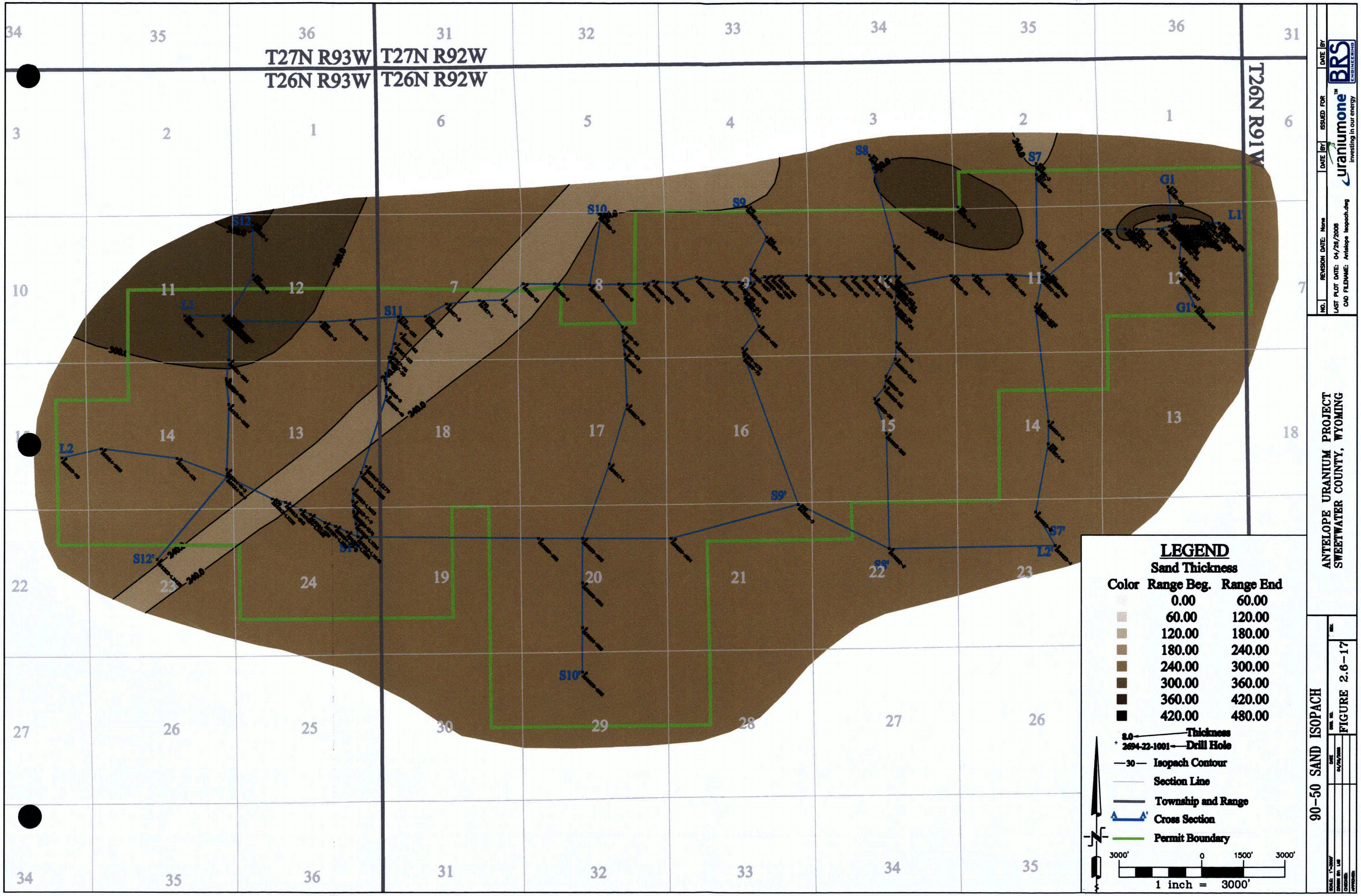
ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

45 SHALE ISOPACH

FIGURE 2.6-16


T27N R93W
T27N R92W
T26N R93W
T26N R92W
T26N R91W
LEGEND
Sand Thickness
Color Range Beg. Range End
0.00 60.00
60.00 120.00
120.00 180.00
180.00 240.00
240.00 300.00
300.00 360.00
360.00 420.00
420.00 480.00
Thickness
Drill Hole
Isopach Contour
Section Line
Township and Range
Cross Section
Permit Boundary
3000' 0 1500' 3000'
1 inch = 3000'
ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING
90-50 SAND ISOPACH
FIGURE 2.6-17
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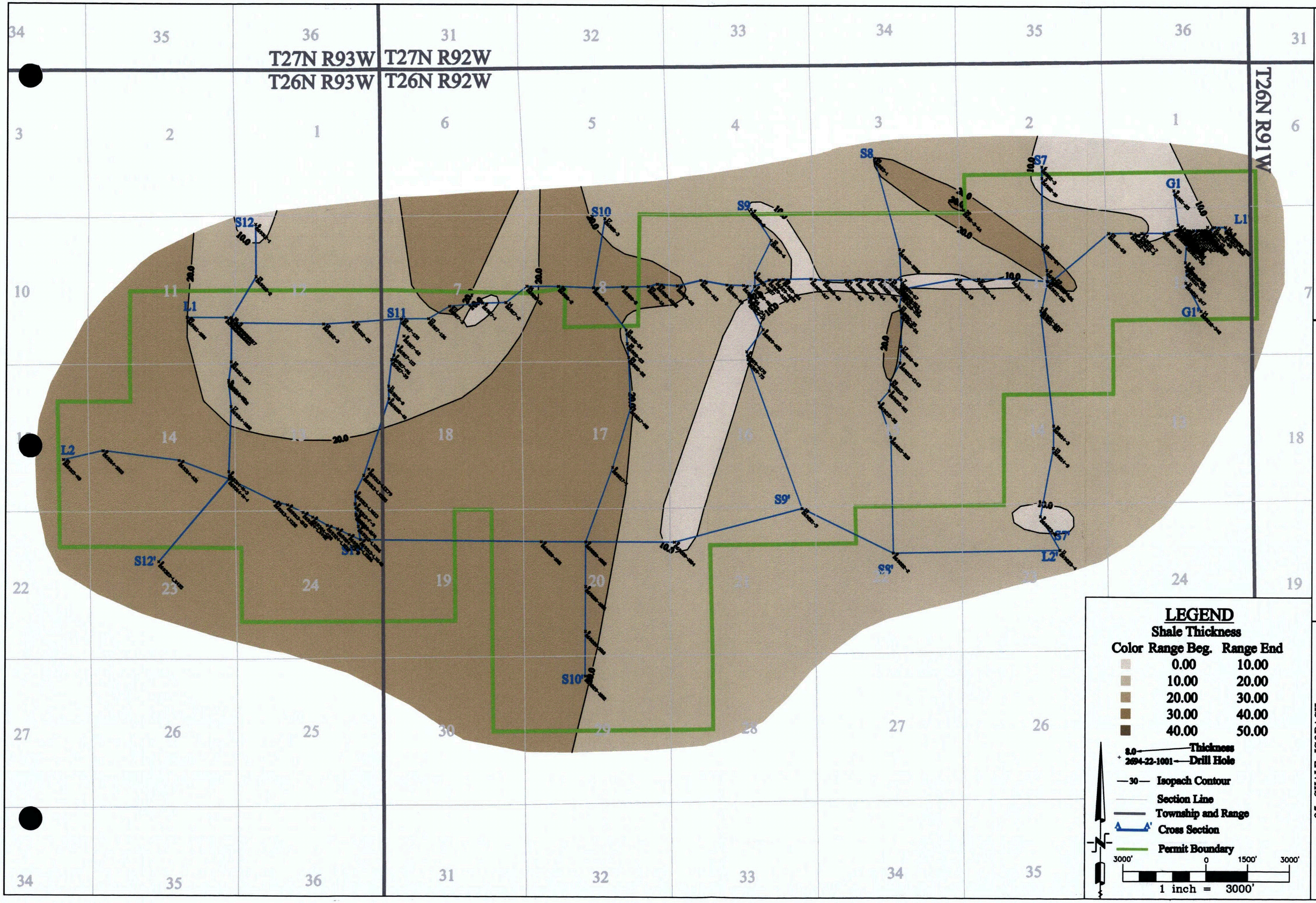
REVISION DATE: None
LAST PLOT DATE: 04/28/2008
CAD FILENAME: Antelope Isopach.dwg



ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

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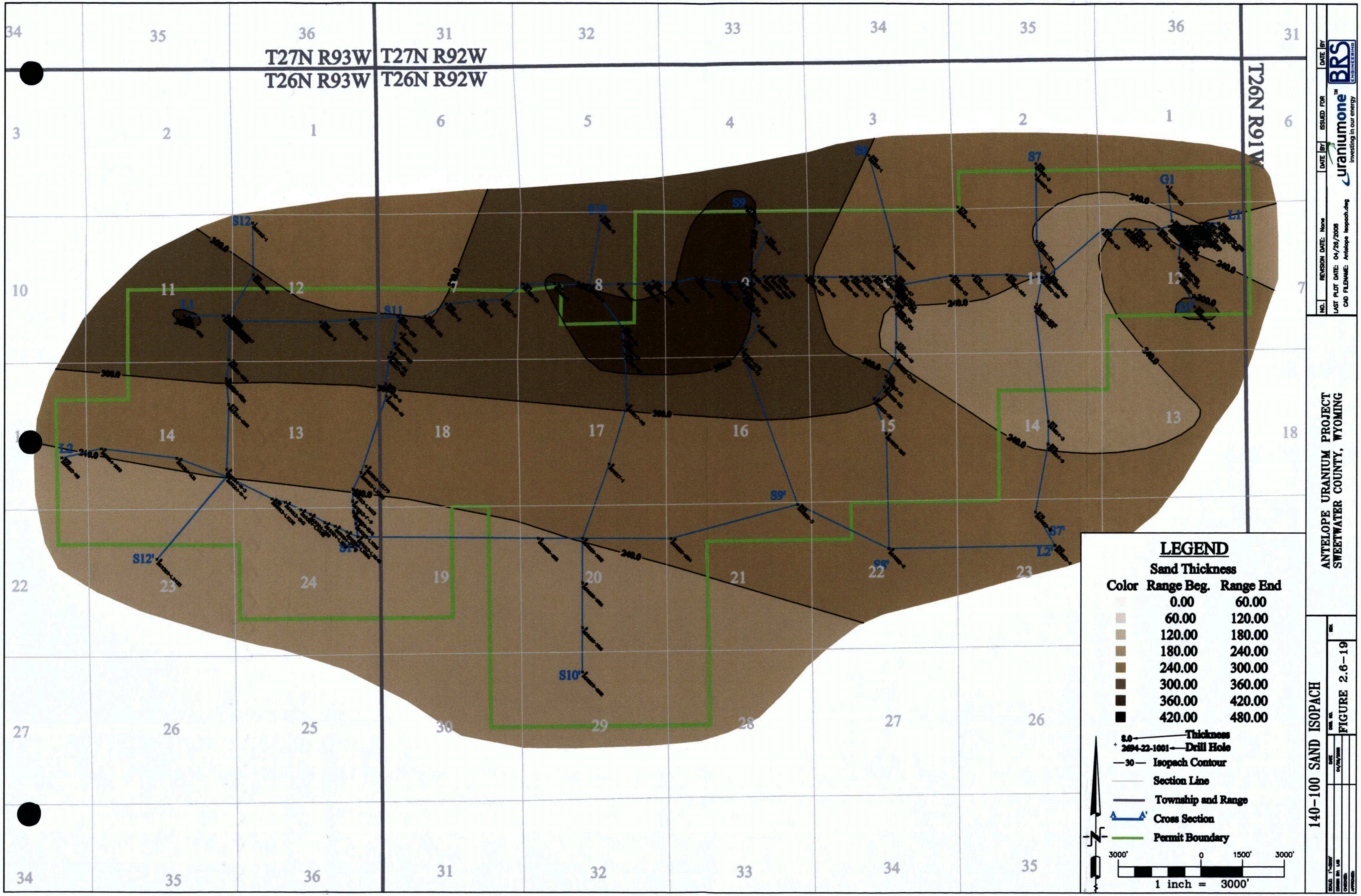
95 SHALE ISOPACH

FIGURE 2.6-18


T27N R93W
T26N R93W
T27N R92W
T26N R92W
T26N R91W
LEGEND
Sand Thickness
Color Range Beg. Range End
0.00 60.00
60.00 120.00
120.00 180.00
180.00 240.00
240.00 300.00
300.00 360.00
360.00 420.00
420.00 480.00
Thickness
Drill Hole
Isopach Contour
Section Line
Township and Range
Cross Section
Permit Boundary
1 inch = 3000'
ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING
140-100 SAND ISOPACH
FIGURE 2.6-19
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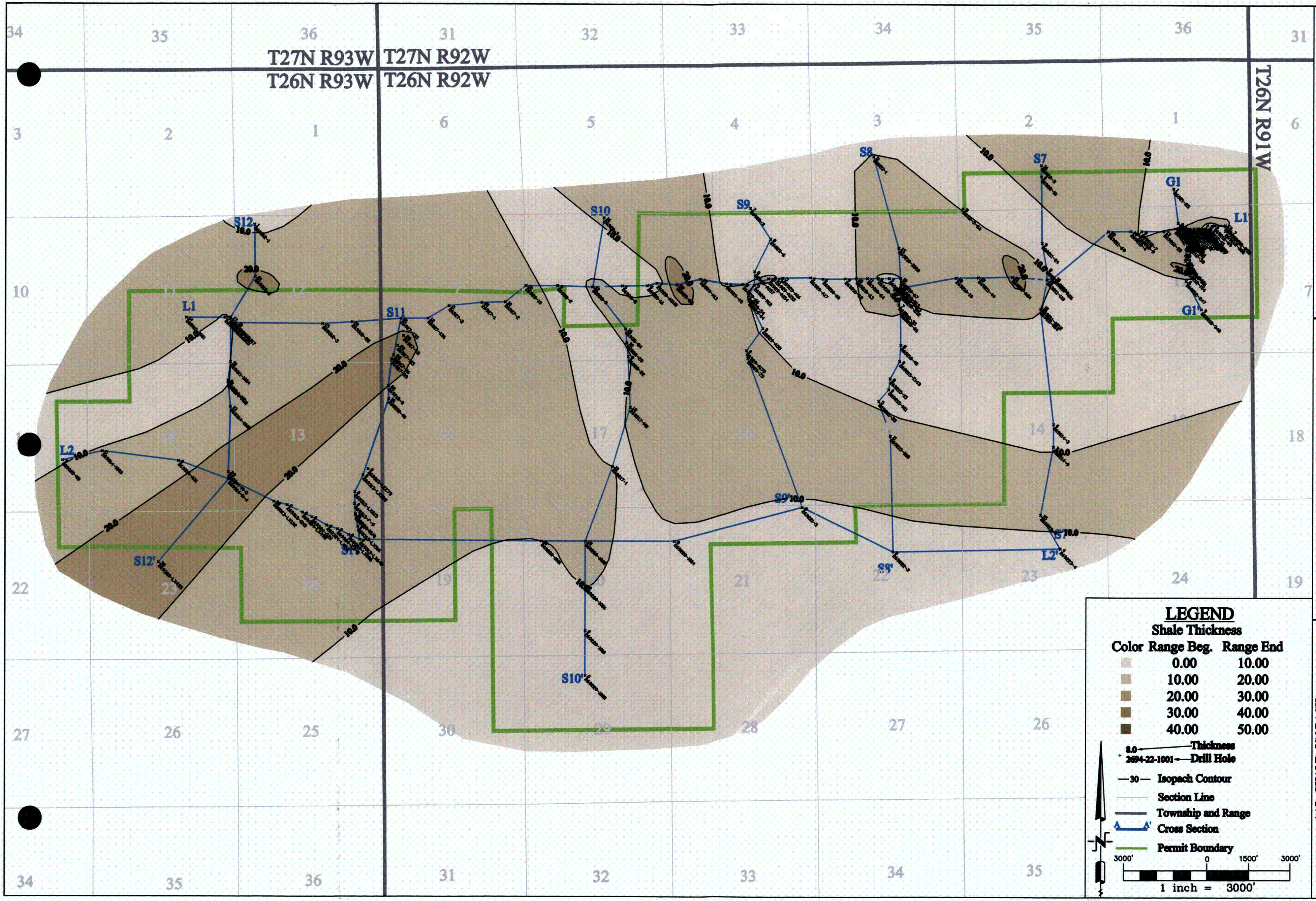

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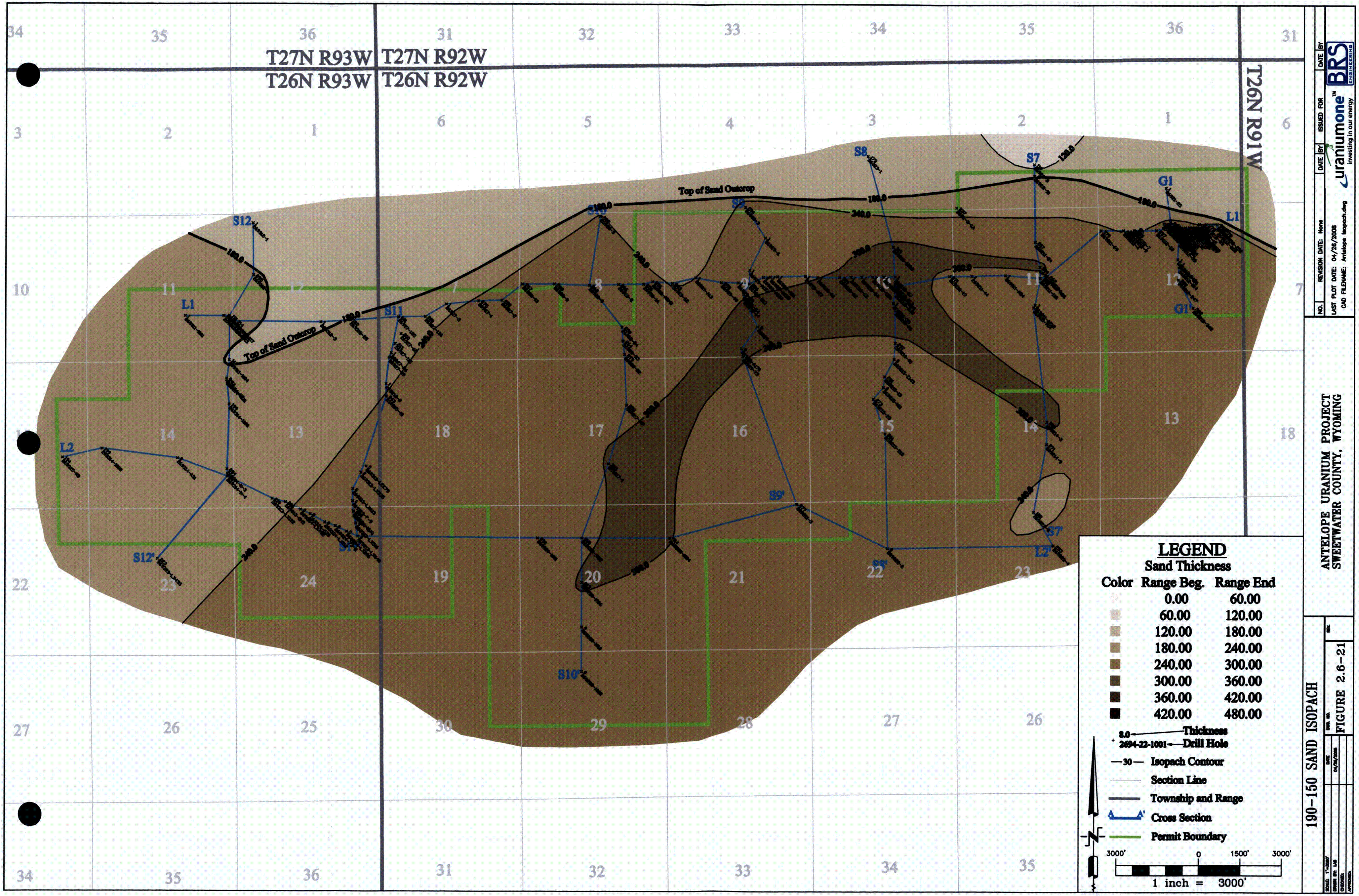
LAST PLOT DATE: 04/28/2008

CAD FILENAME: Antelope Isopach.dwg

ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

145 SHALE ISOPACH

FIGURE 2.6-20


T27N R93W
T27N R92W
T26N R93W
T26N R92W
T26N R91W
Top of Sand Outcrop
LEGEND
Sand Thickness
Color Range Beg. Range End
0.00 60.00
60.00 120.00
120.00 180.00
180.00 240.00
240.00 300.00
300.00 360.00
360.00 420.00
420.00 480.00
Thickness
Drill Hole
Isopach Contour
Section Line
Township and Range
Cross Section
Permit Boundary
1 inch = 3000'
ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING
190-150 SAND ISOPACH
FIGURE 2.6-21
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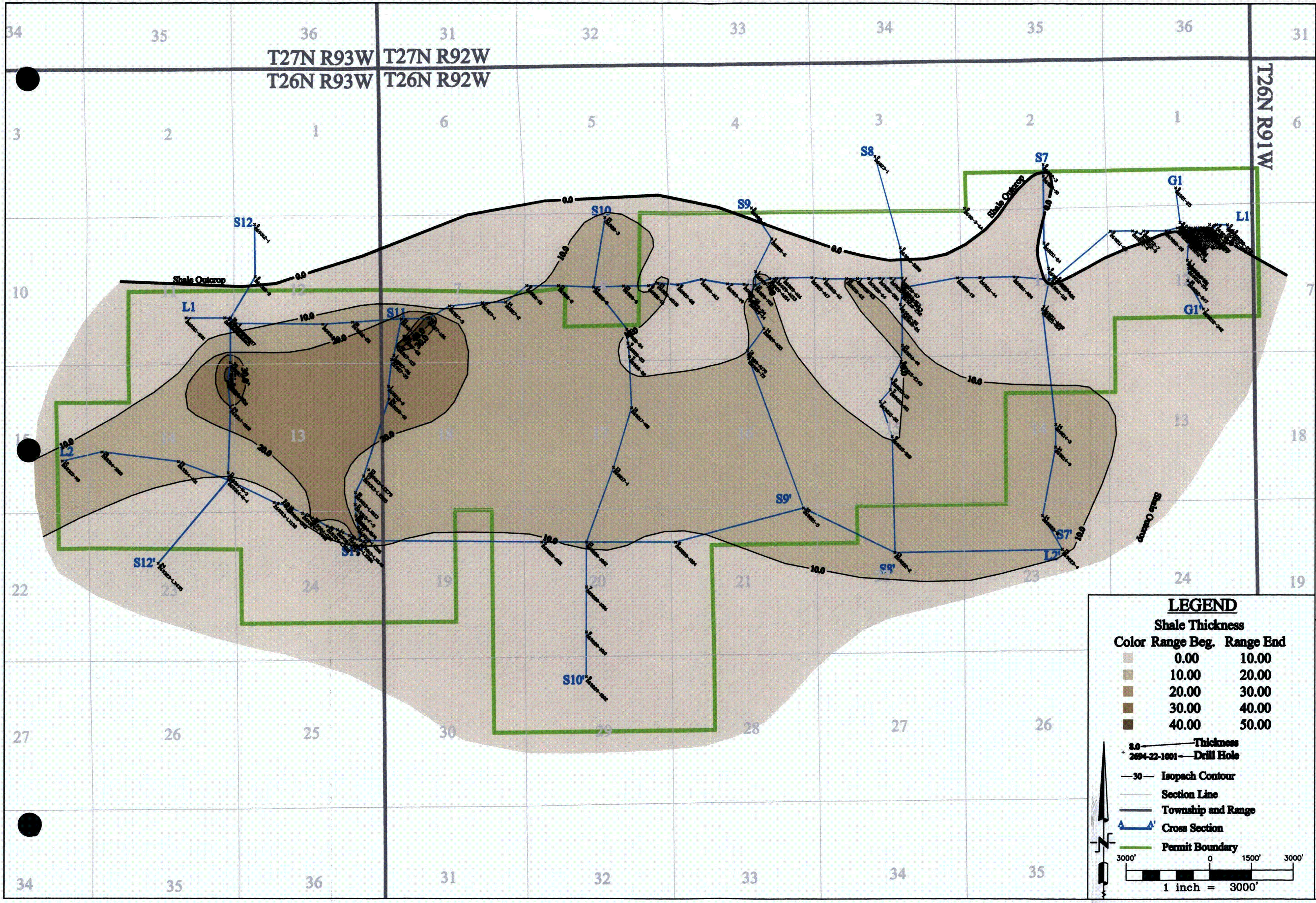

REVISION DATE: None
LAST PLOT DATE: 04/28/2008
CAD FILENAME: Antelope Isopach.dwg

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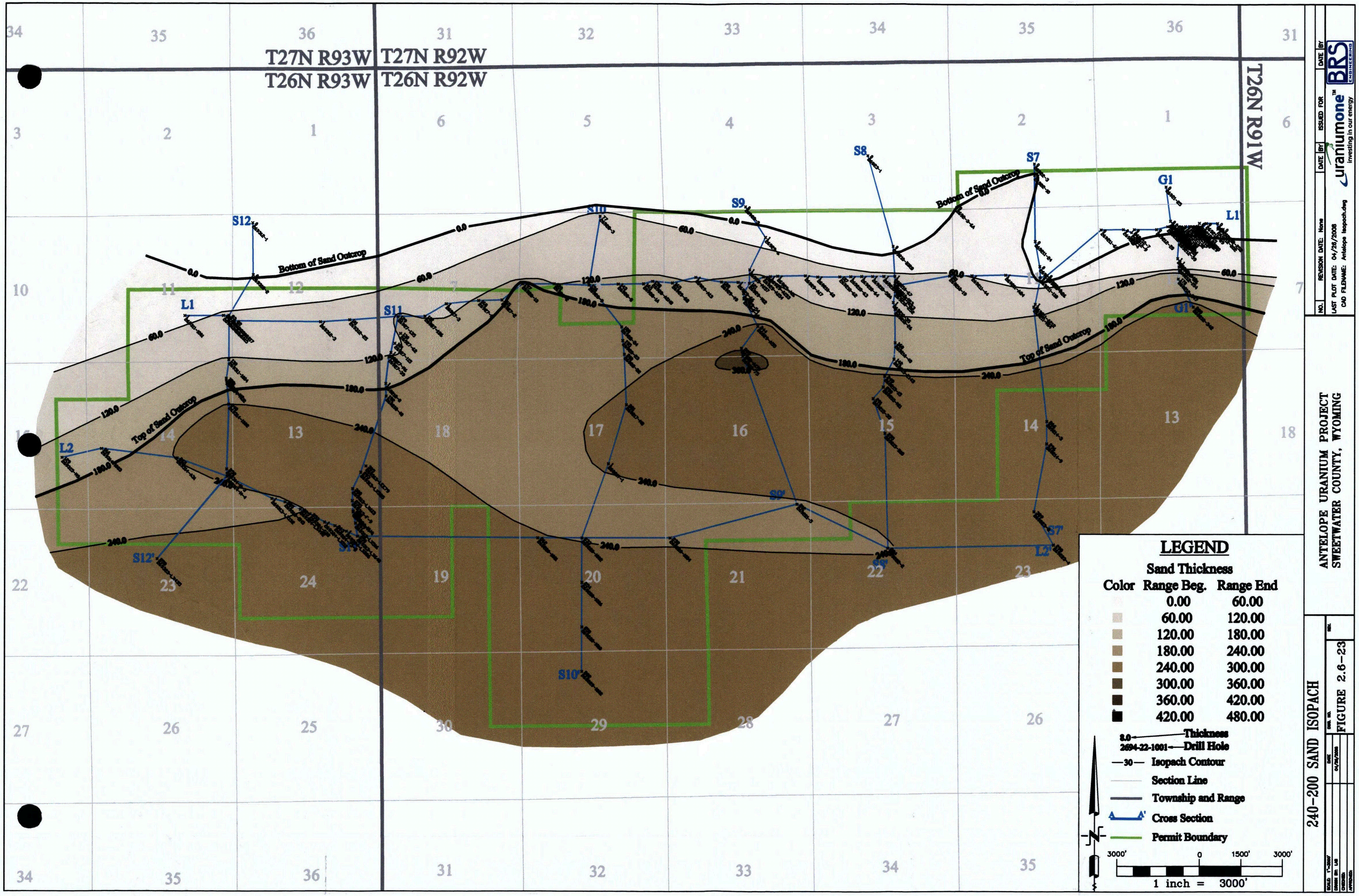
ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING

195 SHALE ISOPACH

FIGURE 2.6-22



T27N R93W
T26N R93W
T27N R92W
T26N R92W
T26N R91W
Bottom of Sand Outcrop
Top of Sand Outcrop
S12
S12'
S11
S11'
S10
S10'
S9
S9'
S8
S8'
S7
S7'
L1
L1'
L2
L2'
G1
G1'
LEGEND
Sand Thickness
Color Range Beg. Range End
0.00 60.00
60.00 120.00
120.00 180.00
180.00 240.00
240.00 300.00
300.00 360.00
360.00 420.00
420.00 480.00
Thickness
Drill Hole
Isopach Contour
Section Line
Township and Range
Cross Section
Permit Boundary
3000' 0 1500' 3000'
1 inch = 3000'
ANTELOPE URANIUM PROJECT
SWEETWATER COUNTY, WYOMING
240-200 SAND ISOPACH
FIGURE 2.6-23
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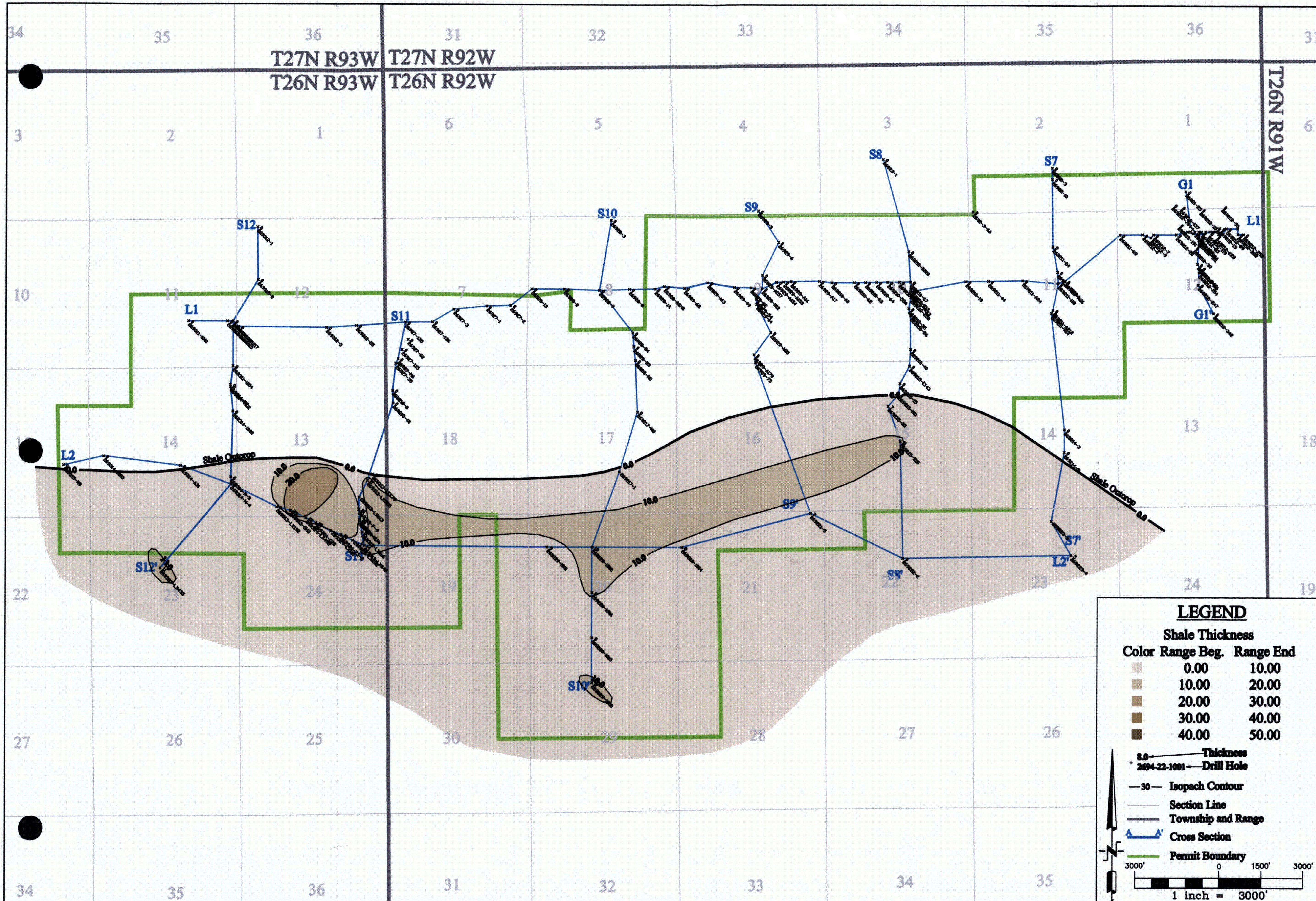

ANTELOPE URANIUM PROJECT

SWEETWATER COUNTY, WYOMING

245 SHALE ISOPACH

FIGURE 2.6-24

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LAST PLOT DATE: 04/28/2008

CAD FILENAME: Antelope Isopach.dwg

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FIGURES 2.6 -25A THROUGH FIGURES 2.6-33

D-08 THROUGH D-21

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WITHIN THIS PACKAGE... OR BY SEARCHING USING THE DOCUMENT/REPORT NO. FIGURES 2.6 -34A THROUGH FIGURES 2.6-35E

D-22 THROUGH D-28