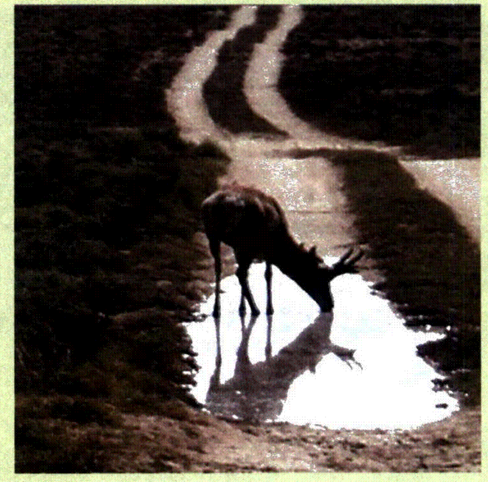
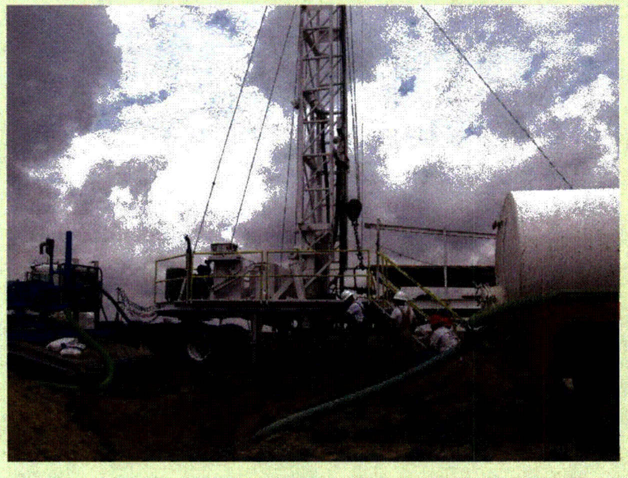
LOST CREEK ISR, LLC

Lost Creek Project

South-Central Wyoming

Environmental Report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Application for

US NRC Source Material License

(Docket No. 40-9068)

October, 2007

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PLATES

LIST OF ABBREVIATIONS AND ACRONYMS

$[UO_2(CO_3)^3]^{-4}$	uranyl tricarbonate ion
$[UO_2(CO_3)^2]^{-2}$	uranyl dicarbonate ion
°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
μR/hr	microRoentgens per hour
ACE	Army Corps of Engineers
ACEC	Area of Critical Environmental Concern
AD	anno domini
AM	Ante Meridiem
AUM	animal unit months
Basin	Great Divide Basin
BLM	Bureau of Land Management
BMP	Best Management Practice
BP	before present
$CaCO_3$	calcium carbonate
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
Conoco	Conoco, Inc.
Cs-137	cesium-137
CSU	Colorado State University
CV	curriculum vitaes
CWA	Clean Water Act
dBA	A-weighted decibels
DOE	Department of Energy
DOT	Department of Transportation
EIS	Environmental Impact Statement
ELI	Energy Laboratories Incorporated
EMT	emergency medical technician
EPA	Environmental Protection Agency
ER	Environmental Report
ERMA	Extensive Resource Management Area
ESD	Emergency Shut Down
Fault	Lost Creek Fault
FLPMA	Federal Land Policy and Management Act
ft^2/d	square feet per day
ft amsl	feet above mean sea level
ft bgs	feet below ground surface
ft/d	feet per day
ft/ft	feet per foot
ft/mi	feet per mile
ft/s	feet per second
FTE	full-time equivalent
FWS	Fish and Wildlife Service

g	gravity
g/L	grams per liter
g/m^2	grams per square meter
GIS	Geographic Information System
gpd/ft	gallons per day per foot
gpm	gallons per minute
GPS	Global Positioning System
GSP	Gross State Product
HDPE	high-density polyethylene
HMA	Herd Management Area
HPGe	High-Purity Germaniun
HPIC	High-Pressure Ionization Chamber
HPRCC	High Plains Regional Climate Center
IR	Isolated Resource
ISR	In Situ Recovery
JCR	Job Completion Report
km	kilometers
lb/mi^3	pounds per cubic mile
lb/VMT	pounds per vehicle miles traveled
LC	Lost Creek
LC ISR, LLC	Lost Creek ISR, LLC
LQD	Land Quality Division
LS	Lost Soldier
m^2	square meters
m/s	meters per second
man-Sv	man-Sievert
MBHFI	Migratory Birds of High Federal Interest
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MiniVol	Mini Volumetric
MIT	mechanical integrity test
mph	miles per hour
mrem	millirem
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NaI	sodium iodide
NEPA	National Environmental Protection Act
NFU	New Frontiers Uranium Wyoming, LLC
NH_3	ammonia
NIST	National Institute of Standards and Technology
NMSS	Nuclear Material Safety and Safeguards
NO_2	nitrogen dioxide
NRC	Nuclear Regulatory Commission

NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWIS	National Water Information System
NWS	National Weather Service
O_3	ozone
OHV	off-highway vehicle
Pb-210	lead-210
PC	personal computer
pCi/L	picoCuries per liter
Permit Area	Lost Creek Permit Area
PFN	Prompt Fission Neutron
PLC	Programmable Logic Controllers
PM_{10}	particulate matter less than ten micrometers in diameter
PM	Post Meridiem
PPE	personal protective equipment
ppm	parts per million
Project	Lost Creek Project
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pound-force per square inch gauge
PVC	polyvinyl chloride
PWMTF	Permanent Wyoming Mineral Trust Fund
QA	quality assurance
QC	quality control
Ra-226	radium-226
rem	röntgen (roentgen) equivalent in man
RMP	Resource Management Plan
RMPPA	Resource Management Plan Planning Area
Rn-222	radon-222
RO	reverse osmosis
ROW	right of way
RV	recreational vehicle
RWP	Radiation Work Permit
SAR	sodium adsorption ratio
SDR	standard dimension ratio
SDWS	Secondary Drinking Water Standard
SEM	scanning electron microprobe
SHPO	State Historic Preservation Office
SMRA	Special Recreation Management Area
SMU	soil mapping unit
SO_2	sulfur dioxide
SOP	standard operating procedure
SPCC	Spill Prevention, Control, and Countermeasure

SWEDA	Sweetwater Economic Development Association
T&E	threatened and endangered
TAC	Technical Assignment Control
TDS	total dissolved solids
TEDE	Total EffectiveDose Equivalent
Texasgulf	Texasgulf, Inc.
Th-230	thorium-230
U_3O_8	uranium oxide
UBC	Uniform Building Code
UIC	Underground Injection Control
U-nat	natural uranium
Ur-E	Ur-Energy USA Inc.
URPA	Ur-Energy Passive Air
US	United States
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VOC	volatile organic compound
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Standard
WCDA	Wyoming Community Development Authority
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department
WHDP	Wyoming Housing Database Partnership
WOS	Wildlife Observation System
WQD	Water Quality Division
WRDS	Water Resources Data System
WS	Wyoming Statute
WSA	Wilderness Study Area
WSEO	Wyoming State Engineer's Office
WW	World War
WYDOT	Wyoming Department of Transportation
WYPDES	Wyoming Pollution Discharge Elimination System

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3.5 Hydrology

NUREG-1569 Section 2.7 states that "characterization of the hydrology at in situ leach uranium extraction facilities must be sufficient to establish the potential effects of in situ operations on the adjacent surface-water and groundwater resources and the potential effects of surface-water flooding on the in situ leach facility" (NRC, 2003). To meet these requirements, this section addresses surface water drainage characteristics and use (**Sections 3.5.1.1 and 3.5.1.2**), surface water quality (**Section 3.5.1.3**), regional and site hydrogeology (**Sections 3.5.2.1** and **3.5.2.2**), groundwater use (**Section 3.5.3**), regional and site groundwater quality (**Sections 3.5.4.1** and **3.5.4.2**), and the regional and site hydrologic conceptual models (**Sections 3.5.5.1** and **3.5.5.2**).

3.5.1 Surface Water

3.5.1.1 Drainage Characteristics

The Permit Area is located in the Great Divide Basin, a topographically closed system which drains internally, due to a divergence in the Continental Divide. Most of the surface water is runoff from precipitation or snowmelt, and it quickly infiltrates, recharging shallow groundwater, evaporates, or is consumed by plants through evapotranspiration... Alluvial deposits, if any, along drainages are not extensive, and the shallow aquifer, Battle Spring, underlying the Permit Area is unconfined, unconsolidated, and poorly stratified. The shallow water table is typically 80 to 150 feet deep below ground surface (ft bgs).

There are no perennial or intermittent streams within the Permit Area or on adjacent lands. The principal drainage within the Permit Area is Battle Spring Draw, which is dry for the majority of the year (**Figure 3.5-1**). Battle Spring Draw drains the northeastern 14 percent of the Permit Area; a sub-basin drains the central 47 percent; and an unnamed wash drains the southwestern 39 percent. The central sub-basin is not considered a separate basin because its headwaters begin approximately one mile north of the Permit boundary and end five miles southwest of the Permit boundary near the Kennecott Sweetwater Mill (NRC Source Material License No. SUA-1350, WDEQ Permit 481). The watersheds in the Project Area drain into the Battle Spring Flat, approximately nine miles southwest of the Permit Area. Much of the water conveyed through the ephemeral channels does not reach Battle Spring Flat. Instead, it infiltrates into the alluvium and recharges the Battle Spring aquifer.

The average slope of the Battle Spring Draw (northeastern) drainage in the Permit Area is 1.2 percent, the central drainage has an average slope of 1.5 percent, and the southwestern drainage has an average slope of 1.7 percent. The sinuosity (length of the channel divided by the length of valley) was calculated for the major channel in each basin. The sinuosity values for the northeastern Battle Spring Draw, central, and southwestern basins are 1.02, 1.15, and 1.16, respectively. The drainage densities range from 3.3 miles per square mile in the southwestern basin to 4.6 miles per square mile and 4.5 miles per square mile in the central and northeastern basins, respectively. A longitudinal profile of the northeastern Battle Spring Draw within the Permit Area is shown in **Figure 3.5-2.**

The existing drainages are incised, wide u-shaped and have trapezoidal cross-sectional morphologies. Vertical and slumping banks exist where active erosion is occurring. The channels near the downstream boundary of the Permit Area are incised three to six feet and are ten to 15 feet wide. The channel side-slopes range in slope from 1:1 to approximately 2.5:1. The bed material in the larger draws is sandy textured and non-cohesive. Draws around the Permit Area are typically vegetated with sagebrush.

Annual runoff in the Permit Area is very low due to the high infiltration capacity and low annual precipitation. The channels are dry for the majority of the year. Drainages in the Permit Area are naturally ephemeral and primarily flow during spring snowmelt as saturated overland flow when soil moisture is at a maximum. The quantity of spring runoff is variable, depending on the amount of winter snowfall accumulation. Peak runoff from high intensity rain events can be significant; but surface flow is generally short-lived. Storm-water runoff after high intensity rain events is very rare because surface water infiltrates very rapidly or evaporates. Some intermittent and localized flow can occur near a small number of springs; but no surface runoff has been observed from springs within the Permit Area.

Runoff data are limited for the ephemeral and intermittent streams in the Great Divide Basin. There are two USGS streamflow gaging stations within 40 miles of the Permit Area; but they are on perennial streams and are not representative of drainages in the Permit Area. On April 6, 1976, the USGS measured the instantaneous discharge of Lost Soldier Creek, approximately 14.5 miles northeast of the Permit Area. The measurement of 0.2 cubic feet per second was taken during spring runoff so the source of water was predominantly snowmelt (USGS, 2006).

A method for estimating peak stream discharge in ungaged watersheds in response to storms with recurrence intervals from two to 100 years has been developed by Miller (2003). Miller analyzed streamflow data for hundreds of gaged watersheds in Wyoming ranging from one to 1,200 square miles, and developed regional regression relationships based upon basin characteristics (drainage area, geographic factors, elevation, etc.). The most significant independent variables in Sweetwater County were drainage area and latitude. The equations used for each calculation as well as the associated percent errors are summarized in **Table 3.5-1**. **Table 3.5-2** shows the calculated peak discharges for Battle Spring Draw (the major drainage in the project area) at the exit boundary of the Project area. Due to the incised nature and the width of the channels, flows from the 100-year flood would likely remain mostly within the channels.

One small (less than one-quarter acre) detention pond exists in the Permit Area, which acts as an off-channel storage area for stock watering. This is Crooked Well Reservoir which is shown in **Figure 3.5-3**. This pond is dry for the majority of the year and typically fills from spring snowmelt during the months of March and April. Wetland vegetation has not been observed around this impoundment. This detention pond is not included in the active surface water rights in the area.

3.5.1.2 Surface Water Use

Water-use permits with legal descriptions inside and within two miles of the Permit Area were queried using the WSEO Water Rights Database (WSEO, 2006). The query results indicate that surface-water-use permits do not exist inside or within two miles of the Permit Area. As noted in **Section 3.5.3**, there are four BLM stock ponds within two miles of the Permit Area, but the water-use permits for these ponds are associated with the wells that supply the ponds. i.e., they are not associated with any surface-water-use permits. Also, as noted in the previous section, the Crooked Well Reservoir is located in the Permit Area. However, it is a small off-channel detention pond, less than one-quarter acre in size, and there is no water-use permit associated with it.

3.5.1.3 Surface Water Quality

Under the WDEQ Water Quality Division (WQD) Classification, Battle Spring Draw is listed as a Class 3B water body. Beneficial uses for Class 3B waters can include recreation, wildlife, "other aquatic life," agriculture, industry, and scenic value, but do not include drinking water, game fish, non-game fish, and fish consumption.

Background historic surface water quality within the study area was characterized using water quality data from 1974 and 1975 that were collected as part of the environmental report for the Sweetwater Uranium permit application (Shepard Miller Inc., 1994). Samples were collected at Battle Spring, which is seven miles southwest of the Permit Area. The historic dataset is small, and more representative of groundwater quality than surface water quality so are not directly comparable to expected surface water conditions within the Permit Area. The water-quality data for the historic sampling at Battle Spring are summarized in **Table 3.5-3**. Historic sampling of Battle Spring in July 1974 showed that pH was highly alkaline at 9.5. Uranium concentrations ranged from 0.006 to 0.95 mg/L.

In April 2006, storm-water samplers were installed at 12 locations in the Permit Area (**Figures 3.5-4** and **3.5-5**). In April 2007, an additional sampler was added to represent an area in the southeastern corner that was added to the Permit Area in the summer of 2006. Three samplers were installed to capture runoff as it enters the Permit Area from the upstream side, and the others capture runoff within the Permit Area or at the downstream boundary. The water samples were collected to characterize the quality of ephemeral surface runoff. The sampling locations were selected based on their topographic potential to concentrate ephemeral surface flow.

Seven samplers collected full, one-liter samples from snowmelt runoff in March and April 2007. These samples were collected on April 17, 2007. The water quality data for these seven samples are summarized in **Table 3.5-4**.

Ionic strength was low in all samples, which is probably due to the majority of the sample being snowmelt water that did not come into contact with the underlying soil. For all samples, the dissolved and total concentrations of trace metals were near or below the detection limit. Radiometric parameters, including uranium, lead-210, polonium-210, and thorium-230, were generally below detection with the exception of dissolved uranium, which was detected at very low concentrations (0.0003 to 0.0004 mg/L) in two samples, suspended uranium (0.0003 to 0.0009 mg/L) in two samples, and total uranium (0.0003 to 0.0009 mg/L) in four samples. Total radium-226 was detected at a low concentration (0.5 picoCuries per liter [pCi/L]) in one sample. This was the LC2 location in the center of the Permit Area in one of the larger channels. Gross alpha was also detected in small amounts (1.1 to 3.6 pCi/L) in six samples. The highest concentration of 3.6 pCi/L was again from the LC2 location. The pH of the sites was slightly acidic to neutral ranging from 6.39 to 7.12. Conductivity was low with less than 100 microSiemens per centimeter for all samples.

In general, the quality of water was very good for all samples. The radiometric parameters detected in the LC2 correlate well with the radiological scans of the Permit Area. This central area has the highest radioactive activity, as indicated by the results from the radiological surveys. Still, the levels are well below all Wyoming agricultural and drinking water standards.

3.5.2 Groundwater Occurrence

This section describes the regional and local groundwater hydrology including hydrostratigraphy, groundwater flow patterns, hydraulic gradient and aquifer parameters. The discussion is based on information from investigations performed within the Great Divide Basin, data presented in previous applications/reports for the Permit Area, and the geologic information presented in **Section 3.4** of this report. Regional and site hydrogeology are discussed in **Sections** 3.5.2.1 and **3.5.2.2**; groundwater use in **Section 3.5.3**; regional and site groundwater quality in **Sections 3.5.4.1** and **3.5.4.2**; and the regional and site hydrologic conceptual models in **Sections 3.5.5.1** and **3.5.5.2**.

3.5.2.1 Regional Hydrogeology

The Project is located within the northeastern portion of the Great Divide Basin. The basin is topographically closed with all surface water draining to the interior of the basin (**Figure 3.5-1**). Available data suggest that groundwater flow within the basin is predominately toward the interior of the basin (Collentine, 1981; Welder, 1966; and Mason, 2005). A generalized potentiometric surface map of the Battle Spring/Wasatch Formations, prepared by Welder and McGreevey (1966), indicates groundwater movement toward the center of the basin (**Figure 3.5-6**). Fisk (1967) suggests that aquifers within the Great Divide Basin may be in communication with aquifers in the Washakie Basin to the south and that groundwater may potentially move across the Wamsutter Arch between the basins.

The topographically elevated area known as the Green Mountains (Townships 26 and 27 North, between Ranges 90 to 94 West) was identified by Fisk as a major recharge area to aquifers within the northeastern portion of the Great Divide Basin (1967). The Rawlins Uplift, Rock Springs Uplift, and Creston Junction, located east, southwest and southeast, respectively, from the Permit Area, were also identified as major recharge areas for aquifers within the Great Divide Basin (Fisk, 1967). The main discharge area for the Battle Spring/Wasatch aquifer system is to a series of lakes, springs and playa lakes beds near the center of the basin. Groundwater potentiometric elevations within the Tertiary aquifer system in the central portion of the basin are generally close to the land surface.

The Battle Spring Formation crops out over most of the northeastern portion of the Great Divide Basin, including much of the Permit Area. The Battle Spring Formation is considered part of the Tertiary aquifer system by Collentine et al. (1981). The Tertiary aquifer system is identified as "the most important and most extensively distributed and accessible groundwater source in the study area" (Collentine et al., 1981). This aquifer system includes the laterally equivalent Wasatch Formation (to the west and south) and the underlying Fort Union and Lance Formations. The base of the Tertiary aquifer system is marked by the occurrence of the Lewis Shale. The Lewis Shale is generally considered a regional aquitard, although this unit does produce limited amounts of water from sandstone lenses at various locations within the Great Divide Basin and to the south in the Washakie Basin.

Shallower aquifer systems that can be significant water supply aquifers within the Great Divide Basin include the Quaternary and Upper Tertiary aquifer systems. However, as previously stated, the Battle Spring Formation of the Tertiary aquifer system crops out over most of the northeast part of the basin; and the Quaternary and Upper Tertiary aquifer systems are absent or minimal in extent. The shallower aquifer systems are only important sources of groundwater in localized areas, typically along the margin of the basin where the Battle Spring Formation is absent. Aquifer systems beneath the Tertiary include the Mesaverde, Frontier, Cloverly, Sundance-Nugget, and Paleozoic aquifer systems (Collentine et al., 1981). In the northeast Great Divide Basin, these aquifer systems are only important sources of water in the vicinity of outcrops near structural highs, such as the Rawlins Uplift).

For purposes of this application, only hydrogeologic units younger than and including the Lewis Shale (Upper Cretaceous age) are described, with respect to general hydrologic properties and potential for groundwater supply. The Lewis Shale is an aquitard and is considered the base of the hydrogeologic sequence of interest within the Great Divide Basin. Units deeper than the Lewis Shale, the top of which is about 14,000 ft bgs in the Permit Area, are generally too deep to economically develop for water supply or have elevated total dissolved solid (TDS) concentration that renders them unusable for human consumption. Exceptions to this can be found along the very eastern edge of the basin, tens of miles from the Permit Area, where some Lower Cretaceous and older units provide relatively good quality water from shallow depths. Hydrologic units of interest within the northeast Great Divide Basin are shown on the stratigraphic column in **Figure 3.5-7** and further described below, from deepest to shallowest.

- Lewis Shale (aquitard between Tertiary and Mesaverde aquifer systems);
- Fox Hills Formation (Cretaceous);
- Lance Formation (Tertiary aquifer system);
- Fort Union Formation (Tertiary aquifer system);
- Battle Spring Formation-Wasatch Formation (Tertiary aquifer system);
- Undifferentiated Tertiary Formations (Upper Tertiary aquifer system, including Bridger, Uinta, Bishop Conglomerate, Browns Park, and South Pass); and
- Undifferentiated Quaternary Deposits (Quaternary aquifer system).

Discussion of the regional characteristics for each of these hydrostratigraphic units is provided below.

Lewis Shale

The Lewis Shale underlies the Fox Hills Formation and is generally considered an aquitard in the Great Divide Basin. This unit is described by Welder and McGreevey (1966) as light to dark gray, carbonaceous shale with beds of siltstone and very fine-grained sandstone. The Lewis Shale is up to 2,700 feet thick, generally increasing in thickness toward the east side of the basin. In the Permit Area, the Lewis Shale is 1,200 feet thick. Small quantities of water may be available from the thin sandstone beds within this unit near the margins of the basin. The Lewis Shale acts as the confining unit between the Tertiary and Mesaverde aquifer systems.

Fox Hills Formation

Fox Hills Formation overlies the Lewis Shale and consists of very fine-grained sandstone, siltstone and coal beds. It is not considered to be an important aquifer in the Permit Area.

Lance Formation

Overlying the Fox Hills Formation is the Lance Formation, consisting predominately of very fine-to fine-grained lenticular, clayey, calcareous sandstone. Shale, coal and lignite beds are present within the formation, which reaches a maximum thickness of approximately 4,500 feet (Welder, 1966). In the Permit Area, the Lance Formation is 2,950 feet thick.

Collentine et al. (1981) include the Lance Formation (Aquifer) as the lower-most aquifer within the Tertiary aquifer system. However, the Lance Aquifer is included as part of the Mesaverde aquifer system by Freethey and Cordy (1991). Several stock wells, located along the eastern outcrop area of the basin, are completed in the Lance Aquifer. The stock wells have estimated yields of five to 30 gpm. Hydraulic conductivity for the Mesaverde aquifer system reported by Freethey and Cordy (1991) (which, by the authors' designation, includes the Fox Hills Sandstone, Lewis Shale, and Mesaverde Group, in addition to the Lance Aquifer) is reported to range from 0.0003 to 2.2 feet per day (ft/d). Because of the limited number of wells completed within the Lance Aquifer in the Great Divide Basin, there are insufficient data to develop representative potentiometric surface maps for this hydrologic unit. However the potentiometric surface is most likely similar in orientation to that seen in the overlying Fort Union and Battle Spring/Wasatch aquifers, with inferred groundwater movement generally toward the center of the basin. No regionally extensive aquitards between the Fort Union and Lance Formation were identified or reported in the hydrologic studies, investigations, and reports reviewed for this permit application.

Fort Union Formation

The Paleocene-age Fort Union Formation is between the Lance Formation and the overlying Wasatch and Battle Spring Formations, reaching a maximum thickness of approximately 6,000 feet within the Great Divide/Washakie Basin area. In the Permit Area, it is 4,650 feet thick. The Fort Union Formation is present at or near land surface in a band around the Rock Springs Uplift and in the northeastern corner of the Great Divide Basin (Mason, 2005). The Fort Union Formation is described as a fine- to coarse-grained sandstone with coal and carbonaceous shale. Siltstone and claystone are present in the upper part of the formation (Welder, 1966).

A potentiometric surface map prepared by Natftz (1996) that groups the Fort Union aquifer with the Battle Spring/Wasatch aquifers shows inferred movement of groundwater toward the basin center (**Figure 3.5-8**).

The Fort Union aquifer is largely undeveloped and unknown as a source of groundwater supply except in areas where it occurs at shallow depths along the margins of the basin. Well yields from the Fort Union aquifer within the Great Divide and Washakie Basins range from three to 300 gpm. Estimates of transmissivity for the Fort Union aquifer are highly variable. Ahern (1981) estimated transmissivity of less than three square feet per day (ft^2/d) for ten Fort Union Formation oil fields in the Green River Basin. Collentine et al. (1981) reported transmissivity of the Fort Union aquifer as characteristically less than 325 ft^2/d from oil well data.

Water quality for the Fort Union aquifer is described in **Section 3.5.3**.

Battle Spring Formation- Wasatch Formation

The most important water-bearing aquifers within the Great Divide Basin are in the Wasatch Formation and the Battle Spring Formation. The Wasatch and Green River Formations grade into the Battle Spring Formation in the northeastern portion of the basin. The Battle Spring Formation is absent along the eastern margin of the Great Divide Basin near the county line between Sweetwater and Carbon Counties. The termination of the Battle Spring Formation to the east is abrupt, controlled largely by structural features, including the Rawlins Uplift to the east and the Green Mountains to the north. A dry oil test in Section 14, Township 24 North, Range 90 West, located within a few miles of the eastern limit of the Battle Spring Formation, had a reported thickness of over 6,000 feet of fine- to coarse-grained sandstone that was interpreted by the American Stratigraphic Company as the Battle Spring Formation. Within the Permit Area, the Battle Spring/Wasatch Formations are over 6,200 feet thick

The Battle Spring Formation is described as an arkosic fine- to coarse-grained sandstone with claystone and minor conglomerates. There are typically several water-bearing sands within the Battle Spring Formation. The Battle Spring aquifers are included in the Tertiary aquifer system, as defined by Collentine et al. (1981).

Groundwater within the Battle Spring aquifers is typically under confined conditions, although locally unconfined conditions exist. The potentiometric surface within the Battle Spring aquifers is usually within 200 feet of the ground surface (Welder, 1966). Most wells drilled for water supply in this unit are less than 1,000 feet deep. The potentiometric surface map of Wasatch and Battle Spring aquifers (**Figure 3.5-6**) indicates groundwater movement toward the center of the basin (Welder, 1966). From the Permit Area, the potentiometric surface dips to the southwest at approximately 50 feet per mile (ft/mi) (a hydraulic gradient of 0.01 foot per foot [ft/ft]). The hydraulic gradient becomes steeper near the margins of the basin, where recharge to the aquifer is occurring.

Collentine et al. (1981) report that wells completed in the Battle Spring aquifers typically yield 30 to 40 gpm; but that yields as high as 150 gpm are possible. Collentine et al. (1981) also reported that pump tests conducted on 26 wells completed within the Battle Spring aquifers resulted in transmissivity values ranging from 3.9 to 423 ft^2/d, although most wells were less than 67 ft^2/d. Specific capacity was less than one gallon per minute per foot for 23 of 26 wells tested.

Water quality for the Wasatch/Battle Spring aquifers is described in **Section 3.5.3**.

Undifferentiated Tertiary and Quaternary Sediments

Undifferentiated Tertiary and Quaternary units above the Battle Spring/Wasatch Formations can be sources of water supply; but wells in the northeastern part of the Great Divide Basin are rare and generally limited to the margins of the basin where the Battle Spring Formation is not present. Commonly, along the margins of the basin, hydrostratigraphic units younger than the Battle Spring/Wasatch have been deposited on rocks of Cretaceous age or older. Water supply wells along the margins of the basin are often completed in both the older hydrostratigraphic units and Tertiary and Quaternary sediments. Water quality within these units tends to be variable and of limited quantity.

The undifferentiated Tertiary units consist of interbedded claystone, sandstone and conglomerate with the coarser grained facies providing suitable groundwater resources where present. The undifferentiated Tertiary units are absent within the Permit Area and are not discussed further.

The undifferentiated Quaternary units consist of clay, silt, sand, gravel and conglomerates that are poorly consolidated to unconsolidated (Welder, 1966). These units represent windblown, alluvial and lake deposits. Where present, these deposits can provide acceptable yields of groundwater of relatively good quality. Thin deposits of Quaternary sediments are present within surface drainages in the Permit Area but are usually above the water table and unsaturated. Therefore, Quaternary sediments are not an important groundwater source in the vicinity of the Project and are not described further.

3.5.2.2 Site Hydrogeology

LC ISR, LLC has been collecting lithologic, water level, and pump test data as part of its ongoing evaluation of hydrologic conditions at the Project. In addition to recent data acquisition, historic data collected for Conoco (Hydro-Search, Inc., 1982) were used to support this evaluation. Drilling and installation of borings and monitor wells is ongoing to provide additional data to further refine the site hydrologic conceptual model. Water level measurements, both historic and recent, provide data to assess potentiometric surface, hydraulic gradients and inferred groundwater flow directions for the aquifers of interest at the Project. A recently completed long-term pump test (Petrotek Engineering Corporation, 2007) and several shorter-term pump tests (Hydro-Engineering, 2007), as well as the pump tests conducted for Conoco (Hydro-Search, Inc., 1982), were used to evaluate hydrologic properties of the aquifers of interest, to assess hydraulic characteristics of the confining units, and to evaluate impacts to the hydrologic system of the Fault through the Permit Area (**Section 3.4.2.2**).

Figure 3.5-9 shows the monitor wells, current and historic, that were used in the site hydrologic evaluation. **Table 3.5-5** provides data for those wells to the extent available.

Hydrostratigraphic Units

LC ISR, LLC has employed the following nomenclature for the hydrostratigraphic units of interest within the Project. The primary uranium production zone is identified as the HJ Horizon. The HJ Horizon is subdivided into the Upper (UHJ), Middle (MHJ) and Lower (LHJ) Sands. The HJ Horizon is bounded above and below by aerially extensive confining units identified as the Lost Creek Shale and the Sage Brush Shale, respectively. Overlying the Lost Creek Shale is the FG Horizon. The deepest sand in the FG Horizon, the Lower FG (LFG) Sand, is the overlying aquifer to the HJ Horizon. Beneath the Sage Brush Shale is the KM Horizon. The uppermost sand within the KM Horizon, designated the Upper KM (UKM) sand, is a secondary production zone and also the underlying aquifer to the HJ Horizon. The No Name Shale unit separates the UKM and Middle KM (MKM) Sand. The MKM Sand is the underlying aquifer to the UKM Sand. The shallowest occurrence of groundwater within the Permit Area occurs within the DE Horizon, which is above the FG Horizon. **Figure 3.5-10** depicts the hydrostratigraphic relationship of these units.

A brief description of each hydrostratigraphic unit follows, going from shallowest to deepest.

DE Horizon

The DE Horizon is the shallowest occurrence of groundwater within the Permit Area, although the horizon is not saturated in all portions of the Permit Area. The DE Horizon consists of a sequence of sands and discontinuous clay/shale units. In the southern part of the Permit Area, sands of the DE Horizon coalesce with sands of the FG Horizon. The top of the unit ranges from 100 to 200 ft bgs.

FG Horizon

The top of the FG Horizon occurs at depths of approximately 200 to 250 ft bgs on the north side of the Fault and 300 to 350 ft bgs on the south side of the fault within the Permit Area (**Section 3.4.2.2**). The FG Horizon is subdivided into the Upper (UFG), Middle (MFG) and Lower (LFG) Sands. The total thickness of the FG Horizon is approximately 100 feet. The basal unit in the FG Horizon, the LFG Sand, ranges from 20 to 50 feet thick within the Permit Area. The LFG Sand is designated as the overlying aquifer for the HJ Horizon.

Lost Creek Shale

Underlying the FG Sands is the Lost Creek Shale. The Lost Creek Shale appears continuous across the Permit Area, ranging from five to 45 feet in thickness. Typically, this unit has a thickness of ten to 25 feet (**Figure 3.5-10**). The Lost Creek Shale is the confining unit between the overlying aquifer (LFG Sand) and the HJ Horizon. The confining characteristics of the Lost Creek Shale have been demonstrated with a pump test, as described later in this application.

HJ Horizon

The HJ Horizon is the primary target for uranium production at the Lost Creek Project. For purposes of uranium ISR operations, the HJ Horizon has been subdivided into three Sands: the Upper HJ (UHJ), Middle HJ (MHJ) and the Lower (LHJ) Sand. These sands are generally composed of coarse-grained arkosic sands with thin lenticular intervals of fine sand, mudstone and siltstone. The bulk of the uranium mineralization is present in the MHJ Sand. The total thickness of the HJ Horizon ranges from 100 to 160 feet, averaging approximately 120 feet (**Figure 3.5-10**). The top of the HJ Horizon ranges from approximately 300 to 450 ft bgs within the Permit Area. The three sands are generally separated by thin clayey units that are not laterally extensive and, based on pump test results, do not act as confining units to prevent groundwater movement vertically between the HJ Sands. The underlying aquifer to the HJ Horizon is the UKM Sand, which is also a potential uranium production zone. Therefore, the deepest sand within the HJ Horizon, the LHJ Sand, is also designated as the overlying aquifer to the UKM Sand.

Sage Brush Shale

Beneath the HJ Horizon is the Sage Brush Shale, at depths ranging from 450 to 550 ft bgs. The Sage Brush Shale is laterally extensive and ranges from five to 75 feet in thickness (**Figure 3.5-10**). The Sage Brush Shale is the lower confining unit to the HJ Production Zone. The confining characteristics of this unit have been demonstrated through pumping tests, as described in later sections of this application.

UKM Sand

The UKM Sand is present beneath the Sage Brush Shale. The UKM Sand is the upper member of the KM Horizon and is generally a massive coarse sandstone with lenticular fine sandstone intervals. The UKM Sand is the underlying aquifer to the HJ Horizon but is also a potential production zone within the Permit Area. The UKM Sand is typically 30 to 60 feet thick but can reach over 75 feet in thickness (**Figure 3.5-10**). The top of the UKM Sand is usually between 450 and 600 ft bgs within the Permit Area. The decision to proceed with a license amendment for production of the UKM Sand will depend on the results of additional delineation drilling and characterization of the lower confining unit and underlying aquifer that are described below.

No Name Shale

The No Name Shale at the base of the UKM Sand has not yet been fully characterized. The top of the unit is approximately 480 to 650 ft bgs. This unit is generally ten to 30 feet thick. This shale would be the lower confining unit to the UKM Sand, if LC ISR, LLC decides to request a license amendment to include the UKM Sand in the Lost Creek Project. Additional drilling is being conducted and a pump test is planned for the fall of 2007 to assess the confining characteristics of this unit.

MKM Sand

The MKM Sand is the underlying aquifer to the UKM Sand. Information on the MKM Sand is limited at this time. Additional borings are being drilled to evaluate the geologic and hydrologic characteristics of this sand. A pump test is planned to assess the hydrologic relationship between the UKM and MKM Sands in the fall of 2007.

Potentiometric Surface, Groundwater Flow Direction and Hydraulic Gradient

The LC ISR, LLC hydrologic evaluation of the Project included measurement of water levels in monitor wells completed in the HJ Horizon, the overlying aquifers (DE and LFG) and the underlying aquifer (UKM) to assess the potentiometric surface, groundwater flow direction and hydraulic gradient of those units. Additional historic water level data were available from the Conoco hydrologic evaluation of the site (Hydro-Search Inc., 1982). **Table 3.5-6** lists static water level data recorded in 1982, 2006 and 2007.

The potentiometric surface for the HJ Horizon is shown on **Figure 3.5-11a**. The water level data were collected just prior to beginning a long-term pump test in June 2007. From the figure, it is evident that the Fault provides a significant hydraulic barrier to groundwater flow. The potentiometric surface on the north side of the Fault is 15 feet higher than on the south side, based on wells located approximately 100 feet apart on either side of the fault (Wells HJT104 and HJMP107). During the long-term pump test, the hydraulic barrier effect of the Fault was confirmed, as described more fully in the following section on aquifer properties. Based on the potentiometric surface map, groundwater is inferred to flow to the west-southwest, generally consistent with the regional flow system. The Fault may redirect groundwater more westward than if the Fault were not present. Data from 1982 and 2006 are shown on **Figure 3.5-11b**. There are an insufficient number of data points to accurately represent the potentiometric surface for those measurement periods. However, the data illustrate the difference in water levels within the HJ Horizon across the Fault.

The horizontal hydraulic gradient for the HJ Sand, determined from water level data from 1982, 2006 and 2007, ranged from 0.0034 to 0.0056 ft/ft (18.0 to 29.6 ft/mi). **Table 3.5-7** summarizes the hydraulic gradients determined from the water level data.

Water levels collected from the overlying aquifer (LFG Sand) in 1982 and 2006 indicate a similar southwesterly groundwater flow direction as the HJ aquifer, although the data are sparse (**Figure 3.5-11c**). Horizontal hydraulic gradients for the LFG aquifer range from 0.0046 to 0.0058 ft/ft (24.3 to 30.6 ft/mi).

Figure 3.5-11d shows the potentiometric surface of the UKM Sand for data collected in 2006 and 2007. The difference in hydraulic heads across the Fault does not appear as pronounced for the UKM Sand as for the other shallower sands. Horizontal hydraulic gradients calculated for the UKM Sand from available water level data ranged from 0.0053 to 0.0063 ft/ft (28.0 to 33.3 ft/mi) (**Table 3.5-7**). While data in the UKM Sand are limited, it is presumed that the general flow direction is consistent with the HJ Horizon (e.g., to the southwest).

The horizontal hydraulic gradient calculated from only two wells completed in the DE Sand on the south side of the Fault was 0.0064 ft/ft (33.0 ft/mi) (**Table 3.5-7**).

Although several monitor wells were completed in the overlying (LFG) and underlying (UKM) aquifers, the hydraulic barrier effect of the Fault limits the number of data points for each aquifer on either side of the Fault. This limits the number of available monitor well locations, at this time, and makes determination of flow direction more complicated. However, the similarity in hydraulic gradients between the HJ aquifer and the LFG and UKM aquifers suggests that, although there is a significant difference in potentiometric heads, the orientation of the potentiometric surface is probably similar. Drilling is currently being conducted that will provide additional potentiometric surface data for those units as well as the MKM aquifer that is the underlying aquifer to the UKM Sand.

Vertical hydraulic gradients were determined by measuring water levels in closely grouped wells completed in different hydrostratigraphic units. **Figure 3.5-12** shows the location of the well groups used for the assessment of vertical hydraulic gradients. **Table 3.5-8** summarizes the calculated vertical gradients between the DE, LFG, HJ and UKM aquifers. Vertical hydraulic gradients range from 0.05 to 0.34 ft/ft between the LFG, HJ and UKM aquifers and consistently indicate decreasing hydraulic head with depth. The vertical gradient between the DE and LFG aquifers is minimal in the two places measured. This is consistent with earlier observations that the DE and LFG sands coalesce in places within the Permit Area. Of the six well groups evaluated, the only place where a downward potential is not evident is between the DE and LFG aquifers in the southwest portion of the Permit Area. The vertical gradients indicate the potential for groundwater flow is downward. A downward potential is indicative of an area of recharge, as opposed to an upward potential that is normally indicative of an area of groundwater discharge. A downward gradient is consistent with the structural and stratigraphic location of the Project with regard to Great Divide Basin.

Aquifer Properties

Aquifer properties for the Battle Spring aquifers within the Permit Area have been estimated from historic and recent pump tests. Hydro-Search Inc. performed a hydrologic evaluation in 1982 to determine the feasibility of in situ production of the Conoco uranium orebody at Lost Creek. Hydro-Search Inc conducted two 25-hour tests within the HJ Horizon. Both pump tests were conducted at a rate of 30 gpm and on the south side of the Fault. The locations of the pumping wells and monitor wells are shown in **Figure 3.5-13**. The results of the tests were variable, with one test indicating a transmissivity of approximately 95 ft^2/d (700 gallons per day per foot [gpd/ft]) and the other indicating a value of 270 ft^2/d (2,000 gpd/ft). The storativity calculated from the first test averaged 5×10^{-4}. There was no reported response in the HJ aquifer north of the fault. Monitor wells in the overlying (LFG) and underlying (UKM) aquifers did not show any effects from the pump test as reported by Hydro-Search Inc. (1982). Results of the pumping tests are summarized in **Table 3.5-9**.

2006 Pump Tests

Hydro-Engineering, Inc. (2007) conducted several short-term single well pump tests and three longer multi-well pump tests in October 2006. The single well tests ranged from 30 minutes to five hours in duration at rates from 0.67 to 14 gpm. The long-term tests were from 20 to 45 hours long at rates of 15 to 19 gpm. Each of the long-term tests were conducted in HJ well completions. The locations of the wells included in the pump test program are shown on **Figure 3.5-13**. Results of the pump test are summarized in **Table 3.5-9**.

The range of transmissivity calculated by Hydro-Engineering for the HJ aquifer was from 44 to 400 ft^2/d (330 to 3,000 gpd/ft). None of the HJ tests indicated significant communication with the overlying or underlying aquifers. There was also no indication of hydraulic communication across the Fault in any of the pump tests. Hydro-Engineering concluded that the Fault acts as a hydraulic barrier (2007).

The Hydro-Engineering data suggest that the transmissivity of the LFG aquifer, calculated from four tested wells, was generally much lower than the values estimated for the HJ aquifer. The range of transmissivity for the LFG aquifer was 4.4 to 40 ft^2/d (33 to 303 gpd/ft). Transmissivity for the UKM aquifer, estimated from single well tests at four wells, was similar to but lower than the HJ aquifer, ranging from 26 to 115 ft^2/d (195 to 858 gpd/ft). Three DE well completions were tested, with resulting transmissivity of 1.3 to 130 ft^2/d (10 to 1,000 gpd/ft).

2007 Pump Test

In June to July 2007, a long-term pump test was conducted in the HJ aquifer at Well LC19M (Petrotek Engineering Corporation, 2007). LC19M had been previously tested by Hydro-Engineering (2007) and is located on the north side of the Fault. The objectives of the test were to further develop aquifer characteristics of the HJ Horizon, to evaluate the hydraulic impacts of the Fault, and to demonstrate confinement of the production zone (HJ Horizon) aquifer. HJ monitor wells on both sides of the Fault and within distances likely to be impacted by the pump test were included as observation wells. Observation wells in the overlying (LFG) and underlying (UKM) aquifers near the pumping well and across the Fault were also monitored during the test. **Table 3.5-10** lists the data for monitor wells included in the pump test. **Figure 3.5-14** includes the locations of the pumping well and all observation wells included in the test.

Pre-pumping monitoring was performed several days in advance of the test to establish baseline conditions and to evaluate barometric effects. A step-rate test was performed on June 23, 2007 to determine a suitable pumping rate for the long-term test. The long-term test was started at 17:20 hours on June 27, 2007 and was terminated on July 3, 2007 at 10:51 hours. The total duration of the test was 5.7 days (8,251 minutes). The average pumping rate during the test was 42.9 gpm. Maximum drawdown in the pumping well was 93.3 feet. Monitoring was continued after pump shut-in to record recovery.

The transmissivity calculated from five wells completed in the HJ aquifer on the north side of the Fault (including the pumping well) were similar, ranging from 30.0 to 75.5 ft^2/d and averaging 68.3 ft^2/d. The average hydraulic conductivity calculated for the five wells, assuming an aquifer thickness of 120 feet, was 0.57 ft/d. Storativity calculated from those wells ranged from 6.6×10^{-5} to 1.5×10^{-4} and averaged 1.1×10^{-4}. **Table 3.5-11** summarizes the analyses of the pump test. Drawdown at the end of the test in the HJ aquifer is shown on **Figure 3.5-15**. **Figure 3.5-16** shows the water levels in the HJ monitor wells at the end of the test.

A pair of observation wells was placed on either side of the Fault, within 100 feet of each other. Well HJT104, located on the north side of the Fault, had a maximum drawdown of 40.5 feet at the end of the test. Well HJMP107 (south of the Fault) in the HJ Sand had a net decrease of 1.4 feet from the beginning of the test to the end of pumping. At least a portion of that change is attributable to a declining trend in water levels that was observed in all monitor wells prior to the start of the test. The reason for the background trend observed has not been identified; however, it might be a result of offset pumping (e.g., surrounding ranch wells, or LC ISR, LLC's first two water supply wells that are screened over multiple sands).

At the beginning of the test, the water level at HJT104 was at 6,770.68 feet above mean sea level (ft amsl) and the water level at HJMP107 was at 6,754.85 ft amsl, a head difference of almost 15 feet with the higher head north of the Fault. At the end of the pump test the water levels for HJT104 and HJMP107 were 6,730.14 ft amsl and 6753.47 ft amsl, respectively (**Figure 3.5-16**). The drawdown observed in HJT104 (immediately north of the Fault) was greater than 40 feet, and the water level difference between HJT104 and HJMP107 (across the Fault from each other) was 23 feet with the higher head south of the Fault. Minor responses to pumping were observed across the Fault (e.g., approximately 0.3 to 0.7 feet of drawdown related to pumping in HJMP107 and other wells south of the Fault). Based on the results, the Fault, while not entirely sealing, significantly impedes groundwater flow, even under considerable hydraulic stress.

The response of the overlying and underlying aquifers during the pump tests was small (e.g., on the order of 0.2 to 0.5 feet); but the water level responses did correspond to the start and stop of pumping from LCM19 in the HJ Horizon. The underlying/overlying responses appear to be relatively consistent, regardless of distance from the pumping well, the hydrostratigraphic interval monitored, or the location relative to the Fault. These water level changes suggest potential impacts from off-site pumping or background trends that, because of distance from the monitor wells, are manifested at multiple locations at the same or similar times. As previously stated, a declining trend in water level elevations was observed prior to the start of the test. Most of the wells showed an initial inverted response (increase in water level) at the start of the test and then resumed a gradual downward trend during the test. This phenomenon was also observed and noted by Hydro-Engineering during the 2006 pump tests. It is possible that some of the response could be caused by (1) pumping in the drilling water well (LC-1) which is completed in both the DE and FG Horizons, (2) communication across multiple sands due to the scissors nature of the Fault distant from the pumping well location, or both. While LC ISR, LLC has aggressively pursued re-plugging of historic wells, it is also possible that some of the communication could be related to abandoned wells. Additional discussion regarding the results of the testing are included in **Attachment 3.5-1**.

It is noted that detailed mine unit pump tests will be conducted during development of each future mine unit. As such, additional investigations will be performed to assess the background trends observed, characteristics of the Fault and potential communication between the sands monitored for the 2007 test. Based on testing results to date, it is anticipated that any minor communication between the HJ Horizon and the overlying and underlying sands can be managed through operational practices, detailed monitoring, and engineering operations. In this regard, the potential communication observed at Lost Creek is much lower (e.g., five to ten times less) than has been observed in other ISR operations where engineering practices were successfully implemented to isolate lixiviant from overlying and underlying aquifers. **Figure 3.5-17** summarizes the results of the Hydro-Search, Inc. (1982), Hydro-Engineering (2007) and Petrotek Engineering Corporation (2007) pump test results.

The 2007 pump test data support the following conclusions:

- the pump test results provide sufficient aquifer characterization of the HJ Horizon;
- the HJ Horizon has sufficient transmissivity such that mining operations can be conducted consistent with the Operations Plan (see **Section 3.0**);
- the HJ Horizon is sufficiently isolated from the overlying and underlying sands by the Lost Creek and Sage Brush Shales;
- hydraulic continuity of the HJ Horizon has been demonstrated over a large scale (e.g., more than 1,000 feet) such that mine planning (e.g., mine unit and monitor well layout) can proceed;

- the hydraulic properties of the Fault have been defined over the test area to an extent such that mine planning can be achieved; and
- testing data to date indicate that the Fault significantly restricts flow in the HJ Horizon.

3.5.3 Groundwater Use

Water-use permits with legal descriptions inside and within two miles of the Permit Area were queried using the WSEO Water Rights Database (WSEO, 2006). The majority of the groundwater-use permits filed in the vicinity of the Permit Area are for monitoring or miscellaneous mining-related purposes, and do not represent consumptive use of groundwater. Many of those permits are associated with the Kennecott Sweetwater Mine, which is in reclamation. Because this mine was an open-pit operation, the dewatering and monitoring associated with it were at much shallower depths than those proposed for ISR at Lost Creek. Dewatering in advance of mining was completed in 1983.

All non-mining and mining groundwater-use permits inside and within two miles of the Permit Area are presented in **Table 3.5-12**. Descriptions of the groundwater-use permits include, but are not limited to, location, uses, priority dates, status, yield, total depth, and static water depth.

The water-use permits unrelated to mining are those of the BLM. In 1968 and 1980, the BLM Rawlins District was granted three permits (13834, 55112, and 55113). Each of these permits is associated with a well that supplies a stock pond (or tank). These wells and associated stock ponds are located outside of the Permit Area, but within the study area (**Figure 3.5-18**). In addition, there is a fourth BLM well, supplying a stock pond, for which no water-use permit was found.

Permit 13834 is for Battle Spring Draw Well No. 4451, which pumps water into a stock tank east of the Permit Area (Township 25 North, Range 92 West, Section 21, Northwest Quarter, Northeast Quarter, Northeast Quarter). In 1968, a uranium exploration hole was drilled at this location; when water was encountered, plastic casing was installed and the well was developed. The well depth is 900 feet, with a static water level of 104 feet. A yield of 19 gallons per minute is permitted. The screened interval is unknown, but given the well depth, it may be significantly deeper than the sands targeted by LC ISR, LLC under this permit.

Boundary Well No. 4775 (Permit 55112) and Battle Spring Well No. 4777 (Permit 55113) were drilled as stock wells in 1981 to a depth of approximately 280 feet and 220 feet, respectively. These wells are shallower than the sands targeted by LC ISR, LLC under this permit. A water use of 25 gallons per minute is permitted at each of these wells. According to aerial photographs, Boundary Well No. 4775 is located northeast of the Permit Area, in Township 25 North, Range 92 West, Section 10, Southeast Quarter, Northeast Quarter, Southwest Quarter. Battle Spring Well No. 4777 is situated southeast of the Permit Area, in Township 25 North, Range 92 West, Section 30, Southeast Quarter, Northwest Quarter. The condition of the windmill on Boundary Well No. 4775 is not known, and the windmill on the Battle Spring Well No. 4777 was not in working order in June 2007 (**Figure 3.5-19**).

In June and July of 2007, LC ISR, LLC contacted BLM to identify the status of these groundwater-use permits. These groundwater-use permits are still considered active (BLM, 2007a). In addition to these wells, BLM identified another active stock well, the East Eagle Nest Draw Well.

The East Eagle Nest Draw Well is located north of the Permit Area, in the Northwest Quarter of the Northwest Quarter of the Northwest Quarter of Section 13, Township 25 North and Range 93 West. From mid-May through mid-September, an electric submersible pump in the well is used to pump water into a livestock watering pond at an average rate of five gallons per minute for six to eight hours each day (**Figure 3.5-20**). The total depth of this well is 370 feet, with a static water level of 269 feet.

Throughout the phases of the Project, LC ISR, LLC will correspond with BLM to ensure that the stock reservoirs and wells are not impacted in a manner that restricts the intended use.

At this time, the Permit Area has three water supply wells and 75 monitor wells permitted and bonded by the State Engineer and WDEQ to LC ISR, LLC and its affiliates (Ur-E and NFU Wyoming, LLC). Installation of these wells is on-going. Currently, the Project consumes a negligible amount of groundwater for well development, monitoring, testing, and miscellaneous purposes related to uranium exploration. Projected water use once ISR begins and the impacts of that use are discussed in **Section 4.5.2**.

A list and description of the queried cancelled and abandoned drill holes and wells within a two-mile radius of the Permit Area are displayed in **Table 3.5-13**. Drill hole abandonment and well abandonment are discussed in detail in **Sections 3.2.2** and **6.3.2, respectively,** of the Technical Report for this Project.

3.5.4 Groundwater Quality

This section describes the regional and local groundwater quality based on information from investigations performed within the Great Divide Basin, data presented in previous applications/reports for the Permit Area, and recent data collected in the Permit Area.

3.5.4.1 Regional Groundwater Quality

Water quality within the Great Divide Basin ranges from very poor to excellent. Groundwater in the near surface, more permeable aquifers is generally of better quality than groundwater in deeper and less permeable aquifers. Groundwater with TDS less than 3,000 mg/L can generally be found at depths less than 1,500 feet within the Tertiary aquifer system, which includes the Battle Spring/Wasatch, Fort Union and Lance aquifers (Collentine et al., 1981).

Water quality for the Great Divide Basin is available from a large number of sources including the USGS National Water Information System (NWIS) database, the University of Wyoming Water Resources Data System (WRDS) and the USGS Produced Waters Database. Much of these data are tabulated in "Water Resources of Sweetwater County, Wyoming", a USGS Scientific Investigation Report by Mason and Miller (2005). However the quality and accuracy of much of the data are difficult to assess. This section of the permit application describes general water quality of the Great Divide Basin, primarily by reference to these sources.

Mason and Miller (2005) noted that water quality in Sweetwater County is highly variable within even a single hydrogeologic unit; and that water quality tends to be better near outcrop areas, where recharge occurs. They also noted that groundwater quality samples from the Quaternary and Tertiary aquifers are most likely biased toward better water quality and do not necessarily represent a random sampling, for the following reasons. Wells and springs that do not produce useable water usually are abandoned or not developed. Deeper portions of the aquifers typically are not exploited as a groundwater resource because a shallower water supply may be available. As a result, these water sources do not become part of the sampled network of wells and springs that ultimately make up the available groundwater database. Groundwater quality samples from deeper Mesozoic and Paleozoic hydrostratigraphic units are often available where oil and gas production or exploration has occurred. Therefore, groundwater samples from older geologic units may have less bias in representing ambient groundwater quality than samples collected from Quaternary and Tertiary aquifers.

Water quality within the shallow Tertiary aquifers generally represents sodium-bicarbonate to sodium-sulfate water types. TDS levels within the Wasatch aquifer in the west and south parts of the Great Divide Basin tend to be high relative to the U.S. EPA's Secondary Drinking Water Standard (SDWS) of 500 mg/L, even within the shallow aquifers. TDS levels within the Battle Spring/Wasatch aquifers are generally below 500 mg/L along the northern flank of the Great Divide Basin (which includes the Permit Area). Elevated TDS levels (greater than 3,000 mg/L) are present within the Wasatch aquifer along the eastern edge of the Washakie Basin and within the Fort Union and Lance aquifers along the east side of the Rock Springs uplift. Elsewhere within the Great Divide and Washakie Basins, TDS levels in the Tertiary aquifer system are typically between 1,000 and 3,000 mg/L (Collentine, 1981).

Low-TDS waters within the Battle Spring aquifer are predominately sodium-bicarbonate type waters. With increasing salinity, the water type tends to become more calcium-sulfate dominated. However, this trend is not exhibited in the Wasatch, Fort Union and Lance aquifers within the Great Divide and Washakie Basins. The Wasatch and Lance aquifers are characterized by predominately sodium-sulfate type waters, particularly near outcrop areas. The Fort Union is more variable in composition.

Water quality data for Tertiary aquifers away from the outcrop areas are sparse, but available data indicate that TDS levels increase rapidly away from the basin margins. A Lance pump test in Section 14, Township 23 North, Range 99 West has TDS levels in excess of 35,000 mg/L. A Fort Union test in Section 25, Township 13 North, Range 95 West had TDS levels in excess of 60,000 mg/L, based on resistivity logs (Collentine et al., 1981). Water quality samples from produced water in the Wasatch and Fort Union Formations from an average depth of 3,500 feet had TDS values ranging from 1,050 to 153,000 mg/L with a median value of 13,900 mg/L (Mason and Miller, 2005). TDS from four wells completed in the Fort Union Formation located along the margins of the basin ranged from 800 to 3,400 mg/L (Welder and McGreevy, 1966).

A graph of TDS versus sampling depth for produced water samples from the Wasatch Formation in Sweetwater County prepared by Mason and Miller (2005) shows that a depths greater than 3,000 feet, TDS values are typically above 10,000 mg/L. It is noted that the Mason and Miller data set is small for a large area and may be biased by data from the southern part of the Great Divide Basin; few site-specific data directly applicable to the Project are available.

Water quality within the Battle Spring aquifer is generally good in the northeast portion of the basin with TDS levels usually less than 1,000 mg/L and frequently less than 200 mg/L. Water type within the Battle Spring aquifer is typically sodium bicarbonate to sodium sulfate. Mason and Miller (2005) reviewed eighteen groundwater samples collected from the Battle Spring aquifer and observed that those samples represented some of the best overall quality of those studied in Sweetwater County. Sulfate levels can be elevated in Tertiary aquifers, but are generally low in the shallow aquifers of the

Battle Spring Formation. Out of eighteen samples included in the Mason and Miller (2005) study, only one sample exceeded the WDEQ Class I Drinking Water Standard for sulfate of 250 mg/L. Most of the samples were also below the WDEQ TDS Class I Drinking Water Standard of 500 mg/L. Nitrate, fluoride and arsenic levels were below WDEQ and EPA standards for all of the samples.

Notable exceptions to the relatively good water quality included waters with elevated radionuclides. Uranium and radium-226 (Ra-226) concentrations exceeded their respective EPA Maximum Contaminant Levels (MCLs) of 003 mg/L and 5 pCi/L in some of the samples; radon-222 (Rn-222) concentrations were also relatively high in some samples (Mason and Miller, 2005). The presence of high levels of uranium in Tertiary sediments and groundwater of the Great Divide Basin has been well documented. The Lost Creek Shroeckingerite deposit located northwest of the Permit Area is noted for high uranium levels in groundwater. Uranium-bearing coals are also present in Great Divide Basin. Sediments of the Battle Spring Formation were derived from the Granite Mountains and contain from 0.0005 to 0.001 percent uranium (Masursky, 1962). Based on historical exploration results, certain areas of the Battle Spring Formation (e.g., Lost Creek) contain much higher uranium concentrations.

Water quality for aquifer systems deeper than the Tertiary (such as the Mesaverde aquifer system) are not described in this report; because they are several thousands of feet deep in the vicinity of the Project and are separated from the Tertiary aquifer system by the Lewis Shale, a regional aquitard. The deeper aquifer systems of the Great Divide Basin will not impact nor be impacted by ISR activities at the Project.

3.5.4.2 Site Groundwater Quality

Information regarding site water quality is primarily derived from reconnaissance studies conducted by Conoco (Hydro-Search, Inc., 1982) and ongoing exploration and delineation of the Project by LC ISR, LLC.

Groundwater Monitoring Network and Parameters

Conoco installed 12 wells, separated into four groups, to evaluate aquifer properties and water quality of the uranium ore-bearing sands and overlying and underlying aquifers within the Permit Area. Three of the groups included wells completed within the HJ Horizon aquifer and the overlying (LFG) and underlying (UKM) aquifers. The fourth group included three wells completed within the HJ Horizon aquifer. The location of the wells is shown on **Figure 3.5-21**. The Conoco wells were sampled for the parameters listed in **Table 3.5-14**.

LC ISR, LLC installed wells in 2006 completed in the DE, LFG, HJ and UKM aquifers and initiated baseline sampling for the same constituents as Conoco, with the addition of alkalinity (as calcium carbonate [$CaCO_3$]), gross alpha, gross beta and radium-228. Four quarters of sampling have been completed for several of the wells that were installed in 2006. Additional wells have been installed in 2007 and are being incorporated into the groundwater monitoring network. The locations of the LC ISR, LLC monitor wells that have been sampled for water quality are indicated on **Figure 3.5-22**.

Groundwater Quality Sampling Results

Ten of the 12 monitor wells installed by Conoco were sampled in August 1982. Hydro-Search, Inc. reported that there were no major differences in water quality between the HJ Horizon aquifer and the overlying and underlying aquifers (1982). The predominant ions were calcium and sulfate. TDS values were all below the WDEQ Class I Standard of 500, ranging from 200 to 490 mg/L (**Figure 3.5-23a**). The pH of the waters ranged from 7.1 to 8.5, indicating slightly alkaline conditions. Chloride levels were very low, ranging from seven to 18 mg/L.

One of the sampled wells had an obstruction in the well and elevated pH (11.1) and potassium (54 mg/L) values. It was determined that the sampling results are not representative of the site aquifers and that the well is possibly are contaminated with cement.

Most trace constituents were below the detection limits. Selenium was present in two samples at 0.023 mg/L, which was above the WDEQ and EPA drinking water standards at that time (0.001 mg/l). The WDEQ Class I Standard and the EPA MCL are currently 0.05 mg/L. Radium-226 was detected in all of the samples, with a range of 2.5 to 300 pCi/L. Only two samples, one collected from the overlying aquifer and one from the underlying aquifer, were below the WDEQ Class I Standard and EPA MCL for radium-226 (5.0 pCi/L). **Figure 3.5-23b** depicts the distribution of Ra-226 from the 1982 sampling round. Elevated Ra-226 groundwater concentrations are common within and around uranium orebodies. Uranium levels ranged from below detection (less than 0.005 mg/L) to 0.48 mg/L. Six of the ten samples exceeded the current EPA MCL for uranium (0.03 mg/L) (**Figure 3.5-23c**).

LC ISR, LLC began baseline sampling in September 2006. The initial sampling round included the following thirteen locations:

- DE Monitor Wells: LC29M, LC30M and LC31M
- LFG Monitor Wells: LC18M, LC21M, and LC25M
- HJ Monitor Wells: LC19M, LC22M, LC26M and LC28M; and
- UKM Monitor Wells: LC20M, LC23M and LC24M.

During the second sampling round, conducted in November 2006, the following three wells were added to the program:

- LFG Monitor Well: LC15M;
- HJ Monitor Well: LC27M; and
- UKM Monitor Well: LC17M.

In the third sampling round conducted in February to March 2007, HJ monitor well LC16M was added to the program. The fourth sampling round was conducted in May 2007. All 17 of the wells listed above were included in that sampling event (**Figure 3.5-24a**). Many of the recently installed wells used for the long-term pump test will be added into the monitoring program in the next sampling round. In addition to the baseline sampling program, LC ISR, LLC has also sampled two of the water supply wells, LC1W and LC2.

Results of the LC ISR, LLC baseline monitoring program are summarized in **Table 3.5-15**. The table shows that the WDEQ TDS Class I standard is exceeded at one well in the DE, HJ and UKM aquifers. Fourteen out of the 17 wells have TDS levels below the Class I Standard. The distribution of TDS is shown in **Figure 3.5-24a**. Sulfate exceeds the WDEQ Class I Standard (250 mg/L) in one DE monitor well (LC31M) and one HJ monitor well (LC26M). The average distribution of sulfate from September 2006 to May 2007 is shown in **Figure 3.5-24b**. As with the Conoco monitoring results, chloride values are low with all but one sample at ten mg/L or lower (**Table 3.5-15**).

Piper diagrams have been developed to compare groundwater quality between individual wells (**Figure 3.5-25a**) and between different aquifers (**Figure 3.5-25b**). The individual well comparison plots the average value for each of the wells for all of the samples analyzed. The piper diagram comparing different aquifers represents the average water quality for all wells sampled within individual aquifers (DE, LFG, HJ and UKM). Groundwater within the shallow Battle Springs aquifers beneath the Permit Area is a calcium sulfate to calcium bicarbonate type water. There is some variability in water chemistry when the wells are compared individually. However, when the average for the aquifers is plotted, there is no significant difference in major water chemistry between the production zone and overlying and underlying aquifers.

The trace constituents, boron, cadmium, chromium, copper, mercury, molybdenum, nickel, vanadium and zinc were at or below detection limits for all samples. Ammonia and selenium exceeded either a WDEQ Class I Standard or an EPA MCL in two monitor wells. Selenium exceeded the WDEQ Class I Standard and EPA MCL (0.05 mg/L in one DE monitor well (LC31M). Iron exceeded the WDEQ Class I Standard and EPA MCL (0.3 mg/L) in one DE monitor well (LC29M), two LFG monitor wells (LC18M and LC21M) and one UKM monitor well (LC24M). Manganese was above the WDEQ Class

I Standard and EPA MCL (0.05 mg/L) in seven of the 12 samples collected from DE monitor wells but did not exceed those standards in any other sampled aquifer.

With the exception of HJ monitor wells LC27M and LC29M, every uranium analysis exceeded the EPA MCL of (0.03 mg/L). The average uranium concentration of all samples collected in the baseline monitoring program (0.306 mg/L) is over an order of magnitude greater than the MCL. The average distribution of uranium at individual wells from September 2006 to May 2007 is shown on **Figure 3.5-26a**.

The average distribution of radium-226+228 is shown on **Figure 3.5-26b**. The WDEQ Class I Standard and EPA MCL for radium-226+228 is 5.0 pCi/L. **Table 3.5-16** summarizes the number of wells in each aquifer that exceed the EPA MCL.

In summary, general water quality in the shallow Battle Spring aquifers within the Permit Area tends to be relatively good, with the exception of the presence of radionuclides. TDS and sulfate values are relatively low, with occasional exceedances of WDEQ Class I standards. Manganese is elevated above state and federal standards in the water table aquifer (DE) but is below standards in deeper confined aquifers in the vicinity of the uranium orebodies. Radium-226+228 exceeds the EPA MCL in over two thirds of the samples collected and the average uranium concentration is an order of magnitude greater than the EPA MCL for that constituent. Elevated concentration of these constituents is consistent with the presence of uranium orebodies.

3.5.5 Hydrologic Conceptual Model

A hydrologic conceptual model of the Project and surrounding area has been developed to provide a framework that allows LC ISR, LLC to make decisions regarding optimal methods for extracting uranium from mineralized zones, and to minimize environmental and safety concerns caused by ISR operations.

LC ISR, LLC will use ISR technology at the Project to extract uranium from permeable uranium-bearing sandstones within the upper portion of the Battle Spring Formation, at depths ranging from 350 to 900 feet. A conceptual hydrologic model of the Project is summarized below.

3.5.5.1 Regional Groundwater Conceptual Model

The Project is located within the northeastern portion of the Great Divide Basin. The Eocene Battle Spring Formation crops out over most of the northeastern portion of the Great Divide Basin, including the Permit Area. The total thickness of the Battle Spring Formation in the vicinity of the Permit Area is approximately 6,200 feet. The Battle

Spring Formation contains multiple aquifers that are a part of the Tertiary aquifer system. Groundwater flow within the Battle Spring aquifers is primarily toward the interior of the basin, southwest of the Project. . Recharge to the Battle Springs aquifers within the Project area is mostly the result of infiltration of precipitation to the north and northeast in the Green Mountains and Ferris Mountains. Based on available information, discharge from the Battle Spring aquifers is predominately to a series of lakes, springs and playa lake beds near the center of the basin. Some groundwater from the Battle Spring aquifers is discharged through pumping for stock watering, irrigation, industrial and domestic use.

The Battle Spring Formation is described as an arkosic fine- to coarse-grained sandstone with claystone and conglomerates. Groundwater within the Battle Spring aquifers is typically under confined (artesian) conditions, although locally unconfined conditions exist. The potentiometric surface within the Battle Spring aquifers is usually within 200 feet of the ground surface. Most wells drilled for water supply in this unit are less than 1,000 feet deep. Wells completed in the Battle Spring aquifers typically yield 30 to 40 gpm but yields as high as 150 gpm are possible.

Water quality within the shallow Tertiary aquifers generally represents sodium-bicarbonate to sodium-sulfate water types. TDS levels within the Battle Spring aquifers are generally below 500 mg/L along the northern flank of the Great Divide Basin near areas of outcrop. Low TDS waters within the Battle Springs aquifer are predominately sodium-bicarbonate type waters. With increasing salinity, the water type tends to become more calcium-sulfate dominated. Notable exceptions to the relatively good water quality included waters with elevated radionuclides (uranium, Ra-226 and radon-228). High levels of uranium are common in Tertiary sediments and groundwater of the Great Divide Basin. The Lost Creek Shroeckingerite deposit located northwest of the Project is noted for high uranium levels in groundwater. Uranium-bearing coals are present in the Wasatch Formation in the central part of the Great Divide Basin.

As described previously, the Battle Springs Formation outcrops over most of the Permit Area. The Battle Spring is the shallowest occurrence of groundwater within the Permit Area. Water-bearing Quaternary and Tertiary units younger than the Battle Spring Formation are present several miles to the north and east and are hydraulically up-gradient of the Permit Area. Therefore, ISR operations conducted at the Project will have no impact on those shallower hydrostratigraphic units.

3.5.5.2 Site Groundwater Conceptual Model

Hydrostratigraphic Units

The hydrostratigraphic units of interest within the Battle Spring Formation, with respect to the Project include, from shallowest to deepest:

- DE Horizon (shallowest occurrence of groundwater):
  - sands and discontinuous clay/shale units, top of unit 100 to 200 ft bgs;
  - coalesces with underlying FG Horizon to the south; and
  - Water levels in the DE Sand are typically 140 to 200 ft bgs;
- Upper No Name Shale (upper confining unit to the FG Horizon):
  - zero to 50 feet thick;
- FG Horizon (includes overlying aquifer to HJ Horizon):
  - subdivided into UFG, MFG and LFG Sands;
  - total thickness of horizon is 100 feet;
  - top of unit is 200 to 350 ft bgs;
  - LFG Sand the overlying aquifer to HJ Horizon;
  - LFG Sand is 20 to 50 feet thick; and
  - water Levels in the LFG Sand are typically 160 to 200 ft bgs;
- Lost Creek Shale (upper confining unit to the HJ Horizon):
  - laterally continuous across Permit Area;
  - five to 45 feet thick; and
  - confining properties demonstrated from water levels and pump test;
- HJ Horizon (contains the primary production zone):
  - subdivided into UHJ, MHJ and LHJ Sands, although sands are hydraulically connected;
  - coarse-grained arkosic sands with thin lenticular intervals of fine sand, mudstone and siltstone;
  - averages 120 feet thick;
  - top of unit is 300 to 450 ft bgs; and
  - water levels in the HJ Horizon range from 150 to 200 ft bgs;
- Sage Brush Shale (lower confining unit to the HJ Horizon and upper confining unit to the UKM Horizon):
  - laterally continuous across Permit Area;
  - five to 75 feet thick;
  - top of unit 450 to 550 ft bgs; and
  - confining properties demonstrated from water levels and pump test;
- KM Horizon (includes possible secondary production zone, lower confining units and underlying aquifers):
  - subdivided into UKM, MKM and LKM Sands;
  - massive coarse sandstones with thin lenticular fine sandstone intervals;

- top of unit is 450 to 600 ft bgs;
- UKM Sand is a possible secondary production zone and first underlying aquifer;
- UKM Sand is 30 to 60 ft thick;
- water levels in the UKM Sand are generally 185 to 220 ft bgs;
- No Name Shale is the lower confining unit to the UKM Sand;
- No Name Shale is ten to 30 feet thick and laterally extensive but will require additional characterization; and
- MKM is the underlying aquifer to the UKM Sand but will require additional characterization.

Potentiometric Surface and Hydraulic Gradients

Potentiometric surface of the HJ Horizon indicates that groundwater flow is to the west-southwest under a hydraulic gradient of 0.003 to 0.006 ft/ft (15.8 to 31.6 ft/mi), generally consistent with the regional flow system. The Fault acts as a hydraulic barrier to groundwater flow as demonstrated from water level differences of 15 feet across the Fault within the HJ Horizon and the pump test results. The Fault may redirect groundwater more westward than if it were not present. Groundwater flow direction and hydraulic gradients for the overlying (DE and FG) and underlying aquifers (UKM) are generally similar to that of the HJ Horizon. The potentiometric heads decrease with depth. Differences in water level elevations between the LFG, HJ and UKM aquifers indicate that confining units are present between these hydrostratigraphic units. Pump tests indicate the presence of confining units between the LFG and HJ aquifers and between the HJ and UKM aquifers.

Vertical hydraulic gradients range from 0.050 to 0.34 ft/ft between the LFG, HJ and UKM aquifers and consistently indicate decreasing hydraulic head with depth. The vertical gradients indicate the potential for groundwater flow is downward. The vertical gradients also support the confining nature of the Lost Creek and Sage Brush Shale. The vertical gradient between the DE and LFG aquifers is minimal, consistent with observations that those hydrostratigraphic units coalesce in places within the Permit Area.

Aquifer Properties

Transmissivity for the HJ Horizon ranges from 35 to 400 ft^2/d (260 to 3,000 gpd/ft). Based on long-term pump tests, the estimated "effective" transmissivity (because of the impacts of the Fault) is 60 to 70 ft^2/d (450 to 525 gpd/ft) on the north side of the Fault. Because of the boundary effect of the Fault (e.g., the system is not an infinite-acting aquifer), the actual transmissivity of the aquifer, without impacts from the Fault, would be higher. Similarly, the estimated hydraulic conductivity is between one to two ft/d. Storativity of the HJ Horizon ranges from 5.0×10^{-5} to 5.0×10^{-4}.

Based on more limited testing, the transmissivity of the LFG aquifer is lower than for the HJ Horizon ranging from 4.4 to 40 ft^2/d (30 to 300 gpd/ft). The range of transmissivity of the UKM aquifer is similar to but slightly lower than the HJ aquifer, from 26 to 115 ft^2/d (195 to 860 gpd/ft). Transmissivity of the DE Horizon is variable, ranging from 1.3 to 130 ft^2/d (10 to 1,000 gpd/ft). Storativity values have not been determined for the overlying and underlying aquifers at this time because no multi-well pump tests have been conducted within those aquifers. However, it is expected that storativity values in the FG and KM Horizons will be similar to the range observed in the HJ Horizon. The DE Horizon is at least partially under unconfined conditions and therefore will have a specific yield instead of a storage coefficient. Long-term multi-well pump tests will be performed in the fall of 2007 to collect additional data regarding aquifer properties of the overlying and underlying aquifers.

Water Quality

Water quality within the hydrostratigraphic units of interest (the production zones and overlying and underlying aquifers) is generally good with respect to major chemistry. TDS and sulfate levels are typically below respective WDEQ Class I Standards and EPA SDWS, although occasionally, regulatory standards are exceeded. Chloride levels are low, (typically less than ten mg/L) making this parameter a good indicator for excursion monitoring. There is no significant difference in major water chemistry between the production zone and overlying and underlying aquifers.

Trace metals generally are below WDEQ Class I Standards and EPA MCLs in the production zone, overlying and underlying aquifers. Ammonia, arsenic, iron and selenium occasionally exceed the respective standards. Manganese is present above the regulatory standards in over half of the samples collected from the DE Horizon. Manganese was below the WDEQ Class I Standards and EPA MCL in all samples from other hydrostratigraphic units.

Uranium is present in nearly all of the wells at levels exceeding the EPA MCL of 0.03 mg/L. For example, the average uranium concentration for all of the hydrostratigraphic units of interest is 0.31 mg/L, an order of magnitude greater than the EPA MCL. Radium-226+228 levels exceed the EPA MCL and WDEQ Class I Standard (five pCi/L) in two-thirds of the samples collected. The percentage of wells that exceed radium-226+228 standards is greater for the HJ and UKM Production Zone aquifers than for the FG and DE Horizons. Dissolved radionuclide levels are commonly elevated in groundwater associated with uranium-bearing sandstones.

Summary

The uranium bearing sandstones within the upper Battle Spring Formation appear to be suitable targets for ISR operations. The primary production zone aquifer (HJ Horizon) is bounded by laterally extensive upper and lower confining units, as demonstrated by static water level differences and responses to pump tests. Aquifer properties (transmissivity, hydraulic conductivity and storativity) are within the ranges observed at other ISR operations that have successfully extracted uranium reserves. Water quality is generally consistent throughout the hydrostratigraphic units of interest. Elevated radionuclides are present in the groundwater, but this is consistent with the presence of uranium ore deposits within the sandstones. The Fault acts as a hydraulic barrier to flow and will need to be accounted for in mine unit design and operation.

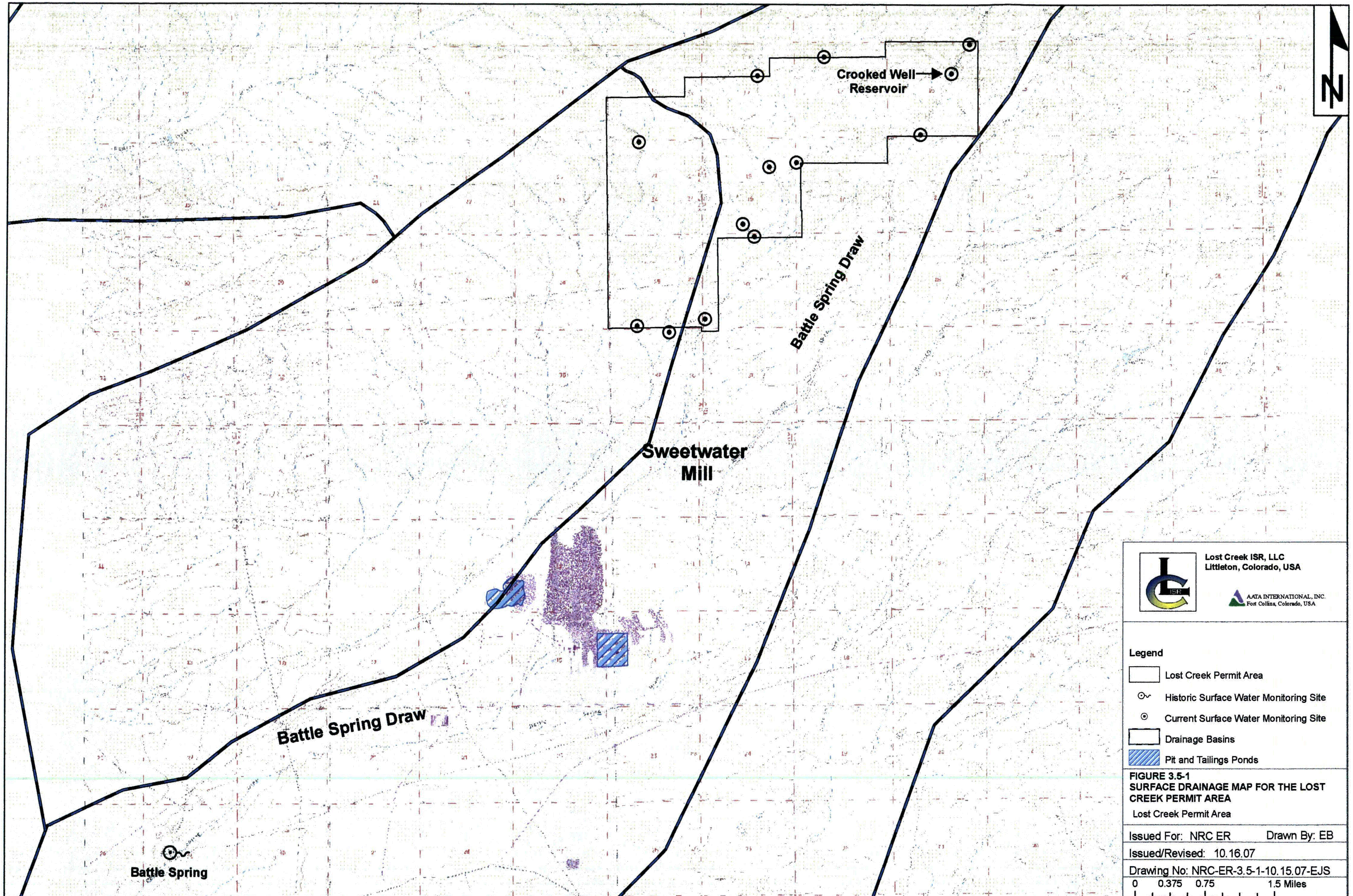
Crooked Well
Reservoir
Battle Spring Draw
Sweetwater
Mill
Battle Spring Draw
Battle Spring
N
Lost Creek ISR, LLC
Littleton, Colorado, USA
AATA INTERNATIONAL, INC.
Fort Collins, Colorado, USA
Legend
Lost Creek Permit Area
Historic Surface Water Monitoring Site
Current Surface Water Monitoring Site
Drainage Basins
Pit and Tailings Ponds
FIGURE 3.5-1
SURFACE DRAINAGE MAP FOR THE LOST CREEK PERMIT AREA
Lost Creek Permit Area
Issued For: NRC ER
Drawn By: EB
Issued/Revised: 10.16.07
Drawing No: NRC-ER-3.5-1-10.15.07-EJS
0 0.375 0.75 1.5 Miles

Figure 3.5-2. Longitudinal profile along Battle Spring Draw from the northern boundary.

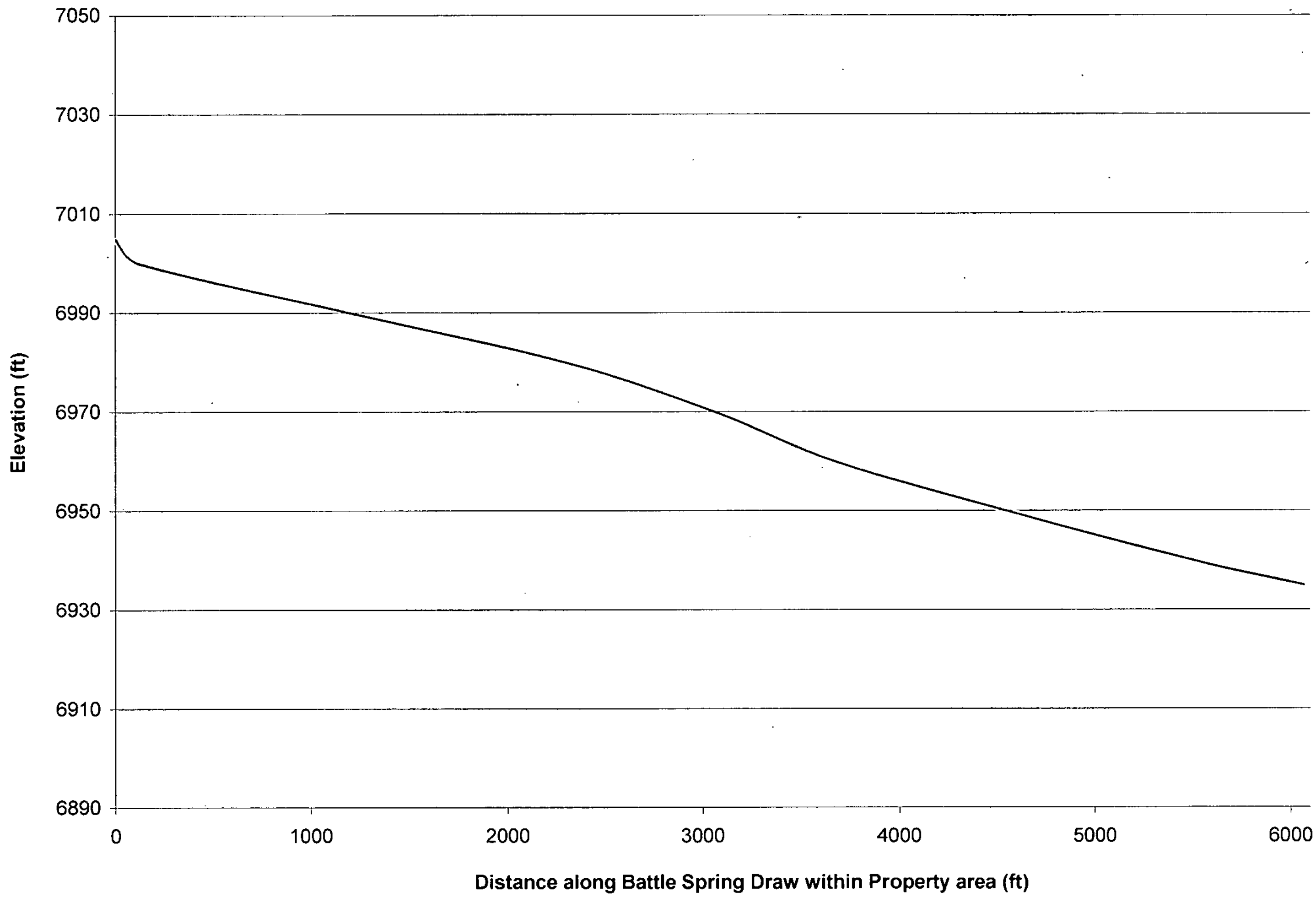

Figure 3.5-3. Photo of Crooked Well Reservoir taken during spring snowmelt runoff looking west.

April, 2007

Figure 3.5-4. Stormwater sampler installed to collect a 1-L sample of snowmelt or storm surface runoff.

April, 2007

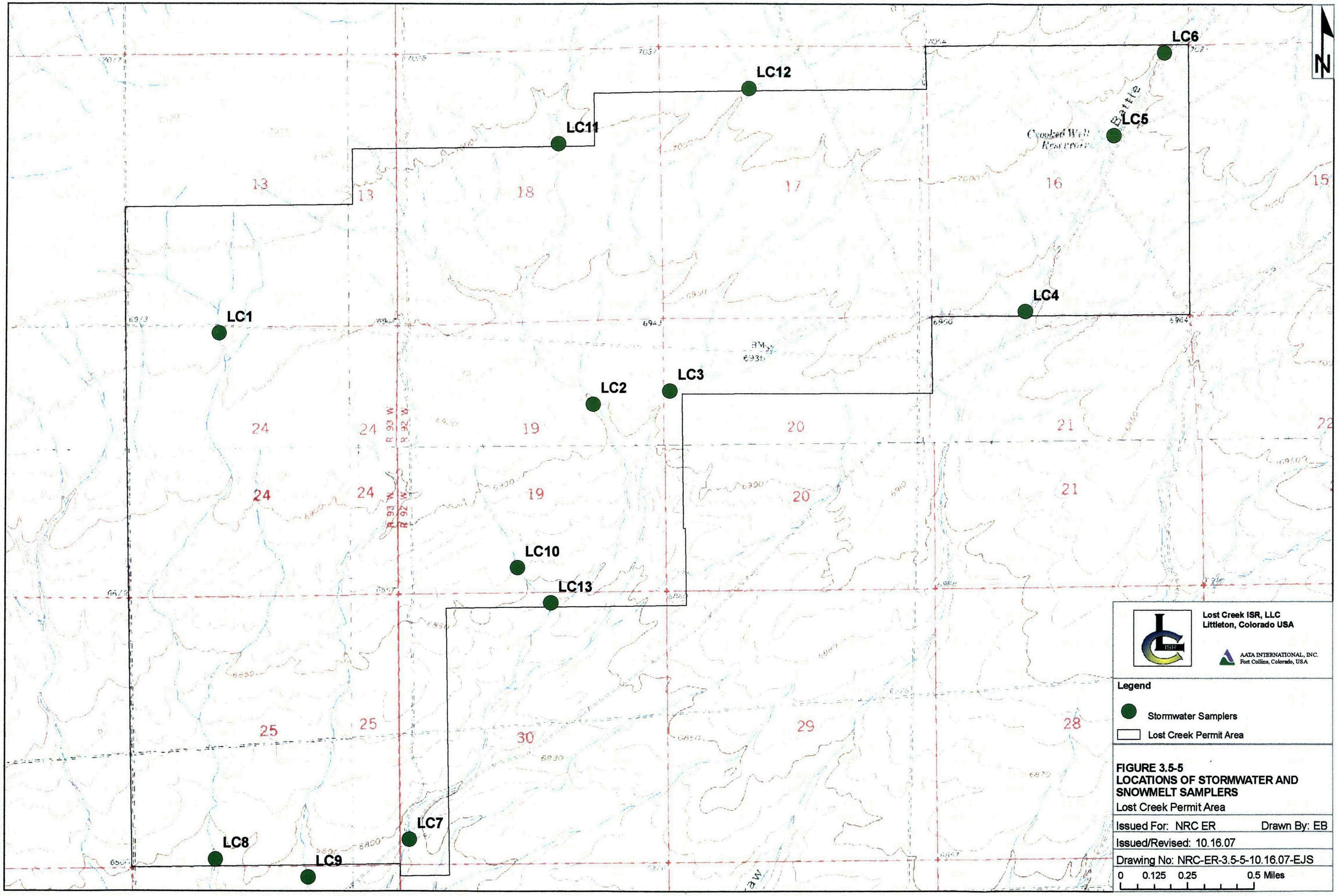

FIGURE 3.5-5
LOCATIONS OF STORMWATER AND SNOWMELT SAMPLERS

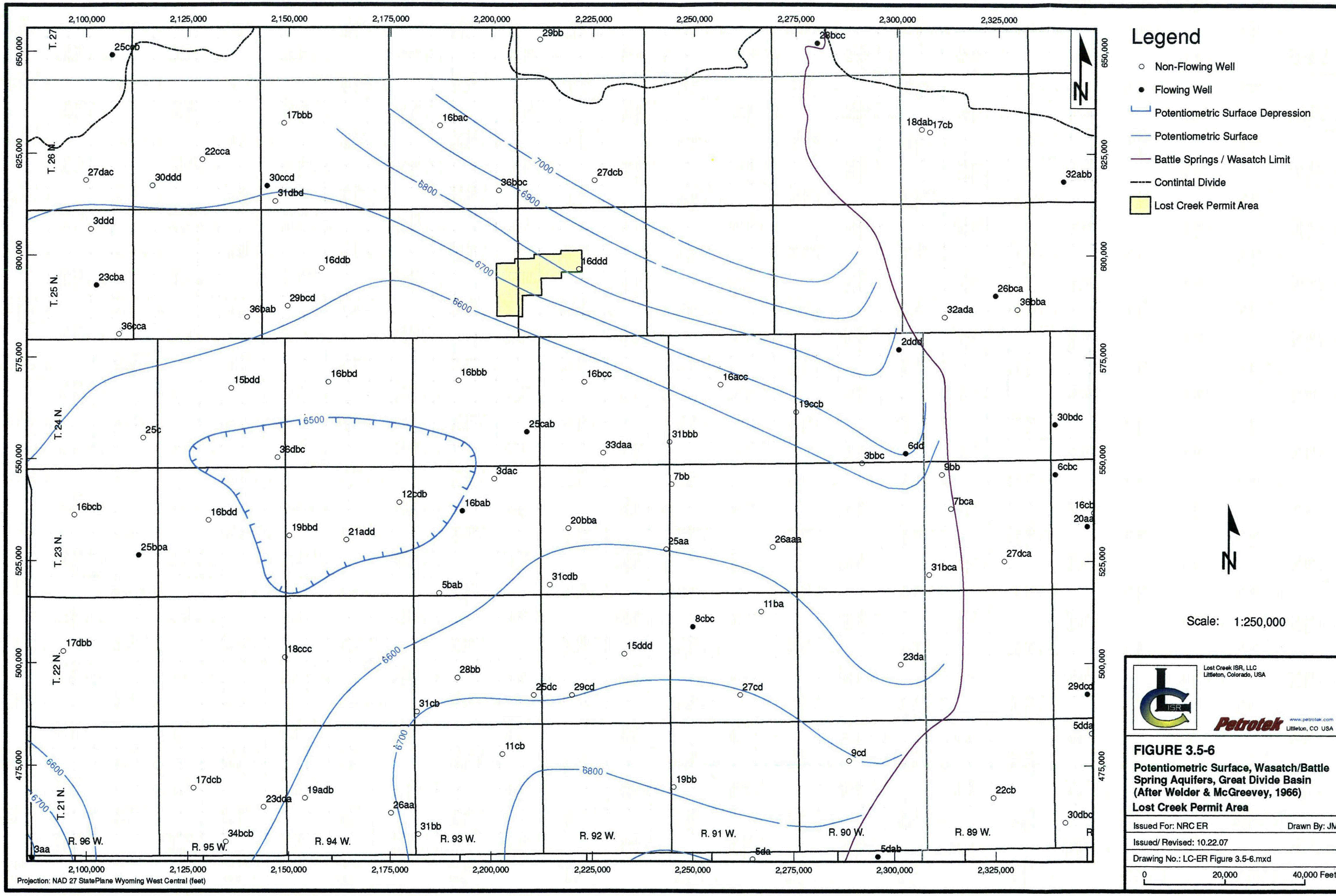

FIGURE 3.5-6
Potentiometric Surface, Wasatch/Battle Spring Aquifers, Great Divide Basin (After Welder & McGreevey, 1966)
Lost Creek Permit Area

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Issued/ Revised: 10.22.07
Drawing No.: LC-ER Figure 3.5-6.mxd

ERA	SYSTEM, SERIES AND OTHER SUBDIVISIONS			STRATIGRAPHIC UNIT	HYDROGEOLOGIC UNIT
Cenozoic	Quaternary			Unnamed Alluvium	Alluvial Aquifers
	Tertiary	Miocene Oligocene	Upper	Browns Park, North Park, and South Pass Formations Bishop Conglomerate	UpperTertiary Aquifers (Not present near Lost Creek)
		Eocene	Lower	Bridger Formation Green River Formation	
		Paleocene		Wasatch Formation-Battle Spring Formation Fort Union Formation	Tertiary Aquifers
Mesozoic	Cretaceous		Upper	Lance Formation Fox Hills Sandstone	
				Lewis Shale	Confining Unit
				Mesaverde Formation	Measaverde Aquifer
				Steele Shale Cody Shale Niobrara Formation	Confining Unit
				Frontier Formation	Frontier Aquifer
			Lower	Mowry Shale Muddy Sandstone Thermopolis Shale	Confining Unit
				Cloverly Formation	Cloverly (Dakota) Aquifer
	Jurassic			Morrison Formation	Confining Unit
				Sundance Formation	Sundance/Nugget Aquifer
	Triassic			Nugget Sandstone	
				Chugwater Formation Dinwoody Formation	Confining Unit
Paleozoic	Permian			Phosphoria Formation	
	Pennsylvanian			Tensleep Sandstone Amsden Formation	Paleozoic Aquifers
	Mississippian			Madison Formation	
	Cambrian			Flathead Sandstone	

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FIGURE 3.5-7

Regional Hydrostratigraphic Units of Interest, Great Divide Basin

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Drawing No.: LC-ER Figure 3.5-7.mxd

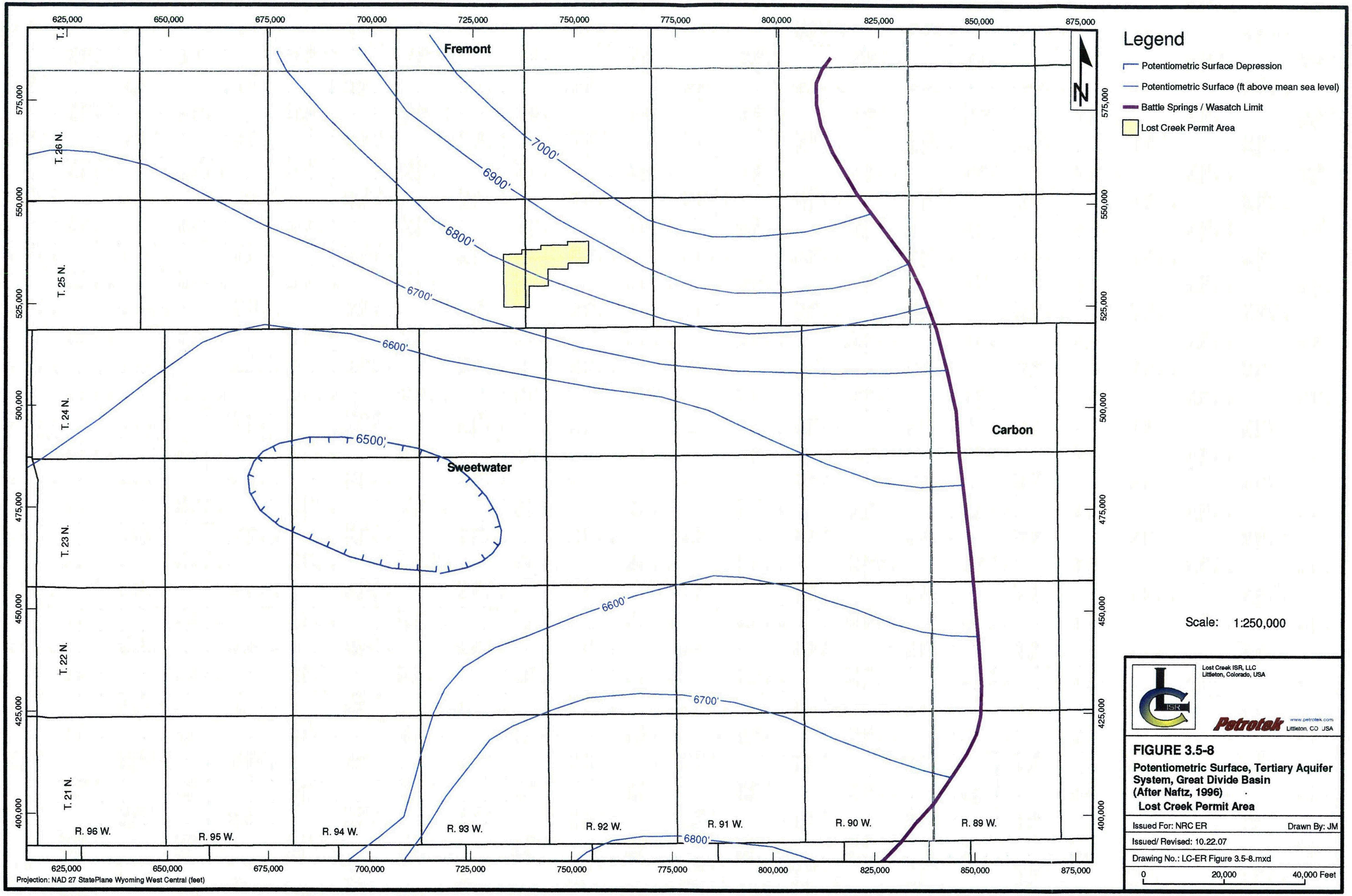

FIGURE 3.5-8

Potentiometric Surface, Tertiary Aquifer System, Great Divide Basin (After Naftz, 1996)

Lost Creek Permit Area

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Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-8.mxd

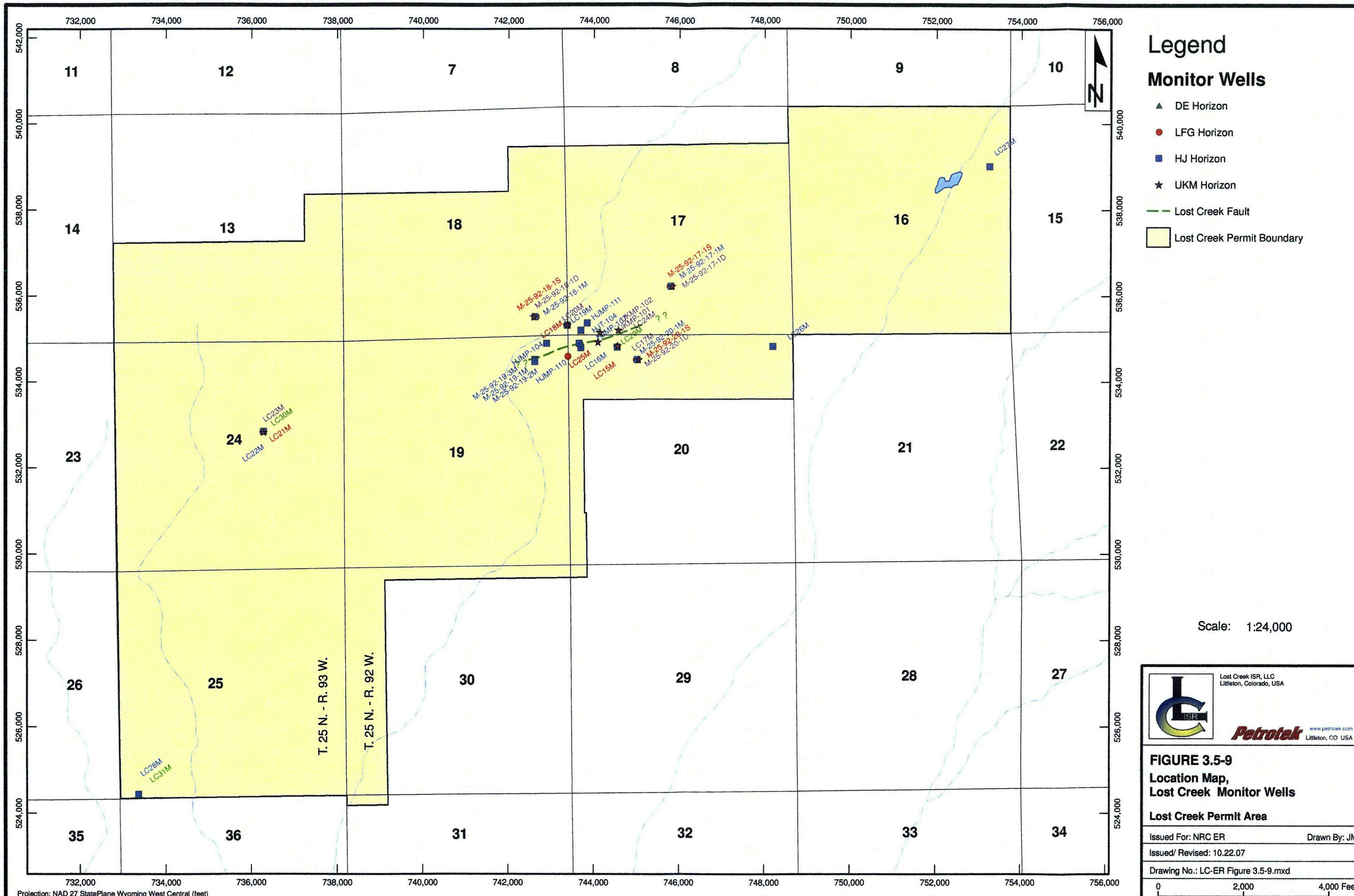
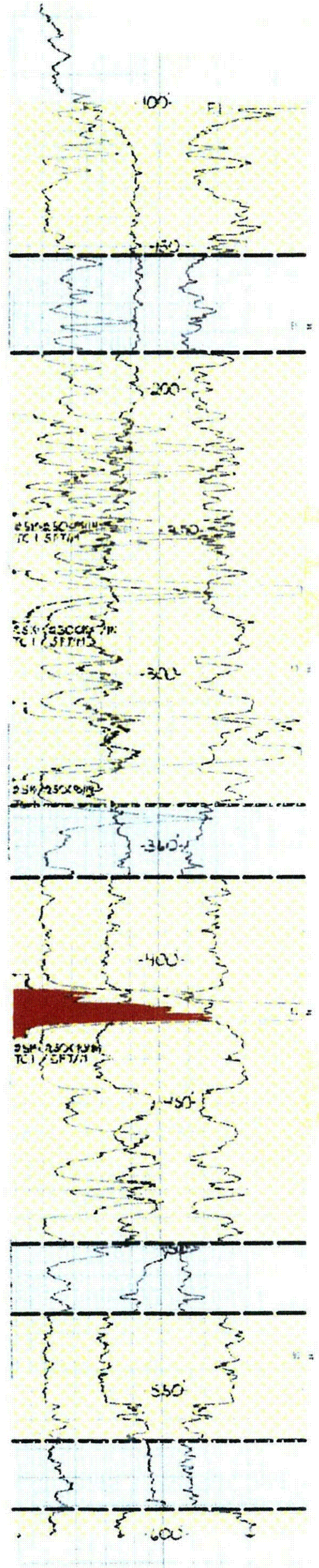


FIGURE 3.5-9
Location Map, Lost Creek Monitor Wells



DE Horizon — DE - Alternating very fine, course-grained sandstone, mudstone and siltstone. Minor host for uranium mineralization.

Shale Horizon

FG Horizon (Overlying Aquifer) — FG - Lenticular arkosic sandstones with intervals of mudstone and siltstone. Categorized as suspended load facies. Cut and fill channels not as prominent as in HJ horizon. Minor host for uranium mineralization.

LC Shale (Overlying Confining Unit) — LCS - Shale horizon separating FG from HJ; a virtually continuous aquiclude in Lost Creek area.

Mineralization

HJ Horizon (Production Zone Aquifer) — HJ - Course-grained arkoses with minor matrix. Very thin lenticular intervals of fine sands. Cut and fill channels are prominent. Mixed load facies. Major host to uranium mineralization, especially in middle parts.

SB Shale (Underlying Confining Unit) — SB Shale - Shale/mudstone separating HJ from UKM Sand. Continuous throughout Permit Area.

UKM Sand (Underlying Aquifer) — UKM - Generally massive, coarse-grained sandstone with lenticular fine sand intervals. Mixed load facies. Host to significant uranium mineralization.

NN Shale — NN Shale - No Name Shale, separating UKM Sand from MKM Sand.

MKM Sand — MKM Sand - Similar to the UKM Sand.

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FIGURE 3.5-10

Site Hydrostratigraphic Units

Lost Creek Permit Area

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Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-10.mxd

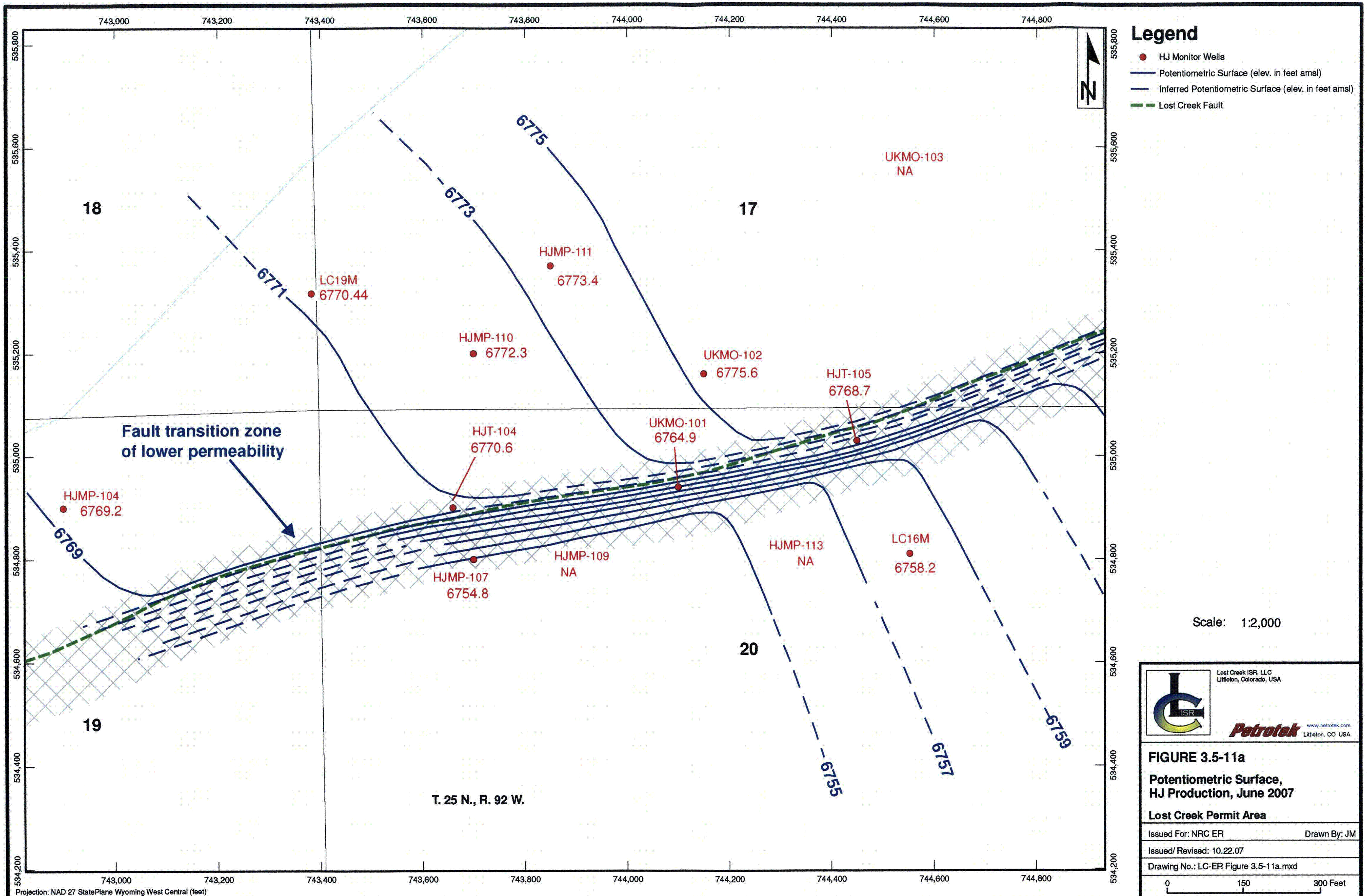

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FIGURE 3.5-11a

Potentiometric Surface, HJ Production, June 2007

Lost Creek Permit Area

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Drawing No.: LC-ER Figure 3.5-11a.mxd

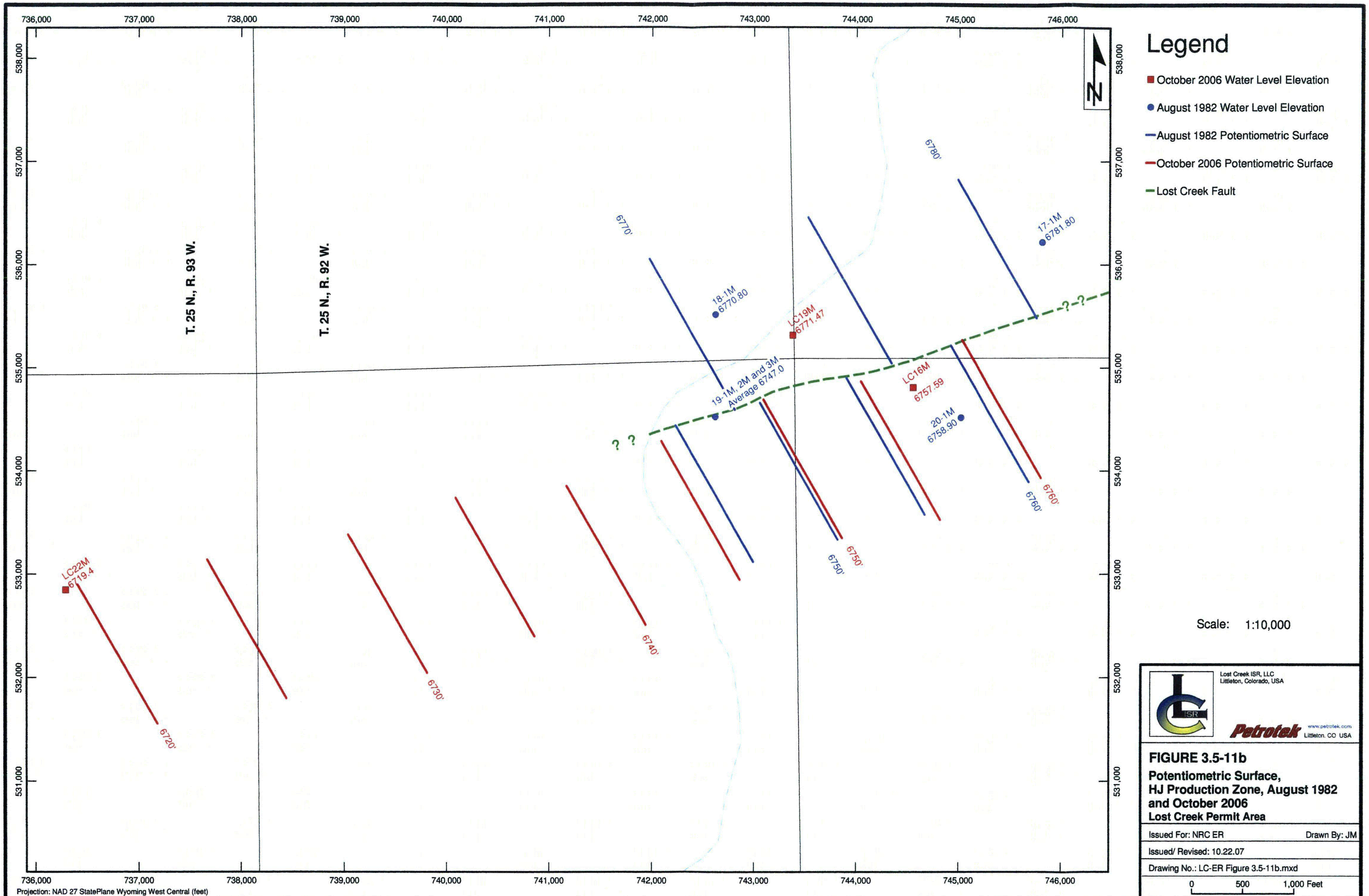

FIGURE 3.5-11b

Potentiometric Surface, HJ Production Zone, August 1982 and October 2006

Lost Creek Permit Area

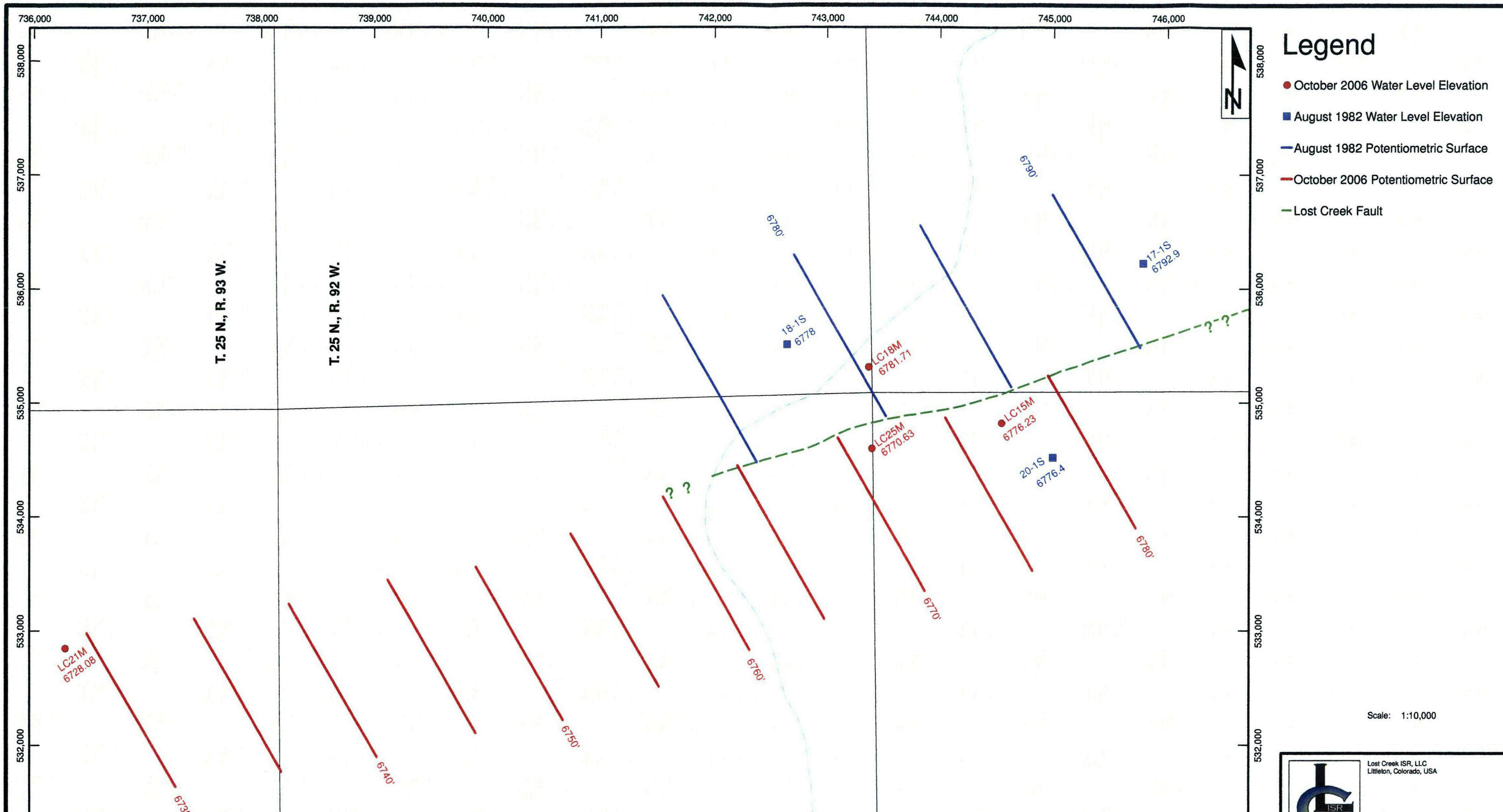

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FIGURE 3.5-11c

Potentiometric Surface, Overlying Aquifer (LFG), August 1982 and October 2006 Lost Creek Permit Area

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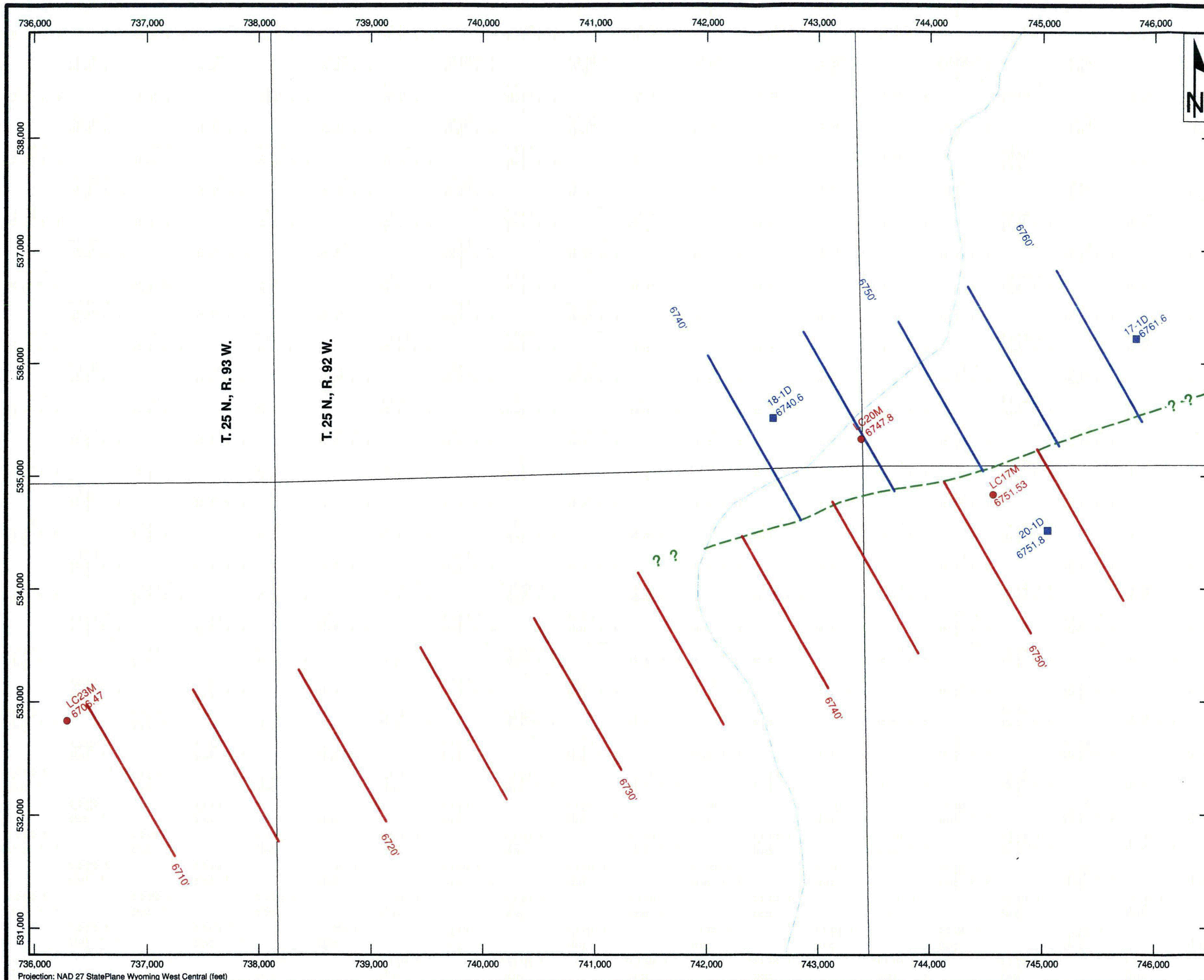
Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-11c.mxd

0 500 1,000 Feet



Legend

- October 2006 water Level Elevation
- August 1982 Water Level Elevation
- October 2006 Potentiometric Surface
- August 1982 Potentiometric Surface
- Lost Creek Fault

Scale: 1:10,000

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FIGURE 3.5-11d

Potentiometric Surface, Underlying Aquifer (UKM), August 1982 and October 2006
Lost Creek Permit Area

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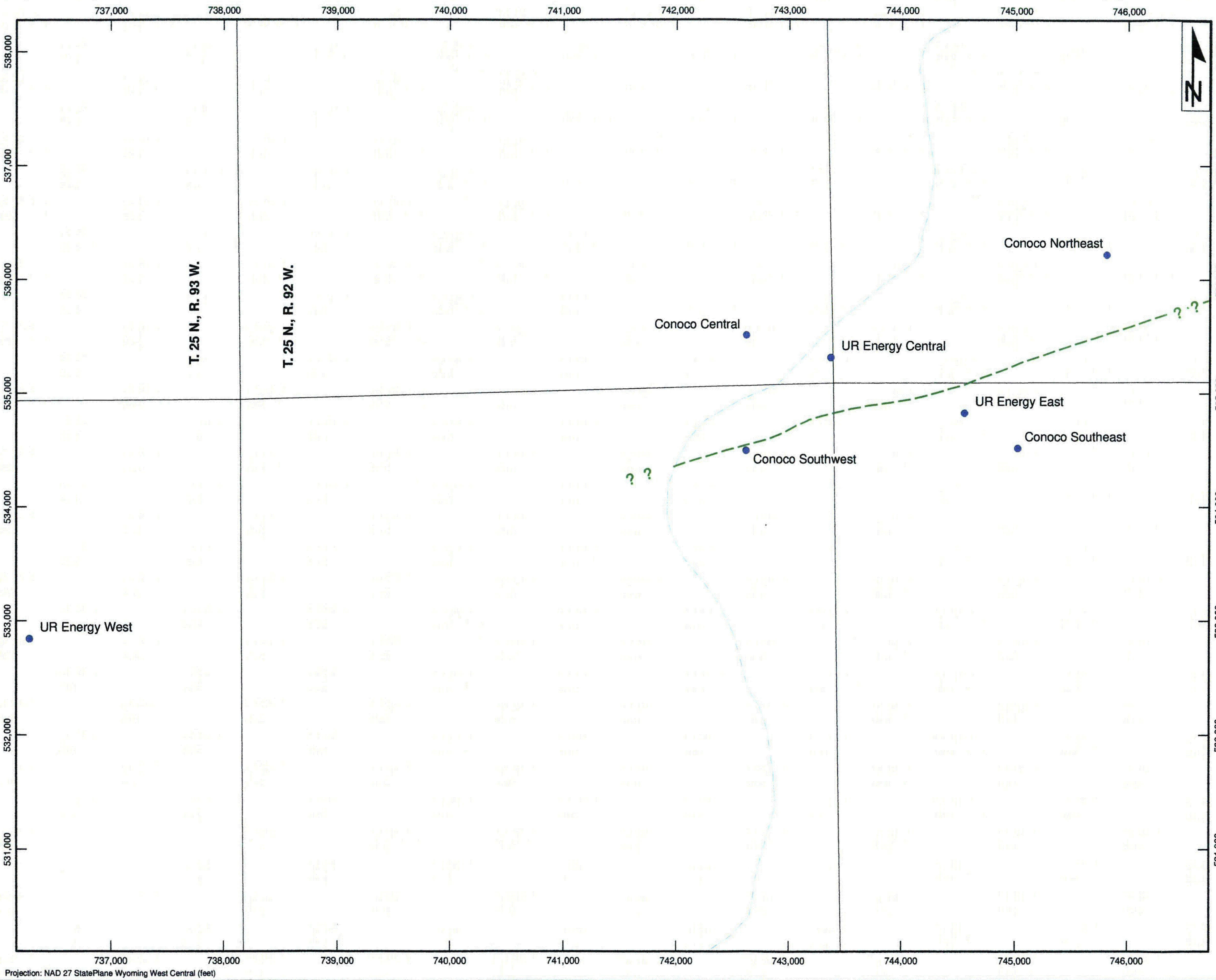
Issued/ Revised: 10.22.07	
Drawing No.: LC-ER Figure 3.5-11d.mxd	

0 500 1,000 Feet



Legend

- Well Group
- Lost Creek Fault

Scale: 1:10,000

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FIGURE 3.5-12
Location of Well Groups Used to Evaluate Vertical Hydraulic Gradients

Lost Creek Permit Area

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Drawing No.: LC-ER Figure 3.5-12.mxd

0 500 1,000 Feet

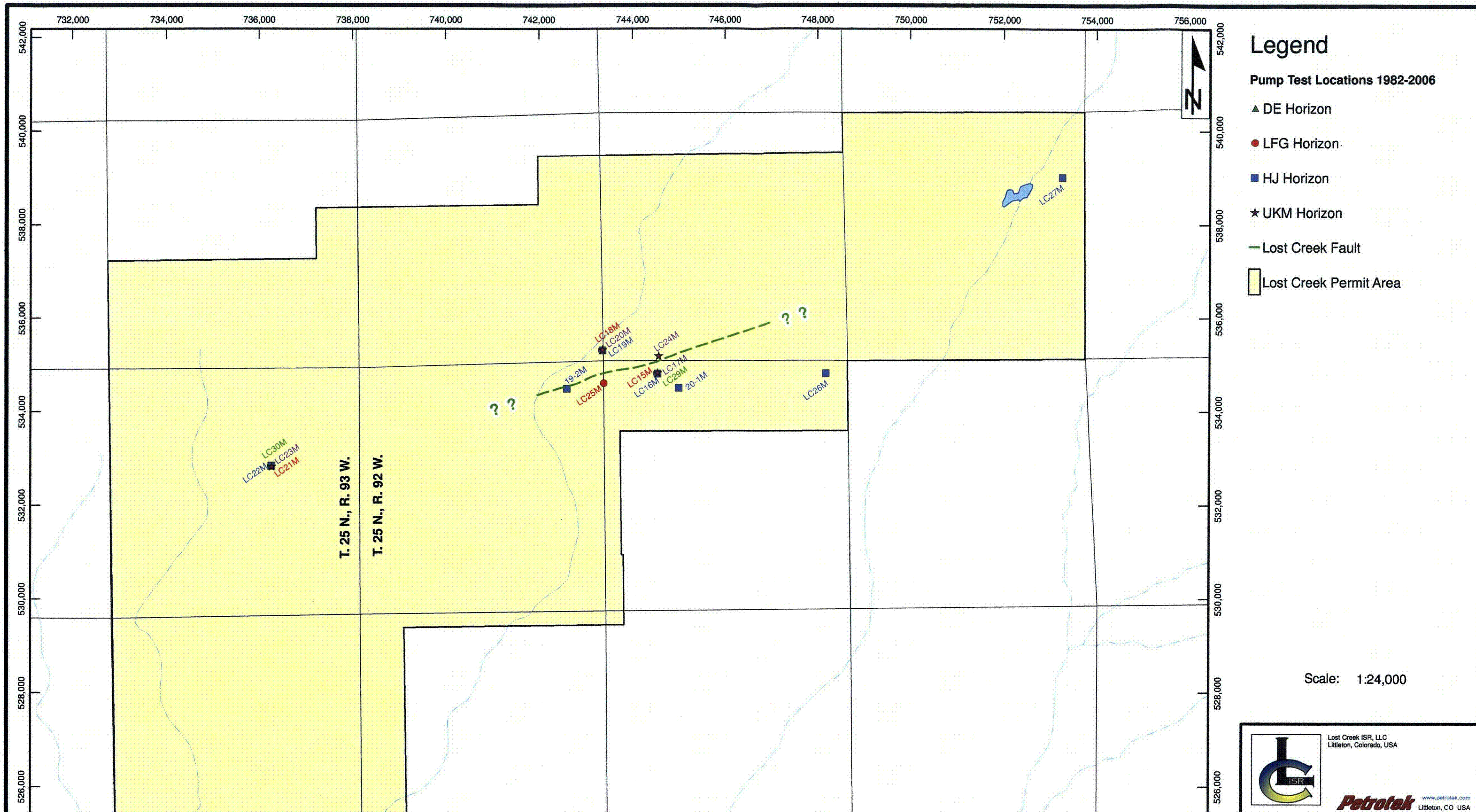

FIGURE 3.5-13

Location of Pump Tests Conducted in 1982 and 2006

Lost Creek Permit Area

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Drawn By: JM

Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-13.mxd

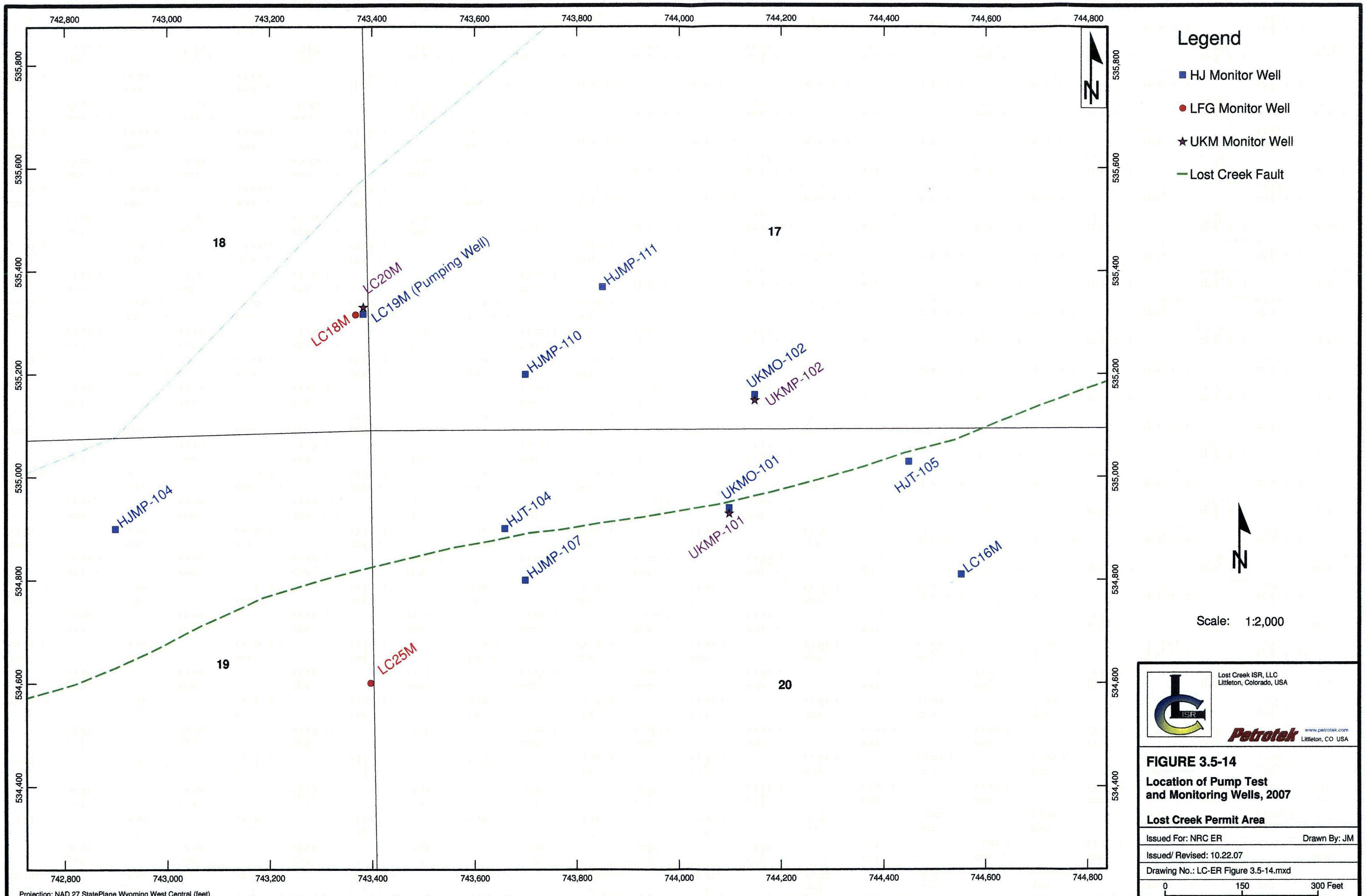


FIGURE 3.5-14
Location of Pump Test and Monitoring Wells, 2007
Lost Creek Permit Area

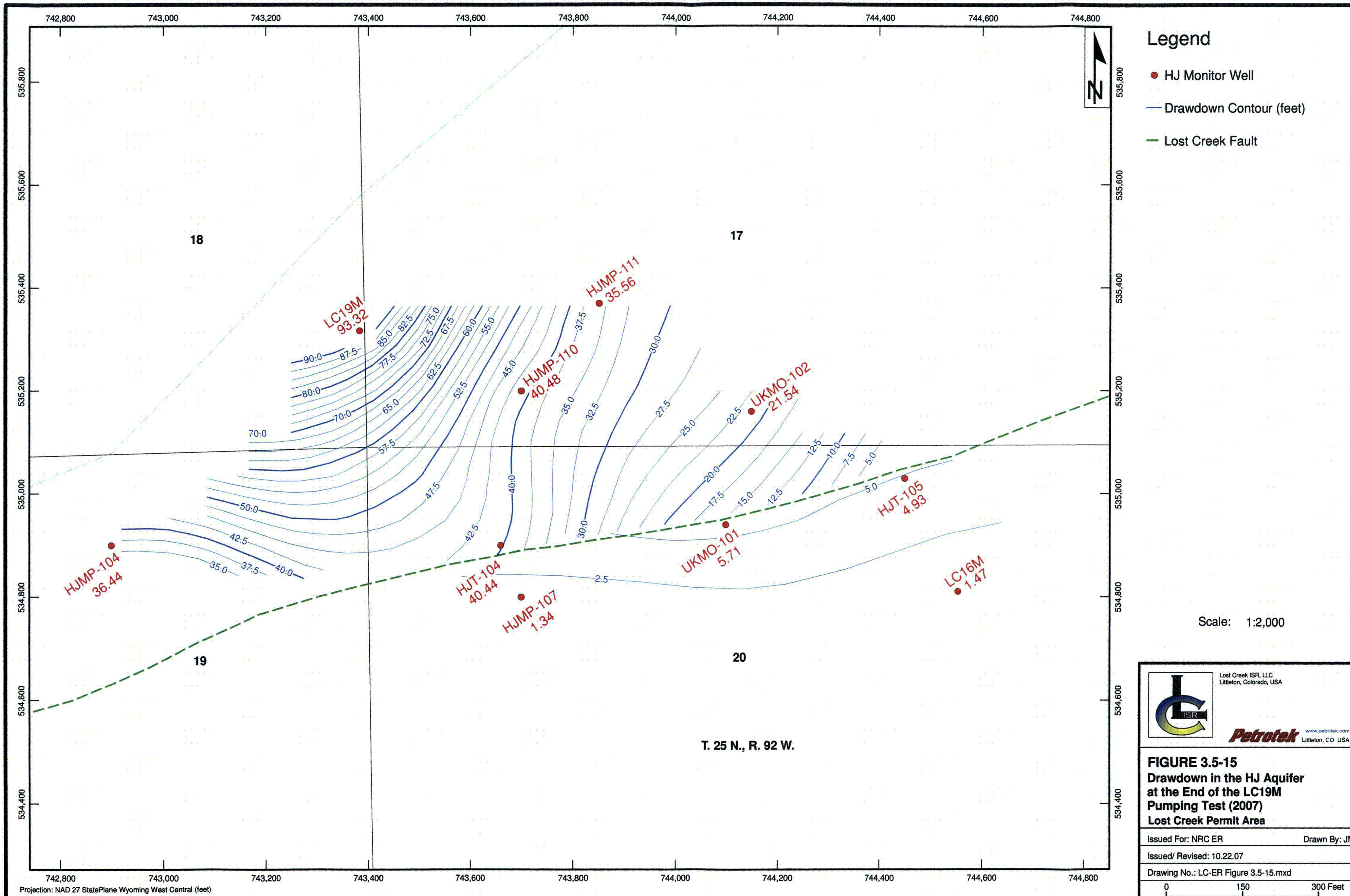
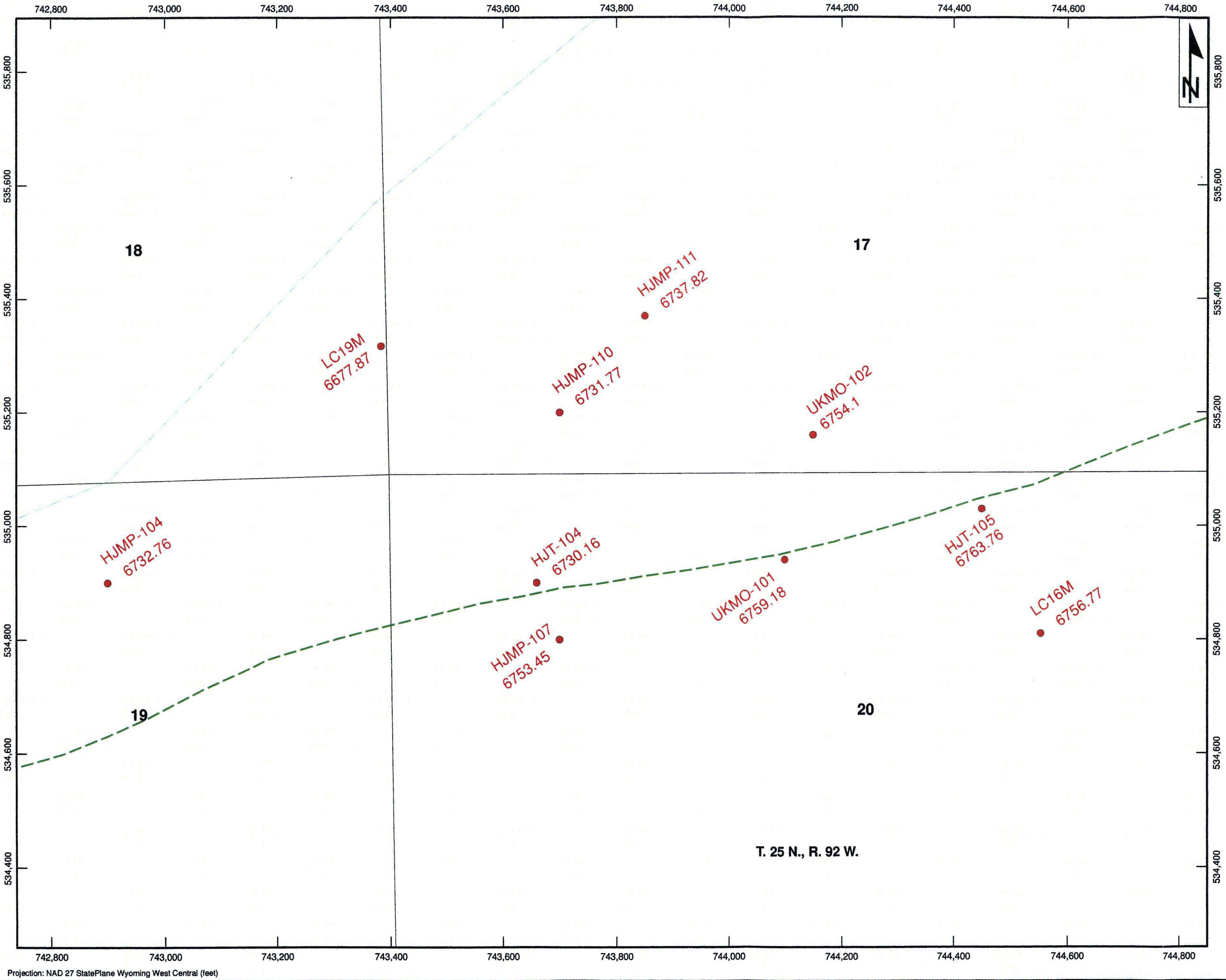


FIGURE 3.5-15
Drawdown in the HJ Aquifer at the End of the LC19M Pumping Test (2007)
Lost Creek Permit Area

Issued For: NRC ER | Drawn By: JM
Issued/ Revised: 10.22.07
Drawing No.: LC-ER Figure 3.5-15.mxd



Legend

- HJ Monitor Wells
- Lost Creek Fault

Scale: 1:2,000

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FIGURE 3.5-16
Water Level Elevations in the HJ Aquifer at the End of the LC19M Pumping Test
Lost Creek Permit Area

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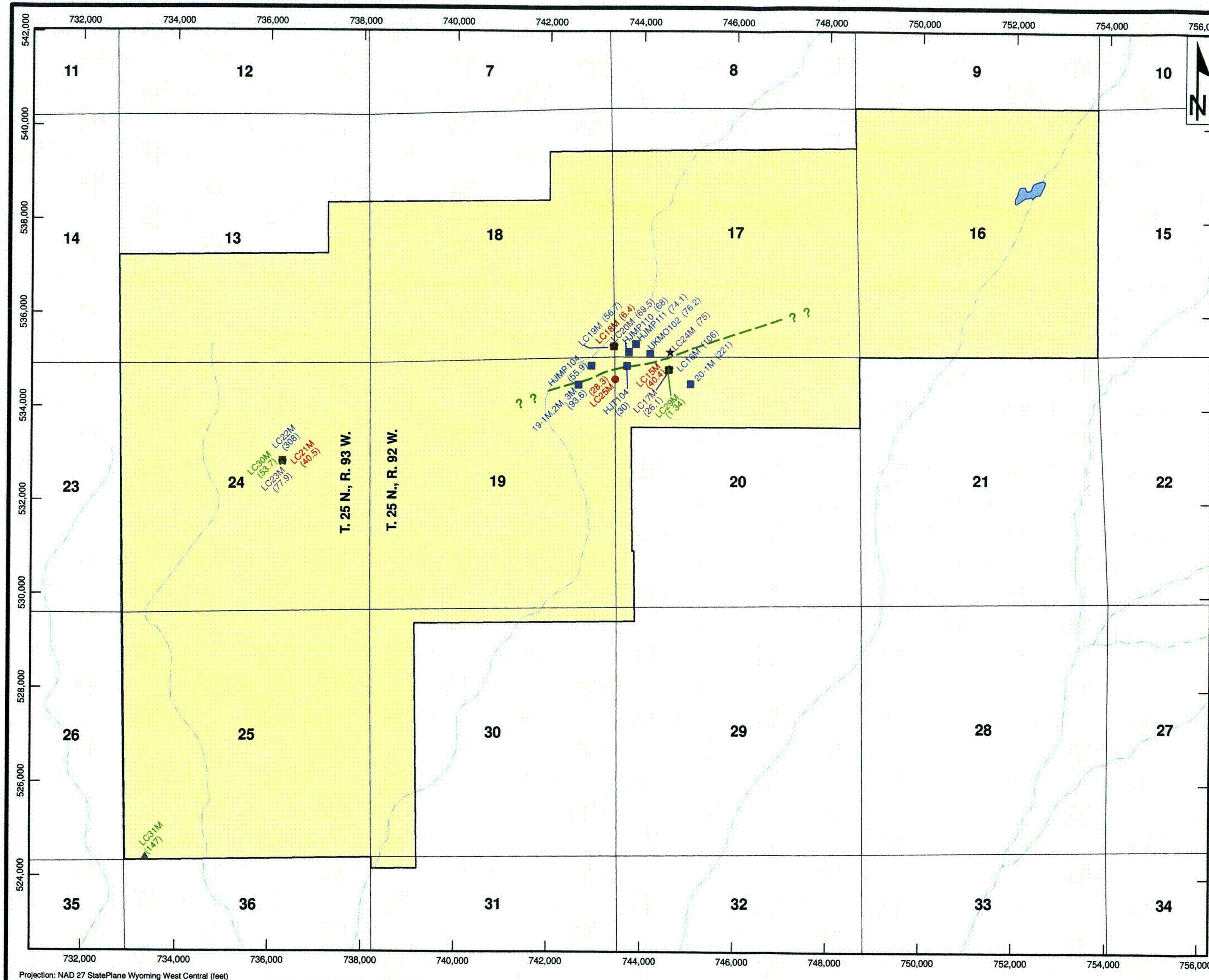
Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-16.mxd

0 150 300 Feet



Legend

- ▲ DE Monitor Well
- ● LFG Monitor Well
- ■ HJ Monitor Well
- ★ UKM Monitor Well
- — Lost Creek Fault
- ☐ Lost Creek Permit Area

N

Scale: 1:24,000

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FIGURE 3.5-17

Spatial Distribution of Aquifer Transmissivity (ft2/d)

Lost Creek Permit Area

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Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-17.mxd

0 1,000 2,000 Feet

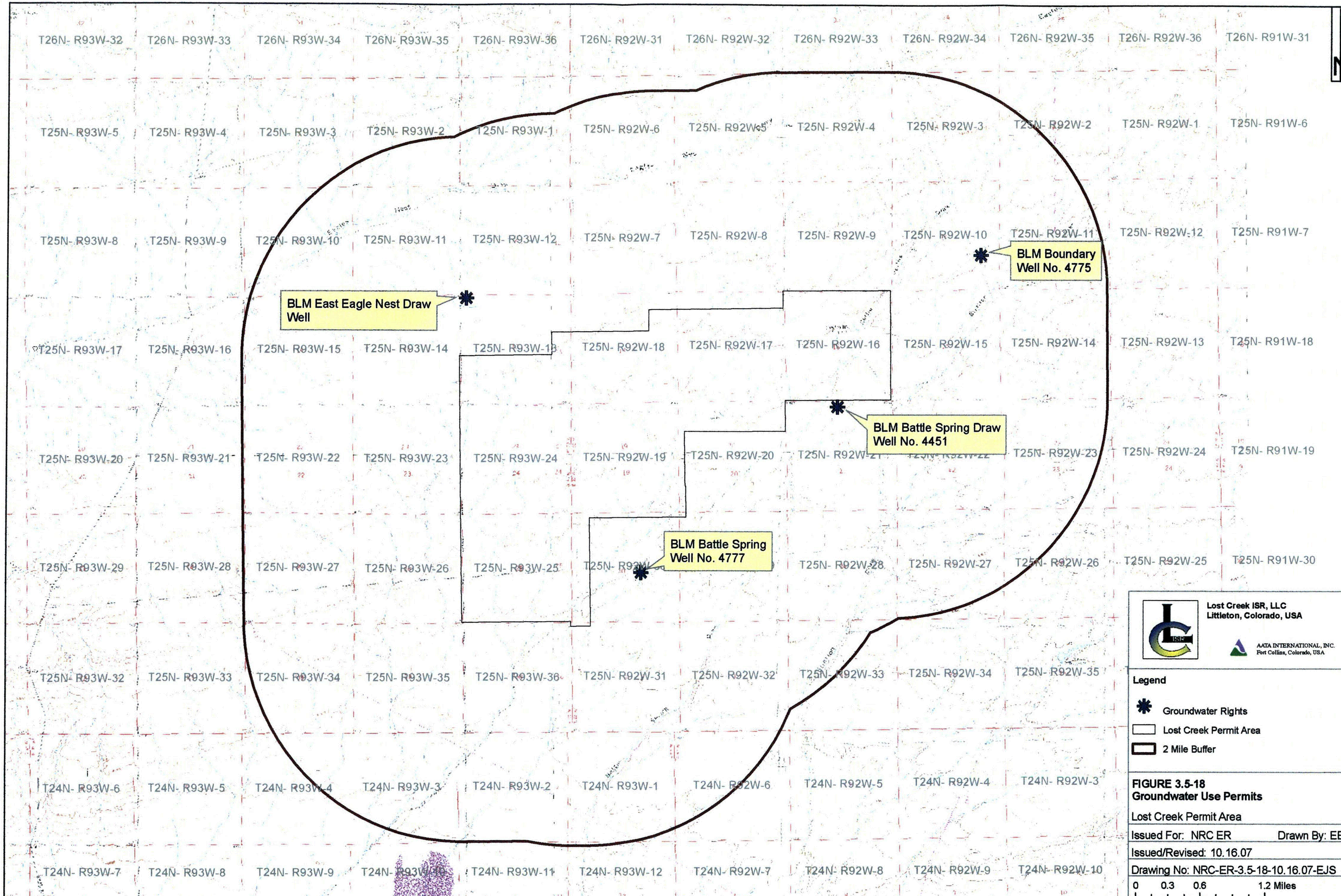

FIGURE 3.5-18
Groundwater Use Permits

Lost Creek Permit Area

Issued For: NRC ER Drawn By: EB

Issued/Revised: 10.16.07

Drawing No: NRC-ER-3.5-18-10.16.07-EJS

Figure 3.5-19. BLM Battle Spring Well No. 47777

June 13, 2007

Figure 3.5-20 East Eagle Nest Draw Well

June 13, 2007

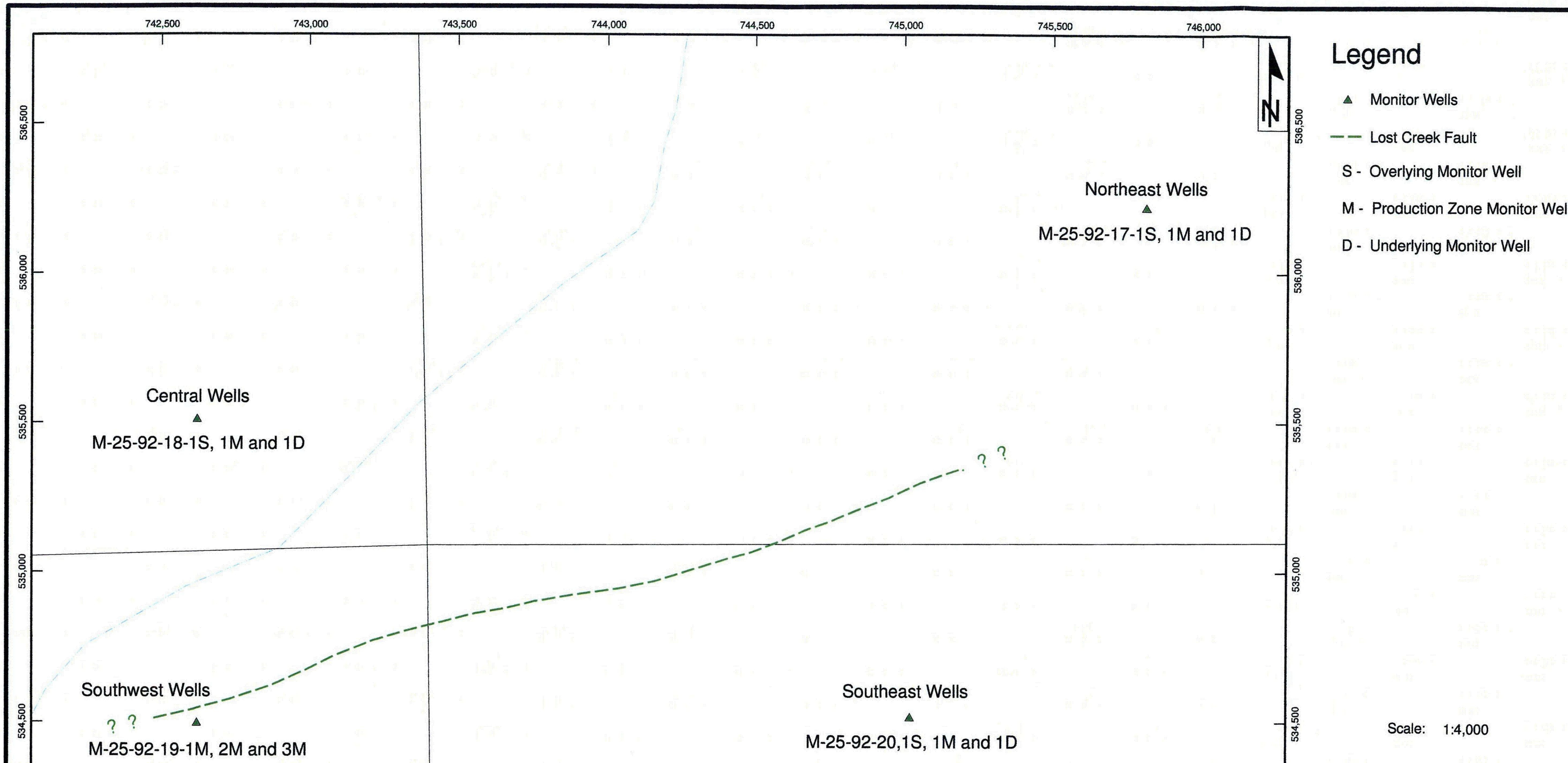

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FIGURE 3.5-21
Location of Historic Conoco Site Monitor Wells

Lost Creek Permit Area

Issued For: NRC ER Drawn By: JM

Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-21.mxd

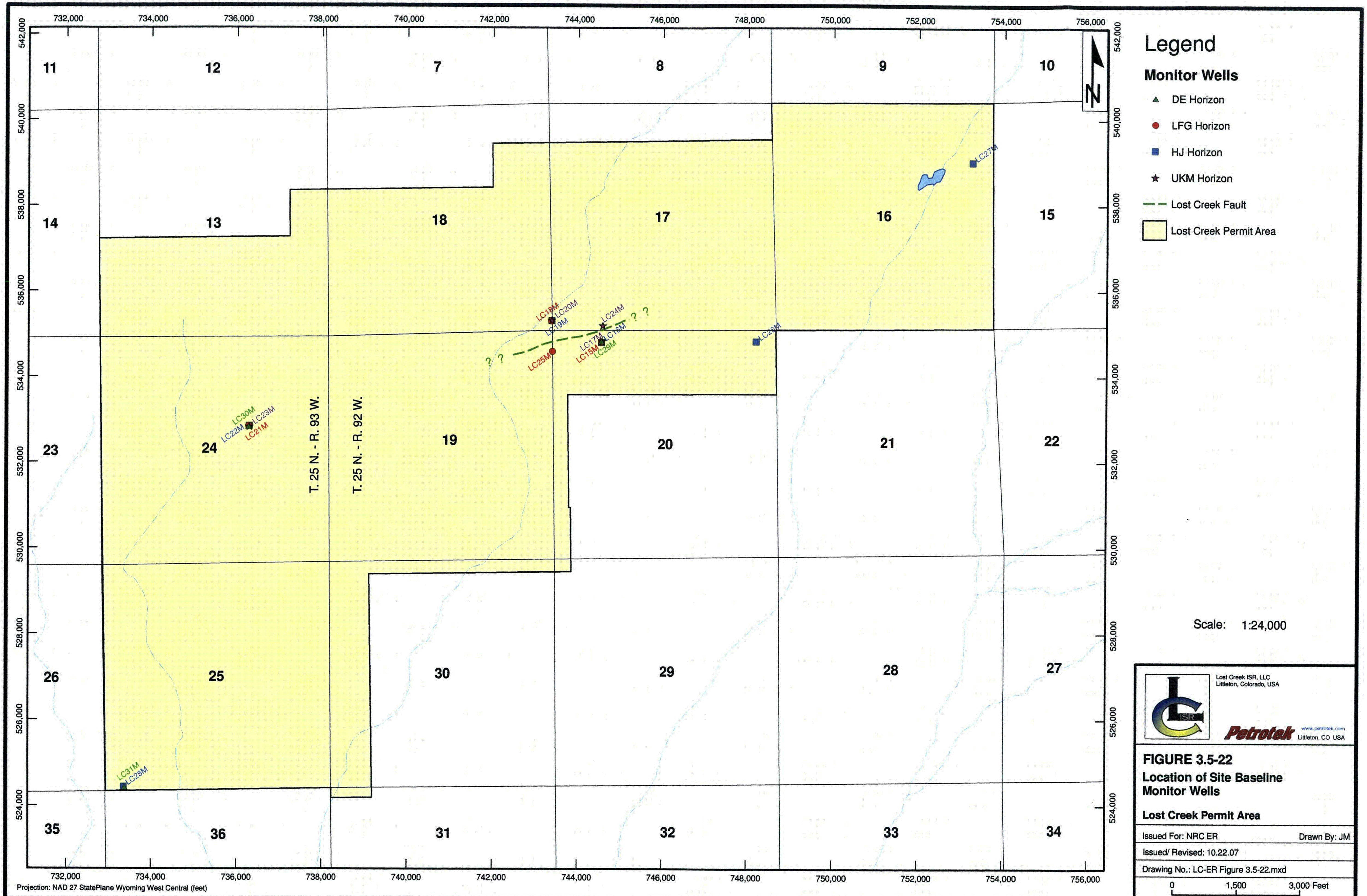

FIGURE 3.5-22
Location of Site Baseline Monitor Wells

Lost Creek Permit Area

Issued For: NRC ER
Drawn By: JM
Issued/ Revised: 10.22.07
Drawing No.: LC-ER Figure 3.5-22.mxd

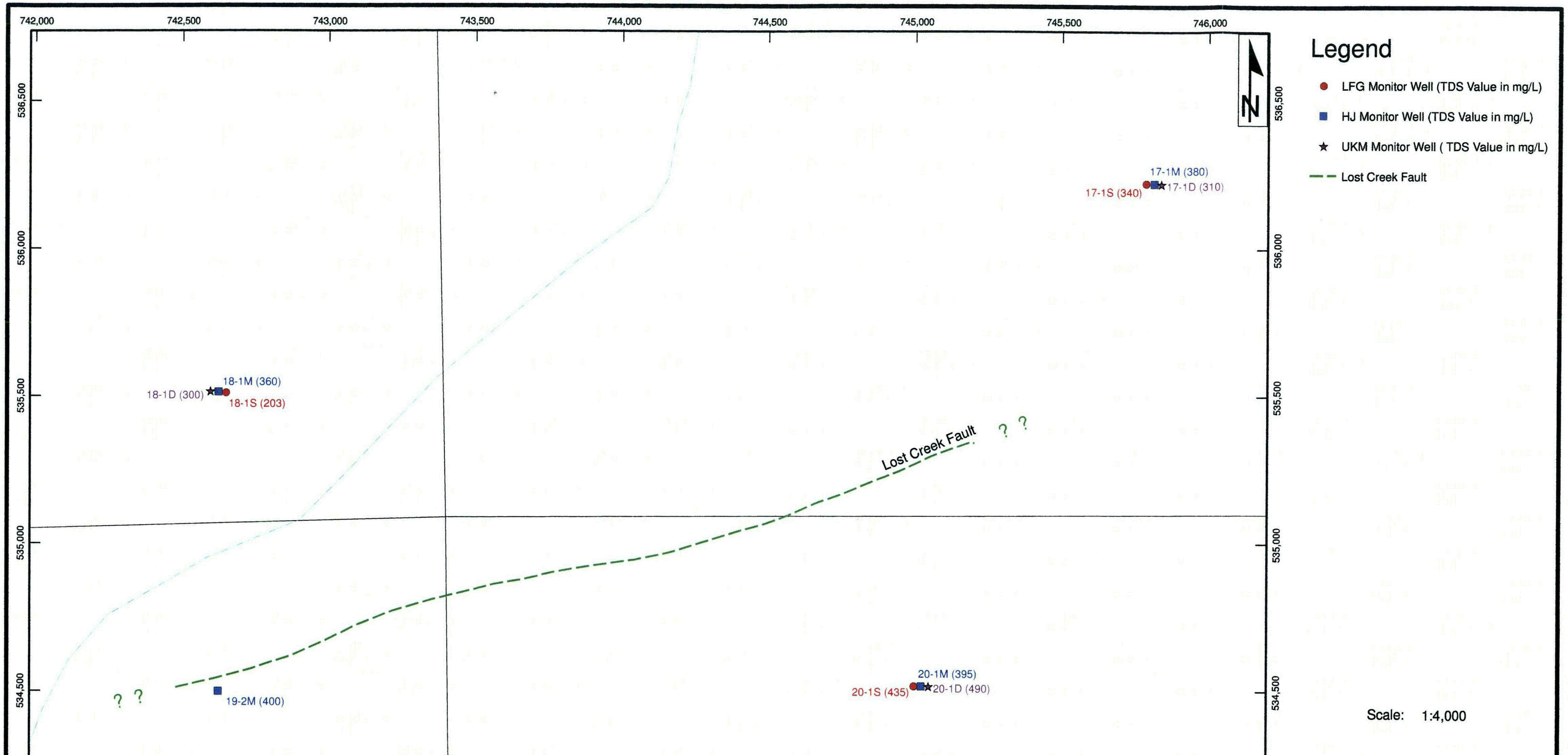

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FIGURE 3.5-23a

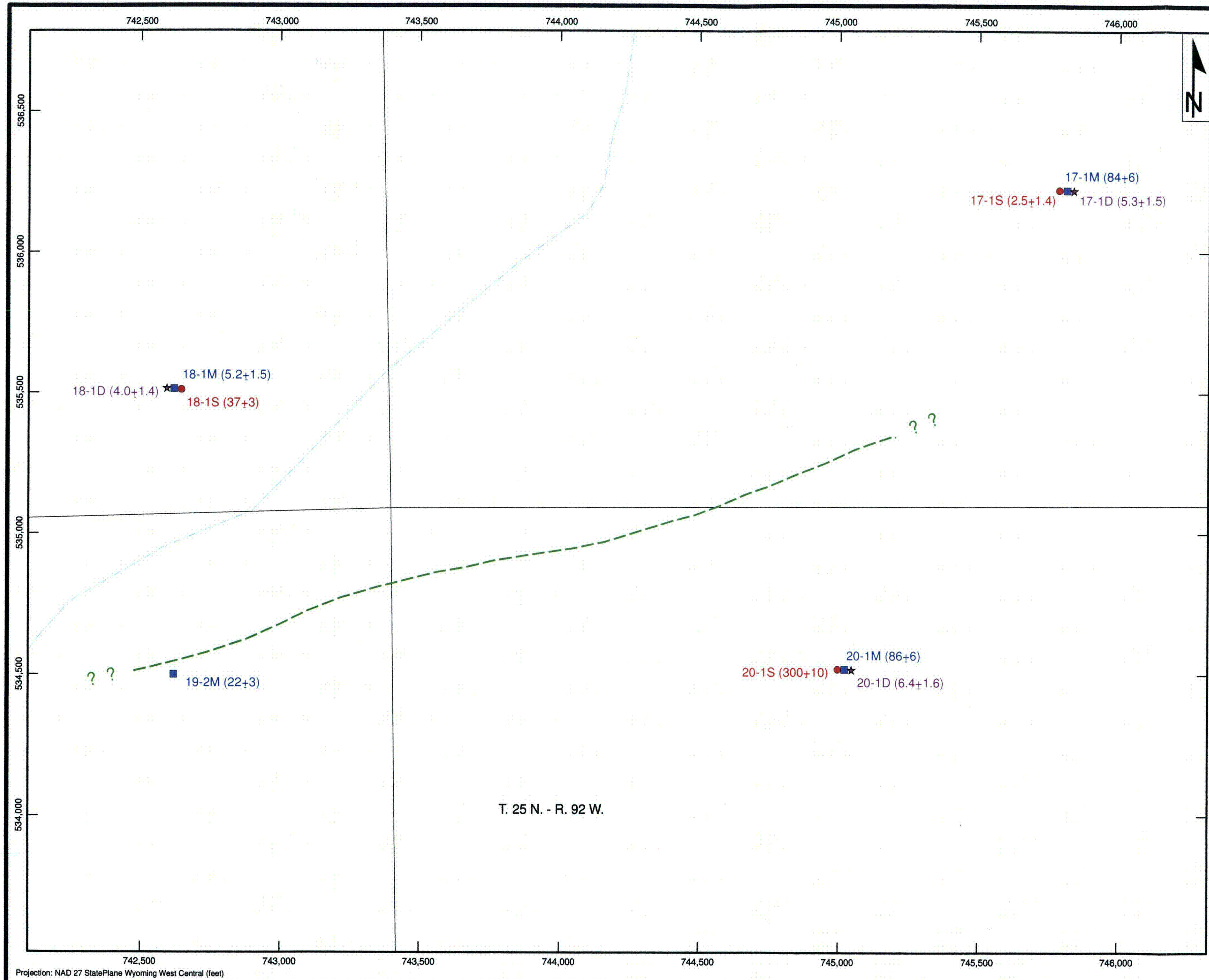
Distribution of TDS, August 1982

Lost Creek Permit Area

Issued For: NRC ER Drawn By: JM

Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-23a.mxd



Legend

- LFG Monitor Well (Ra-226 Value in pCi/L)
- HJ Monitor Well (Ra-226 Value in pCi/L)
- UKM Monitor Well (Ra-226 Value in pCi/L)
- Lost Creek Fault

Scale: 1:4,000

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FIGURE 3.5-23b

Distribution of Radium-226, August 1982

Lost Creek Permit Area

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Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-23b.mxd

0 200 400 Feet

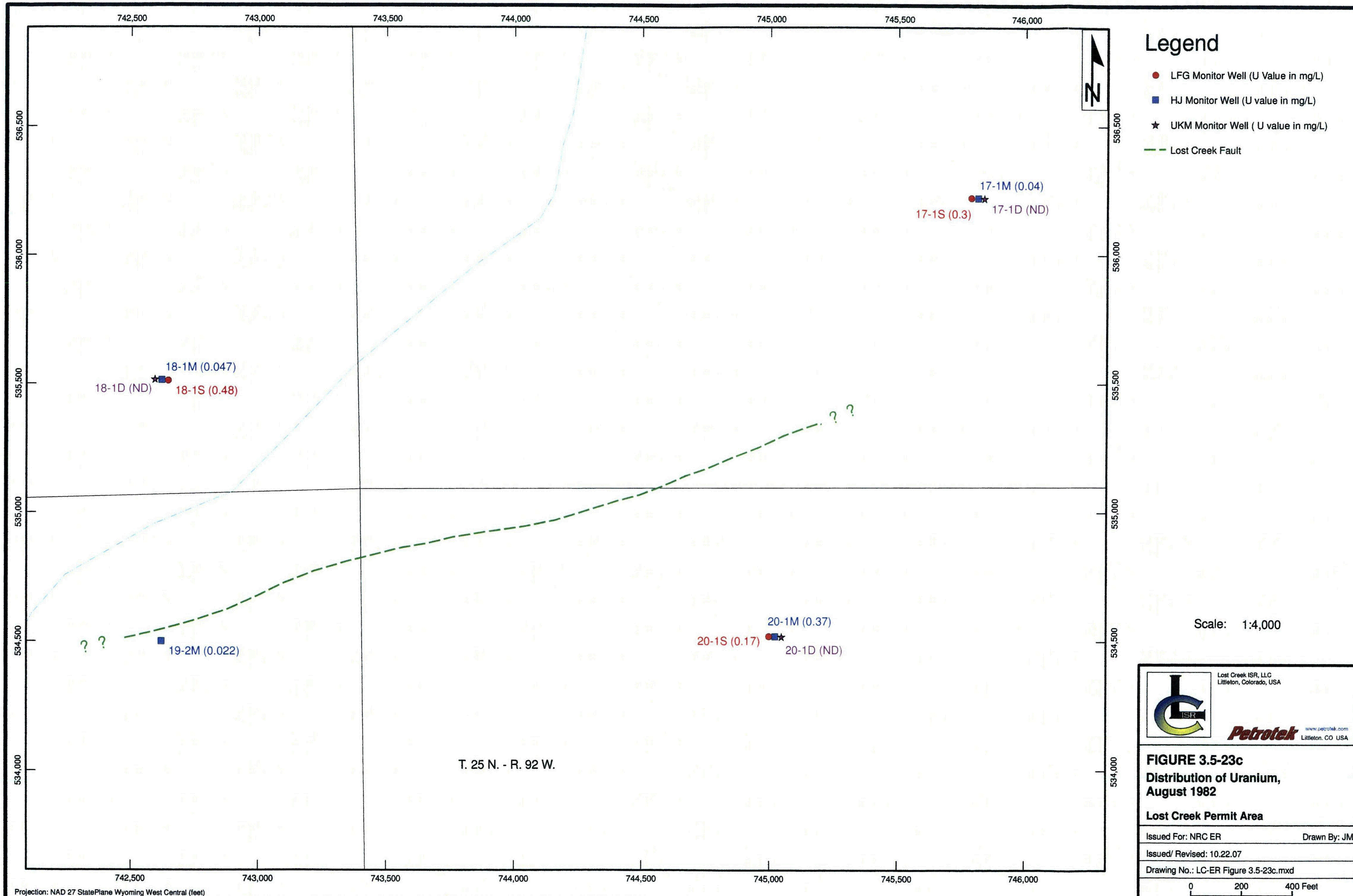

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FIGURE 3.5-23c
Distribution of Uranium, August 1982

Lost Creek Permit Area

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Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-23c.mxd

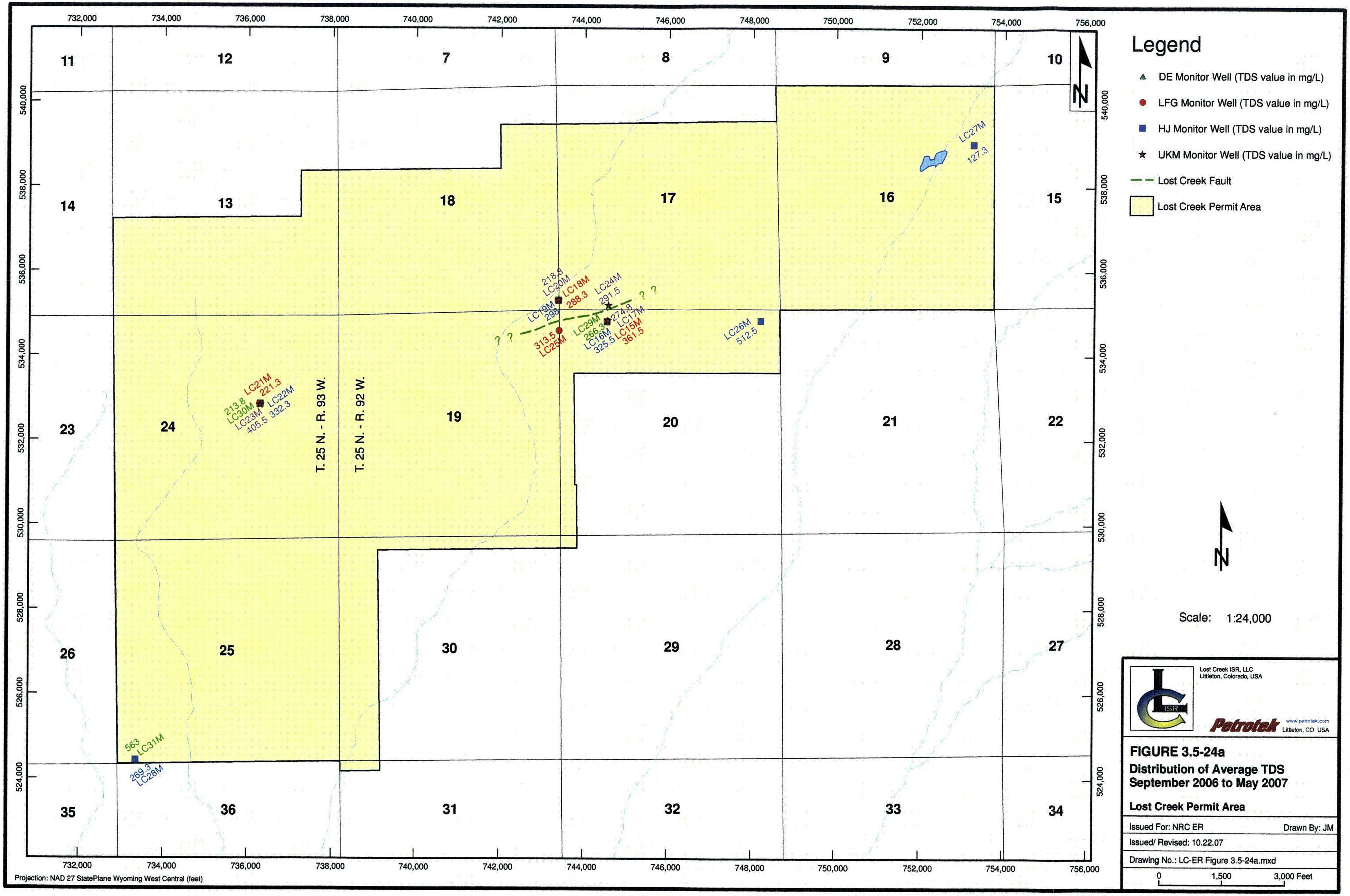
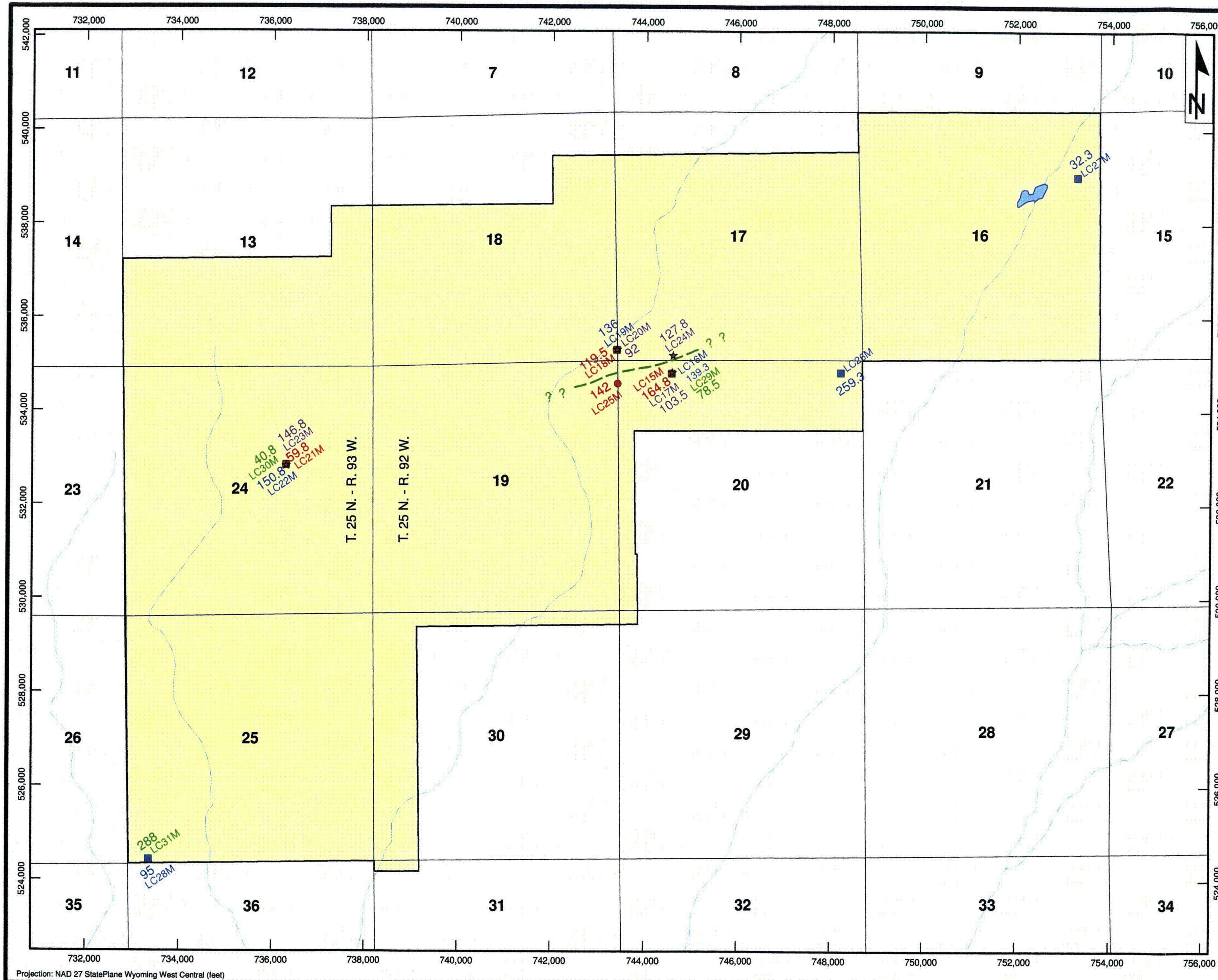


FIGURE 3.5-24a
Distribution of Average TDS September 2006 to May 2007
Lost Creek Permit Area

Issued For: NRC ER
Drawn By: JM
Issued/ Revised: 10.22.07
Drawing No.: LC-ER Figure 3.5-24a.mxd



Legend

- DE Monitor Well (Sulfate value in mg/L)
- LFG Monitor Well (Sulfate value in mg/L)
- HJ Monitor Well (Sulfate value in mg/L)
- UKM Monitor Well (Sulfate value in mg/L)
- Lost Creek Fault
- Lost Creek Permit Area

Scale: 1:24,000

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FIGURE 3.5-24b
Distribution of Average Sulfate September 2006 to May 2007
Lost Creek Permit Area

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Issued/ Revised: 10.22.07
Drawing No.: LC-ER Figure 3.5-24b.mxd

0 1,500 3,000 Feet

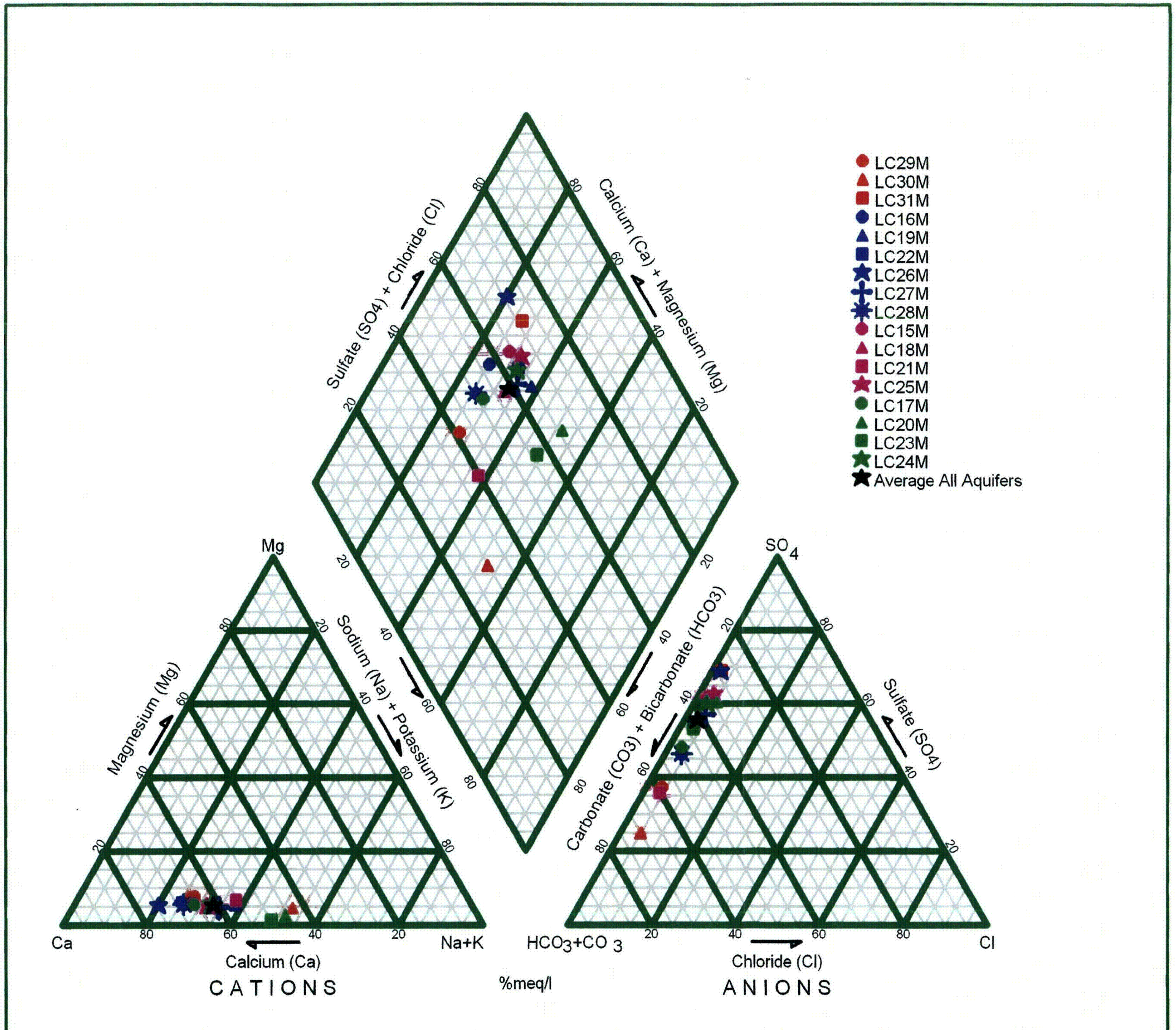

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FIGURE 3.5-25a
Piper Diagram Average Baseline Water Quality at Individual Monitor Wells
Lost Creek Permit Area

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Issued/ Revised: 10.22.07
Drawing No.: LC-ER Figure 3.5-25a.mxd

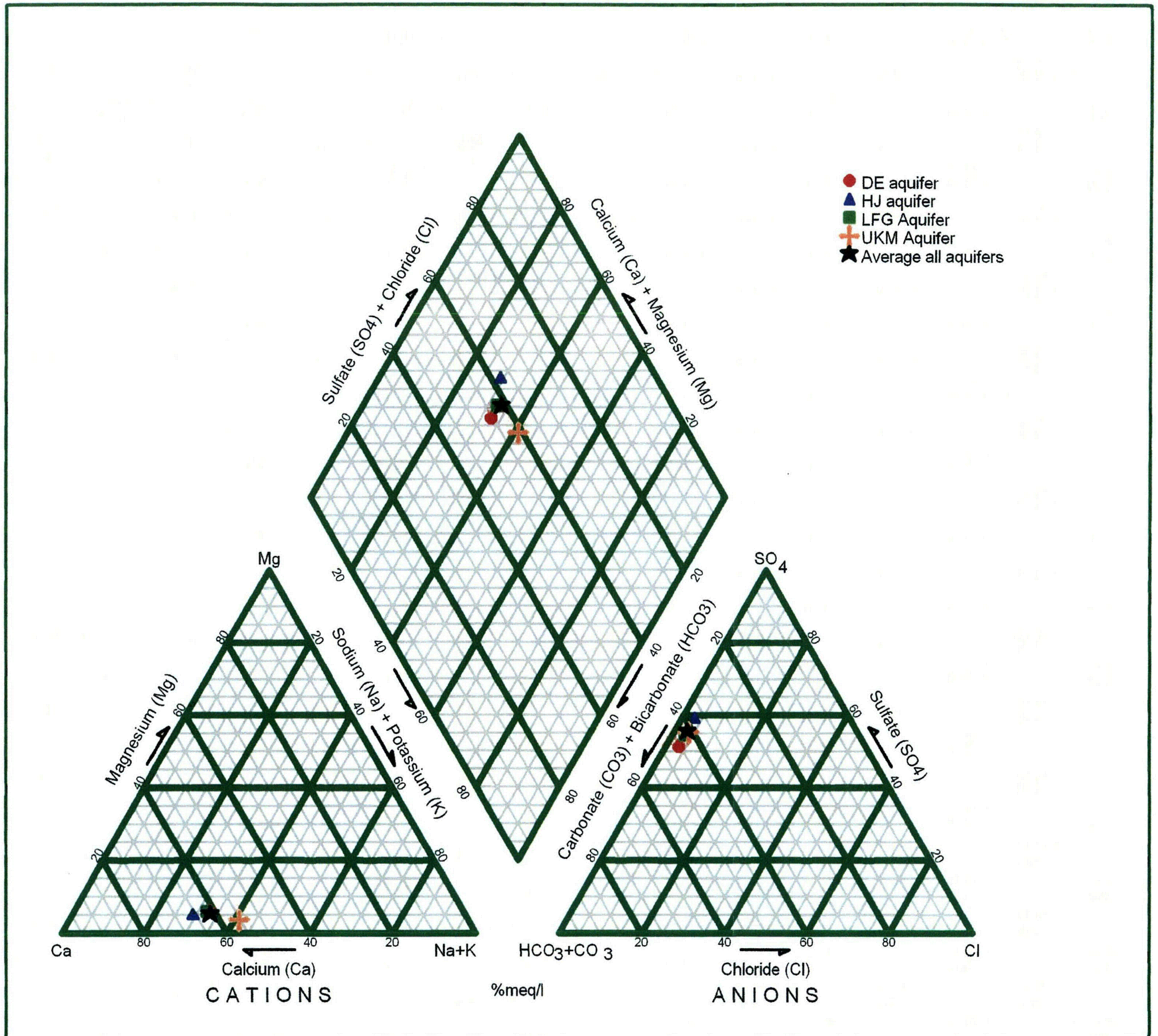

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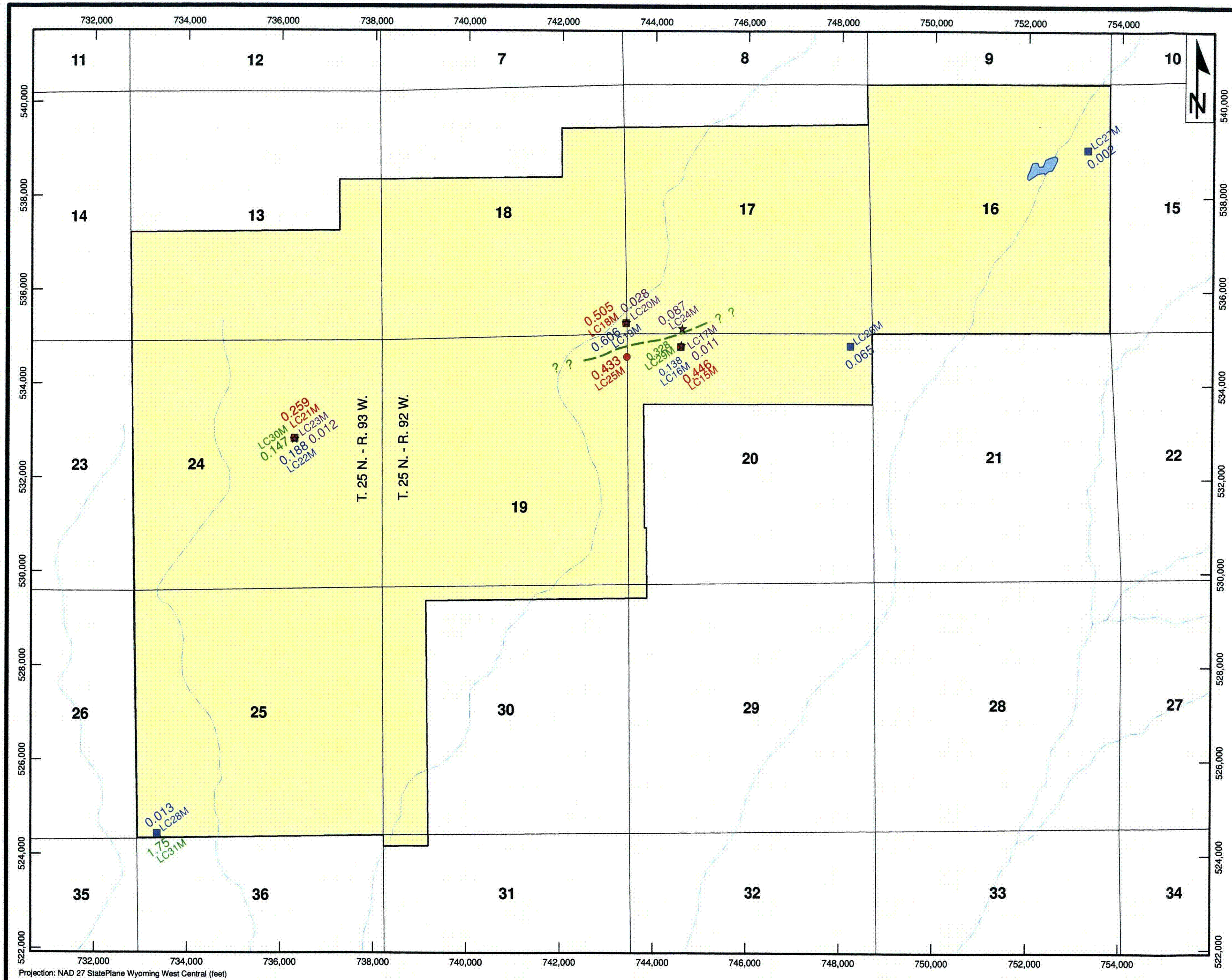
FIGURE 3.5-25b
Piper Diagram Average Baseline Water Quality in Aquifers of Interest
Lost Creek Permit Area

Issued For: NRC ER | Drawn By: JM

Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-25b.mxd



Legend

- DE Monitor Well (Uranium value in mg/L)
- LFG Monitor Well (Uranium value in mg/L)
- HJ Monitor Well (Uranium value in mg/L)
- UKM Monitor Well (Uranium value in mg/L)
- Lost Creek Fault
- Lost Creek Permit Area

Scale: 1:24,000

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FIGURE 3.5-26a

Distribution of Average Uranium September 2006 to May 2007

Lost Creek Permit Area

Issued For: NRC ER Drawn By: JM

Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-26a.mxd

0 1,500 3,000 Feet

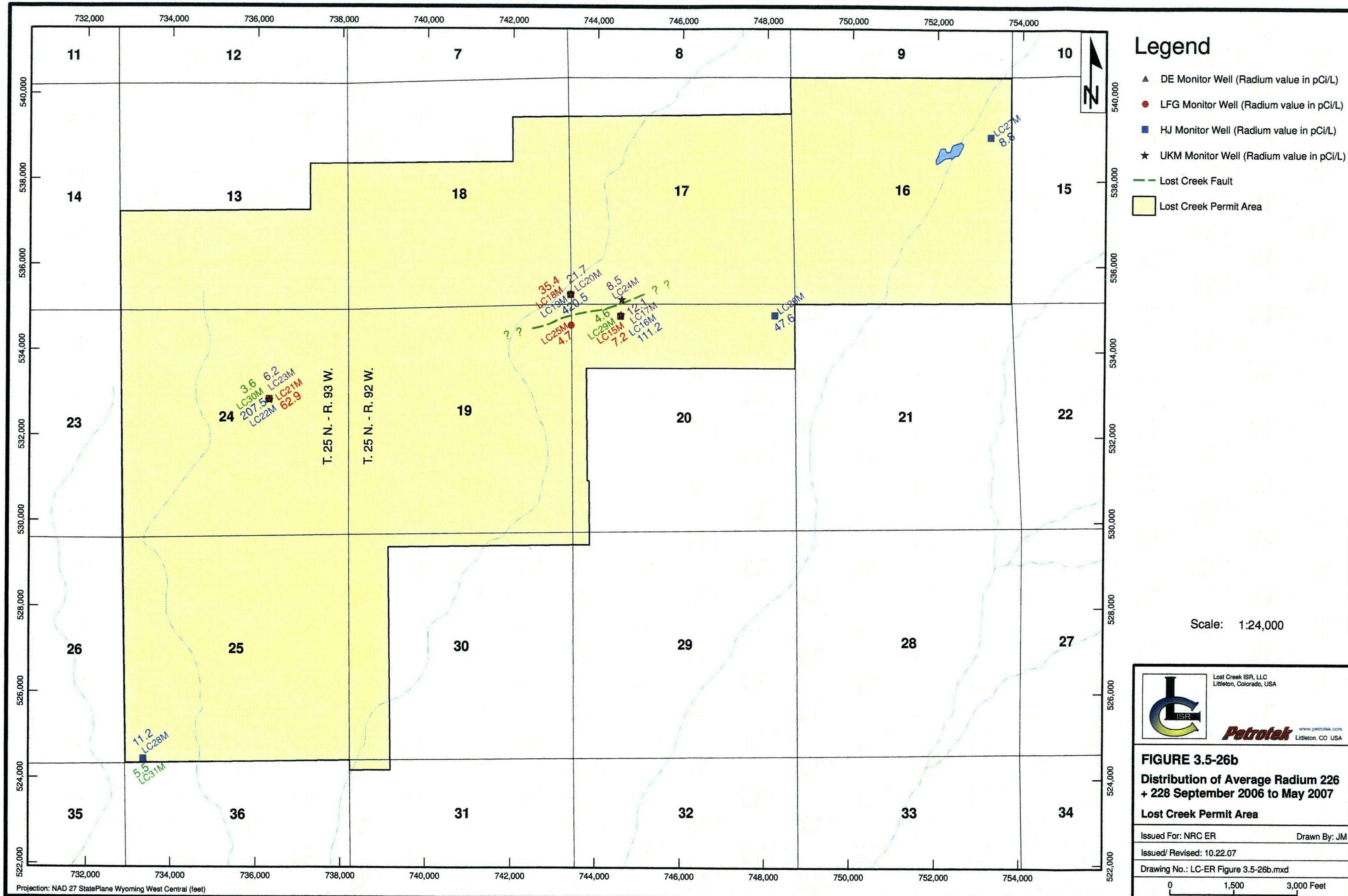

FIGURE 3.5-26b

Distribution of Average Radium 226 + 228 September 2006 to May 2007

Lost Creek Permit Area

Issued For: NRC ER
Drawn By: JM

Issued/ Revised: 10.22.07

Drawing No.: LC-ER Figure 3.5-26b.mxd

Table 3.5-1 Peak Flow Regression Equations

Equation	SE_E (percent)	SE_P (percent)	Average equivalent years of record	95-percent prediction interval factor	
				Lower limit	Upper limit
$Q_{1.5} = 12.7(AREA^{0.626})((LAT-40)^{-1.18})$	66	72	3.2	0.266	3.76
$Q_2 = 22.2(AREA^{0.608})((LAT-40)^{-1.24})$	60	66	3.2	.292	3.43
$Q_{2.33} = 28.1(AREA^{0.600})((LAT-40)^{-1.26})$	59	64	3.3	.301	3.32
$Q_5 = 66.4(AREA^{0.567})((LAT-40)^{-1.35})$	53	59	4.7	.328	3.05
$Q_{10} = 116(AREA^{0.544})((LAT-40)^{-1.40})$	52	57	6.4	.336	2.98
$Q_{25} = 204(AREA^{0.520})((LAT-40)^{-1.44})$	52	58	8.5	.331	3.02
$Q_{50} = 290(AREA^{0.504})((LAT-40)^{-1.46})$	53	60	9.7	.320	3.13
$Q_{100} = 394(AREA^{0.489})((LAT-40)^{-1.47})$	56	63	10.4	.304	3.29
$Q_{200} = 519(AREA^{0.476})((LAT-40)^{-1.48})$	59	67	10.9	.286	3.49
$Q_{500} = 719(AREA^{0.459})((LAT-40)^{-1.49})$	64	73	11.1	.261	3.83

SE_E=average standard error of estimate; SE_P=average standard error of prediction; Q_T=estimated peak flow (cfs) for the recurrence interval of T years; AREA=total drainage area (mi^2); LAT=latitude of basic outlet location in decimal degrees.

Table 3.5-2 Calculated Peak Flows for Battle Spring Draw

Basin	Drainage Area (mi²)	Latitude (Decimal deg.)	2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	25-Year (cfs)	50-Year (cfs)	100-Year (cfs)
Battle Spring Draw	4.9	42.1	22.9	59.1	95.9	157.4	214.8	282.8

Table 3.5-3 Historic Water Quality Results for Battle Spring from the Sweetwater Mill Permit Application *

Battle Spring						
Sample Date	July 18-20, 1974	April 29, 1975	June 20-23, 1975	August 21-28, 1975	October 3-6, 1975	July 30, 1976
Sodium (mg/L)	116					
Potassium (mg/L)	8					
Calcium (mg/L)	23					
Magnesium (mg/L)	5					
Sulfate (mg/L)	130					
Chloride (mg/L)	18					
Carbonate (mg/L)	0					
Bicarbonate (mg/L)	220					
TDS (mg/L)	276					
pH (SU)	9.5					
Gross Alpha (pCi/L)				156 ± 34		
Gross Beta (pCi/L)				90.3 ± 8.8		
Th-230 (pCi/L)				3.34 ± 0.43		
Ra-226 (pCi/L)				33.5 ± 1.1		
Sr-90 (pCi/L)				1.5 ± 0.6		
Uranium (mg/L)	0.006	0.153	0.153	0.289	0.95	0.5

* (Shepherd and Miller, 1994)

Table 3.5-4 Water Quality Results for Seven Stormwater/Spring Snowmelt Samples Collected on 17 April 2007 (Page 1 of 3)

Laboratory Analysis Report - UR Energy Project			Sample ID:	LC1	LC2	LC4	LC5	LC10	LC11	LC12
			Lab ID:	C07040912-001	C07040912-002	C07040912-003	C07040912-004	C07040912-005	C07040912-006	C07040912-007
			Sample Matrix	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater
			Sample Date	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007
			Report Date	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007
Major Ions-Dissolved		Units	Detection Limit	Results	Results	Results	Results	Results	Results	Results
Calcium	Ca	mg/L	1.0	2.8	5.6	3.3	5.5	3.3	5.2	7.4
Magnesium	Mg	mg/L	1.0	0.9	1.5	0.9	1.6	0.6	1.3	1
Sodium	Na	mg/L	1.0	1.1	1.1	0.8	1.2	1.4	1	1
Patassium	K	mg/L	1.0	4.1	6.2	5	7.8	8.4	9.4	3.4
Carbonate	CO_3	mg/L	1.0	<1	<1	<1	<1	<1	<1	<1
Bicarbonate	HCO_3	mg/L	1.0	12	27	17	30	29	15	24
Sulfate	SO_4	mg/L	1.0	3	3	3	5	13	6	6
Chloride	CL	mg/L	1.0	2	1	1	2	1	2	<1
Ammonia as N	NH_3	mg/L	0.05	0.46	0.6	0.55	1.11	8.7	0.86	0.41
Nitrite as N	NO_2	mg/L	0.10	<0.1	<0.1	<0.1	<0.1	0.3	0.2	<0.1
Nitrite + Nitrate as N	NO_2+NO_3	mg/L	0.10	0.3	0.3	0.3	<0.1	0.7	0.6	0.9
Fluoride	F	mg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silica	SiO_2	mg/L	1.0	6.9	9.9	7.1	14.5	0.9	1.1	3.9
Trace Metals-Dissolved										
Aluminum	Al	mg/L	0.10	0.3	0.7	0.6	0.6	<0.1	0.2	0.7
Arsenic	As	mg/L	0.001	0.002	0.003	0.002	0.006	0.002	0.002	0.001
Barium	Ba	mg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	B	mg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	Cd	mg/L	0.005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	Cr	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	Cu	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	Fe	mg/L	0.05	0.66	0.76	0.66	1.26	0.04	0.17	0.35
Lead	Pb	mg/L	0.001	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	Mn	mg/L	0.01	0.03	0.01	0.07	0.4	0.07	0.13	0.04
Mercury	Hg	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	Mo	mg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	Ni	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	Se	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Silver	Ag	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	V	mg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	Zn	mg/L	0.01	0.07	0.04	0.05	0.03	0.22	0.13	0.08

Table 3.5-4 Water Quality Results for Seven Stormwater/Spring Snowmelt Samples Collected on 17 April 2007 (Page 2 of 3)

Laboratory Analysis Report - UR Energy Project			Sample ID:	LG1	LG2	LG4	LG5	LG10	LG11	LG12
			Lab ID:	C07040912-001	C07040912-002	C07040912-003	C07040912-004	C07040912-005	C07040912-006	C07040912-007
			Sample Matrix:	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007
			Report Date:	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007
Major Ions-Dissolved		Units	Detection Limit	Results	Results	Results	Results	Results	Results	Results
Trace Metals-Total										
Aluminum	Al	mg/L	0.10	0.5	1.4	1.6	2.7	0.1	0.3	0.8
Arsenic	As	mg/L	0.001	0.001	0.002	<0.001	0.004	<0.001	<0.001	<0.001
Barium	Ba	mg/L	0.10	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1
Boron	B	mg/L	0.10	0.6	1	0.8	0.4	0.7	0.8	1.2
Cadmium	Cd	mg/L	0.005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	Cr	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	Cu	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	Fe	mg/L	0.05	0.24	0.54	0.29	1.83	0.06	0.21	0.17
Lead	Pb	mg/L	0.001	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	Mn	mg/L	0.01	0.04	0.13	0.08	1.45	0.06	0.13	0.03
Mercury	Hg	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	Mo	mg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	Ni	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	Se	mg/L	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Silver	Ag	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	V	mg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	Zn	mg/L	0.01	0.06	0.03	0.05	0.08	0.22	0.13	0.09

Table 3.5-4 Water Quality Results for Seven Stormwater/Spring Snowmelt Samples Collected on 17 April 2007 (Page 3 of 3)

Laboratory Analysis Report - UR Energy Project			Sample ID:	LC1	LC2	LC4	LC5	LC10	LC11	LC12
			Lab ID:	C07040912-001	C07040912-002	C07040912-003	C07040912-004	C07040912-005	C07040912-006	C07040912-007
			Sample Matrix:	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater	Stormwater
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007
			Report Date:	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007	6/5/2007
Radiometric-Dissolved										
Uranium	NatU	mg/L	0.0003	<0.0003	0.0004	<0.0003	0.0003	<0.0003	<0.0004	<0.0003
Lead 210	Pb	pCi/L	2.2	<2.4	<2.2	<2.2	<2.5	<2.2	<2.3	<2.2
Polonium 210	Po	pCi/L	2.2	<2.4	<2.2	<2.2	<2.5	<2.2	<2.3	<2.2
Thorium230	Th	pCi/L	0.4	<0.5	<0.4	<0.4	<0.5	<0.4	<0.5	<0.4
Radiometric-Suspended										
Uranium	NatU	mg/L	0.0003	<0.0003	0.0005	<0.0003	0.0006	<0.0003	<0.0003	<0.0003
Lead 210	Pb	pCi/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Polonium 210	Po	pCi/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Thorium230	Th	pCi/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
226Radium	226Ra	pCi/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Radiometric-Total										
Uranium	NatU	mg/L	0.0003	0.0003	0.0008	0.0003	0.0009	<0.0003	<0.0003	<0.0003
226Radium	NatU	pCi/L	0.2	<0.2	0.5	<0.2	<0.2	<0.2	<0.2	<0.2
228Radium	NatU	pCi/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Gross Alpha minus Rn & U	226Ra	pCi/L	1	1.3	3.6	1.4	2.6	1.2	<1.0	1.1
Gross Beta	a	pCi/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Quality Assurance Data			Target Range							
Anion	-	meq/L		0.355	0.571	0.377	0.655	0.823	0.486	0.609
Cation	-	meq/L		0.462	0.766	0.537	0.881	1.12	0.748	0.698
WYDEQ A/C Balance	-	%	-5 to +5	13	14.6	17.4	14.7	15.2	21.3	6.82
Calc TDS	-	mg/L		29	43	30	52	46	37	40
Non-Metals										
pH	S.U.	std. units	0.01	7.1	6.86	6.66	6.83	7.12	6.41	6.39
Conductivity	Cond.	µmho/cm	1.0	36.4	57.3	40.5	64.5	100	66.4	62.6
Total Suspended Solids @ 105°C	TSS	mg/L	1.0	36	422	24	5280	4	14	9
Alkalinity as CaCO3	Alk.	mg/L	1.0	10	22	14	25	24	12	20

Table 3.5-5 Monitor Well Data

Well ID	Easting	Northing	Completion Zone	Ground Surface Elevation	Measure Point Elevation	Total Depth	Top Under-Reamed Interval	Bottom Under-Reamed Interval	Total Under-Reamed Thickness
	(feet)	(feet)	(feet)	(ft amsl)	(ft amsl)	(ft bgs)	(ft bgs)	(ft bgs)	(feet)
LC29M	744547	534837	DE	6935.11	6936.86	171	140	164	24
LC30M	736276	532836	DE	6925.10	6927.40	236	196	236	40
LC31M	733380	524434	DE	6856.52	6805.83	191	150	190	40
LC15M	744546	534823	LFG	6934.72	6936.57	350	286	340	54
LC18M	743368	535316	LFG	6948.43	6949.03	350	290	332	42
LC21M	736277	532850	LFG	-	6927.13	410	375	398	23
LC25M	743397	534601	LFG	6935.00	6936.52	380	316	369	53
HJMP-104	742900	534900	HJ	6939.76	6941.01	430	405	430	25
HJMP-107	743700	534800	HJ	6937.13	6938.40	464	443	460	17
HJMP-110	743700	535200	HJ	6945.95	6947.14	476	430	475	45
HJMP-111	743850	535370	HJ	6948.98	6950.32	440	395	440	45
HJT-104	743660	534900	HJ	6938.78	6940.11	460	413	463	50
LC16M	744553	534811	HJ	6934.76	6936.38	472	410	467	57
LC19M	743383	535317	HJ	6949.32	6950.52	463	412	463	51
LC22M	736292	532850	HJ	6924.91	6926.06	592	504	585	81
LC26M	748203	534832	HJ	6952.96	6955.67	436	376	431	55
LC27M	753260	539018	HJ	7010.00	7012.16	477	433	456	23
LC28M	733364	524437	HJ	7804.15	6805.19	563	502	557	55
LC17M	744562	534840	UKM	6935.13	6936.87	575	529	565	36
LC20M	743383	535331	UKM	6949.27	6950.64	543	511	543	32
LC23M	736292	532835	UKM	6924.41	6926.80	634	595	630	35
UKMP-101	744100	534930	UKM	6940.26	6941.75	575	540	572	32
UKMP-102	744150	535150	UKM	6940.87	6942.03	498	485	505	20
LC24M	744580	535203	UKM	6942.76	6944.63	542	478	531	53
Conoco Wells									
M-25-92-17-1S	745785	536224	LFG	UNK [1]	6966.20	UNK	UNK	UNK	UNK
M-25-92-18-1S	742648	535513	LFG	UNK	6939.30	UNK	UNK	UNK	UNK
M-25-92-20-1S	744998	534521	LFG	UNK	6934.50	UNK	UNK	UNK	UNK
M-25-92-17-1M	745813	536223	HJ	UNK	6966.70	UNK	UNK	UNK	UNK
M-25-92-18-1M	742623	535515	HJ	UNK	6940.00	UNK	UNK	UNK	UNK
M-25-92-20-1M	745023	534520	HJ	UNK	6934.90	UNK	UNK	UNK	UNK
M-25-92-19-1M	742622	534524	HJ	UNK	6926.10	UNK	UNK	UNK	UNK
M-25-92-19-2M	742623	534500	HJ	UNK	6925.50	UNK	UNK	UNK	UNK
M-25-92-19-3M	742623	534474	HJ	UNK	6923.90	UNK	UNK	UNK	UNK
M-25-92-17-1D	745837	536222	UKM	UNK	6967.40	UNK	UNK	UNK	UNK
M-25-92-18-1D	742596	535517	UKM	UNK	6938.70	UNK	UNK	UNK	UNK
M-25-92-20-1D	745048	534519	UKM	UNK	6935.00	UNK	UNK	UNK	UNK

[1] UNK = unknown

(-) Ongoing well installation, data provided when becomes available

Table 3.5-6 Water Level Data

Well ID	Completion Zone	Measure Point Elevation (ft amsl)	DTW[1] 8/18/82 (ft bgs)	WL Elev[2] 8/18/82 (ft amsl)	DTW 10/25/06 (ft bgs)	WL Elev 10/25/06 (ft amsl)	DTW 2/28/07 (ft bgs)	WL Elev 2/28/07 (ft amsl)	DTW 6/27/07 (ft bgs)	WL Elev 6/27/07 (ft amsl)
M-25-92-17-1D	UKM	6,967.40	#	6,761.60	-	-	-	-	-	-
M-25-92-17-1M	HJ	6,966.70	#	6,781.80	-	-	-	-	-	-
M-25-92-17-1S	LFG	6,966.20	#	6,792.90	-	-	-	-	-	-
M-25-92-18-1D	UKM	6,938.70	#	6,740.60	-	-	-	-	-	-
M-25-92-18-1M	HJ	6,940.00	#	6,770.80	-	-	-	-	-	-
M-25-92-18-1S	LFG	6,939.30	#	6,778.00	-	-	-	-	-	-
M-25-92-19-1M	HJ	6,926.10	#	6,749.80	-	-	-	-	-	-
M-25-92-19-2M	HJ	6,925.50	#	6,745.50	-	-	-	-	-	-
M-25-92-19-3M	HJ	6,923.90	#	6,745.70	-	-	-	-	-	-
M-25-92-20-1D	UKM	6,935.00	#	6,751.80	-	-	-	-	-	-
M-25-92-20-1M	HJ	6,934.90	#	6,758.90	-	-	-	-	-	-
M-25-92-20-1S	LFG	6,934.50	#	6,776.40	-	-	-	-	-	-
LC15M	LFG	6,936.57	-	-	160.34	6,776.23	160.80	6,775.77	-	-
LC16M	HJ	6,936.38	-	-	178.79	6,757.59	178.62	6,757.76	178.14	6,758.24
LC17M	UKM	6,936.87	-	-	185.34	6,751.53	185.26	6,751.61		
LC18M	LFG	6,949.03	-	-	167.32	6,781.71	165.15	6,783.88	168.04	6,780.99
LC19M	HJ	6,950.52	-	-	179.05	6,771.47	179.15	6,771.37	180.08	6,770.44
LC20M	UKM	6,950.64	-	-	202.84	6,747.80	203.35	6,747.29	202.36	6,748.28
LC21M	LFG	6,927.13	-	-	199.05	6,728.08	198.20	6,728.93	-	-
LC22M	HJ	6,926.06	-	-	206.66	6,719.40	206.73	6,719.33	-	-
LC23M	UKM	6,926.80	-	-	220.33	6,706.47	220.75	6,706.05	-	-
LC24M	UKM	6,944.63	-	-	-	-	192.11	6,752.52	-	-
LC25M	LFG	6,936.52	-	-	165.89	6,770.63	169.01	6,767.51	167.05	6,769.47
LC26M	HJ	6,955.67	-	-	-	-	171.10	6,784.57	-	-
LC27M	HJ	7,012.16	-	-	-	-	189.80	6,822.36	-	-
LC28M	HJ	6,805.19	-	-	-	-	154.45	6,650.74	-	-
LC29M	DE	6,936.86	-	-	153.75	6,783.11	153.95	6,782.91	-	-
LC30M	DE	6,927.40	-	-	199.02	6,728.38	198.91	6,728.49	-	-
LC31M	DE	6,805.83	-	-	-	-	144.01	6,661.82	-	-
HJMP-104	HJ	6,941.01	-	-	-	-	-	-	171.81	6,769.20
HJMP-107	HJ	6,938.40	-	-	-	-	-	-	183.61	6,754.79
HJMP-110	HJ	6,947.14	-	-	-	-	-	-	174.89	6,772.25
HJMP-111	HJ	6,950.32	-	-	-	-	-	-	176.94	6,773.38
HJT-104	HJ	6,940.11	-	-	-	-	-	-	169.51	6,770.60
UKMP-101	UKM	6,941.75	-	-	-	-	-	-	192.13	6,749.62
UKMP-102	UKM	6,942.03	-	-	-	-	-	-	190.68	6,751.35

[1] DTW = depth to water

[2] WL Elev = water level elevation

\# values not provided in Hydro-Search Inc 1982 report

\- water level not measured

Table 3.5-7 Horizontal Hydraulic Gradients (Page 1 of 2)

Well Pair	Easting	Northing	Water Level Elevation	Distance Between Wells	Head Difference	Hydraulic Gradient	Description (Aquifer, Location and Date)
	(feet)	(feet)	(ft amsl)	(feet)	(feet)	(ft/ft)	
LC16M	744553	534811	6757.59	8490.6	38.19	0.0045	HJ Aquifer-South Side of Fault 2006
LC22M	736292	532850	6719.40				
M-25-92-17-1M	745813	536223	6781.80	3267.9	11.00	0.0034	HJ Aquifer-North Side of Fault 1982
M-25-92-18-1M	742623	535515	6770.80				
M-25-92-20-1M	745023	534520	6758.90	2400.8	13.40	0.0056	HJ Aquifer-South Side of Fault 1982
M-25-92-19-2M	742623	534500	6745.50				
M-25-92-20-1M	745023	534520	6758.90	2400.8	9.10	0.0038	HJ Aquifer-South Side of Fault 1982
M-25-92-19-1M	742622	534524	6749.80				
LC16M	744553	534811	6758.24	853.1	3.45	0.0040	HJ Aquifer-South Side of Fault 2007
HJMP-107	743700	534800	6754.79				
HJMP-111	743850	535370	6773.38	1059.9	4.18	0.0039	HJ Aquifer-North Side of Fault 2007
HJMP-104	742900	534900	6769.20				
M-25-92-17-1S	745785	536224	6792.90	3216.8	14.90	0.0046	LFG Aquifer-North Side of Fault 1982
M-25-92-18-1S	742648	535513	6778.00				

Table 3.5-7 Horizontal Hydraulic Gradients (Page 2 of 2)

Well Pair	Easting	Northing	Water Level Elevation	Distance Between Wells	Head Difference	Hydraulic Gradient	Description (Aquifer, Location and Date)
	(feet)	(feet)	(ft amsl)	(feet)	(feet)	(ft/ft)	
LC15M	744546	534823	6776.23	1170.2	5.60	0.0048	LFG Aquifer-South Side of Fault 2006
LC25M	743397	534601	6770.63				
LC15M	744546	534823	6776.23	8501.1	48.15	0.0057	LFG Aquifer-South Side of Fault 2006
LC21M	736277	532850	6728.08				
LC25M	743397	534601	6770.63	7332.1	42.55	0.0058	LFG Aquifer-South Side of Fault 2006
LC21M	736277	532850	6728.08				
M-25-92-17-1D	745837	536222	6761.60	3317.3	21.00	0.0063	UKM Aquifer-North Side of Fault 1982
M-25-92-18-1D	742596	535517	6740.60				
LC17M	744562	534840	6751.53	8509.6	45.06	0.0053	UKM Aquifer-South Side of Fault 2006
LC23M	736292	532835	6706.47				
LC29M	744547	534837	6783.11	8509.6	54.73	0.0064	DE Aquifer-South Side of Fault 2006
LC30M	736276	532836	6728.38				

Table 3.5-8 Vertical Hydraulic Gradients

Well ID	Easting (feet)	Northing (feet)	Completion Zone	Measure Point Elevation (ft amsl)	Top Under-Reamed Interval (ft bgs)	Bottom Under-Reamed Interval (ft bgs)	Midpoint Under-Reamed Interval (ft bgs)	Date of Measurement	Depth to Water (ft bgs)	Water Level Elevation (ft amsl)	Vertical Hydraulic Gradient (ft/ft)
Central Well Group											
LC18M	743368	535316	LFG	6,949.03	290	332	311	10/25/2006	167.32	6,781.71	-
LC19M	743383	535317	HJ	6,950.52	412	463	438	10/25/2006	179.05	6,771.47	0.08
LC20M	743383	535331	UKM	6,950.64	511	543	527	10/25/2006	202.84	6,747.80	0.26
LC18M	743368	535316	LFG	6,949.03	290	332	311	6/27/2007	168.04	6780.99	-
LC19M	743383	535317	HJ	6,950.52	412	463	438	6/27/2007	180.08	6770.44	0.08
LC20M	743383	535331	UKM	6,950.64	511	543	527	6/27/2007	202.36	6748.28	0.25
East Well Group											
LC29M	744547	534837	DE	6936.86	140	164	152	10/25/2006	153.75	6,783.11	
LCM15	744546	534823	LFG	6936.57	286	340	313	10/25/2006	160.34	6,776.23	0.04
LCM16	744562	534820	HJ	6936.38	410	467	438.5	10/25/2006	178.79	6,757.59	0.15
LCM17	744562	534840	UKM	6936.87	529	565	547	10/25/2006	185.34	6,751.53	0.06
West Well Group											
LC30M	736276	532836	DE	6927.404	196	236	216	10/25/2006	199.02	6,728.38	-
LC21M	736277	532850	LFG	6927.13	375	398	387	10/25/2006	199.05	6,728.08	0.00
LC22M	736292	532850	HJ	6926.06	504	585	544.5	10/25/2006	206.66	6,719.40	0.06
LC23M	736292	532835	UKM	6926.8	595	630	612.5	10/25/2006	220.33	6,706.47	0.19
Conoco Northeast Wells											
M-25-92-17-1S	745785	536224	LFG	6966.2	#	#	334	8/18/1982	#	6792.90	-
M-25-92-17-1M	745813	536223	HJ	6966.7	#	#	422	8/18/1982	#	6781.80	0.13
M-25-92-17-1D	745837	536222	UKM	6967.4	#	#	516	8/18/1982	#	6761.60	0.21
Conoco Central Wells											
M-25-92-18-1S	742648	535513	LFG	6939.3	#	#	340	8/18/1982	#	6778.00	-
M-25-92-18-1M	742623	535515	HJ	6940	#	#	413	8/18/1982	#	6770.80	0.10
M-25-92-18-1D	742596	535517	UKM	6938.7	#	#	608	8/18/1982	#	6740.60	0.15
Conoco Southeast Wells											
M-25-92-20-1S	744998	534521	LFG	6934.5	#	#	341	8/18/1982	#	6776.40	-
M-25-92-20-1M	745023	534520	HJ	6934.9	#	#	388	8/18/1982	#	6758.90	0.37
M-25-92-20-1D	745048	534519	UKM	6935	#	#	522	8/18/1982	#	6751.80	0.05

Values were not reported by HydroSearch, Inc. (1982)

Vertical hydraulic gradient is calculated between middle of underreamed interval in overlying aquifer to middle of underreamed interval in underlying aquifer
(a positive number indicates a downward potential)

Table 3.5-9 1982 and 2006 Pump Test Results

Well Identification	Completion Zone	Pumping Well	Under-Reamed Interval [6] (feet)	Pumping Rate (gpm)	Length of Test (hour:minute)	Maximum Drawdown (feet)	Transmissivity/Analytical Method						Average (ft^2/d)	Average Hydraulic Conductivity (ft/d)	Storativity
							Cooper Jacobs [7]		Hantush		Jacob Recovery				
							(gpd/ft)	(ft^2/d)	(gpd/ft)	(ft^2/d)	(gpd/ft)	(ft^2/d)			
Multi-Well Tests															
LC16M [1]	HJ	LC16M	57	15	19:50	21.8	818	109.4			769	102.8	106.1	1.9	
LC19M 1st [2]	HJ	LC19M	51	17.6 to 18.8	10:42	26.4	553	73.9			719	96.1	85.0	1.7	
LC19M 2nd [2]	HJ	LC19M	51	17.6 to 18.8	25:30	29.1	590	78.9			773	103.3	91.1	1.8	
LC22M [3]	HJ	LC22M	81	11.75	45:00	36.3	3007	402.0			1605	214.6	308.3	3.8	
M-25-92-19-1M	HJ	M-25-92-19-2M	~ 50	30	25:10	28.5	700	93.6	730	97.6	760	101.6	97.6	2.0	0.00084
M-25-92-19-2M	HJ	M-25-92-19-2M	~ 50	30	25:10	49	730	97.6	580	77.5	620	82.9	86.0	1.7	
M-25-92-19-3M	HJ	M-25-92-19-2M	~ 50	30	25:10	31.7	680	90.9	610	81.6	730	97.6	90.0	1.8	0.00033
M-25-92-20-1M [4]	HJ	M-25-92-20-1M	~ 50	30	25:00	25	2000	267.4			1300	173.8	220.6	4.4	
Single Well Tests															
LC26M	HJ		55	13.6 to 14.3	1:09	9.7	1821	243.4						4.4	
LC27M 1st	HJ		23	12.8 to 13.0	2:05	12.5	1659	221.8						9.6	
LC27M 2nd [5]	HJ		23	8.8	2:13	8.2	2013	269.1						11.7	
LC15M	LFG		54	14.2	1:50	32.1	302	40.4						0.7	
LC18M 1st	LFG		42	8.8 to 13.0	3:25	94	33	4.4						0.1	
LC18M 2nd	LFG		42	7.5 to 10	2:17	50.5	62	8.3						0.2	
LC21M	LFG		23	13.1	3:45	50.2	303	40.5						1.8	
LC25M	LFG		33	9.4 to 12.2	2:01	75	212	28.3						0.9	
LC17M	UKM		36	13	2:15	26	195	26.1						0.7	
LC20M	UKM		32	12 to 12.5	2:21	23.5	520	69.5						2.2	
LC23M	UKM		35	9.9	3:56	25	583	77.9						2.2	
LC24M	UKM		53	12.1	1:12	24	561	75.0						1.4	
LC29M	DE		40	0.67	0:31	10.3	10	1.3						0.0	
LC30M 1st	DE		40	2.7 to 3.3	5:02	13	231	30.9						0.8	
LC30M 2nd	DE		40	7	2:55	24	573	76.6						1.9	
LC31M	DE		40	7	1:34	14	1098	146.8						3.7	

[1] No significant response from the HJ observation wells LC19M (across the Fault 1,284 feet), LC22M (8,500 feet) or LC26M (3,640 feet) during the test.
[2] No significant response from the HJ observation wells LC16M (1,284 feet), LC22M (7,500 feet) or LC26M (4,850 feet), which are all located across the Fault, during the test.
[3] No significant response from the HJ observation wells LC16M (8,502 feet) or LC28M (8,908 feet) or from LFG well LC21M (15 feet) or UKM well LC23M (15 feet) during the test.
[4] No response from the overlying (M-25-92-20S) or underlying (M25-92-20-D) observation wells during the test.
[5] The pump was shut off after 59 minutes for ten minutes; then the test was resumed.
[6] The 50-foot under-reamed interval for wells M-25-92 was an estimate; these data were not provided in the Hydro-Search, Inc. report (1982).
[7] Hydro Engineering (2007) reported early and late time values for Cooper Jacobs analytical methods; only late time data results are shown here.
Late time data provides better representation, as much of the early time data is impacted by casing storage and later time date shows effects of the Fault.

Table 3.5-10 2007 LC19M Long Term Pump Test Monitor Wells

Well ID	Type of Well	Completion Zone	Ground Surface Elevation (ft amsl)	Top of Casing Elevation (ft amsl)	Top of Under-Reamed Zone (ft bgs)	Bottom of Under-Reamed Zone (ft bgs)	Distance from Pumping Well (feet)	Same Side of Fault as Pumping Well?	Initial Depth to Water (ft bgs)	Static Water Level Elevation (ft amsl)
LC19M	Pumping	HJ	6949.32	6950.52	412	463	0	Yes	180.08	6770.44
HJT-104	Production Zone Monitor	HJ	6938.78	6940.11	413	463	501	Yes	169.51	6770.60
HJMP-104	Production Zone Monitor	HJ	6939.76	6941.01	405	430	638	Yes	171.81	6769.20
HJMP-110	Production Zone Monitor	HJ	6945.95	6947.14	430	475	338	Yes	174.89	6772.25
HJMP-111	Production Zone Monitor	HJ	6948.98	6950.32	395	440	470	Yes	176.94	6773.38
HJMP-107	Production Zone Monitor	HJ	6937.13	6938.40	443	460	606	No	183.61	6754.79
LC16M	Production Zone Monitor	HJ	6934.76	6936.38	410	467	1284	No	178.14	6758.24
LC20M	Underlying Monitor	UKM	6949.27	6950.64	511	543	14	Yes	202.36	6748.28
UKMP-102	Underlying Monitor	UKM	6940.87	6942.03	485	505	785	Yes	190.68	6751.35
UKMP-101	Underlying Monitor	UKM	6940.26	6941.75	540	572	815	No	192.13	6749.62
LC18M	Overlying Monitor	LFG	6948.43	6949.03	290	332	15	Yes	168.04	6780.99
LC25M	Overlying Monitor	LFG	6935.00	6936.52	316	369	697	No	167.05	6769.47

Table 3.5-11 2007 LC19M Pump Test Results

Well ID	Type Well	Underreamed interval (feet)	Distance from pumping well (feet)	Same side of fault as pumping well?	Drawdown at End of Pumping	Transmissivity (ft^2/d)			Storage Coefficient	Hydraulic Conductivity (ft/d) [1]
						Theis	Theis Recovery	Average		
LC19M	Pumping	51	0	Yes	93.3	-	56.7	56.7	-	0.47
HJT-104	Prod. Zone Monitor	50	501	Yes	40.5	30.0	56.9	43.5	9.60E-05	0.36
HJMP-104	Prod. Zone Monitor	25	638	Yes	36.5	61.3	56.8	59.1	6.60E-05	0.49
HJMP-110	Prod. Zone Monitor	45	338	Yes	40.5	66.4	63.0	64.7	1.30E-04	0.54
HJMP-111	Prod. Zone Monitor	45	470	Yes	35.6	69.8	64.1	67.0	9.10E-05	0.56
UKMO-102						75.5	76.9	76.2	1.50E-04	0.64
	Average	43	-	-	-	60.6	62.4	61.2	1.07E-04	0.51
HJMP-107	Prod. Zone Monitor	17	606	No	1.4	NA [3]	NA	NA	NA	NA
LC16M	Prod. Zone Monitor	57	1284	No	1.2	NA	NA	NA	NA	NA
LC20M	Underlying Monitor	32	14	Yes	-0.7	NA	NA	NA	NA	NA
UKMP-102	Underlying Monitor	20	785	Yes	1.2	NA	NA	NA	NA	NA
UKMP-101	Underlying Monitor	32	815	No	2.6 [2]	NA	NA	NA	NA	NA
LC18M	Overlying Monitor	42	15	Yes	1.1	NA	NA	NA	NA	NA
LC25M	Overlying Monitor	53	697	No	1.6	NA	NA	NA	NA	NA

[1] Hydraulic Conductivity Calculated from Average Transmissivity and Estimated Aquifer Thickness of 120 feet.
[2] Value shifted abruptly downward 2.7 feet between consecutive measure points one hour prior to end of test.
[3] NA - Not analyzed because of insufficient response

Table 3.5-12 Groundwater Use Permits (Page 1 of 12)

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Permit Number	Applicant [1]	Township	Range	Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
P9742W	Kennecott Uranium Company	24 N	92 W	5	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	24 N	92 W	6	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	24 N	92 W	7	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	24 N	93 W	1	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	24 N	93 W	2	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	24 N	93 W	3	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	24 N	93 W	11	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	24 N	93 W	12	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P147594W	Kennecott Uranium Company	24 N	93 W	1	SWNE	Monitoring	10/22/2002	Good Standing	X	TMW-90	INP	55	36.13
P48386W	Kennecott Uranium Company	24 N	93 W	3	SWNE	Dewatering, Miscellaneous	5/31/1979	Unadjudicated	X	24-93W-3AC-M-1	0 gpm	450	135.8
P147595W	Kennecott Uranium Company	24 N	93 W	1	SENW	Monitoring	10/22/2002	Good Standing	X	TMW-91	INP	110	100.17
P47137W	Kennecott Uranium Company	24 N	93 W	3	SWSW	Reservoir Supply, Stock, Miscellaneous	12/7/1977	Unadjudicated	INP	BLUE #5	100 gpm	INP	INP
P47137W	Kennecott Uranium Company	24 N	93 W	3	SESW	Reservoir Supply, Stock, Miscellaneous	12/7/1977	Unadjudicated	INP	BLUE #5	100 gpm	INP	INP
P9742W	Kennecott Uranium Company	25 N	93 W	1	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	2	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	3	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	10	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	11	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	12	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	13	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	14	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	15	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	22	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	23	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	24	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	25	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104

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Permit Number	Applicant [1]	Township	Range	Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
P9742W	Kennecott Uranium Company	25 N	93 W	26	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	27	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	34	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	35	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
P9742W	Kennecott Uranium Company	25 N	93 W	36	INP	Stock, Industrial	7/15/1971	Adjudicated	INP	J E S #1	25 gpm	170	104
39/1/565W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMO-101	LCS	LCS	LCS
39/1/566W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMV-105	LCS	LCS	LCS
39/1/567W	NFU Wyoming LLC	25 N	92 W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-108	LCS	LCS	LCS
39/1/568W	NFU Wyoming LLC	25 N	92 W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	HJMO-111	LCS	LCS	LCS
39/1/569W	NFU Wyoming LLC	25 N	92 W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	UKMU-101	LCS	LCS	LCS
39/10/564W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-101	LCS	LCS	LCS
39/10/565W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMO-104	LCS	LCS	LCS
39/10/566W	NFU Wyoming LLC	25 N	92 W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMV-108	LCS	LCS	LCS
39/10/567W	NFU Wyoming LLC	25 N	92 W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	HJMP-111	LCS	440	176.94
39/10/568W	NFU Wyoming LLC	25 N	92 W	20	NENW	Monitoring	3/1/2007	Unadjudicated	X	HJMO-114	LCS	LCS	LCS
39/10/88W	NFU Wyoming LLC	25 N	92 W	16	SENE	Monitoring	6/9/2006	Unadjudicated	X	LC27M	LCS	477	189.8
39/2/564W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJT 101	LCS	LCS	LCS
39/2/565W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMV-102	LCS	LCS	LCS
39/2/566W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-105	LCS	LCS	LCS
39/2/567W	NFU Wyoming LLC	25 N	92 W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMO-108	LCS	LCS	LCS
39/2/568W	NFU Wyoming LLC	25 N	92 W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMV-112	LCS	LCS	LCS
39/2/569W	NFU Wyoming LLC	25 N	92 W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	UKMP-101	LCS	575	192.13
39/3/564W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJT 102	LCS	LCS	LCS
39/3/565W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-102	LCS	LCS	LCS
39/3/566W	NFU Wyoming LLC	25 N	92 W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMO-105	LCS	LCS	LCS
39/3/567W	NFU Wyoming LLC	25 N	92 W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMV-109	LCS	LCS	LCS
39/3/568W	NFU Wyoming LLC	25 N	92 W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMP-112	LCS	LCS	LCS
39/3/569W	NFU Wyoming LLC	25 N	92 W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	UKMO-101	LCS	LCS	LCS

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Permit Number	Applicant [1]	Township		Range		Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
39/4/563W	NFU Wyoming LLC	25	N	92	W	17	NWSE	Miscellaneous	2/28/2007	Unadjudicated	X	LC 32W	LCS	LCS	LCS
39/4/564W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJT 103	LCS	LCS	LCS
39/4/565W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMO-102	LCS	LCS	LCS
39/4/566W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMV-106	LCS	LCS	LCS
39/4/567W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMP-109	LCS	LCS	LCS
39/4/568W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMO-112	LCS	LCS	LCS
39/4/569W	NFU Wyoming LLC	25	N	92	W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	UKMU-102	LCS	LCS	LCS
39/4/88W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC15M	LCS	350	160.8
39/4/88W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC16M	LCS	472	178.14
39/4/88W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC17M	LCS	575	185.26
39/4/88W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC29M	LCS	171	153.95
39/5/563W	NFU Wyoming LLC	25	N	92	W	20	NENE	Miscellaneous	2/28/2007	Unadjudicated	X	LC 33W	LCS	LCS	LCS
39/5/564W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJT 104	LCS	460	169.51
39/5/565W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMV-103	LCS	LCS	LCS
39/5/566W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-106	LCS	LCS	LCS
39/5/567W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMO-109	LCS	LCS	LCS
39/5/568W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMV-113	LCS	LCS	LCS
39/5/569W	NFU Wyoming LLC	25	N	92	W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	UKMP-102	LCS	498	190.68
39/5/88W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC18M	LCS	350	168.04
39/5/88W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC19M	LCS	463	180.08
39/5/88W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC20M	LCS	543	202.36
39/6/564W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJT 105	LCS	LCS	LCS
39/6/565W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-103	LCS	LCS	LCS
39/6/566W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMO-106	LCS	LCS	LCS
39/6/567W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMV-110	LCS	LCS	LCS
39/6/568W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMP-113	LCS	LCS	LCS
39/6/569W	NFU Wyoming LLC	25	N	92	W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	UKMO-102	LCS	LCS	LCS
39/7/564W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJT 106	LCS	LCS	LCS

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Permit Number	Applicant [1]	Township		Range		Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
39/7/565W	NFU Wyoming LLC	25	N	92	W	18	SESE	Monitoring	3/1/2007	Unadjudicated	X	HJMO-103	LCS	LCS	LCS
39/7/566W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMV-107	LCS	LCS	LCS
39/7/567W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMP-110	LCS	476	174.89
39/7/568W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMO-113	LCS	LCS	LCS
39/7/569W	NFU Wyoming LLC	25	N	92	W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	UKMU-103	LCS	LCS	LCS
39/7/88W	NFU Wyoming LLC	25	N	92	W	17	SWSW	Monitoring	6/9/2006	Unadjudicated	X	LC24M	LCS	542	192.11
39/8/564W	NFU Wyoming LLC	25	N	92	W	20	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJT 107	LCS	LCS	LCS
39/8/565W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMV-104	LCS	LCS	LCS
39/8/566W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-107	LCS	464	183.61
39/8/567W	NFU Wyoming LLC	25	N	92	W	20	NWNW	Monitoring	3/1/2007	Unadjudicated	X	HJMO-110	LCS	LCS	LCS
39/8/568W	NFU Wyoming LLC	25	N	92	W	20	NENW	Monitoring	3/1/2007	Unadjudicated	X	HJMV-114	LCS	LCS	LCS
39/8/569W	NFU Wyoming LLC	25	N	92	W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	UKMP-103	LCS	LCS	LCS
39/8/88W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	6/9/2006	Unadjudicated	X	LC25M	LCS	380	167.05
39/9/564W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMV-101	LCS	LCS	LCS
39/9/565W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-104	LCS	430	171.81
39/9/566W	NFU Wyoming LLC	25	N	92	W	19	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMO-107	LCS	LCS	LCS
39/9/567W	NFU Wyoming LLC	25	N	92	W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	HJMV-111	LCS	LCS	LCS
39/9/568W	NFU Wyoming LLC	25	N	92	W	20	NENE	Monitoring	3/1/2007	Unadjudicated	X	HJMP-114	LCS	LCS	LCS
39/9/569W	NFU Wyoming LLC	25	N	92	W	17	SWSW	Monitoring	3/1/2007	Unadjudicated	X	UKMP-103	LCS	LCS	LCS
39/9/88W	NFU Wyoming LLC	25	N	92	W	20	NENE	Monitoring	6/9/2006	Unadjudicated	X	LC26M	LCS	436	171.1
39/6/88W	NFU Wyoming LLC	25	N	93	W	24	SWNE	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC21M	LCS	410	198.2
39/6/88W	NFU Wyoming LLC	25	N	93	W	24	SWNE	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC22M	LCS	592	206.73
39/6/88W	NFU Wyoming LLC	25	N	93	W	24	SWNE	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC23M	LCS	634	220.75
39/6/88W	NFU Wyoming LLC	25	N	93	W	24	SWNE	Monitoring, Test Well	6/9/2006	Unadjudicated	X	LC30M	LCS	236	198.91
39/2/89W	NFU Wyoming LLC	25	N	93	W	25	SWSW	Monitoring	6/9/2006	Unadjudicated	X	LC31M	LCS	191	144.01
39/1/89W	NFU Wyoming LLC	25	N	93	W	25	SWSW	Monitoring	6/9/2006	Unadjudicated	X	LC28M	LCS	563	154.45
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	16	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	16	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS

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Permit Number	Applicant [1]	Township	Range	Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	SWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	SENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	NESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	NWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	SWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	SESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	NESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	NWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	SWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	16	SESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	SWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	SENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	NESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	NWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	SWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	SESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	NESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	NWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS

Table 3.5-12 Groundwater Use Permits (Page 6 of 12)

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Permit Number	Applicant [1]	Township	Range	Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	SWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	17	SESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	SWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	SENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	NESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	NWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	SWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	SESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	NESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	NWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	SWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	18	SESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	SWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	SENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	NESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25 N	92 W	19	NWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS

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Permit Number	Applicant [1]	Township		Range		Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3, 4]	Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	19	SWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	19	SESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	20	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	20	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	20	SWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	20	SENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	20	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	20	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	20	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	20	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	30	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	30	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	30	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	30	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	30	NESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	30	NWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	30	SWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	92	W	30	SESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	NWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	SWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	SESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	SWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	SESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	NESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	NESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	NWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS

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Permit Number	Applicant [1]	Township		Range		Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	SWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	SENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	13	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	SESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	SWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	SWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	SESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	SENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	SWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	X	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	24	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	SWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	SESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	SESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	NESE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS	LCS	LCS

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Permit Number	Applicant [1]	Township		Range		Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield		Well Depth (ft)	Static Well Depth (ft)
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	NWSE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	NESW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	NWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	SWSW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	SWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	SENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	SWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	SENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	25	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	36	NWNW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	36	NENW	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	36	NWNE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P169906W	Ur-Energy USA Inc. -- WSBLC	25	N	93	W	36	NENE	Miscellaneous	9/12/2005	Good Standing Incomplete	LCS	LCIW	LCS		LCS	LCS
P13834P	USDI BLM, Rawlins District	25	N	92	W	21	NENW	Stock	9/21/1968	INP	INP	BATTLE SPRING DRAW WELL #4451	19	gpm	900	104
P13834P	USDI BLM, Rawlins District	25	N	92	W	21	NENW	Stock	9/21/1968	INP	X	BATTLE SPRING DRAW WELL #4451	19	gpm	900	104
P55113W	USDI BLM, Rawlins District	25	N	92	W	30	NWSE	Stock	12/24/1980	INP	INP	BATTLE SPRINGS	5	gpm	220	109
P55113W	USDI BLM, Rawlins District	25	N	92	W	30	NWSE	Stock	12/24/1980	INP	X	BATTLE SPRINGS	5	gpm	220	109
P55112W	USDI BLM, Rawlins District	25	N	92	W	10	SESE	Stock	12/24/1980	INP	INP	BOUNDARY	5	gpm	280	155
P55112W	USDI BLM, Rawlins District	25	N	92	W	10	SESE	Stock	12/24/1980	INP	X	BOUNDARY	5	gpm	280	155

Table 3.5-12 Groundwater Use Permits (Page 10 of 12)

Last Revised October, 2007

Permit Number	Applicant [1]	Township		Range		Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield		Well Depth (ft)	Static Well Depth (ft)
P39744W	USDI, BLM -- Apexco Inc.	25	N	93	W	22	SWNE	Miscellaneous	8/26/1977	INP	INP	BATTLE SPRINGS #1	25	gpm	640	60
P39744W	USDI, BLM -- Apexco Inc.	25	N	93	W	22	SWNE	Miscellaneous	8/26/1977	INP	X	BATTLE SPRINGS #1	25	gpm	640	60
P54891W	USDI, BLM -- Kennecott Uranium Company	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 39	200	gpm	600	169
P54892W	USDI, BLM -- Kennecott Uranium Company	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 40	200	gpm	600	155
P54891W	USDI, BLM -- Kennecott Uranium Company	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 39	200	gpm	600	169
P54892W	USDI, BLM -- Kennecott Uranium Company	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 40	200	gpm	600	155
P63128W	USDI, BLM -- Kennecott Uranium Company	24	N	93	W	11	SWSW	Monitoring	1/28/1983	INP	INP	TMW-14	0	gpm	INP	INP
P63128W	USDI, BLM -- Kennecott Uranium Company	24	N	93	W	11	SWSW	Monitoring	1/28/1983	INP	X	TMW-14	0	gpm	INP	INP
P54886W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 34	200	gpm	450	140
P54894W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 42	200	gpm	600	166
P54883W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 31	190	gpm	600	152
P54893W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 41	190	gpm	600	157

Table 3.5-12 Groundwater Use Permits (Page 11 of 12)

Last Revised October, 2007

Permit Number	Applicant [1]	Township		Range		Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield		Well Depth (ft)	Static Well Depth (ft)
P54884W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 32	200	gpm	600	147
P54885W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 33	190	gpm	560	141
P54886W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 34	200	gpm	450	140
P54894W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 42	200	gpm	600	166
P54883W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 31	190	gpm	600	152
P54893W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 41	190	gpm	600	157
P54884W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 32	200	gpm	600	147
P54885W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	Unadjudicated	INP	DW 33	190	gpm	560	141
P54887W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	INP	INP	DW 35	400	gpm	INP	INP
P54888W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	INP	INP	DW 36	400	gpm	INP	INP
P54890W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	INP	INP	DW 38	400	gpm	INP	INP

Table 3.5-12 Groundwater Use Permits (Page 12 of 12)

Last Revised October, 2007

Permit Number	Applicant [1]	Township		Range		Section	¼ ¼ [2]	Uses	Priority	Status	Headgate-Outlet-Well [3,4]	Permit Facility Name	Yield		Well Depth (ft)	Static Well Depth (ft)
P54889W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SWSW	Dewatering, Industrial, Miscellaneous	11/24/1980	INP	INP	DW 37	400	gpm	INP	INP
P54887W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	INP	INP	DW 35	400	gpm	INP	INP
P54888W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	INP	INP	DW 36	400	gpm	INP	INP
P54890W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	INP	INP	DW 38	400	gpm	INP	INP
P54889W	Minerals Exploration Company -- WSBLC	24	N	93	W	11	SESW	Dewatering, Industrial, Miscellaneous	11/24/1980	INP	INP	DW 37	400	gpm	INP	INP

[1] WSBLC = Wyoming State Board of Land Commissioners

[2] INP = Information not provided by the online WSEO database.

[3] An "X" in the "Headgate-Outlet-Well" column indicates the location of a headgate for a ditch or pipeline, an outlet for a reservoir or stock reservoir, or a well.

[4] LCS = Part of the on-going Lost Creek Project study. Information will be provided when it becomes available.

Table 3.5-13 Abandoned and Cancelled Wells (Page 1 of 5)

Last Revised April, 2007

Permit Number	Applicant	Township		Range		Section	¼ ¼	Uses	Priority	Status	HeadGate-Outlet-Well	GW Permit Facility Name	Yield		Well Depth (ft)	Static Well Depth (ft)
P61528W	Texasgulf Inc.	25	N	92	W	20	NWNW	Monitoring	6/11/1982	Abandoned		M25 92 20 1S	0	gpm	355	155.8
P61528W	Texasgulf Inc.	25	N	92	W	20	NWNW	Monitoring	6/11/1982	Abandoned	X	M25 92 20 1S	0	gpm	355	155.8
P61529W	Texasgulf Inc.	25	N	92	W	20	NWNW	Monitoring	6/11/1982	Abandoned		M25 92 20 1M	0	gpm	440	173.8
P61529W	Texasgulf Inc.	25	N	92	W	20	NWNW	Monitoring	6/11/1982	Abandoned	X	M25 92 20 1M	0	gpm	440	173.8
P61530W	Texasgulf Inc.	25	N	92	W	20	NWNW	Monitoring	6/11/1982	Abandoned		M25 92 20 1D	0	gpm	534	181.2
P61530W	Texasgulf Inc.	25	N	92	W	20	NWNW	Monitoring	6/11/1982	Abandoned	X	M25 92 20 1D	0	gpm	534	181.2
P61531W	Texasgulf Inc.	25	N	92	W	19	NENE	Monitoring	6/11/1982	Abandoned		M25 92 19 3M	0	gpm	460	176.5
P61531W	Texasgulf Inc.	25	N	92	W	19	NENE	Monitoring	6/11/1982	Abandoned	X	M25 92 19 3M	0	gpm	460	176.5
P61532W	Texasgulf Inc.	25	N	92	W	19	NENE	Monitoring	6/11/1982	Abandoned		M25 92 19 2M	0	gpm	460	175.9
P61532W	Texasgulf Inc.	25	N	92	W	19	NENE	Monitoring	6/11/1982	Abandoned	X	M25 92 19 2M	0	gpm	460	175.9
P61533W	Texasgulf Inc.	25	N	92	W	19	NENE	Monitoring	6/11/1982	Abandoned		M25 92 19 1M	0	gpm	460	174.4
P61533W	Texasgulf Inc.	25	N	92	W	19	NENE	Monitoring	6/11/1982	Abandoned	X	M25 92 19 1M	0	gpm	460	174.4
P61534W	Texasgulf Inc.	25	N	92	W	18	SWSE	Monitoring	6/11/1982	Abandoned		M25 19 18 1M	0	gpm	465	166.7
P61534W	Texasgulf Inc.	25	N	92	W	18	SESE	Monitoring	6/11/1982	Abandoned	X	M25 19 18 1M	0	gpm	465	166.7
P61535W	Texasgulf Inc.	25	N	92	W	18	SESE	Monitoring	6/11/1982	Abandoned		M25 19 18 1S	0	gpm	355	159.5
P61535W	Texasgulf Inc.	25	N	92	W	18	SESE	Monitoring	6/11/1982	Abandoned	X	M25 19 18 1S	0	gpm	355	159.5
P61536W	Texasgulf Inc.	25	N	92	W	18	SESE	Monitoring	6/11/1982	Abandoned		M25 92 18 1D	0	gpm	615	195.7
P61536W	Texasgulf Inc.	25	N	92	W	18	SESE	Monitoring	6/11/1982	Abandoned	X	M25 92 18 1D	0	gpm	615	195.7
P61537W	Texasgulf Inc.	25	N	92	W	17	SESW	Monitoring	6/11/1982	Abandoned		M25 92 17 1S	0	gpm	340	170.53
P61537W	Texasgulf Inc.	25	N	92	W	17	SESW	Monitoring	6/11/1982	Abandoned	X	M25 92 17 1S	0	gpm	340	170.53
P61538W	Texasgulf Inc.	25	N	92	W	17	SESW	Monitoring	6/11/1982	Abandoned		M25 92 17 1M	0	gpm	480	182.7
P61538W	Texasgulf Inc.	25	N	92	W	17	SESW	Monitoring	6/11/1982	Abandoned	X	M25 92 17 1M	0	gpm	480	182.7
P61539W	Texasgulf Inc.	25	N	92	W	17	SESW	Monitoring	6/11/1982	Abandoned		M25 92 17 1D	0	gpm	529	204.5
P61539W	Texasgulf Inc.	25	N	92	W	17	SESW	Monitoring	6/11/1982	Abandoned	X	M25 92 17 1D	0	gpm	529	204.5
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	SESE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	NESE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	NWSE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	SWSE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWSE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SESE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SESW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		

Table 3.5-13 Abandoned and Cancelled Wells (Page 2 of 5)

Last Revised April, 2007

Permit Number	Applicant	Township		Range		Section	¼ ¼	Uses	Priority	Status	HeadGate-Outlet-Well	GW Permit Facility Name	Yield		Well Depth (ft)	Static Well Depth (ft)
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NESE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWSE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NESW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWSW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWSW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWNE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWNE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SENE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NENE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SWSE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SWSE	Stock, Miscellaneous	12/8/1976	Abandoned	X	TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SESE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SESW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NESE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NWSE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NESW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NWSW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SWSW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	SWNW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	SENW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	SENE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	NENW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	NWNW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	NENE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	NWNE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	SWNE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NWNW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	SWNW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	SENW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	SWNE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	SENE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		

Table 3.5-13 Abandoned and Cancelled Wells (Page 3 of 5)

Last Revised April, 2007

Permit Number	Applicant	Township		Range		Section	¼ ¼	Uses	Priority	Status	HeadGate-Outlet-Well	GW Permit Facility Name	Yield		Well Depth (ft)	Static Well Depth (ft)
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NENW	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NENE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P35721W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NWNE	Stock, Miscellaneous	12/8/1976	Abandoned		TE 24	25	gpm		
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	SWSE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	SESE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	NESE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	NWSE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWSE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWSE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SESE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWSW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SESW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NESE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SENE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NESW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWSW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NENE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWNE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWNE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NWSE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SWSE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SESE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SWSW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SESW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NESE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NESW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NWSW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	SENW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	NENW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	NWNW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	SWNW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220

Table 3.5-13 Abandoned and Cancelled Wells (Page 4 of 5)

Last Revised April, 2007

Permit Number	Applicant	Township		Range		Section	¼ ¼	Uses	Priority	Status	HeadGate-Outlet-Well	GW Permit Facility Name	Yield		Well Depth (ft)	Static Well Depth (ft)
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	NWNE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	SWNE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	SENE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	23	NENE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	SENW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NENW	Miscellaneous	5/5/1977	Cancelled	X	TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NWNW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	SWNW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	SWNE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	SENE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NENW	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NENE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P37637W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	24	NWNE	Miscellaneous	5/5/1977	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	SESE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	NESE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	NWSE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	12	SWSE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWSE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SESE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SESW	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NESE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWSE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NESW	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWSW	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWSW	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NWNE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SWNE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	SENE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	13	NENE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	NWSE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25	N	93	W	14	SWSE	Miscellaneous	8/10/1984	Cancelled		TE 38	25	gpm	380	220

Table 3.5-13 Abandoned and Cancelled Wells (Page 5 of 5)

Last Revised April, 2007

Permit Number	Applicant	Township	Range	Section	¼ ¼	Uses	Priority	Status	HeadGate-Outlet-Well	GW Permit Facility Name	Yield	Well Depth (ft)	Static Well Depth (ft)
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	14	SESE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	14	SWSW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	14	SESW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	14	NESE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	14	NESW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	14	NWSW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	23	SWNW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	23	SENW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	23	SENE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	23	NENW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	23	NWNW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	23	NENE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	23	NWNE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	23	SWNE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	NWNW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	SWNW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	SENW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	SENE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	NENW	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	NENW	Miscellaneous	8/10/1984	Cancelled	X	TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	NENE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	NWNE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220
P68449W	USDI, BLM -- Texasgulf Inc.	25 N	93 W	24	SWNE	Miscellaneous	8/10/1984	Cancelled		TE 38	25 gpm	380	220

Table 3.5-14 Baseline Water Quality Monitoring Parameters

Major Ions	Trace Constituents
Calcium	Aluminum
Magnesium	Ammonia
Potassium	Arsenic
Sodium	Barium
Bicarbonate	Boron
Chloride	Cadmium
Carbonate	Chromium
Sulfate	Copper
Nitrate (Total)	Iron
	Fluoride
General Water Chemistry	Manganese
Alkalinity [1]	Mercury
Total Dissolved Solids	Molybdenum
pH (field measured)	Nickel
pH (lab measured)	Selenium
Specific Conductance (field measured)	Silica
Temperature (field measured)	Vanadium
	Zinc
Radionuclides	
Gross Alpha [1]	
Gross Beta [1]	
Radium-226	
Radium-228 [1]	
Uranium	

[1] The 1982 sampling did not include these parameters.

Table 3.5-15 Analytical Results of Baseline Monitoring (Page 1 of 12)

Well ID	Completion Zone	Sample Date	Major Cations and Anions									
			Na (mg/L)	K (mg/L)	Ca (mg/L)	Mg (mg/L)	Cl (mg/L)	HCO_3 (mg/L)	CO_3 (mg/L)	SO_4 (mg/L)	Si (mg/L)	NO_3 (mg/L)
LC29M	DE	9/20/06	26.0	2.0	57.0	4.0	6.0	137.0	ND [1]	108.0	12.0	ND
LC29M	DE	11/26/06	26.0	3.0	64.0	4.0	4.0	98.0	ND	131.0	17.2	ND
LC29M	DE	3/1/07	24.0	2.0	57.0	3.0	4.0	205.0	ND	54.0	18.1	ND
LC29M	DE	5/4/07	27.0	2.0	47.0	3.0	10.0	183.0	ND	21.0	15.3	0.90
LC30M	DE	9/20/06	29.0	2.0	33.0	2.0	6.0	122.0	ND	31.0	14.7	1.40
LC30M	DE	11/26/06	25.0	1.0	31.0	2.0	5.0	124.0	ND	26.0	13.7	1.20
LC30M	DE	3/1/07	51.0	2.0	33.0	2.0	6.0	156.0	ND	51.0	17.4	0.60
LC30M	DE	5/3/07	62.0	2.0	28.0	2.0	6.0	176.0	ND	55.0	17.7	ND
									ND			
LC31M	DE	9/21/06	40.0	3.0	140.0	9.0	7.0	140.0	ND	316.0	15.0	0.80
LC31M	DE	11/26/06	39.0	3.0	120.0	8.0	7.0	145.0	ND	280.0	13.9	0.40
LC31M	DE	2/28/07	64.0	3.0	108.0	7.0	8.0	156.0	ND	277.0	17.0	0.30
LC31M	DE	5/3/07	71.0	3.0	99.0	6.0	6.0	159.0	ND	279.0	15.9	0.20
									ND			
LC16M	HJ	3/1/07	30.0	2.0	74.0	4.0	4.0	132.0	ND	138.0	15.0	ND
LC16M	HJ	5/4/07	29.0	2.0	74.0	4.0	5.0	137.0	ND	139.0	14.8	ND
LC19M	HJ	9/20/06	35.0	3.0	66.0	3.0	6.0	103.0	2.0	139.0	NM	ND
LC19M	HJ	11/3/06	32.8	2.1	72.9	3.2	6.0	132.0	ND	146.0	15.0	ND
LC19M	HJ	3/5/07	40.0	13.0	41.0	3.0	6.0	73.0	ND	124.0	14.5	ND
LC19M	HJ	5/4/07	33.0	8.0	45.0	3.0	5.0	93.0	ND	137.0	14.8	ND
LC19M	HJ	5/4/07	33.0	8.0	46.0	3.0	5.0	96.0	ND	137.0	14.6	ND
LC22M	HJ	9/21/06	40.0	2.0	74.0	3.0	5.0	113.0	ND	170.0	15.0	ND
LC22M	HJ	11/16/06	36.0	2.0	62.0	3.0	4.0	109.0	ND	154.0	12.8	ND
LC22M	HJ	3/1/07	37.0	4.0	60.0	3.0	6.0	110.0	ND	142.0	14.2	ND
LC22M	HJ	5/3/07	35.0	4.0	64.0	3.0	5.0	113.0	ND	137.0	13.0	ND

Table 3.5-15 Analytical Results of Baseline Monitoring (Page 2 of 12)

			Major Cations and Anions									
Well ID	Completion Zone	Sample Date	Na (mg/L)	K (mg/L)	Ca (mg/L)	Mg (mg/L)	Cl (mg/L)	HCO_3 (mg/L)	CO_3 (mg/L)	SO4 (mg/L)	Si (mg/L)	NO_3 (mg/L)
LC26M	HJ	9/21/06	35.0	4.0	133.0	6.0	6.0	168.0	ND	269.0	17.7	ND
LC26M	HJ	11/17/06	33.0	3.0	127.0	5.0	6.0	166.0	ND	256.0	17.0	ND
LC26M	HJ	3/1/07	33.0	3.0	125.0	5.0	5.0	159.0	ND	253.0	16.2	ND
LC26M	HJ	5/3/07	34.0	8.0	90.0	5.0	5.0	57.0	ND	259.0	17.5	ND
LC27M	HJ	11/16/06	21.0	4.0	27.0	ND	6.0	82.0	2.0	29.0	15.5	ND
LC27M	HJ	3/1/07	21.0	5.0	11.0	ND	4.0	38.0	ND	39.0	16.4	ND
LC27M	HJ	5/3/07	22.0	5.0	7.0	ND	4.0	33.0	5.0	32.0	17.8	ND
LC28M	HJ	9/21/06	27.0	3.0	60.0	3.0	6.0	125.0	ND	101.0	16.1	ND
LC28M	HJ	11/26/06	24.0	2.0	58.0	3.0	4.0	127.0	ND	88.0	15.7	ND
LC28M	HJ	2/28/07	25.0	2.0	59.0	3.0	6.0	127.0	ND	95.0	16.9	ND
LC28M	HJ	5/3/07	25.0	2.0	62.0	3.0	6.0	130.0	ND	96.0	15.0	ND
LC15M	LFG	11/26/06	31.0	2.0	84.0	4.0	6.0	134.0	ND	157.0	14.3	ND
LC15M	LFG	3/1/07	33.0	3.0	89.0	5.0	1.0	130.0	ND	180.0	14.8	0.20
LC15M	LFG	5/4/07	34.0	9.0	46.0	3.0	6.0	85.0	ND	142.0	13.0	0.40
LC18M	LFG	9/20/06	35.0	3.0	61.0	3.0	5.0	122.0	ND	122.0	13.2	ND
LC18M	LFG	11/22/06	31.0	2.0	55.0	3.0	5.0	117.0	ND	117.0	12.4	ND
LC18M	LFG	3/1/07	33.0	2.0	60.0	3.0	5.0	120.0	ND	120.0	13.6	ND
LC18M	LFG	5/4/07	30.0	3.0	49.0	3.0	5.0	112.0	ND	119.0	12.6	ND
LC21M	LFG	9/20/06	33.0	2.0	46.0	3.0	6.0	121.0	5.0	62.0	15.8	1.00
LC21M	LFG	11/26/06	30.0	2.0	41.0	3.0	5.0	132.0	ND	59.0	13.9	0.80
LC21M	LFG	2/28/07	31.0	3.0	35.0	3.0	5.0	120.0	ND	60.0	15.2	1.00
LC21M	LFG	5/3/07	30.0	2.0	41.0	3.0	5.0	124.0	ND	58.0	13.7	1.00

Table 3.5-15 Analytical Results of Baseline Monitoring (Page 3 of 12)

			Major Cations and Anions									
Well ID	Completion Zone	Sample Date	Na (mg/L)	K (mg/L)	Ca (mg/L)	Mg (mg/L)	Cl (mg/L)	HCO_3 (mg/L)	CO_3 (mg/L)	SO_4 (mg/L)	Si (mg/L)	NO_3 (mg/L)
LC25M	LFG	9/21/06	35.0	4.0	73.0	2.0	6.0	100.0	2.0	146.0	14.1	0.30
LC25M	LFG	11/17/06	34.0	2.0	70.0	4.0	6.0	120.0	ND	139.0	14.6	0.20
LC25M	LFG	3/1/07	32.0	2.0	72.0	4.0	6.0	126.0	ND	150.0	14.7	0.20
LC25M	LFG	5/3/07	34.0	4.0	34.0	3.0	4.0	36.0	ND	133.0	13.5	ND
LC17M	UKM	11/26/06	27.0	2.0	55.0	2.0	5.0	120.0	ND	94.0	15.1	ND
LC17M	UKM	3/1/07	29.0	2.0	62.0	3.0	5.0	124.0	ND	105.0	16.8	ND
LC17M	UKM	5/4/07	27.0	2.0	61.0	3.0	4.0	142.0	ND	108.0	15.9	ND
LC20M	UKM	9/21/06	32.0	3.0	56.0	2.0	6.0	113.0	2.0	102.0	17.2	ND
LC20M	UKM	11/22/06	32.0	5.0	38.0	ND	6.0	63.0	3.0	80.0	12.7	ND
LC20M	UKM	3/1/07	36.0	11.0	15.0	ND	5.0	39.0	ND	95.0	14.6	ND
LC20M	UKM	5/4/07	35.0	11.0	12.0	ND	6.0	34.0	2.0	91.0	14.1	ND
LC23M	UKM	9/21/06	44.0	8.0	58.0	ND	5.0	83.0	6.0	165.0	13.9	ND
LC23M	UKM	11/26/06	41.0	7.0	50.0	2.0	3.0	85.0	ND	150.0	14.1	ND
LC23M	UKM	3/1/07	64.0	48.0	52.0	ND	15.0	7.0	137.0	146.0	10.7	ND
LC23M	UKM	5/3/07	63.0	52.0	86.0	ND	5.0	4.0	66.0	126.0	9.4	ND
LC24M	UKM	9/21/06	32.0	3.0	68.0	4.0	5.0	109.0	ND	138.0	16.1	ND
LC24M	UKM	11/26/06	29.0	2.0	66.0	3.0	4.0	126.0	2.0	121.0	14.7	ND
LC24M	UKM	3/1/07	31.0	7.0	43.0	3.0	5.0	73.0	ND	126.0	14.8	ND
LC24M	UKM	5/4/07	31.0	7.0	48.0	3.0	5.0	85.0	ND	126.0	14.6	ND

Table 3.5-15 **Analytical Results of Baseline Monitoring** (Page 4 of 12)

			General Water Quality				Radionuclides				
Well ID	Completion Zone	Sample Date	TDS (mg/L)	Specific Conductivity	Lab pH s.u	Alkalinity (mg/L)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Ra-226 (pCi/L)	Ra-228 (pCi/L)	Uranium (mg/L)
LC29M	DE	9/20/06	283.0			112.0	328.0	142.0	1.9	ND	0.499
LC29M	DE	11/26/06	298.0	491.0	7.68	80.0	158.0	54.0	1.7	4.7	0.246
LC29M	DE	3/1/07	265.0	385.0	7.77		265.0	86.1	4.0	ND	0.318
LC29M	DE	5/4/07	219.0	356.0	7.75		200.0	84.6	3.0	ND	0.251
LC30M	DE	9/20/06	184.0			100.0	129.0	41.5	1.0	ND	0.141
LC30M	DE	11/26/06	170.0	288.0	7.33	102.0	107.0	32.3	0.9	1.6	0.154
LC30M	DE	3/1/07	241.0	393.0	8.02		108.0	31.9	5.7	ND	0.162
LC30M	DE	5/3/07	260.0	440.0	8.07		109.0	40.0	2.1	ND	0.130
LC31M	DE	9/21/06	602.0	800.0	7.85	114.0	1120.0	405.0	2.0	1.7	1.890
LC31M	DE	11/26/06	528.0	838.0	7.79	119.0	1430.0	395.0	2.6	3.2	2.100
LC31M	DE	2/28/07	563.0	817.0	7.94		967.0	262.0	7.2	1.0	1.400
LC31M	DE	5/3/07	559.0	860.0	7.79		1030.0	319.0	1.9	2.4	1.610
LC16M	HJ	3/1/07	333.0	509.0	7.92		290.0	79.7	65.1	3.8	0.134
LC16M	HJ	5/4/07	335.0	534.0	8.01		188.0	69.2	122.0	3.2	0.122
LC19M	HJ	9/20/06	319.0			87.0	985.0	540.0	366.0	4.8	0.336
LC19M	HJ	11/3/06	328.0	506.0	7.85	108.0	863.0	592.0	547.0	4.1	0.051
LC19M	HJ	3/5/07	278.0	432.0	8.02		1220.0	473.0	316.0	3.4	0.844
LC19M	HJ	5/4/07	292.0	482.0	8.11		1470.0	603.0	423.0	1.0	0.762
LC19M	HJ	5/4/07	294.0	487.0	8.09		1350.0	568.0	386.0	1.6	0.766
LC22M	HJ	9/21/06	366.0	511.0	8.14	93.0	810.0	358.0	261.0	3.2	0.342
LC22M	HJ	11/16/06	328.0	531.0	8.15		597.0	258.0	247.0	1.9	0.185
LC22M	HJ	3/1/07	319.0	483.0	7.87		86.5	97.9	1.7	3.6	0.129
LC22M	HJ	5/3/07	316.0	513.0	8.11		576.0	186.0	308.0	3.8	0.097

Table 3.5-15 **Analytical Results of Baseline Monitoring** (Page 5 of 12)

			General Water Quality				Radionuclides				
Well ID	Completion Zone	Sample Date	TDS (mg/L)	Specific Conductivity	Lab pH s.u	Alkalinity (mg/L)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Ra-226 (pCi/L)	Ra-228 (pCi/L)	Uranium (mg/L)
LC26M	HJ	9/21/06	554.0	741.0	8.16	138.0	306.0	111.0	87.7	4.6	0.107
LC26M	HJ	11/17/06	528.0	786.0	8.06		300.0	119.0	77.2	3.8	0.072
LC26M	HJ	3/1/07	519.0	745.0	7.85		30.5	46.1	ND	3.6	0.045
LC26M	HJ	5/3/07	449.0	653.0	8.44		50.2	23.4	12.4	ND	0.037
LC27M	HJ	11/16/06	145.0	243.0	8.66		6.8	9.4	1.1	3.6	0.002
LC27M	HJ	3/1/07	117.0	171.0	8.74		77.7	4.1	26.6	ND	0.001
LC27M	HJ	5/3/07	111.0	178.0	9.51		2.9	3.9	0.4	ND	0.002
LC28M	HJ	9/21/06	276.0	394.0	8.14	103.0	30.7	19.4	8.1	3.4	0.017
LC28M	HJ	11/26/06	259.0	435.0	8.00	104.0	18.1	14.4	8.4	4.2	0.006
LC28M	HJ	2/28/07	269.0	400.0	8.15		27.0	13.0	7.7	2.1	0.007
LC28M	HJ	5/3/07	273.0	440.0	8.01		19.4	11.2	7.1	3.7	0.023
LC15M	LFG	11/26/06	370.0	605.0	7.84	110.0	334.0	116.0	3.8	4.8	0.472
LC15M	LFG	3/1/07	390.0	587.0	7.32		374.0	92.7	6.0	3.5	0.467
LC15M	LFG	5/4/07	296.0	492.0	8.27		236.0	92.1	3.6	ND	0.358
LC18M	LFG	9/20/06	303.0			100.0	518.0	192.0	43.0	2.8	0.523
LC18M	LFG	11/22/06	277.0	461.0	8.33	98.0	490.0	199.0	63.5	3.9	0.546
LC18M	LFG	3/1/07	296.0	460.0	7.86		439.0	148.0	ND	ND	0.533
LC18M	LFG	5/4/07	277.0	467.0	8.09		385.0	115.0	26.4	ND	0.419
LC21M	LFG	9/20/06	233.0			106.0	219.0	70.3	1.6	1.2	0.251
LC21M	LFG	11/26/06	219.0	373.0	8.17	108.0	205.0	49.2	1.2	12.0	0.278
LC21M	LFG	2/28/07	214.0	333.0	8.25		815.0	62.6	230.0	ND	0.270
LC21M	LFG	5/3/07	219.0	371.0	8.17		202.0	65.2	3.7	ND	0.236

Table 3.5-15 Analytical Results of Baseline Monitoring (Page 6 of 12)

	General Water Quality						Radionuclides				
Well ID	Completion Zone	Sample Date	TDS (mg/L)	Specific Conductivity	Lab pH s.u	Alkalinity (mg/L)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Ra-226 (pCi/L)	Ra-228 (pCi/L)	Uranium (mg/L)
LC25M	LFG	9/21/06	336.0	452.0	8.37	91.0	353.0	124.0	3.1	3.3	0.465
LC25M	LFG	11/17/06	330.0	516.0	8.28		301.0	138.0	3.1	ND	0.460
LC25M	LFG	3/1/07	344.0	519.0	7.97		369.0	107.0	2.3	2.3	0.517
LC25M	LFG	5/3/07	244.0	390.0	8.57		194.0	72.5	2.9	ND	0.289
LC17M	UKM	11/26/06	262.0	436.0	8.02	98.0	29.0	15.5	8.8	12.9	0.010
LC17M	UKM	3/1/07	284.0	433.0	7.88		26.8	11.5	5.5	ND	0.011
LC17M	UKM	5/4/07	291.0	467.0	8.11		17.3	9.1	7.2	1.5	0.009
LC20M	UKM	9/21/06	274.0	388.0	8.56	96.0	44.4	24.0	9.6	3.9	0.036
LC20M	UKM	11/22/06	216.0	362.0	8.91	56.0	38.7	19.5	9.3	3.4	0.025
LC20M	UKM	3/1/07	197.0	305.0	7.66		65.3	23.9	47.8	ND	0.024
LC20M	UKM	5/4/07	188.0	322.0	9.04		31.9	23.6	9.2	2.6	0.025
LC23M	UKM	9/21/06	341.0	451.0	8.87	76.0	32.8	17.5	3.3	ND	0.023
LC23M	UKM	11/26/06	303.0	498.0	7.97	70.0	35.0	14.9	4.7	6.7	0.019
LC23M	UKM	3/1/07	452.0	1180.0	11.60		5.3	34.8	1.9	1.0	0.002
LC23M	UKM	5/3/07	526.0	1720.0	11.60		15.1	44.7	4.7	1.5	0.002
LC24M	UKM	9/21/06	321.0	455.0	8.30	91.0	107.0	43.2	6.5	1.5	0.134
LC24M	UKM	11/26/06	302.0	500.0	8.33	105.0	86.8	27.6	5.9	5.8	0.100
LC24M	UKM	3/1/07	266.0	410.0	7.99		48.6	22.6	1.8	2.0	0.062
LC24M	UKM	5/4/07	277.0	452.0	8.08		49.1	23.8	8.9	1.5	0.052

Table 3.5-15 **Analytical Results of Baseline Monitoring** (Page 7 of 12)

			Trace Parameters								
Well ID	Completion Zone	Sample Date	Al (mg/L)	NH_4 (mg/L)	As (mg/L)	Ba (mg/L)	Bo (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	F (mg/L)
LC29M	DE	9/20/06	ND	1.07	0.002	ND	ND	ND	ND	ND	0.30
LC29M	DE	11/26/06	ND	0.57	0.003	ND	ND	ND	ND	ND	0.30
LC29M	DE	3/1/07	ND	0.26	0.005	ND	ND	ND	ND	ND	0.20
LC29M	DE	5/4/07	ND	0.18	ND	ND	ND	ND	ND	ND	0.20
LC30M	DE	9/20/06	ND	0.11	0.002	ND	ND	ND	ND	ND	0.50
LC30M	DE	11/26/06	ND	0.08	0.002	ND	ND	ND	ND	ND	0.50
LC30M	DE	3/1/07	ND	0.07	0.004	ND	ND	ND	ND	ND	0.50
LC30M	DE	5/3/07	ND	0.06	0.007	ND	ND	ND	ND	ND	0.50
LC31M	DE	9/21/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC31M	DE	11/26/06	ND	0.07	ND	ND	ND	ND	ND	ND	0.20
LC31M	DE	2/28/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC31M	DE	5/3/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC16M	HJ	3/1/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC16M	HJ	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC19M	HJ	9/20/06	ND	ND	0.014	ND	ND	ND	ND	ND	ND
LC19M	HJ	11/3/06	ND	ND	0.002	ND	ND	ND	ND	ND	ND
LC19M	HJ	3/5/07	ND	0.06	0.008	ND	ND	ND	ND	ND	0.20
LC19M	HJ	5/4/07	ND	ND	0.007	ND	ND	ND	ND	ND	ND
LC19M	HJ	5/4/07	ND	ND	0.006	ND	ND	ND	ND	ND	ND
LC22M	HJ	9/21/06	ND	ND	0.005	ND	ND	ND	ND	ND	ND
LC22M	HJ	11/16/06	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC22M	HJ	3/1/07	ND	ND	0.002	ND	ND	ND	ND	ND	0.20
LC22M	HJ	5/3/07	ND	ND	0.002	ND	ND	ND	ND	ND	0.20

Table 3.5-15 Analytical Results of Baseline Monitoring (Page 8 of 12)

Trace Parameters											
Well ID	Completion Zone	Sample Date	Al (mg/L)	NH_4 (mg/L)	As (mg/L)	Ba (mg/L)	Bo (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	F (mg/L)
LC26M	HJ	9/21/06	ND	ND	0.003	ND	ND	ND	ND	ND	ND
LC26M	HJ	11/17/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC26M	HJ	3/1/07	ND	0.07	ND	ND	ND	ND	ND	ND	ND
LC26M	HJ	5/3/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC27M	HJ	11/16/06	ND	ND	0.006	ND	ND	ND	ND	ND	0.30
LC27M	HJ	3/1/07	ND	ND	0.007	ND	ND	ND	ND	ND	0.30
LC27M	HJ	5/3/07	ND	ND	0.005	ND	ND	ND	ND	ND	0.30
LC28M	HJ	9/21/06	ND	ND	0.005	ND	ND	ND	ND	ND	ND
LC28M	HJ	11/26/06	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC28M	HJ	2/28/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC28M	HJ	5/3/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC15M	LFG	11/26/06	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC15M	LFG	3/1/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC15M	LFG	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC18M	LFG	9/20/06	ND	ND	0.004	ND	ND	ND	ND	ND	0.20
LC18M	LFG	11/22/06	ND	ND	0.002	ND	ND	ND	ND	ND	0.20
LC18M	LFG	3/1/07	ND	ND	0.002	ND	ND	ND	ND	ND	0.20
LC18M	LFG	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC21M	LFG	9/20/06	ND	0.08	ND	ND	ND	ND	ND	ND	0.30
LC21M	LFG	11/26/06	ND	ND	ND	ND	ND	ND	ND	ND	0.30
LC21M	LFG	2/28/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC21M	LFG	5/3/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20

Table 3.5-15 Analytical Results of Baseline Monitoring (Page 9 of 12)

			Trace Parameters								
Well ID	Completion Zone	Sample Date	Al (mg/L)	NH_4 (mg/L)	As (mg/L)	Ba (mg/L)	Bo (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	F (mg/L)
LC25M	LFG	9/21/06	ND	ND	0.004	ND	ND	ND	ND	ND	0.20
LC25M	LFG	11/17/06	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC25M	LFG	3/1/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC25M	LFG	5/3/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20
LC17M	UKM	11/26/06	ND	ND	0.003	ND	ND	ND	ND	ND	0.20
LC17M	UKM	3/1/07	ND	0.06	0.002	ND	ND	ND	ND	ND	0.20
LC17M	UKM	5/4/07	ND	ND	0.002	ND	ND	ND	ND	ND	0.20
LC20M	UKM	9/21/06	ND	ND	0.012	ND	ND	ND	ND	ND	ND
LC20M	UKM	11/22/06	ND	ND	0.012	ND	ND	ND	ND	ND	0.20
LC20M	UKM	3/1/07	ND	ND	0.012	ND	ND	ND	ND	ND	0.20
LC20M	UKM	5/4/07	ND	ND	0.011	ND	ND	ND	ND	ND	0.20
LC23M	UKM	9/21/06	ND	ND	0.009	ND	ND	ND	ND	ND	ND
LC23M	UKM	11/26/06	ND	ND	0.004	ND	ND	ND	ND	ND	0.20
LC23M	UKM	3/1/07	ND	0.86	0.003	0.30	ND	ND	ND	ND	0.40
LC23M	UKM	5/3/07	0.20	0.75	0.002	0.30	ND	ND	ND	ND	0.20
LC24M	UKM	9/21/06	ND	0.13	0.003	ND	ND	ND	ND	ND	ND
LC24M	UKM	11/26/06	ND	0.08	ND	ND	ND	ND	ND	ND	0.20
LC24M	UKM	3/1/07	ND	0.08	ND	ND	ND	ND	ND	ND	ND
LC24M	UKM	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	0.20

Table 3.5-15 Analytical Results of Baseline Monitoring (Page 10 of 12)

			Trace Parameters								
Well ID	Completion Zone	Sample Date	Fe (mg/L)	Hg (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Pb (mg/L)	Se (mg/L)	Vn (mg/L)	Zn (mg/L)
LC29M	DE	9/20/06	0.09	ND	0.12	ND	ND	ND	0.002	ND	ND
LC29M	DE	11/26/06	0.67	ND	0.48	ND	ND	ND	ND	ND	ND
LC29M	DE	3/1/07	0.40	ND	0.24	ND	ND	ND	ND	ND	ND
LC29M	DE	5/4/07	0.14	ND	0.04	ND	ND	ND	ND	ND	ND
LC30M	DE	9/20/06	ND	ND	0.01	ND	ND	ND	0.016	ND	ND
LC30M	DE	11/26/06	ND	ND	0.01	ND	ND	ND	0.016	ND	ND
LC30M	DE	3/1/07	0.11	ND	0.08	ND	ND	ND	0.006	ND	ND
LC30M	DE	5/3/07	0.09	ND	0.07	ND	ND	ND	0.003	ND	ND
LC31M	DE	9/21/06	ND	ND	0.01	ND	ND	ND	0.215	ND	ND
LC31M	DE	11/26/06	ND	ND	0.06	ND	ND	ND	0.211	ND	ND
LC31M	DE	2/28/07	0.10	ND	0.10	ND	ND	ND	0.151	ND	ND
LC31M	DE	5/3/07	0.07	ND	0.02	ND	ND	ND	0.111	ND	ND
LC16M	HJ	3/1/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC16M	HJ	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC19M	HJ	9/20/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC19M	HJ	11/3/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC19M	HJ	3/5/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC19M	HJ	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC19M	HJ	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC22M	HJ	9/21/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC22M	HJ	11/16/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC22M	HJ	3/1/07	ND	ND	0.02	ND	ND	ND	ND	ND	ND
LC22M	HJ	5/3/07	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 3.5-15 **Analytical Results of Baseline Monitoring** (Page 11 of 12)

			Trace Parameters								
Well ID	Completion Zone	Sample Date	Fe (mg/L)	Hg (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Pb (mg/L)	Se (mg/L)	Vn (mg/L)	Zn (mg/L)
LC26M	HJ	9/21/06	ND	ND	0.02	ND	ND	ND	ND	ND	ND
LC26M	HJ	11/17/06	0.23	ND	0.03	ND	ND	ND	ND	ND	ND
LC26M	HJ	3/1/07	ND	ND	0.02	ND	ND	ND	ND	ND	ND
LC26M	HJ	5/3/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC27M	HJ	11/16/06	0.08	ND	ND	ND	ND	ND	ND	ND	ND
LC27M	HJ	3/1/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC27M	HJ	5/3/07	0.04	ND	ND	ND	ND	ND	ND	ND	ND
LC28M	HJ	9/21/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC28M	HJ	11/26/06	0.04	ND	ND	ND	ND	ND	ND	ND	ND
LC28M	HJ	2/28/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC28M	HJ	5/3/07	0.05	ND	ND	ND	ND	ND	0.002	ND	ND
LC15M	LFG	11/26/06	ND	ND	ND	ND	ND	ND	0.016	ND	ND
LC15M	LFG	3/1/07	ND	ND	ND	ND	ND	ND	0.017	ND	ND
LC15M	LFG	5/4/07	ND	ND	ND	ND	ND	ND	0.010	ND	ND
LC18M	LFG	9/20/06	0.53	ND	ND	ND	ND	ND	0.024	ND	ND
LC18M	LFG	11/22/06	0.51	ND	ND	ND	ND	ND	0.015	ND	ND
LC18M	LFG	3/1/07	0.67	ND	ND	ND	ND	ND	0.016	ND	ND
LC18M	LFG	5/4/07	0.10	ND	ND	ND	ND	ND	ND	ND	ND
LC21M	LFG	9/20/06	0.40	ND	0.02	ND	ND	ND	0.040	ND	ND
LC21M	LFG	11/26/06	ND	ND	ND	ND	ND	ND	0.039	ND	ND
LC21M	LFG	2/28/07	ND	ND	ND	ND	ND	ND	0.034	ND	ND
LC21M	LFG	5/3/07	ND	ND	ND	ND	ND	ND	0.032	ND	ND

Table 3.5-15 Analytical Results of Baseline Monitoring (Page 12 of 12)

			Trace Parameters								
Well ID	Completion Zone	Sample Date	Fe (mg/L)	Hg (mg/L)	Mn (mg/L)	Mo (mg/L)	Ni (mg/L)	Pb (mg/L)	Se (mg/L)	Vn (mg/L)	Zn (mg/L)
LC25M	LFG	9/21/06	ND	ND	ND	ND	ND	ND	0.027	ND	ND
LC25M	LFG	11/17/06	ND	ND	ND	ND	ND	ND	0.027	ND	ND
LC25M	LFG	3/1/07	ND	ND	ND	ND	ND	ND	0.025	ND	ND
LC25M	LFG	5/3/07	ND	ND	ND	ND	ND	ND	0.015	ND	ND
											ND
LC17M	UKM	11/26/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC17M	UKM	3/1/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC17M	UKM	5/4/07	0.05	ND	ND	ND	ND	ND	ND	ND	ND
LC20M	UKM	9/21/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC20M	UKM	11/22/06	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC20M	UKM	3/1/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC20M	UKM	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC23M	UKM	9/21/06	ND	ND	ND	ND	ND	ND	0.002	ND	ND
LC23M	UKM	11/26/06	ND	ND	ND	ND	ND	ND	0.002	ND	ND
LC23M	UKM	3/1/07	ND	ND	ND	ND	ND	ND	ND	ND	ND
LC23M	UKM	5/3/07	ND	ND	ND	ND	ND	0.002	0.005	ND	ND
											ND
LC24M	UKM	9/21/06	0.32	ND	ND	ND	ND	ND	0.002	ND	ND
LC24M	UKM	11/26/06	0.16	ND	ND	ND	ND	ND	0.002	ND	ND
LC24M	UKM	3/1/07	0.06	ND	ND	ND	ND	ND	ND	ND	ND
LC24M	UKM	5/4/07	ND	ND	ND	ND	ND	ND	ND	ND	ND

1 ND = Non Detect-sample was below the Detection Limit

Table 3.5-16 Distribution of Samples Exceeding EPA MCL for Radium-226+228

Monitored Aquifer	Number of Samples	Number of Samples Exceeding EPA MCL	Percent of Exceedances (percent)
DE	12	4	33.3
LFG	15	8	53.3
HJ	22	19	86.3
UKM	15	12	80.0
Total	64	43	67.2

Attachment 3.5-1 Evaluation of Pump Tests

Petrotek

LOST CREEK REGIONAL HYDROLOGIC TESTING REPORT #1

ISR

10758 West Centennial Road, Suite 200
Ken Caryl Ranch, Colorado 80127 USA

LOST CREEK PROJECT, SWEETWATER COUNTY, WY

OCTOBER 2007

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EXECUTIVE SUMMARY

- Lost Creek ISR, LLC (LC ISR. LLC) plans to develop and extract uranium from in-situ recovery (ISR) mine units within the HJ Horizon and, potentially, the UKM Sand of the Battle Spring Formation located at the Lost Creek Project Area (LCPA). To support State and Federal permit applications necessary for the project, LC ISR, LLC has completed the first of three regional pumping tests in the HJ Horizon, located on the north side of the Lost Creek Fault within the proposed Permit Area. For the 2007 hydrogeologic and mineral characterization program, LC ISR, LLC plans to install approximately 70 new wells in the LCPA. Approximately half of those wells were installed at the time of testing.

- Results from the pump test performed in the HJ Horizon north of the Lost Creek Fault have demonstrated hydraulic communication between the Production Zone (HJ Horizon) pumping well and the surrounding monitor wells north of the fault. Based on the wells installed to date, this test has also confirmed that the Lost Creek Fault, although slightly leaky, provides a significant barrier to groundwater flow with in the HJ Horizon. During the test, responses observed in the HJ Horizon on the south side of the fault were an order of magnitude less than those on the north. It appears that a transition zone of lower permeability exists on both sides of the fault. Additional data will be collected during the remaining testing scheduled in October 2007 to better define aquifer properties associated with the fault.

- The pump test results provide sufficient aquifer characterization of the HJ Horizon such that permitting can proceed and the HJ Horizon has sufficient transmissivity for ISR operations.

- Based on the limited data for the overlying and underlying aquifers, some responses were observed that coincide with the start and stop of the pumping well. The cause for these responses is unknown at this time. Geologic data indicate that the overlying and underlying confining shale units are continuous throughout the permit area. While LC ISR, LLC has undertaken an extensive abandonment program of historic wells, it is unknown whether these are responsible for the responses observed. Additional data will be collected during subsequent testing to better understand the integrity of the overlying and underlying confining shale units. Based on testing results to date, it is anticipated that any minor communication between the HJ Horizon and the overlying and underlying sands can be managed through operational practices, detailed monitoring, and engineering operations. In this regard, the potential communication observed at Lost Creek is much lower (e.g., five to ten times less) than has been observed in other ISR operations where engineering practices were successfully implemented to isolate lixiviant from overlying and underlying aquifers.

- Additional hydrostratigraphic characterization will be completed by the end of November to further characterize the flow regimes in the proposed Permit Area. Results of the additional testing will be used to enhance the current conceptual model.

1.0 INTRODUCTION

1.1 BACKGROUND

The Lost Creek Project Area (LCPA) is located in the northeastern portion of the Great Divide Basin of Wyoming, within Sweetwater County (Figure 1-1). LC ISR, LLC plans to develop and extract uranium from ISR mine units within the HJ Horizon and the UKM Sand of the Battle Spring Formation. This report provides a summary of the regional hydrogeologic testing conducted in the HJ Horizon during the months of June and July of 2007 at LCPA to support State and Federal permit applications necessary for the project.

The LCPA is located in all or parts of Sections 13 through 14, and 23 through 26 of T25N, R93W and Sections 16 through 21, and 29 through 31 of T25N, R92W. Figure 1-1 shows the LCPA and its relationship to the Great Divide Basin. Figure 1-2 presents the location of the pumping well and monitor wells used for this test.

There are no operational ISR operations within ten miles of the LCPA. COGEMA's Christensen Ranch and PRI's Smith-Highland Ranch uranium project are located approximately 150 miles to the northeast and east, respectively. The primary Production Zone at Lost Creek is the HJ Horizon that occurs between depths of 300 and 450 feet below ground surface, although typically the ore bearing sand is found in the middle portion of the HJ horizon.

In this area, water is beneficially used for livestock watering as well as for purposes related to mining (monitoring, test wells, dewatering, industrial, stock, reservoir supply, and miscellaneous). Currently, water is not used for domestic or irrigation purposes within two miles of the proposed Permit Area.

1.2 REGULATORY REQUIREMENTS

The objectives of the regional pumping test, as stated in the Wyoming Department of Environmental Quality/Land Quality Division (WDEQ/LQD) Chapter 11 (and associated guidelines) and Nuclear Regulatory Commission (NRC) NUREG 1569 (Section 2.7; Hydrology), are to:

1. Determine the hydrologic characteristics of the Production Zone Aquifer;
2. Demonstrate hydrologic communication between the Production Zone pumping well and the surrounding Production Zone monitor wells;
3. Assess the presence of hydrologic boundaries, if any, within the Production Zone Aquifer over the area evaluated by the Pump Test; and,
4. Evaluate the degree of hydrologic communication, if any, between the Production Zone and the overlying and underlying aquifers in the vicinity of the pumping well.

The testing procedures and results are presented and discussed in this report. It is noted that the regional pump test is not intended to replace mine unit-scale testing that is routinely conducted under WDEQ/LQD mine unit permit applications. Rather, the test is designed to obtain the requisite data required for characterization of the regional hydrology at the LCPA in support of submitting an NRC Source Materials License application and a WDEQ/LQD Permit to Mine application.

1.3 PURPOSE AND OBJECTIVES

The purpose of this report is to demonstrate that the recently completed hydrologic test meets the requirements and objectives of WDEQ and NRC as previously stated. This report demonstrates that the HJ Horizon on the north side of the proposed Lost Creek Permit Area has been sufficiently evaluated with respect to hydrogeologic conditions and is suitable for ISR mining. This initial test was conducted within the HJ Horizon on the north side of the Lost Creek Fault. The Lost Creek Fault trends west-southwest across the LCPA. Potential production zones exist on both sides of the fault. A second test is scheduled for the HJ Horizon on the south side of the fault. Another test is scheduled within the deeper UKM Sand on the north side of the fault.

The objective of this report is to present the information required by WDEQ/LQD and NRC NUREG 1569 (Section 2.7; Hydrology) for a Hydrologic Test Report. In accordance with these regulations the following information is included:

- A description and maps of the proposed permit area;
- Geological cross-sections, including data from monitor wells and test holes;
- Isopach maps of the Production Zone, Overlying Confining Unit and Overlying Sands, and Underlying Confining Unit and Underlying Sands;
- Well completion reports;
- A description of hydrologic testing;
- Discussion of the hydrologic test results including raw pump test data, type curve matches, potentiometric surface maps, water level graphs, drawdown maps, and other hydrologic data with interpretation and conclusions, as appropriate; and,
- Verification, based on the test data, that: (1) the monitor wells are in communication with the Production Zone; and (2) there is adequate confinement between the HJ Horizon Production Zone and the overlying and underlying sands, LFG Sand and UKM Sand, respectively and (3) the Lost Creek Fault acts as a hydraulic barrier.

1.4 REPORT ORGANIZATION

This report includes eight sections, the first being this introduction. The site-specific hydrogeologic conditions are discussed in Section 2. Information related to the monitor well locations and completions is included in Section 3. Section 4 presents the hydrologic (pump) test design and procedures. Section 5 discusses the barometric effects on observed water levels. The test results are presented in Section 6. Analytical methods are presented in Section 7. Conclusions from the testing and analysis and references are included in Sections 8 and 9, respectively.

Field activities for the Lost Creek Pump Test were jointly performed by LC ISR, LLC, Leppert & Associates, Inc. (LAI) and Petrotek Engineering Corporation (Petrotek) personnel. Geologic interpretations were performed by LC ISR, LLC geologists. Aquifer test analyses were performed and this report written by Petrotek.

2.0 SITE CHARACTERIZATION

2.1 HYDROSTRATIGRAPHY

The entire Permit Area is covered by the upper part of the Battle Spring Formation. The total thickness of the Battle Spring Formation under the Permit Area is about 3,200 ft. The Battle Spring Formation unconformably overlies the Fort Union Formation. LC ISR, LLC has employed the following nomenclature for the hydrostratigraphic units of interest within the Battle Spring Formation. The primary Production Zone is identified as the HJ Horizon. The HJ Horizon is subdivided into the Upper (UHJ), Middle (MHJ) and Lower (LHJ) Sands. The HJ Horizon is bounded above and below by aerially extensive confining units identified as the Lost Creek Shale and the Sage Brush Shale, respectively. Overlying the Lost Creek Shale is the FG Horizon. The deepest sand in the FG Horizon, the Lower FG (LFG) Sand, is the overlying aquifer to the HJ Production Zone (HJ Horizon). Beneath the Sage Brush Shale is the KM Horizon. The uppermost sand within the KM Horizon, designated the Upper KM (UKM) sand, is a secondary Production Zone and also the underlying aquifer to the Primary Production Zone (HJ Horizon). An unnamed shale unit separates the UKM and Middle KM (MKM) Sand. The MKM Sand is the underlying aquifer to the UKM Production Zone. The shallowest occurrence of groundwater within the Permit Area occurs within the DE Horizon, which is above the FG Horizon. Figure 2-1 depicts the hydrostratigraphic relationship of these units.

Thickness (isopach) maps of target production zones (HJ and UKM), as well as the shale units above HJ (Lost Creek Shale) and below HJ (Sage Brush Shale) are presented in Plates 2.6-2a through 2.6-2d of the NRC Technical Report (LC ISR, 2007).

2.2 OVERLYING UNITS: LFG SAND AND LOST CREEK SHALE

The overlying aquifer designated for this Pump Test is the LFG Sand, a member of the FG Horizon. The LFG Sand is continuous throughout the LCPA and ranges from 20 to 50 feet thick. The Lost Creek Shale is the confining layer that separates the overlying LFG Sand and Production Zone HJ Horizon. The Lost Creek Shale appears to be continuous throughout the Permit Area and ranges from 5 to 45 feet thick, with typical thickness of 10 to 25 feet.

2.3 PRODUCTION ZONE: HJ HORIZON

The Production Zone aquifer is designated as the HJ Horizon and includes the UHJ, MHJ and LHJ Sands. The HJ Horizon is continuous throughout the Permit Area with a total thickness ranging from 100 to 160 feet, and averages approximately 120 feet. As mentioned above, the majority of mineralization within the HJ Horizon occurs in the middle portion (MHJ). For purposes of this report and because no laterally extensive confining units have been observed between the UHJ, MHJ and LHJ Sands, discussions and analyses presented herein will focus on the HJ Horizon as a single hydrostratigraphic unit.

2.4 UNDERLYING UNITS: UNDERLYING SAGE BRUSH SHALE AND UKM SAND

The underlying aquifer is designated as the UKM Sand, a member of the KM Horizon. The total thickness of the UKM Sand is typically 30 to 60 feet and is continuous throughout the Permit Area. The Sage Brush Shale is the confining layer that separates the underlying UKM Sand and the Production Zone HJ Horizon. The Sage Brush Shale appears to be continuous throughout the Permit Area and ranges from 5 to 75 feet thick.

2.5 STRUCTURE

In the proposed Permit Area, the Battle Spring Formation dips to the west at a gentle rate of three degrees. A "scissor fault" that extends the length of the Permit Area from the west-southwest to the east-northeast has been identified and is referred to as the Lost Creek Fault. Maximum displacement of the fault at the west end of the Permit Area is around 45 feet, downthrown to the north; whereas the displacement on the east side of the Permit Area is about 80 feet with the downthrown side to the south. Near the middle of the Permit Area, at the hinge of the scissors fault, there is essentially no displacement.

2.6 PREVIOUS TESTING

Several historic pumping tests were conducted on the Lost Creek project in 1982 and 2006 to assess hydraulic characteristics of the Production Zone as well as overlying and underlying hydrostratigraphic units. Historic testing was performed by Hydro-Search Inc. (1982) and Hydro-Engineering, Inc. (2006). A summary of these tests is presented in Section 2.7 of the NRC Technical Report (LC ISR, LLC, 2007).

3.0 MONITOR WELL LOCATIONS, INSTALLATION, AND COMPLETION

3.1 WELL LOCATIONS

The majority of the LCPA monitor wells are located within the planned mine units of the proposed permit area. The monitor wells included in the pump test are shown on Figure 1-2.

3.2 WELL INSTALLATION AND COMPLETION

For this test, LC ISR, LLC installed 15 new wells (Figure 1-2), including 9 Production Zone (HJ Horizon) monitor wells, 2 Overlying (LFG Sand) monitor wells, 3 Underlying (UKM Sand) monitor wells, and LC19M (pumping well completed in the HJ Horizon). LC19M was located on the north side of the Lost Creek Fault and was installed specifically for use as a pumping well.

All of the wells used for this test are located in Sections 17, 18, 19 and 20, Township 25 North, Range 92 West (Figure 1-2), and were constructed with 4.5-inch nominal diameter casing. The wells were developed using standard water well construction techniques, including air lifting, pumping, swabbing, and/or surging. Completion information for each well is provided in Appendix A. Specific data related to well location, construction, completion interval, and initial water levels are provided in Table 3-1.

4.0 PUMP TEST DESIGN AND PROCEDURES

4.1 TEST DESIGN

As mentioned above, this is the first of three regional hydrologic tests to be conducted in the LCPA. This test, conducted from the HJ Horizon on the north side of the Lost Creek Fault, was designed to:

1. Demonstrate hydraulic communication between the Production Zone (HJ Horizon) pumping well and the surrounding monitor wells;
2. Assess the hydrologic characteristics of the Production Zone aquifer within the test area;
3. Evaluate the presence or absence of hydrologic boundaries in the Production Zone within the LCPA; and,
4. Demonstrate sufficient confinement between the Production Zone and the Overlying and Underlying aquifers for the purposes of ISR mining.

The general testing procedures were as follows:

- Install In-Situ Level TROLL data logging transducers (12 vented, 2 non-vented) in wells to record changes in water levels during tests. Verify setting depths and head readings with manual water level measurements.
- Measure and record background water levels and barometric pressure for a minimum of 48 to 96 hours prior to the test.
- Run the pumping well at a constant rate (or as close as practical).
- Record water levels and barometric pressure throughout background, pumping, and recovery periods.

4.2 PUMP TEST EQUIPMENT

The test was performed using a Grundfos 40S50-15, 5 hp, 460V, 3-phase electrical submersible pump powered by a portable diesel generator. The pump was set at a depth of 375 feet (approximately 85 feet off the bottom of pumping well [LC19M]). The static depth to water in LC19M was approximately 181 feet, providing for 194 feet of head above the pump. Flow from the pump was controlled with a manual gate valve. Surface flow monitoring equipment included a NUFLO™MCII totalizer (provided by LC ISR, LLC) and a SeaMetrics DL-75 Data Logger (provided by LAI). Per discussions with WDEQ/LQD, no Temporary Discharge Permit was required; discharge water was land applied approximately 300 feet downgradient of the pumping well via a manifold and 5 perforated 1" HDPE lines to minimize erosion.

Water levels in each well were measured and recorded with In-Situ Level TROLL transducer/dataloggers. The pressure rating for the transducers ranged from 15 to 100 psi. The transducers were programmed to record depth to water measurements at 10 minute intervals (during background monitoring, and the pumping and recovery periods). A summary of the monitoring equipment used is presented in Table 4-1.

Petrotek personnel installed the monitoring equipment prior to testing and LAI assisted with day-to-day data downloads. Petrotek personnel verified the datalogger programming and equipment layout, and performed the step-test. Thereafter, LAI personnel collected the daily downloads and transferred the data to Petrotek for review/QA/QC for the duration of the long term pumping test. Table 4-2 contains the drawdown and responses observed for each well.

4.3 POTENTIOMETRIC SURFACES

Figure 4-1 presents potentiometric elevations the Production Zone (HJ Horizon) within the LCPA from water level measurements on June 27, 2007. Based on those data, the direction of groundwater flow within the HJ Horizon north of the fault is predominantly to the west with the ground water gradient at approximately 0.0039 ft/ft (20.6 ft/mile) as calculated from between wells HJMP-111 and HJMP-104. Based on the limited number of HJ wells on the south side of the fault, it appears that the direction of groundwater flow within the HJ Horizon is predominantly to the south-southwest. The steep gradient observed in the potentiometric surface from the north to the south side of the fault is most likely a manifestation of a lower permeability transition area associated with the fault smear zone and/or secondary faulting and fracturing near the fault. This is consistent with regional groundwater flow impacted by lower permeability zones studied and modeled by Freeze (1969). Although limited groundwater leakage occurs across the fault, the majority of groundwater flow on both sides of the fault appears to be generally parallel to the fault, to the west-southwest. Water level data used for preparation of this map are presented in Table 3-1.

For the Overlying (LFG Sand) aquifer, two monitor wells were monitored during this test (one on each side of the fault). Based on a distance of approximately 715 feet between LC18M (north of fault) and LC25M (south of fault), and a water level elevation difference of 11.5 feet (Table 3-1), the fault is a barrier to groundwater flow within the test area.

For the Underlying (UKM Sand) aquifer, three monitor wells were monitored (2 north and 1 south of fault). Based on the data in Table 3-1, it appears that the direction of groundwater flow north of the fault is in a westerly direction. The elevation of groundwater observed in the UKM Sand north of the fault is not significantly different when compared to the UKM elevation on the south (UKMP-102 is 1.7 feet higher than UKMP-101). Based on only two data points, it is not certain whether the fault is acting as a hydraulic barrier to flow within the UKM Sand.

Water level data collected from the LC18M (LFG), LC-19M (HJ) and LC20M (UKM) well cluster, indicate the potentiometric surface of the HJ Horizon (LC19M) is approximately 10.5 feet lower than the potentiometric surface of the overlying LFG Sand and suggests that the LFG Sand is not in hydraulic communication with the HJ Horizon, but has the potential to drain to it if an artificial pathway was created (improperly constructed well or improperly abandoned borehole). Additionally, the potentiometric surface of the HJ Horizon is approximately 21.6 feet higher than the potentiometric surface of the underlying UKM Sand at this location, also and suggesting that the HJ Horizon is not in hydraulic communication with the UKM Sand.

At the time of the HJ Horizon test on the north side of the fault, the drilling/monitor well installation associated with characterization of the Overlying, Production Zone, and Underlying hydrostratigraphic units was approximately 50% complete. As such, a limited number of data points were available for the first test. As of this writing, all monitoring wells associated with characterization of all hydrostratigraphic units of interest have been drilled, installed and completed. Tests in the UKM Sand on the north side of the fault and HJ Horizon on the south side of the fault, respectively, are currently scheduled to commence in October 2007.

4.4 BACKGROUND MONITORING, TEST PROCEDURES AND DATA COLLECTION

The majority of the testing equipment (e.g., pump, flow meters, Level TROLLs) was installed and checked by Petrotek and LAI on June 22, 2007. A step-rate test was conducted on June 23, 2007.

The background-monitoring period followed the step test and ran for a period of 4.1 days. Water levels were recorded every 10 minutes during background monitoring.

In-Situ® Level TROLLS® were programmed to record water levels every 10 minutes during the pumping and recovery periods. Pumping rate data for this test is shown on Table 4-3. A CD containing the water level data for the step test, background monitoring, pumping, and recovery periods is included in Appendix D.

5.0 BAROMETRIC PRESSURE CORRELATIONS AND CORRECTIONS

5.1 MONITORING EQUIPMENT

As discussed earlier, twelve of the fourteen In-Situ Level TROLL transducers used were vented (gauged), while two were non-vented (absolute). The use of non-vented transducers requires post-test barometric corrections since they are not vented to the atmosphere. In-Situ has stated that if vented transducers are used, the vent eliminates the impact of barometric pressure on the sensor, which is correct. However, a change in water levels due to barometric changes will occur whether a vented sensor is used or not. Hence, use of vented equipment eliminates the barometric impact on the sensor, but does not correct the water level measurements for barometric effects on the aquifer. In this regard, the vented Level TROLLs are barometrically *compensated*, but not *corrected*. Hence, if significant variations in water levels are observed, the data require correction for fluctuations in water levels associated with changes in barometric pressure.

Data for two of the non-vented Level TROLL (absolute) transducers were corrected for changes in barometric pressure. In-Situ states that non-vented (absolute) transducers must be corrected for barometric pressure because the sensors are not barometrically compensated.

5.2 BAROMETRIC CORRECTIONS

To demonstrate the effect of barometric pressure on water levels for this pumping test, two different corrections were evaluated. The first correction was simply evaluating the data based on total head (i.e., the elevation of water in the well plus barometric pressure as feet of water), and normalizing the values to the initial barometric pressure at the start of each pump test. This correction is referred to as the Manual Correction. Example input parameters and calculations follow:

<u>Input Parameters:</u>

Initial water elevation (feet)
Initial barometric pressure (equivalent feet of water)
Barometric pressure at time X (feet of water)
Water elevation at time X

<u>Manual Barometric Correction:</u>

(Raw elevation + barometric pressure [ft H_2O]) - Initial Barometric Pressure [ft H_2O]

The second method employed to assess barometric impacts is referred to as BETCO (Sandia Corporation, 2005), which is a program that was developed to analyze barometric and tidal effects for the Waste Isolation Pilot Project (WIPP) in New Mexico. BETCO was developed as a method to remove water level fluctuations due to barometric pressure and earth tides through the application of a multiple regression analysis. The BETCO software is publicly available at http://www.sandia.gov/betco as freeware. To correct the data, water level, time, and barometric pressure are entered into the program. BETCO then calculates corrected water level values. Examples of the raw data versus the Manual and BETCO corrections for LC19M, HJMP-111 and HJMP-107 are presented in Figures 5-1, 5-2 and 5-3, respectively.

As shown in Figures 5-1 through 5-3, barometric pressure had a negligible impact on water levels as evidenced by comparing the raw data to the barometrically corrected data. Because of the minimal impact of barometric pressure on water levels prior to, during and after the pumping test, original, uncorrected data from the vented Level TROLLs were used in the analyses discussed below.

It is noted that the water levels in three wells (HJMP-110, HJMP-111 and HJT-104) dropped below the level of the TROLLs during the pumping period. As such, data from those wells were not valid for a short period of time. The TROLLs in those wells were lowered during the test and water level data adjusted accordingly.

6.0 TEST RESULTS

6.1 BACKGROUND TRENDS

As mentioned previously, water level stability data were collected prior to the start of the pump test. Plots of the background, pumping, and recovery data for all wells completed in the HJ Horizon are shown in Figures 6-1 through 6-10. Water level data for the overlying (LFG Sand) and underlying (UKM Sand) wells are presented in Figures 6-11 through 6-15. Water level vs. barometric pressure plots for all wells monitored during the test are presented in Appendix B.

In general, water levels in the HJ Horizon north of the fault were slightly increasing while water levels on the south side were decreasing. Background water levels in the LFG Sand and UKM Sand were trending downward on both sides of the fault prior to start of the test.

6.2 PUMP DURATION AND RATE

The test was started at 17:20 on June 27, 2007 and run for a period of 8,252 minutes. The pump was shut off at 10:51:30 on July 03, 2007. The average pumping rate during the test was 42.9 gallons per minute. It is noted that a false start occurred at 16:50 on June 27, 2007. This false start was attributed to field adjustments made to the discharge manifold to eliminate backpressure and achieve a higher pumping rate.

6.3 HJ HORIZON

As shown in Figure 6-16, significant drawdown was observed in all of the HJ Horizon monitor wells located on the north side of the fault after pumping LC19M at a constant rate of 42.9 gallons per minute for 5,282 minutes (5.73 days). Prior to shut-in of LC19M, drawdown observed in the pumping well was 93.3 feet. Observed drawdown in monitor wells located on the north side of the fault ranged from 21 to 40 feet. As mentioned above, the potentiometric level on the north side of the fault is approximately 15 feet higher on the north than the south side under static, non-pumping conditions. At monitor well HJT-104, located just north of the fault, approximately 40 feet of drawdown was observed. Accounting for the differences in water elevations between the north and south side of the fault, water on the north was lowered approximately 25 feet below the background elevation on the south. As such, significant hydraulic stress was applied to the north side of the fault. On the south side of the fault, minimum drawdown was observed and ranged from 1.3 to 5.7 feet. Based on the significant drawdown that occurred in the HJ Horizon north of the fault in response to pumping at LC19M and the minimal response to the HJ Horizon south of the fault during the test, the Lost Creek Fault is a significant barrier to groundwater flow in this area. The drawdown observed in wells south of the fault during the test, although minimal; suggests that some leakage across the fault occurs. The degree and significance of the leakage will be further investigated with additional regional and mine unit scale pump tests.

6.4 CONFINING UNITS

During the pumping test, small responses were observed from of the overlying wells LC18M and LC25M, and underlying UKMP-102, Figures 6-11, 6-12, and 6-14, respectively. The responses observed correlate with the start and stop of pumping from LCM19 in the HJ

Sand. After backing out the downward background trends, the responses ranged from about 0.2 to 0.8 feet. As previously stated, a declining trend in water level elevations in both the overlying and underlying aquifers was observed prior to the start of the test. Most of the wells showed an initial inverted response (increase in water level) at the start of the test and then resumed a gradual downward trend during the test. This phenomenon was also observed and noted by Hydro-Engineering during the 2006 pump tests. At this time, the cause of the observed responses is unknown. Thickness (isopach) maps of the shale units above HJ (Lost Creek Shale) and below HJ (Sage Brush Shale) as presented in Plates 2.6-6a and 2.6-6c of the NRC Technical Report (LC ISR, LLC 2007) indicate that the shales are continuous throughout the area. While LC ISR, LLC has aggressively pursued abandonment and re-plugging of historic wells, it is also possible that some form of communication could be related to abandoned wells.

Additional drilling and logging during 2007 and 2008 will provide a more detailed understanding of the stratigraphic section and confining units at the LCPA. Two additional pump tests are planned for 2007 in the HJ and KM Horizons, and additional hydrologic testing will be conducted for each mine unit. Future work will provide additional data with which to re-evaluate the responses in the underlying and overlying units observed during the recent testing. In this regard, it is anticipated that the overlying/underlying responses observed to date will be resolved and communication between the underlying and overlying aquifers, if significant, will be understood to a degree such that mining can proceed in accordance with NRC and WDEQ regulations.

7.0 ANALYTICAL METHODS

Drawdown data collected from the monitor wells were graphically analyzed to determine aquifer properties of Transmissivity and Storativity. The primary analysis method used was Theis (1935). The assumption used in this analysis was that the aquifer is confined and has a saturated thickness of 120 feet. The use of the Cooper & Jacob time-drawdown (1946) method was evaluated for the pump test data, however the criteria for using this method was only met at one location (observation well HJMP-110) 338 feet from the pumping well. A Theis Recovery (1935) analysis was performed for the pumping well. As noted, minor responses in observation wells across the fault were observed. However, the magnitude of those responses was so low that quantitative analyses were not performed. Water elevation plots for all the wells are presented in Appendix B.

The test data were analyzed using the Theis method because this method is mathematically valid for all distances and times. The significant assumptions inherent in this method include:

- The aquifer is confined and has apparent infinite extent;
- The aquifer is homogeneous and isotropic, and of uniform effective thickness over the area influenced by pumping;
- The piezometric surface is horizontal prior to pumping;
- The well is pumped at a constant rate;
- The pumping well is fully penetrating; and,
- Well diameter is small, so well storage is negligible.

These assumptions are reasonably satisfied, with the exception of the uniform thickness of the aquifer and infinite extent of the aquifer. Locally, the HJ Horizon at LCPA is not homogeneous and isotropic; however, over the scale of the pump test, it can be treated in this manner. As previously discussed, and verified with the pumping test, the fault acts as a significant hydraulic barrier to groundwater flow and therefore limits the effective extent of the aquifer. In this regard, water level responses from all the wells in the HJ Horizon likely are impacted by the fault. The Transmissivity (T) and hydraulic conductivity (K) results obtained from these analyses are likely to be lower than the actual values, yet will be representative of conditions that will be observed during mining in the vicinity of the fault.

Because none of the monitor wells were completed within the confining units, a Neuman-Witherspoon (1972) analysis was not performed. The software used to graphically analyze the data was AquiferTest Pro ver 3.5 (Waterloo Hydrogeologic, Inc., 2002).

Water level stability data collected during the pre-test and post-test periods along with barometric pressure (Appendix B) were used to assess the background trends. No significant recharge or trend corrections were warranted for any of the wells.

7.1 ANALYTICAL RESULTS

Transmissivity (T) results from the Theis analysis were calculated using both drawdown and recovery portions of the test data. Average T results for the HJ Horizon Sand range from 30 to 75.5 ft^2/d, with an average T value of 61.2 ft^2/d (68.3 ft^2/d of the data from HJT-104, which are impacted by the transition zone associated with the fault, are not included). Based on an average thickness of 120 feet, the average hydraulic conductivity (K) is 0.51 ft/d (Table 5-1). Assuming a water viscosity of 1.35 cp (50 degrees F) and a density of 1.0, this equates to a permeability of approximately 250 millidarcies (md). Storativity (S) of the HJ Production Zone ranges from 6.6 E-05 to 1.5 E-04, with an average value of 1.1 E-04.

The Theis analysis of well HJT-104, located near the fault on the north side, was performed on the early to middle-time data to assess the effects of the fault as shown in Figure 7-1. The change in slope in the later time data is believed to be a manifestation of the recharge to the well resulting from leakage across the fault. A Transmissivity value of 30 ft^2/d was calculated for the early time data for HJT-104. The early time data represents near well aquifer characteristics, which supports the conceptual model of a transition zone of lower permeability near the fault mentioned previously. The conceptual model is further supported by the background potentiometric surface shown in Figure 4-1. Although the fault serves as a significant boundary to groundwater flow, there is hydraulic communication, albeit small.

Type curve matches for all of the HJ Horizon monitor wells included in the pump test are provided in Appendix C. Water level data for all monitor wells from background through pumping and recovery are included in Appendix D on a CD ROM.

7.2 DIRECTIONAL PERMEABILITY

The transmissivity results at LCPA correlate reasonably well with the thickness of the HJ Horizon and the permeability transition zone located near the fault (Figure 7-2). In general, higher T values are reported in the areas of thicker and/or cleaner sand, while lower T values are reported in areas of lower permeability near the fault transition zone. On a regional scale, the observed variation in T is not expected to significantly impact ISR mining and has no apparent regulatory implications. Further, field operations will be modified to achieve mine unit balance in light of the variation in T. The test data to date are limited and the issue of directional transmissivity will be further investigated during mine unit-scale testing required by NRC and WDEQ/LQD.

As discussed previously, the T results for the HJ Horizon on the north side of the fault obtained from the test are considered "effective" because of the barrier effect of the fault. Because of the fault, the aquifer is not infinite-acting. The T results are representative of the HJ Horizon on a regional scale, and directly apply to design calculations such as water balance. However, on a small scale, the actual transmissivity of the aquifer, without impacts from the fault, would be higher (e.g., by an approximate factor of 1.5 to 2.0). Similarly, the K results from this test (0.25 to 0.63 ft/d) are "effective". Actual K values on a small scale (e.g., pattern area) likely are on the order of 1.0 ft/d. This value would be most representative with regard to mine unit design and exterior monitor well spacing.

7.3 RADIUS OF INFLUENCE

Based on the limited drawdown response observed at HJT-105 (south of fault), test results suggest a radius of influence (ROI) of at least 1,100 feet (Figure 6-16). As noted previously, additional mine unit scale testing will be required prior to initiation of operations at Lost Creek.

8.0 SUMMARY AND CONCLUSIONS

- The HJ Horizon monitor wells and pumping well located on the north side of the fault are in hydraulic communication, demonstrating that the HJ Horizon Production Zone has hydraulic continuity. While minor communication was also demonstrated in the HJ Horizon south of the fault, the response was an order of magnitude smaller suggesting that the fault is a significant barrier to groundwater flow. Additional (mine unit) scale testing required by NRC and WDEQ will be designed to demonstrate communication throughout each mine unit between the pumping well(s) and the monitor well ring;

- On a regional scale, the HJ Horizon Sand north of the fault has been adequately characterized with respect to hydrogeologic conditions within the test area at LCPA. The pump test results demonstrate that the HJ Horizon has sufficient transmissivity for in-situ recovery mining operations. The pump test has provided sufficient aquifer characterization of the HJ Horizon such that permitting can proceed, and;

- Geological information suggests that the overlying and underlying shales are continuous throughout the test area. Minor responses were observed during the pump test and the cause of the responses is unknown at this time. Additional testing currently scheduled will provide additional information regarding the confining characteristics of the overlying and underlying shales.

9.0 REFERENCES

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