Bjornsen, Alan

From: Bjornsen, Alan – FSME
Sent: Monday, August 02, 2010 1:40 PM
To: Cash, John
Subject: Sage Grouse Monitoring Plan
Attachments: Submittal of Wildlife Monitoring and Protection Plan_Oct2009.pdf; Attach_OP_6 _Wildlife_Oct2009.pdf; TabOP_2_VegTopsoilDisturb_Feb10.xls

John,

I know UR-Energy has been working with the WGFD for more than a year on the sage grouse issue. The wildlife survey you sent (attach) was developed in 2009, and it contains some sage grouse information. However, it does not reflect the most recent decisions of the State. I know you have hired an expert in the field to help you through this problem. Do you have a sage grouse-specific monitoring plan that was developed as a result of the new guidance? Thank you.

Alan

From: Cash, John [mailto:John.Cash@ur-energyusa.com]
Sent: Friday, July 23, 2010 10:29 AM
To: Bjornsen, Alan
Subject: RE: More Questions

Alan,

1. A copy of the Wildlife Monitoring Plan is attached for your use along with the cover letter it was submitted under.
2. Yes, NRC has the most up to date financial assurance. It was submitted to Tanya Oxenberg.
3. Until we have a license in hand and other permitting is complete or nearly complete we are hesitant to sign a disposal agreement. Therefore, we do not have a disposal agreement in place yet.
4. Non-hazardous, non-radiological solid waste will most likely go to the Rawlins Landfill that is located just north of Rawlins.
5. I don't see the reference to 324 acres in the Draft SEIS but I may be missing it. The WDEQ has made us make some minor revisions to how we calculate disturbance. The most significant difference is that they required us to place the entire east and west access roads into the permit area. This increased the area of disturbance by about 19.3 acres. The remaining differences are simply minor adjustments required by WDEQ-LQD. I have attached the latest table submitted to LQD.
6. We would love to find a way to make portable pits or mud separators work. In fact, we have spent considerable effort assessing various methods and have even taken two field trips to look at separation units. However, there are three significant problems that we have not been able to overcome. First, using a portable pit for the depth of holes we are drilling is impractical due to the volume of cuttings. Second, mud separation units are very expensive. Third, and most significantly, what do we do with the cuttings? Each exploration hole will generate around four yards of cuttings and each well, due to its larger diameter, will generate around 10 yards of cuttings. If you can solve the cuttings problem for us economically we will find a way to work out the technical problems. But for now, a mud pit at each hole is the best we can do.

Hope this answers your questions but if not just send me an email. I plan to be in the office all day today and most of next week.

Regards,
John

F/136

From: Bjornsen, Alan [mailto:Alan.Bjornsen@nrc.gov]
Sent: Friday, July 23, 2010 6:24 AM
To: Cash, John
Subject: More Questions

John,

I'm embarrassed to keep asking you questions, but the closer we get to finalizing the SEIS the more 'little holes' we find.

1. I know I asked you this before, but could you send me a copy of the Sage Grouse Impact Study your consultant prepared? An electronic would be preferable.
2. Can I assume that the NRC has the most up-to-date financial assurance info?
3. Where does the Lost Creek ISR facility plan to dispose its solid byproduct material?
4. Can I assume that the non-hazardous, non-radiological solid waste would go to the SWCSWD#1 landfill in Rock Springs?
5. On Table 4-1 of the draft SEIS, the numbers don't align with the text – Total Land Disturbed from the table is 285.4 ac vs. 324 ac in the text -Which on is it?
6. What is UR-Energy's position/thoughts on the use of portable tanks in place of mud pits?

Thank you.

Alan B. Bjornsen
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LOST CREEK ISR, LLC

October 28, 2009

Mr. Scott Gamo
Wyoming Game and Fish Department
5400 Bishop Blvd.
Cheyenne, WY 82006

Re: Submittal of Wildlife Monitoring and Protection Plans

Dear Mr. Gamo:

The Wyoming Department of Environmental Quality - Land Quality Division (WDEQ-LQD) regulations require that applicants for a permit to mine consult with the Wyoming Game and Fish Department to ensure the proper monitoring and protection of wildlife. In order to comply with this requirement, please find attached, in hardcopy, the Lost Creek Project's Wildlife Monitoring and Protection Plans and Vegetation and Wildlife Appendices for your review and comment. These documents have also been submitted to the WDEQ-LQD Lander Field Office for their review. A hard copy of the Table of Contents for the complete application is also attached, and a CD of the entire application is included so you have access to the complete package.

We look forward to meeting with you in the near future to discuss this submittal. If you need any additional information, please do not hesitate to contact me at the Casper office.

Sincerely,
Lost Creek ISR, LLC
By: Ur-Energy USA Inc., Manager

John W Cash

John W. Cash
Manager EHS and Regulatory Affairs

Cc: Ms. Nancy Fitzsimmons, URE, Littleton, CO w/o attachments
Mr. Brian Kelly, USFWS, Cheyenne, WY,w/ attachments,

Attachments: Table of Contents for WDEQ-LQD Permit-to-Mine Application
Appendix D8, Vegetation
Appendix D9, Wildlife
Attachment OP-6 Wildlife Protection and Monitoring Plans
Lost Creek Permit to Mine Application in CD format

Attachment OP-6

Wildlife Protection Plan and Wildlife Monitoring Plan

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ADDENDUM

Addendum OP-A6-A Agency Review Letters, Wildlife Monitoring and Protection Plan

REFERENCES

Attachment OP-6
Wildlife Protection and Monitoring Plans

LC ISR, LLC has completed extensive baseline wildlife surveys to evaluate existing wildlife resources in and adjacent to the Permit Area (**Appendix D9**). In addition, LC ISR, LLC has implemented protection measures as appropriate to the on-going exploration activities at the site, such as drilling restrictions based on location or timing for wildlife activities and use of appropriate fencing around activity areas. LC ISR, LLC will continue a combination of protection measures and monitoring to improve the current understanding of ISR impacts on wildlife and minimize the impacts.

The Wildlife Protection Plan and the Wildlife Monitoring Plan, in **Sections 1.0** and **2.0** of this attachment, respectively, were developed to prevent impacts to wildlife, where possible; and if impacts are identified or anticipated, the Plans will help minimize those impacts. If needed, additional wildlife protection or monitoring measures can be designed and implemented to minimize or offset anticipated impacts. The Plans were developed to be consistent with recommendations and requirements of USFWS, BLM, WGFD and WDEQ-LQD.

The results and conclusions from each year's wildlife protection and monitoring measures will be included in LC ISR, LLC's Annual Report to WDEQ-LQD and NRC.

1.0 WILDLIFE PROTECTION PLAN

LC ISR, LLC recognizes that mining activities have the potential to impact wildlife, including: loss of habitat; changes in habitat usage due to increased human presence, reductions in food sources, and displacement to new areas; and collisions with structures and vehicles. The following protection measures include both impact avoidance and mitigation measures. Those measures that are currently in use during exploration drilling that are also applicable to ISR operations, will be continued, and new measures will also be implemented as on-site activities increase during ISR operations.

The protection measures include a range of options, from activity restrictions to reclamation. Proposed measures are designed to be consistent with those recommended by the USFWS, BLM, and WGFD. The discussion of the measures is organized into those relating to: Activity Restrictions and Reporting; Infrastructure; Human Disturbance; Site Maintenance and Reclamation; and Habitat Enhancements.

Particular attention was given to protection measures for sage grouse, raptors, and MBHFI because of their presence in the area. The measures for sage grouse were adapted from the Core Population Area Stipulations (WGFD, 2008) to be practical in an ISR environment. The stipulations and their application are included in **Table OP-A6-1**. The project is located on the edge of the South Pass Sage-Grouse Core Breeding Area, as shown on **Figure OP-A6-1** (WGFD 2008).

1.1 Observation and Reporting of Wildlife Activity

Wildlife observed within and near the Permit Area is described in detail in Appendix D9. The on-going wildlife monitoring plan, which includes annual reporting, is described in detail in **Section 2.0** of this attachment. However, there may be times at which more immediate reporting may be necessary. In particular, any unanticipated new or unusual wildlife activity which could interfere with site operations will be reported to the WDEQ, USFWS, and WGFD. Similarly, any mortality that could be caused by exposure to toxic substances or other unusual project-related concern will be reported immediately to the WDEQ, USFWS, and WGFD. The goal of such reporting will be to identify and solve the problem as quickly as possible.

1.2 Timing Restrictions

The major phases of the Lost Creek Project include: *exploration* for ore; *facility construction*; *delineation* of mine units (economic portions of the ore zone); mine unit *installation*; *production* and groundwater *restoration*; and surface *reclamation*. Six mine units are planned within the Lost Creek Permit Area. The units are brought on-line and reclaimed in scheduled succession during the life-of-mine, which is anticipated to be 12 years. The ISR operations and reclamation are described in detail in the main portion of the permit application; and the schedule is included in **Figure OP-4a** of the Operations Plan.

During *exploration* drilling, the standard timing restrictions identified by BLM will continue to be followed, unless otherwise approved by BLM. The timing restrictions for protection of specific species which occur in the vicinity of the Lost Creek Project are listed in **Table OP-A6-2**. It should be noted that exploration drilling took place at the site several times in the past (**Appendix D2**); and LC ISR, LLC has been conducting exploration and delineation drilling at the site since 2005 under Notice WYW-166224 with BLM.

Facility construction, i.e., construction of the on-site office building, the Plant, and associated support facilities, is anticipated to take six to seven months. Construction will begin once agency approvals are obtained.

The *delineation* and subsequent *installation* of the mine unit can be considered as the first step in accessing the ore - similar to topsoil stripping prior to opening a pit at a surface mine - and will occur year-round. However, the similarity ends there as topsoil removal is not necessary over the entire mine unit. Topsoil removal is only necessary at the mud pits, and the topsoil is replaced after drilling. Also, although vegetation is affected in the mine unit, removal throughout the mine unit is not generally required, and the surface area of the mine unit is largely reclaimed, with a native seed mix, prior to production. (In fact, topsoil and vegetation removal over the entire mine unit could be detrimental to shrub recovery given the relative resilience of sagebrush to mechanical disturbance). In addition, installation of injection and production wells and the associated facilities requires about 14 months rather than the several years a surface pit may be open.

During *production* and ground water *restoration*, the wellheads, header houses, and tertiary access roads are the only long-term ISR features on the surface in the mine units. In addition, activities within the mine unit are almost all restricted to daytime hours. A mine unit operator is present at night for security and for process control. Because of the limited surface disturbance during production, surface *reclamation* generally results in minimal disturbance.

1.3 Infrastructure

The infrastructure for the Lost Creek Project is shown on **Figure OP-2a** and **Plate OP-1**. A discussion of which items in the infrastructure are life-of-mine (e.g., the Plant) and which are shorter term (e.g., header houses in Mine Units) is included in **Section OP 2.1**. The reclamation of the infrastructure is described in **Sections RP 3.0 and 4.0**. The steps that will be taken to mitigate impacts of the infrastructure are discussed in the following subsections.

1.3.1 Locations and Disturbance Area

The locations for the mine units are dependent on the ore distribution (**Figure OP-2b**). Within the Lost Creek Permit Area (as in much of Wyoming), the ore occurs in long, narrow, sinuous 'roll front' deposits. The deposits are usually in sandstones, which are vertically separated by shales, so there may be mine units at different depths at overlapping locations. The mining process is iterative; new mine units are brought into

production as older mine units are reclaimed. Therefore, not all of the disturbance occurs at once, and the disturbance is clustered, which will minimize disruptions to wildlife.

The proportion of disturbance within the Permit Area is less than 10% of the Permit Area (**Table OP-A6-3**). In addition, the in situ mining technique minimizes surface disturbance since in most cases topsoil and vegetation are left intact. In areas where vegetation is removed, revegetation efforts will commence at the next appropriate season, using native seed mixes approved by BLM and WDEQ-LQD. Consideration was also given to use of existing roadways wherever possible to minimize disturbance of new lands (**Table OP-A6-1**).

The orientation of the project facilities and existing sage grouse leks are shown on **Figure OP-A6-2**. The majority of the mine units are outside the 2-mile buffers for the closest active and occupied leks, which are the Green Ridge Satellite Lek to the east and the Discover 2 Lek to the west. (Although the 2-mile buffers are no longer applicable in the Core Breeding Areas, the buffers were recognized when wildlife monitoring for the Project began in 2006.) The necessary support facilities were sited, in part, based on distance from existing occupied sage grouse leks. In particular, the Plant was sited between the 2-mile buffers for the closest active and occupied leks. The closest lek is considered "occupied and inactive" based on data from the last several years (**Attachment D9-4**).

For comparison with the current sage grouse Core Population Area Stipulations, the disturbance is broken down by section in **Table OP-A6-3.**

Existing raptor nests are located greater than one mile away from proposed mining activities (**Figure D9-7**). If the annual raptor nest survey locates a new raptor nest within 0.5 miles of project activities, the USFWS and WGFD will be consulted to determine appropriate mitigation measures. If needed, appropriate mitigation permits will be obtained from the USFWS and WGFD.

Based on breeding bird surveys, the Lowland Big Sagebrush habitat, described in **Appendix D8**, provides the most important breeding habitat for MBHFI passerine bird species in the area. Only a small portion of this habitat will be disturbed (**Table OP-A6-3**), and where possible, project activities will be located outside of this habitat area.

1.3.2 Roads and Utilities

Access roads will follow existing two-track roads to the extent possible to help minimize disturbance of habitat. Road widths will be minimized while still conforming to the

International Fire Code, as requested by county zoning. The existing two-track road network is shown on **Figure D7-3**, and proposed road locations and improvements are discussed in **Section OP 2.6**. Existing two-track roads that are adjacent to the main access road and Plant will be gated (only if approved by the BLM) and or signed to help prevent additional traffic disturbances in the area. Travel outside of primary construction and drilling areas will be minimized through the installation of main and secondary access roads.

Because of the proximity of existing public roads and the access roads to some of the leks, line-of-sight analyses were conducted with GIS and in the field. The GIS analyses evaluated what was visible if the viewer's line of sight were one meter above the ground (slightly taller than a sage grouse) and two meters above the ground. The results for the leks that are 'Occupied and Active' are included on **Figures OP-A6-3a** (Green Ridge Lek), **OP-A6-3b** (Green Ridge Satellite Lek), **OP-A6-3c** (Discovery Lek), and **OP-A6-3d** (Discovery Satellite [or Discovery 2] Lek). The results for the Crooked Well Lek that is 'Occupied and Inactive' are included on **Figure OP-A6-3e**. Purple is used to show areas that are visible from the lek at a line of sight one meter above the ground, and blue is used to show additional areas that are visible from two meters above the ground. (On the figures, the green triangle is a relatively large symbol because the dimensions of the lek are not precise.)

From the Green Ridge Lek, part of the Sooner Road, which is an existing public road (BLM Road 3215), and the East Access Road may be visible from the eastern side of the lek. Portions of the Permit Area may also be visible, although those portions are three miles away or more. Less of the roads may be visible from the Green Ridge Satellite Lek, a closer portion of the Permit Area may be visible. However, the only facility in this portion of the Permit Area is one of the deep wells (**Plate OP-1**). From the Discover Lek, parts of the Wamsutter - Crooks Gap Road, which is an existing public road (County Road 23), the West Access Road, and the main portion of the Permit Area are visible. However, most of the closest of these features, the West Access Road, is not visible. (At its closest point, the West Access Road is about 0.5 miles north of the Discover Lek.) From the Discover 2 Lek, even less is visible as it sits in a topographic low. The GIS results for the Discover and Discover 2 Leks were confirmed by field observations in September 2009. **Figure OP-A6-4** includes 360° panoramic views standing at the approximate locations of the Discover and Discover 2 leks. In both cases, a subtle ridgeline to the north obstructs a clear view of the West Access Road. The Crooked Well Lek is apparently in a topographic low given the scattered visibility from the lek.

The proposed pipelines, transmission line, and any other utilities will be placed in or adjacent to the access road ROW to help minimize habitat impacts where possible. To prevent the electrocution of raptors, the primary and secondary transmission lines and power poles will be built to the latest approved methods (Olendorf et al., 1996). This will

include cross-arm design, and transformer design. Tertiary transmission lines will be buried in order to minimize risks to raptors and large birds. In addition, to discourage roosting by raptors and corvids (and, in turn, increased predation on sage-grouse), appropriate anti-perching and anti-roosting devices will be placed on power poles and cross-arms.

1.3.3 Fencing or Screening

The ISR activities that require a visual deterrent, fencing, or screening include: the mine units; mud pits used during well installation; and the storage ponds. The specific types of deterrent, fencing, or screening for these activities are outlined below.

1.3.3.1 Mine Units

Mine units will be fenced to keep out cattle and wild horses but will be constructed to allow the passage of antelope and other wildlife (Type III fencing per LQD Guideline 10). The fences will be removed after ISR operations are complete and vegetation has become reestablished in accordance with permit requirements (**Section RP 4.5.5**) unless otherwise approved and agreed upon with the landowner (BLM).

1.3.3.2 Mud Pits

As during exploration drilling, LC ISR, LLC will continue to fence mud pits outside of the fenced portion of the Mine Units. Inside the fenced portion of the mine units, mud pits will not be fenced, in part due to the limited time the pits are open and the level of activity around the pits while they are open. Mud pits have not been the cause for significant wildlife mortality at other ISR operations, If conditions are found to differ from those at other ISR operations, more protective measures, such as temporary fencing, will be evaluated.

1.3.3.3 Storage Ponds

The only fluid-holding structures will be the storage ponds, which are described in detail in **Section OP 2.9.4**. The ponds will be fenced to prevent access by wildlife on the ground and for safety reasons (Type I fencing per LQD Guideline 10). Based on the anticipated quality of the water in the ponds (**Table OP-A6-4**), fencing and deterrents will be used and algae and plankton growth will be prevented. If birds are attracted to the ponds, it will most likely be waterfowl that would be exposed via water ingestion. If sage grouse and local sagebrush endemic passerine bird species use the ponds as a regular

water source there is an exposure potential. However, the amount of freeboard, and water depth maintained for the two ponds should make it difficult for land birds (such as sage grouse), passerine birds, and wading birds (such as herons) to drink from the ponds. An exception might be swallows, if present in the area, that drink water on the wing. Waterfowl are not expected to reside on the ponds for more than a few days. A study of wastewater ponds in central Idaho noted that waterfowl resided from 1 to 25 days, with an average residence time at the ponds of 6 days (Halford et al. 1982).

Recommended drinking water quality guidelines for wild birds are not known to exist (although there are water quality standards that are thought to indirectly protect wild birds). But, guidelines for drinking water quality do exist for poultry (Carter and Sneed 1996). The list of major constituents in the storage ponds (**Table OP-A6-4**) are not considered hazardous to poultry, with the exception of radium-226, which is discussed in more detail below. High concentrations of chloride, magnesium, sodium, and sulfate cause mild symptoms such as metabolic effects or loose droppings or act as a diuretic or laxative, respectively, in poultry (Carter and Sneed 1996). Maximum recommended concentrations for poultry were not available in the North Carolina Cooperative Extension publication (Carter and Sneed 1996) for the trace parameters listed above non-detect (ND) levels.

A document published by the National Academy of Sciences (NAS 1980) provides "maximum tolerable levels" (MTLs) of various minerals in the diet for poultry, among other domestic animals. The MTLs for poultry regarding aluminum, arsenic, fluoride, manganese, selenium, and vanadium match or are greater than the anticipated maximum concentrations listed for these analytes in **Table OP-A6-4**.

Selenium

A study focused on waterfowl determined that water concentrations of 20 micrograms per liter (μg/L) [or 0.020 milligrams per liter (mg/L)] and greater are hazardous to aquatic birds (Skorupa and Ohlendorf 1991). This value is ten times less than the anticipated maximum concentration in the storage ponds (**Table OP-A6-4**). Another study of waterfowl using irrigation drainwater ponds in California with abnormally high concentrations of selenium up to 300 parts per billion (equivalent to 0.3 mg/L) noted severe reproductive effects (Ohlendorf et al. 1986). Selenium is known to greatly bioconcentrate in aquatic ecosystems between concentrations in water and that in primary producer organisms such as algae and plankton, as well as bioaccumulate many-fold between primary producers and waterfowl (Lemly 1993). If algae and plankton were allowed to flourish in the storage ponds, even higher concentrations of selenium might become available to waterfowl while feeding.

Contrary toxicological evidence is manifested using methods from the practice of ecological risk assessment. A comparison of avian toxicity criteria for selenium used in California was made by the California Department of Toxic Substances Control (CalEPA 2000). The values ranged from 0.23 to 0.5 mg/kg body weight (BW)/day. The maximum anticipated storage pond concentration of 0.2 mg/L can be compared to the lowest criterion of 0.23 mg/kg BW/day by multiplying the pond concentration by a calculated water ingestion rate of 0.0514 L/day for various bird species (EPA 1993) and dividing the product by the approximate body weight of a lesser scaup duck (EPA 1993), 0.8 kg, as follows:

0.2 mg Se/L pond water x 0.0514 L water ingested/day = 0.010 mg Se/day;

0.010 mg Se/day from pond water / 0.8 kg body weight of duck =
0.013 mg Se/kg BW/day;

Hazard Quotient = Dose / Toxicity Criteria = 0.013 / 0.23 = 0.06.

When the hazard quotient is less than 1, it can be assumed that there are no risks to the organism from the contaminant. These calculations apply only to selenium exposure from drinking water and assume that there is no selenium exposure (and bioaccumulation) from food items in the water.

WDEQ recently published a literature review of health effects of inorganic contaminants in drinking water for livestock and wildlife (Raisbeck et al. 2007). The document, however, does not contain information on avian species. There is discussion of aquatic life criterion and whole body tissue concentrations for fish and macroinvertebrates and the relationship of those parameters to risk to avian species. However, fish will not be present in the ponds. In addition, algae and plankton growth will be controlled and the pond habitat will not be suitable for macroinvertebrates, so these parameters are not applicable.

Radium-226

The anticipated maximum concentration of radium-226 is 1,500 picoCuries per liter (pCi/L). Radium-226 is a radionuclide that emits alpha and gamma particles, meaning that waterfowl would receive both internal and external doses of radiation when sitting on the ponds and drinking water. It is a long-lived radionuclide with a decay half-life of 1,620 years. Acting similarly to calcium, radium-226 is stored in bone tissue and is slow to be released from bone. Radium-226 has been shown to bioconcentrate in plankton at 100 to 2,750 times that of the concentration in the water column (Whicker and Schultz 1982).

In a study of waterfowl using wastewater ponds at the Idaho National Engineering Laboratory, the maximum total dose to any waterfowl was calculated to be 5,600 millirad for American coots that resided on the ponds for 20 days (Halford et al. 1982). No tissue abnormalities were noted and no long-term effects from the radiation were expected. The anticipated dose from the storage ponds at the Lost Creek Project is being evaluated.

The WDEQ-WQD Rules and Regulations (WDEQ 2007b) state that the total radium-226 concentration shall not exceed 60 pCi/L for effluent-dependent waters. This narrative standard is 25 times less than the anticipated maximum concentration of 1,500 pCi/L and about three times less than the anticipated minimum concentration of 200 pCi/L.

Mitigation

As described in **Section 2.9.4**, the water quality in the ponds will be checked quarterly, to ensure unanticipated changes in the water quality are detected, and whenever a process change may result in a significant change in water quality. The location of the ponds adjacent to the Plant, and associated human activity (including daily checks of the ponds), is anticipated to reduce the attractiveness of the ponds to wildlife. Deterrents, such as flagging and predator silhouettes or decoys, will also be used. The growth of algae and plankton will be monitored, and if necessary, a herbicide approved for use in pond settings will be used to reduce or eliminate such growth.

1.4 Human Activity

All employees will be informed of applicable wildlife laws and penalties associated with unlawful take and harassment of wildlife and will be trained to recognize types of wildlife in the area.

1.4.1 Road and Equipment Use

Mitigating the impacts of the roads and equipment will depend on the number of vehicles and the way in which they are used. For example, use of carpools will help minimize traffic, and use of designated roadways (especially in the mine units) will help limit disturbance.

1.4.1.1 Type and Amount of Equipment

The vehicles used to operate the site are classified in three categories: Company Owned - On Site Only; Company Owned - On and Off Site; and Contractor Owned - On and Off

Site. The types and numbers of vehicles that will be used when the Project is at peak production are listed below. Many of the vehicles will only be working in a specific portion of the site at one time, e.g., in the Plant or in a given mine unit.

1. Company Owned - On Site Only
   a. Pickups: A total of approximately 24 ½-ton, ¾-ton and 1-ton pickups for supervision, construction, operations and maintenance in production, exploration and monitoring areas.
   b. Equipment: Approximately 3 All Wheel Drive (AWD) Forklifts: 2 Hard Surface Forklifts; 1 Motor Grader; 2 Backhoes; 3 Geophysical Logging Trucks; 1 All Terrain Vehicle (ATV); 3 Flat Bed Trailers; 3 Reel Trailers; 1 High-Density Polyethylene (HDPE) Fusion Cart; 9 Generators; 2 Water Trucks; 1 Mechanical Integrity Testing (MIT) Truck; and 6 Cementers; 1 Pulling Unit and 1 Grout Trailer.

2. Company Owned - On and Off Site
   a. Pickups: Approximately 3 ½-ton or ¾-ton pickups used by supervisors on site and to travel to and from the site.
   b. Vans: Approximately 4 vans to transport personnel to and from the site and Casper, Rawlins, or other town.
   c. Tractor/Trailer: One tractor will be used to mobilize two slurry trailers at the site. In addition, a side-dump or end-dump trailer (in conjunction with the tractor) is planned for off-site waste transport.
3. Contractor Owned - On and Off Site
   a. Pickups: Approximately 10 ¾-ton and/or 1-ton pickups may be used by drilling contractors for travel to and from the site as well as travel on the site.
   b. Water Trucks: Approximately 10 80-barrel to 100-barrel water trucks will be used on site to support contract drilling operations.
   c. Truck-Mounted Drilling Rigs: Approximately 10 1500-Class drill rigs will be used on site to support contract drilling operations.
   d. Deliveries: Standard deliveries will occur of materials used for construction, operations, as well as maintenance of the site. Frequency of deliveries will be based on production rate, usage, time of year and other needs. The materials can be separated into the following categories:
      i. Chemicals (weekly to monthly): Carbon dioxide, oxygen, salt, soda ash, peroxide, gasoline, and diesel;
      ii. Yellowcake shipments (weekly to monthly);
      iii. Construction (weekly to monthly): Steel, polyvinyl chloride (PVC) and HDPE pipe, wire, valves, fittings, and structural steel;
      iv. Operations (weekly): Potable water, trash, and office supplies; and
      v. Maintenance (weekly to monthly): Grease, oils, pipe, wire, and fittings.

1.4.1.2 Road Use

All employees and contractors will be trained to recognize types of wildlife in the area, their susceptibility to disturbance or to collisions with motor vehicles, and measures that should be taken to avoid disturbance and wildlife/vehicle collisions. Speed limits will be set at 30 mph on main access routes and no greater than 20 mph on secondary roads. All new employees will receive training on these speed limits with refresher training at least once per year. LC ISR, LLC will enforce these traffic rules to minimize the likelihood of vehicle collisions with wildlife.

Speed limits within the permit area will be set based on the following considerations: the condition of the road, design of the road, safety factors, protection of equipment, wildlife and livestock protection, and dust mitigation measures. Generally, the speed limit on main roads will be 30 miles per hour and on secondary roads the speed limit will be 20 miles per hour. However, in no case shall the speed limit be greater than 30 miles per hour. All employees will receive training regarding speed limits during indoctrination training. Site visitors will be advised of the site speed limits during site specific training. Speed limits signs will be posted on the main roadways with the permission of BLM.

Compliance to safety rules is of utmost importance. Supervisors will be responsible for ensuring their employees abide by traffic safety rules; including speed limits. Employees who don't abide by traffic rules will be subject to progressive discipline up to and including dismissal. The Safety Department will from time to time monitor speed limits to ensure compliance.

1.4.2 Hours of Operation

Normal field operations at the facility will take place between the hours of 7 a.m. and 5 p.m. Mining operations, i.e., pumping and injection of production solutions, will continue around the clock. However, during a routine night shift, only one employee will be in the field in a light truck to monitor equipment.

1.4.3 Noise

Background noise in the Permit Area under calm wind conditions is representative of a quiet rural area. Field measurements were made using a Sper Scientific Sound Meter 840005, which accurately measures noise between 40 and 80 A-weighted decibels dB(A) to within ±3.0 dB(A). At eight cardinal directions, noise levels were measured for three 30-second intervals facing a cardinal direction. The peak noise level of each interval was

recorded. The mean of the peak noise levels for each of the eight cardinal directions is presented in **OP-A6-5a**.

Initial noise measurements were made on the afternoon of June 13, 2007. Meteorological conditions at the time of measurement were relatively calm, with an east wind averaging 4.8 meters per second (m/s). As shown in **Table OP-A6-5a**, the measured noise levels were below the instrument detection limit of 40 dB(A).

Noise measurements at the Plant site were repeated on the morning of April 28, 2009, when no workers were on site and no heavy equipment was operational. Meteorological conditions at the time of measurement were windy, with a south-southwest wind averaging 11 m/s, and gusts up to 15 m/s. **Table OP-A6-5a** shows the measured noise levels ranged from 68 to 89 dB(A), with the greatest noise levels measured while facing west and southwest. The maximum peak noise level of a 30-second interval was 94 dB(A) facing east and west. The minimum peak noise level was 66 dB(A), facing north and south. The noise levels measured on April 28, 2009 were greater than on June 13, 2007 due to the high winds present.

An in situ mine is unlike conventional mines in that it does not use large equipment such as haul trucks, drag lines, and large loaders. The transfer of production and injection fluids is done by submersible pumps in wells, similar to water well pumps, and the metering of the solutions occurs in enclosed buildings (header houses). There is no conventional ore processing, only the filtration of production fluid inside the Plant. Therefore, most noise is generated by the field equipment listed in **Section 1.4.1** (Road Use). Of the field equipment, the drill rigs generate the most noise. **Figure OP-A6-4** is a graph of noise levels versus distance from two of the drill rigs typical for use on site. While the rig noise is on the order of 95 dB(A) at the rigs, the noise attenuates to background levels, as measured on a windy day, within a couple of hundred feet of the rig. **Table OP-A6-5b** is a table of the noise levels versus distance from machinery typical for use on site. The highest levels measured were on the order of 80 dB(A), with wind noise over-riding the equipment noise within a couple of hundred feet of the equipment. On a calm day, noise levels are also not anticipated to be elevated at distances of concern because noise levels diminish by 6 dB(A) for each doubling of the distance from the source (Golden et al., 1979).

1.4.4 Hunting

For health and safety reasons, public access to the Plant and mine units is restricted. Hunting and other recreation will also be restricted to the extent allowable under BLM guidelines, within the Permit Area.

1.4.5 Cumulative Impacts

Information on cumulative impacts is based on publicly available information on existing and proposed projects, general knowledge of the conditions in Wyoming, and reasonably foreseeable changes to existing conditions. The primary concern in the evaluation of cumulative impacts is the resurgence in interest in mining and oil and gas development within the last few years. This resurgence has not necessarily translated into projects on the ground as of yet, making it difficult to evaluate cumulative impacts because of the lack of definitive information. For example, uranium exploration, including exploration by LC ISR, LLC, is ongoing in the Great Divide Basin, but uranium mines have not been established. The Sweetwater Uranium Project, which includes a reclaimed surface mine and associated milling facility, currently on standby, is located about two miles south of the Lost Creek Project. An application for the Antelope-Jab ISR Project, about six miles north of the Lost Creek Project, was submitted to federal and state agencies in 2008 and is in review.

ISR operations will minimize disturbance by chemically removing the uranium and leaving the matrix surrounding the ore intact. Proposed disturbed areas (mine units, the Plant, pipelines, and access roads) will be reseeded with a native seed mix as soon as conditions allow. Ultimately, the disturbed areas will be reclaimed to their pre-operational contours and revegetated to support the approved land uses. Due to this reclamation, cumulative impacts to ecological resources are not anticipated.

1.4.6 Climate Change

According to the Nuclear Energy Institute, in 2007, U.S. nuclear power plants prevented the emission of 1 million short tons of nitrogen oxides and 3 million tons of sulfur dioxide. The amount of nitrogen oxide emissions that nuclear plants prevent annually is the equivalent of taking more than 51 million passenger cars off the road. Also in 2007, U.S. nuclear plants prevented the emissions of almost 693 million metric tons of carbon dioxide. This is nearly as much carbon dioxide as is released from all U.S. passenger cars (see http:/www.nei.org/keyissues/protectingtheenvironment/factsheets/ nuclearenergyandtheenvironment/). Environmentally responsible production of uranium from the Lost Creek Project will minimize the emissions of carbon dioxide and other greenhouse gases.

1.5 Site Maintenance and Reclamation

1.5.1 Vegetation

1.5.1.1 Invasive Plants

Vegetation surveys across the permit area reveal that the only noxious weed is Tansy Mustard (**Appendix D8**). LC ISR, LLC commits to performing annual surveys to locate and eradicate invasive plant species including but not limited to Cheat Grass. These efforts will cover the entire permit area as well as along all access roads to the site.

1.5.1.2 Conifers

Conifer invasion has not been an issue within the area of the project. However, LC ISR, LLC will work with BLM to control or eradicate conifers if they begin to move into the permit area.

1.5.1.3 Revegetation

All surface disturbances will be revegetated at the soonest appropriate season using a mixture of native seed including sage brush (seed mixture approved by both BLM and WDEQ). LC ISR, LLC will continue to reclaim disturbed areas as soon as possible after exploration and ISR activities to help ensure re-establishment of habitat, as described in the Reclamation Plan (**Section RP 4.5**).

1.5.2 Fire

1.5.2.1 Wildfire

LC ISR, LLC will implement procedures to minimize the likelihood of starting a wildfire (including but not limited to Hot Work Permits, Site Inspections, Proper Storage of Waste, etc.) All field personnel will be trained in Emergency Response Procedures, including reporting of fires. In situ uranium facilities generally use plastic piping, therefore, minimal welding and cutting takes place in the field. LC ISR, LLC will maintain a generous supply of fresh water that can be used for wildfire suppression, if necessary.

1.5.2.2 Prescribed Fire

LC ISR, LLC will not use prescribed fire to remove vegetation or to control invasive species unless prior approval is granted by the BLM and the Wyoming Game and Fish Department.

1.5.2.3 Grazing

The area surrounding the wellfields and the plant will be removed from grazing by wildlife friendly fencing

1.5.3 Predation and Disease Control

1.5.3.1 Predation

LC ISR, LLC will work proactively with the WGFD to control predators on the permit area that pose a threat to species of concern, particularly sage grouse. Predators of concern include skunks, coyotes, and corvids. Above-ground transmission line supports will include perching and roosting deterrents. To the extent possible, LC ISR, LLC will also design and construct structures in a manner that does not encourage roosting or nesting by raptors.

1.5.3.2 Disease

To reduce the threat of mosquito-borne illnesses in wildlife, LC ISR, LLC will treat the two holding ponds with an approved insecticide to prevent mosquito hatches. Drilling mud pits will be backfilled as soon as possible after use in order to eliminate their use by mosquitoes. Equipment and materials will be stored in a manner that minimizes the accumulation of stagnant water. Used tires will be disposed of as they are generated or will be stored in a manner that prevents accumulation of water until taken off-site for disposal.

1.5.4 Potentially Harmful Materials

As described in the Operations Plan, LC ISR, LLC will implement several measures to prevent exposure to potentially harmful materials, and should an accident occur, procedures will be in place to promptly remove/remediate any releases. All liquid chemicals and petroleum products in and around the Plant will be maintained within

bermed areas sufficient to contain any potential spill. No bulk hazardous chemicals will be used in the Mine Units. The mining solution will have a pH of around 8.0 and will not contain any petroleum based chemicals or elevated levels of heavy metals that present an acute hazard to wildlife or employees.

Any mortality that could be caused by exposure to toxic substances will be reported immediately to the WDEQ, USFWS, and WGFD. The goal of such reporting will be to identify and solve the problem as quickly as possible.

1.5.5 Storage Ponds

The water quality in the storage ponds will be monitored quarterly and whenever a process change may result in a significant change in water quality. The ponds will contain produced groundwater and process waters with a near neutral pH. No petroleum based products will be sent to the holding ponds. LC ISR, LLC does not anticipate the water quality within the ponds will pose a risk to birds, with the use of fencing, deterrents, and control of algae and plankton, but will work with the Wyoming Game and Fish Department to ensure the protection of birds.

1.6 Habitat Enhancements

LC ISR, LLC will work with BLM and the Wyoming Game and Fish Department (WGFD) to develop enhancements in the Permit Area. Additional enhancements may be completed on nearby areas (areas outside the Permit Area) that are not proposed for operations or disturbance if permitting agencies deem them desirable to offset onsite impacts. These enhancements could include: placement of new raptor nest platforms, creation of new water sources, or habitat modifications/improvements to improve specific habitat conditions for sage-grouse or other high interest species.

2.0 WILDLIFE MONITORING

Wildlife monitoring in and near the Permit Area will be completed on an annual basis through the life of the Project. Consultation with BLM, WGFD, and USFWS will be conducted as needed prior to completing any annual survey work. An annual monitoring report will be prepared and submitted to the WDEQ-LQD and BLM each year. The report will include: survey methods; results; any trends; an assessment of protection measures implemented during the past year; recommendations for protection measures for the coming year; recommended modifications to monitoring or surveying; and any recommendations for additional species to be monitored (e.g., a newly listed species). The Annual Wildlife Monitoring Report, data and mapping will be formatted to meet WDEQ-LQD requirements. Only qualified wildlife biologists or ecologists will be employed for wildlife monitoring.

In addition to the specific annual monitoring for wildlife, LC ISR, LLC will document all instances where Project activities may have impacted wildlife (such as wildlife/vehicle collisions on roads, or other mortality within the Permit Area). Any large die-offs or other evidence of possible wildlife exposure to toxic chemicals will be reported immediately to WDEQ-LQD and BLM. A record of wildlife mortality will be kept at the mine site and included in the Annual Report.

Monitoring and survey methods are designed to be consistent with standard protocol used by the WGFD (WGFD 2007), and to also follow monitoring requirements and recommendations from WDEQ-LQD (Wildlife Monitoring Requirements for Surface Coal Mining Operations).

Figure OP-A6-6 includes the wildlife monitoring schedule, which is described in more detail in the following sections.

2.1 Big Game

2.1.1 Seasonal Distribution and Habitat Affinity

Based on current WGFD GIS mapping, the Permit Area is mapped as winter/yearlong range for pronghorn. The Permit Area is out of mapped range for mule deer, elk and moose. Both elk and mule deer have been observed on the site during baseline studies. The survey area for big game will include the Permit Area and surrounding 2-mile buffer.

One aerial survey and one ground survey will be completed between January 1 and mid-March each year to determine winter habitat use. Aerial surveys will be completed on a clear day when snow cover is near 100 percent. Transects will be flown at approximately 0.5 mile intervals (with one observer). The ground survey will be completed as soon as possible after the aerial survey. If appropriate snow conditions have not developed by March 1st, the aerial survey will be conducted when snow cover is either less than 20 percent or between 80 to 100 percent. If these snow conditions are not present the aerial survey will be cancelled for the year and only the ground survey would be completed.

To determine spring and summer habitat use, one ground survey of the study area will be completed in April, early June, and August. This survey will be completed while driving a standard route within the survey area.

During each survey the number of pronghorn (and other big game species) will be counted, and the general location will be recorded by GPS. The dominant vegetation/habitat type that is being used will be noted.

2.1.2 Climatological Information

Climate data from the nearest NOAA weather station or the on-site weather station will be summarized from the period of November to mid-March.

2.1.3 Range Conversion

The entire Permit Area is within winter/yearlong pronghorn range; no other mapped big game ranges are present. The acreage of this range impacted will be detailed in each annual report (the total for the project life and the incremental area impacted per year will be summarized).

2.1.4 Mortality and Concentration Buildups

An annual record of all big game mortality due to fence entanglements, vehicle collisions, and other factors will be completed. Winter mortalities will be estimated each spring from observations taken during wildlife surveys and other mine activities. The data to be recorded include: species, date, probable cause of mortality, and location. A table summarizing big game mortality will be submitted in the annual report.

If concentrations of pronghorn appear suddenly or if apparent migration blocks (fences, snow drifts along roads or other blocks) are observed they will be reported immediately

to the local WGFD personnel. Any big game concentrations or migration blocks will be reported in the annual report.

2.2 Sage Grouse/Upland Birds

The only upland birds in the project area are sage grouse. Sage grouse surveys will follow standard protocol as recommended by the BLM and WGFD. Annual monitoring will include lek surveys, designed to locate any new leks in the study area, annual lek attendance surveys (counts of birds on known leks), and brood surveys.

2.2.1 Lek Searches

Searches for new leks will be completed following recommended protocol from the BLM and WGFD. The purpose of the surveys is to identify new sage grouse leks and also help to determine whether known leks are active.

Lek Search Methodology:

- Searches will be conducted from early April to early May (April 1 – May 7). (Survey season corresponds to peak male attendance as established by the WGFD for documenting population trends.). Surveys will be completed from approximately 0.5 hours before sunrise to approximately 0.5 hours after sunrise.

- Surveys for new leks will be conducted a minimum of three times (with subsequent surveys approximately 7 to 10 days apart).

- Surveys for new leks will be conducted throughout suitable habitat within a 2-mile radius of the Permit Area. New leks can be located by the discovery of concentrated tracks/droppings/feathers at all times of the day when conducting other field activities. Return visits to such sites during the morning strutting hours must be made to confirm the location as a lek.

- Surveys will be conducted from the ground and from a fixed wing aircraft. The survey area will include the Permit Areas and a surrounding 2-mile radius. Transects (approximately 0.6 miles apart) will be flown along north-south lines. Flights will be limited to days with good visibility and weather. Transects will be flown from approximately 100-150 meters above ground level. Ground surveys will be used to supplement the flights and to investigate areas where sage grouse were observed during the flights. All new leks or suspected leks will be located by GPS and reviewed by ground survey.

2.2.2 Lek Attendance Surveys

Lek Attendance Surveys will be completed according to recommended protocol from the BLM and WGFD. The purpose of the lek trend surveys is to document the actual number of male and female sage grouse observed on known leks and to determine if the leks are active or inactive. Lek data is primarily used to develop indices to relative population levels and provide short and long term trend information and changes in occupied range.

Lek Attendance Methodology:

- Counts will be conducted during the month following the peak of mating activity (April 1 – May 7). Research has shown that the highest number of male sage grouse is observed during this period. The increased number of males is due to young males showing up later in the strutting season even though most of the breeding has already occurred.

- Counts will be conducted from the ground as close to sunrise as possible and extended for one-half hour after sunrise.

- Counts will be conducted a minimum of three times each year for each lek (at least one count every 7 to 10 days.)

- Counts will be completed on days with good weather conditions. Weather conditions will be recorded each time lek observations are made.

- Known lek sites are located in mid-day periods prior to completing any counts. Access routes and counting points are predetermined to allow the observer to count the lek without disturbing birds by driving or hiking. Counts are made by using binoculars and spotting scopes from observation points.

2.2.3 Brood Habitat Success

Permanent walking transects will be established along edges of lowland sagebrush swales, and any other mesic sites within the permit area totaling up to 3,000 meters. If appropriate (if reclaimed habitat conditions are present) additional transects will be established on reclaimed areas as soon as revegetated drainages and bottomlands become available.

During July (early to mid July if possible) transects will be surveyed twice within a 1-week period. Surveys will be completed during calm, clear and dry weather conditions. All grouse observed will be counted and classified (adult male, adult female, juvenile). Results will be expressed as number of individuals observed per 1,000 meters.

2.2.4 Measures of Disturbance

To determine the effects of visual, auditory and other disturbance, the linear distance from each lek to the nearest known regular human or equipment activity will be measured for each breeding season. The presence or absence of a direct line of site to each lek from the disturbance will be noted. It will be determined if the activity/disturbance is unrelated or related to mining activities. This information will be shown on a sage-grouse monitoring map with each year's annual report.

The annual acreage of habitat alteration (by habitat type) will be determined annually and cumulatively (totals of each year of operation). Acreage of permanent reclamation (by habitat type) will also be tabulated.

2.3 Raptors

2.3.1 Nest Status and Production Success

Annual monitoring of known raptor nests will be completed each spring between April and July to determine nest status. Nest surveys can be completed by air or from the ground.

A ground or aerial survey of the permit area and surrounding 1 mile radius will be completed during the first two weeks of February each year for signs of golden eagle and great-horned owl nesting and or courtship.

Three thorough surveys for nesting raptors will be completed for the permit area and surrounding 1-mile perimeter through the spring. One survey will be completed during March to locate great-horned owl and golden eagle nests. One survey will be completed in April to locate most of the nests of other species. One survey will be completed from mid-May to mid-June to locate new raptor nests (nests that have become established since the April survey) and to check the status (activity, number of young birds) of all nests.

Nest surveys will be completed either from the air or the ground. Nest checks will be brief and conducted to avoid flushing incubating raptors.

The status and productivity of all nests will be reported annually (by location, nest type and characteristics, species, and number of fledged birds).

2.3.2 Measures of Disturbance

The linear distance of each nest site (active and inactive) from the nearest known regular human or equipment activity will be determined each breeding season. The presence of visual barriers (does a direct line of site exists between the disturbance and the nest) will be noted. It will be determined if the activity/disturbance is unrelated or related to mining activities. This information will be shown on a raptor monitoring map with each year's annual report.

2.3.3 Prey Abundance

2.3.3.1 Lagomorphs

Lagomorphs include desert cottontails and white-tailed jackrabbits. Pygmy rabbits are also present in lowland sagebrush swales. Lagomorph surveys will be completed by spotlight surveys through native habitat in the Permit Area. One survey will be completed in June and another survey will be completed in August of each year. Transects will be established along approximately 1.5 miles of road within the Permit Area. Once reclaimed/restored areas are established, a transect will be established in these areas. All transect locations will be shown on a wildlife monitoring map with each year's annual report.

Surveys will be completed on a night as close to the full moon as possible.

2.3.3.2 Small Mammals

Surveys for other small mammals are not proposed at this time.

2.4 Migratory Birds of High Federal Interest (MBHFI)

Nesting non-game bird surveys will be conducted in representative vegetation/habitat types within the Permit Area. These surveys will be used to document breeding MBHFI that are present in the area.

Surveys will follow techniques recommended by the WDEQ (WDEQ 1994). Two transects will be established in each vegetation type of the Permit Area. Transects will be 1,000 meters in length (2,000 meters per habitat type). The two dominant vegetation types are Upland Big Sagebrush and Lowland Big Sagebrush. Based on already completed baseline breeding bird surveys, the Lowland Big Sagebrush habitat provides the most important nesting habitat to MBHFI on the site.

In upland vegetation types, belt transects (100 meters) wide will be walked. All birds observed or heard will be recorded. Transect start and stop points will be located by GPS. Transect locations will be shown on a 1:24,000 scale quad map. There are no riparian habitats in the Permit Area.

Surveys will be completed during the peak of the nesting season during the 1st week of June. Surveys will be completed from 0.5 hours before sunrise to 9:30 am. Nesting bird surveys were completed during the spring of 2007.

2.5 Federally Listed Threatened and Endangered Species

Any observation of a federally listed (threatened or endangered) species will be recorded and promptly reported. Any mortality of a listed species will be reported to the USFWS within one day of discovery.

If new species (that are present in the Permit Area) are listed as threatened or endangered during the period of mine operation, the USFWS will be consulted to develop specific mitigation and monitoring measures.

2.6 Non-Game Mammals

Specific monitoring surveys of non-game mammals are not proposed. Incidental observations of non-game mammals will be made while completing other wildlife surveys. These incidental observations will be summarized in a table in the Annual Report.

2.7 Non-Game Birds

Specific surveys for non-game birds (except as noted for raptors and migratory birds of high federal interest) are not proposed. Incidental observations of non-game birds will be made while completing other wildlife surveys. These incidental observations will be summarized in a table in the Annual Report.

2.8 Reptiles and Amphibians

Specific surveys for reptiles and amphibians are not proposed. Incidental observations of reptiles and amphibians will be made while completing other wildlife surveys. These incidental observations will be summarized in a table in the Annual Report.

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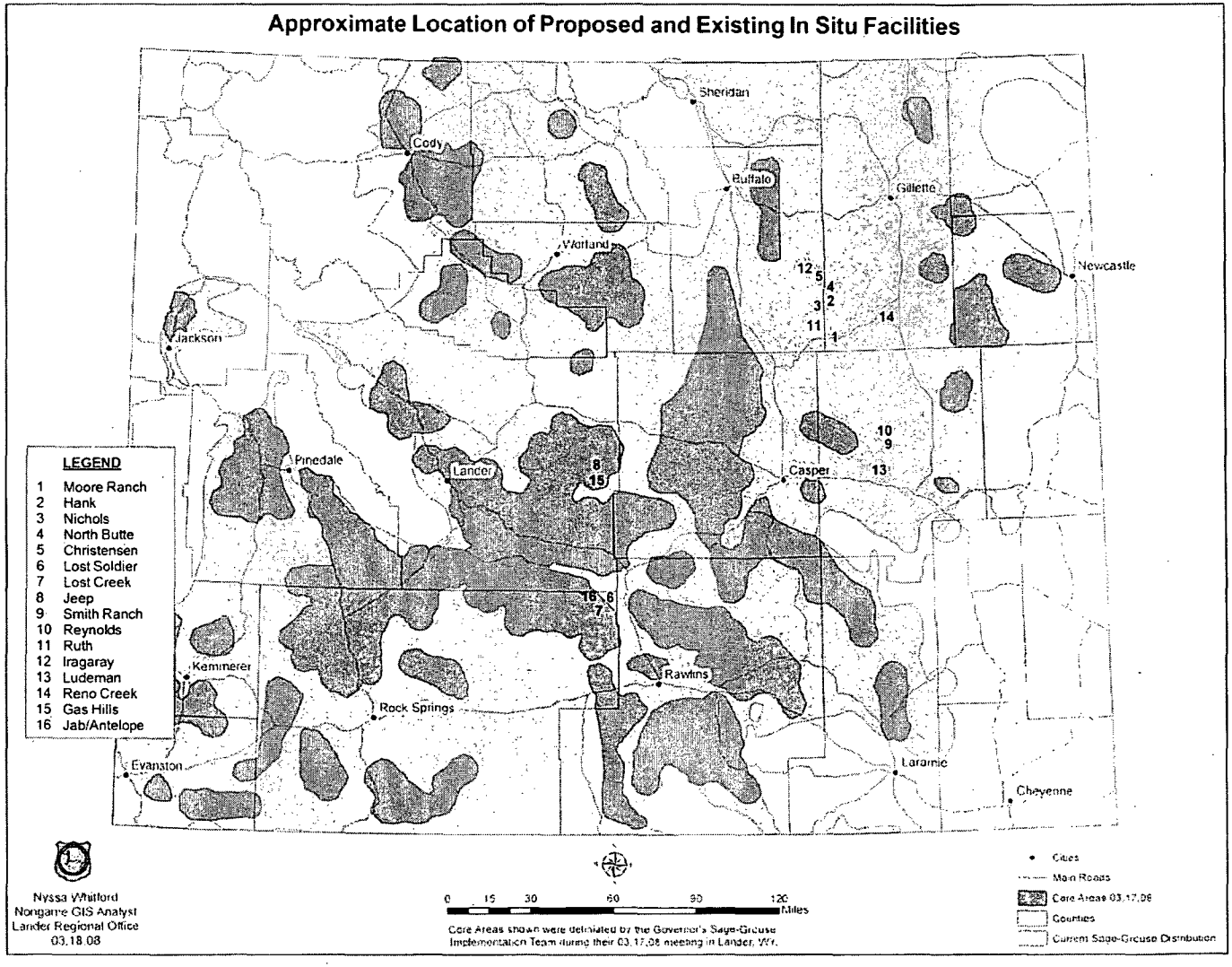
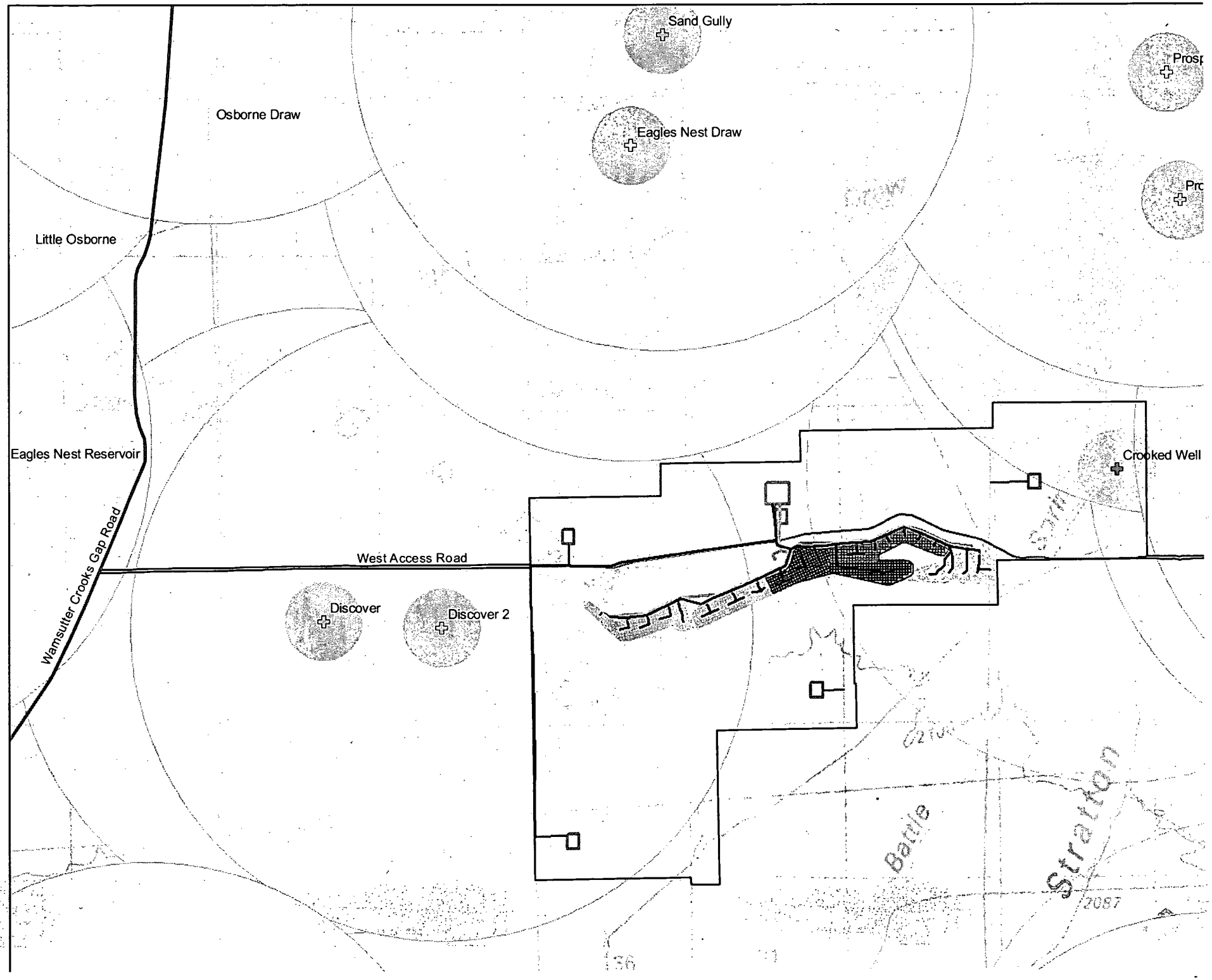
Addendum OP-A6-A

Agency Review Letters

To be provided after review by USFWS and WGFD.

Figure OP-A6-1 Location of Sage Grouse Core Population Areas

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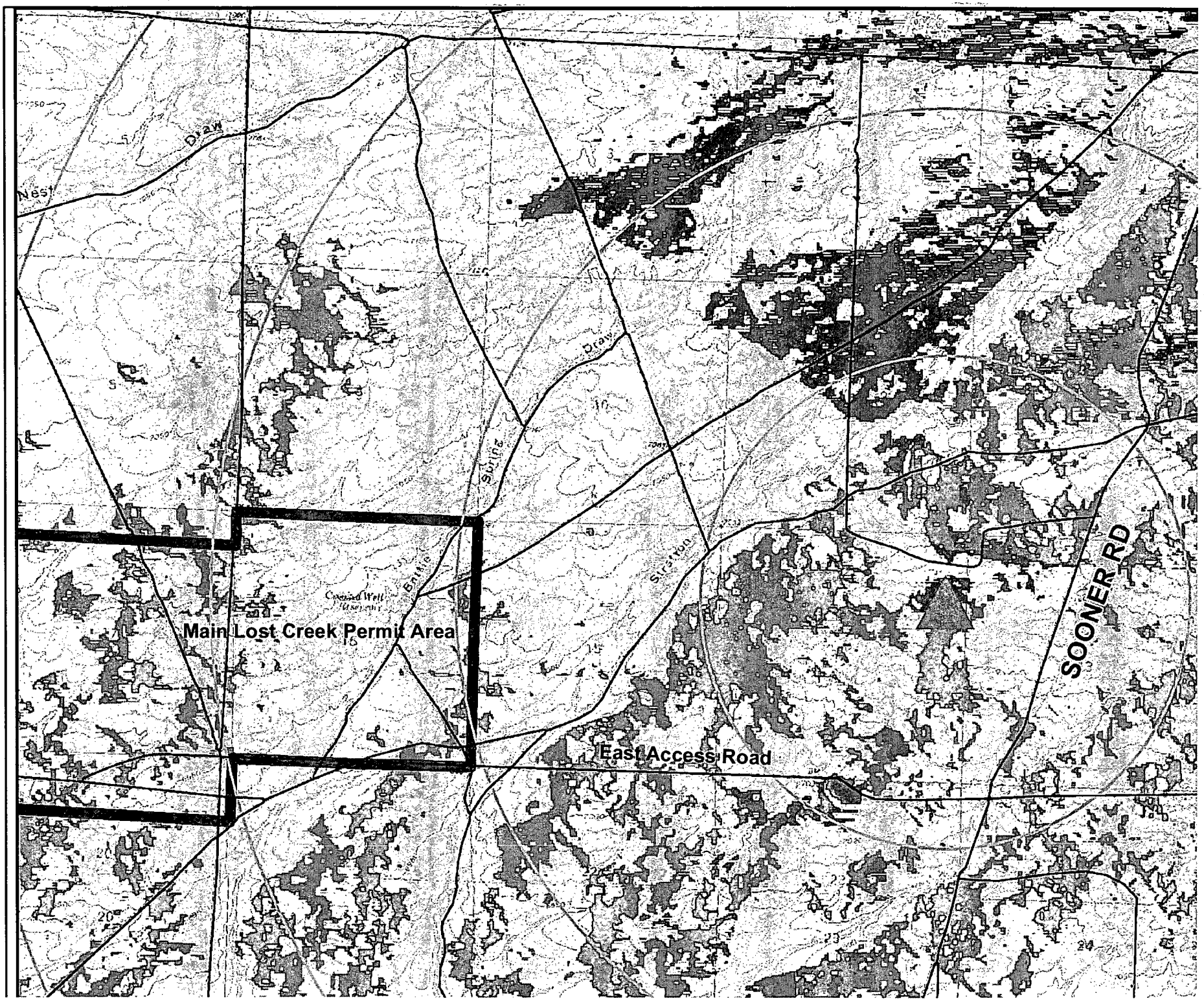
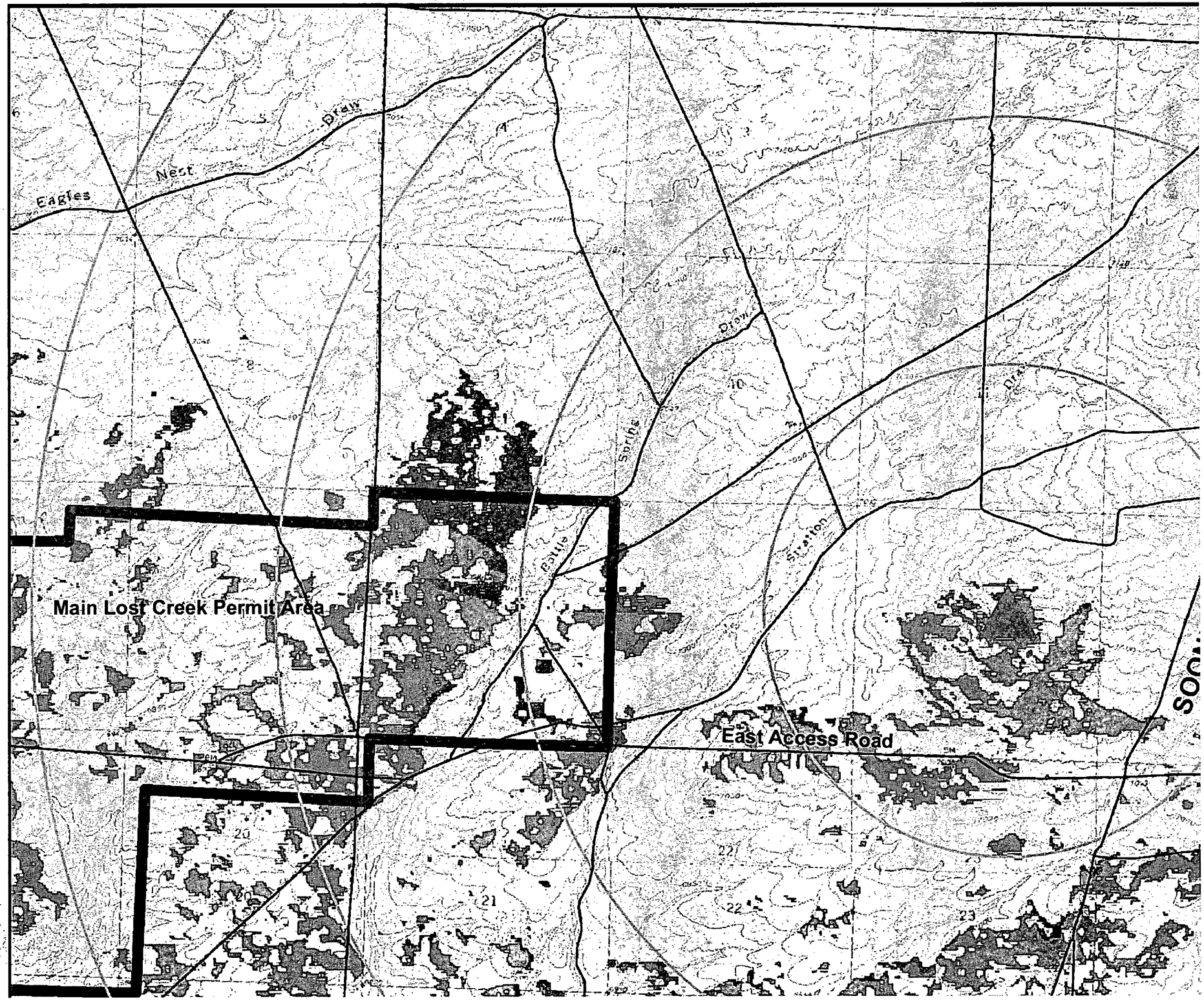
Osborne Draw
Eagles Nest Draw
Little Osborne
Eagles Nest Reservoir
Wamsutter Crooks Gap Road
West Access Road
Discover
Discover 2
Crooked Well
Battle
Stratton
2087


Main Lost Creek Permit Area
East Access Road
SOONER RD
Draw
Spring
Draw
Nest
Entrie
Stretch
Covered Well
Reservoir


Main Lost Creek Permit Area
East Access Road
Eagles
Nest
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Springs
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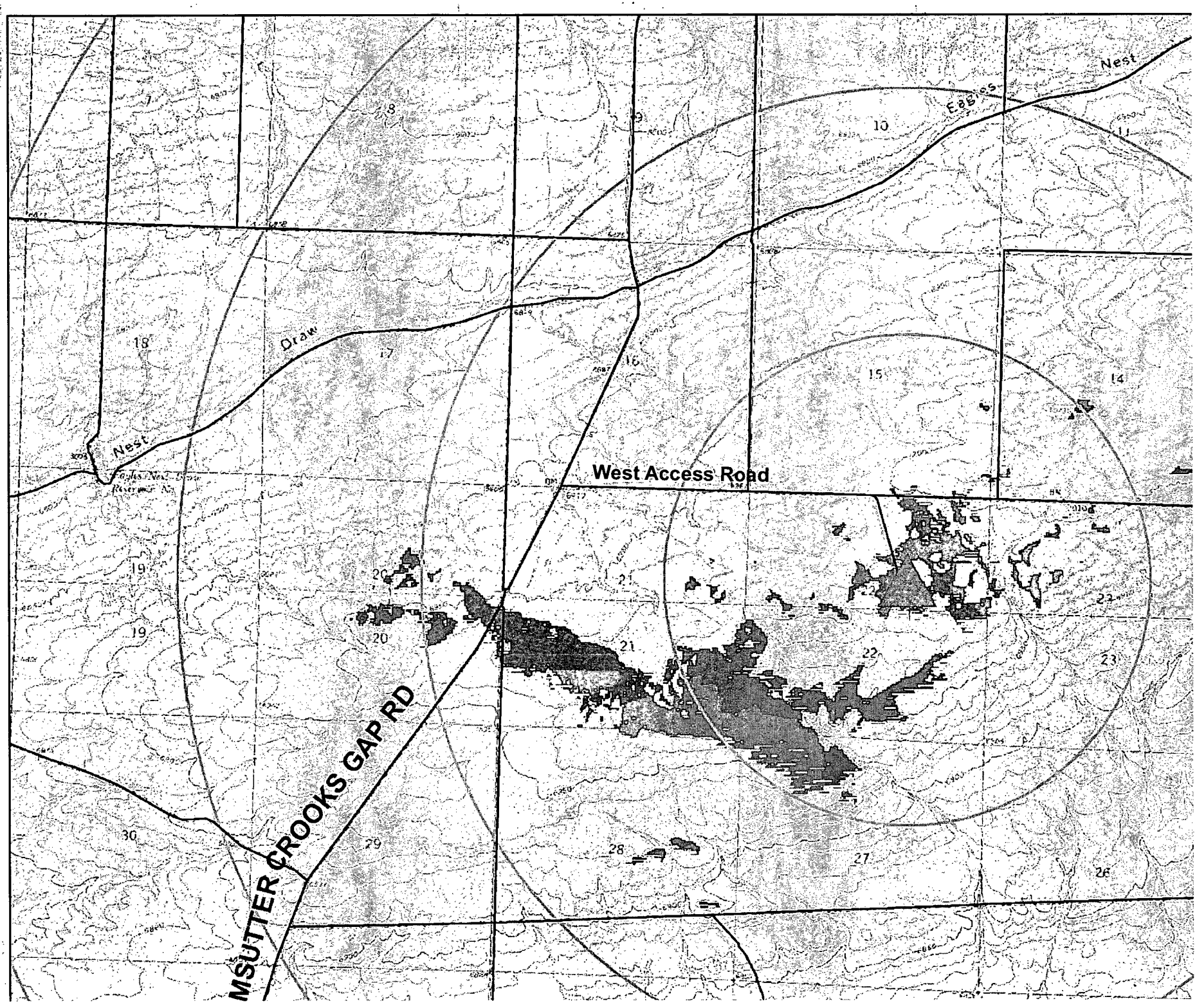
West Access Road
MSUTTER CROOKS GAP RD
Nest
Draw
Nest
Eagles
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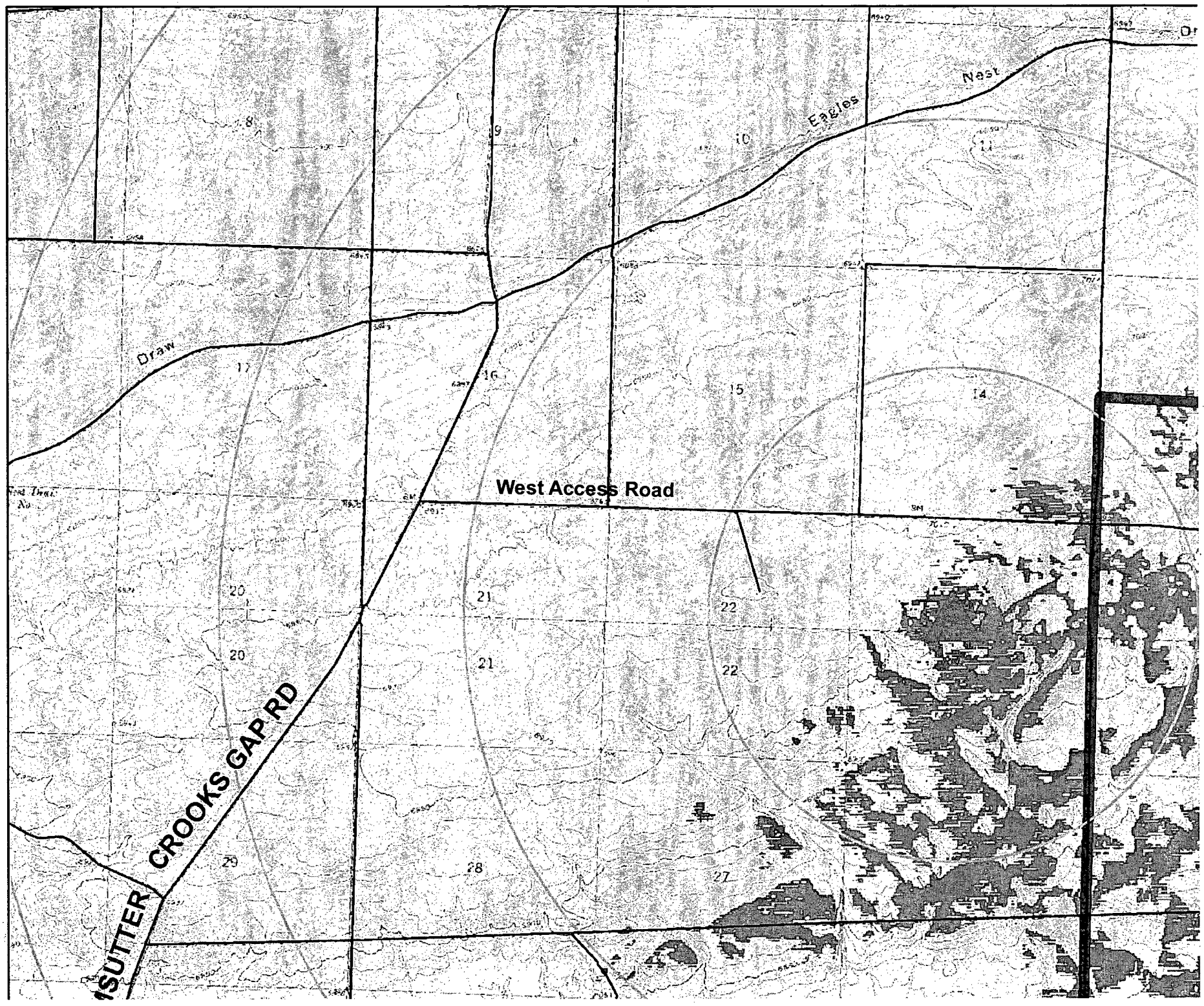
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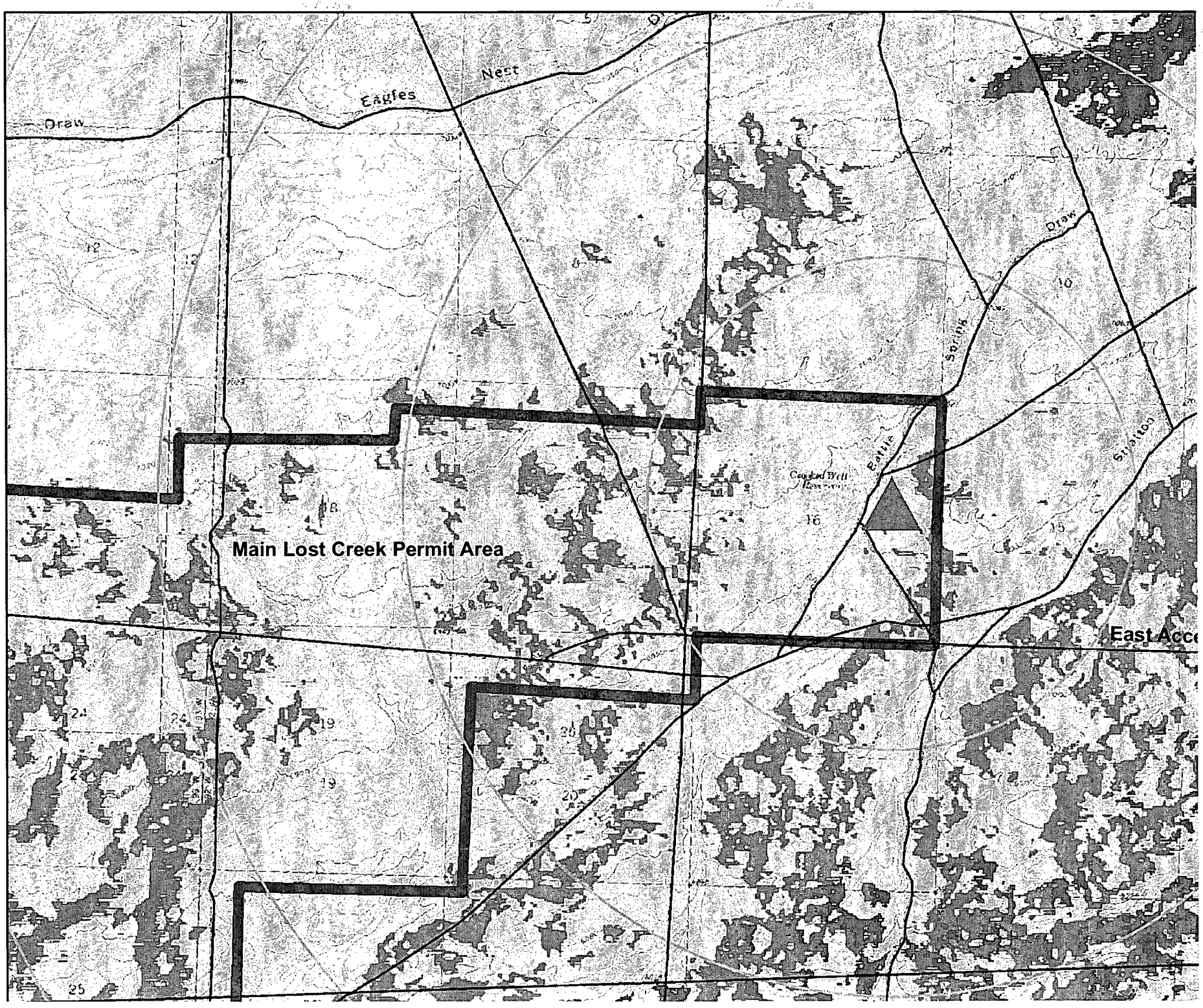
Eagles
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Main Lost Creek Permit Area
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Crooked Well
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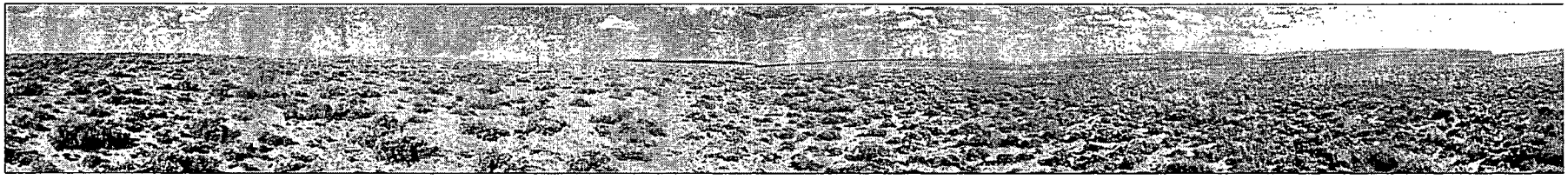
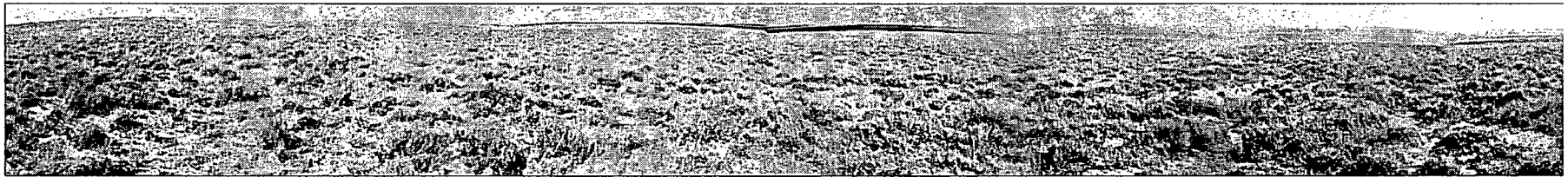
Figure OP-A6-4 - 360° Panoramas from the Discover and Discover 2 Leks - September 2009



Discover Lek

North **East** **South**



Discover 2 Lek

North **East** **South**

Figure OP-A6-5 Drilling Rig Noise versus Distance

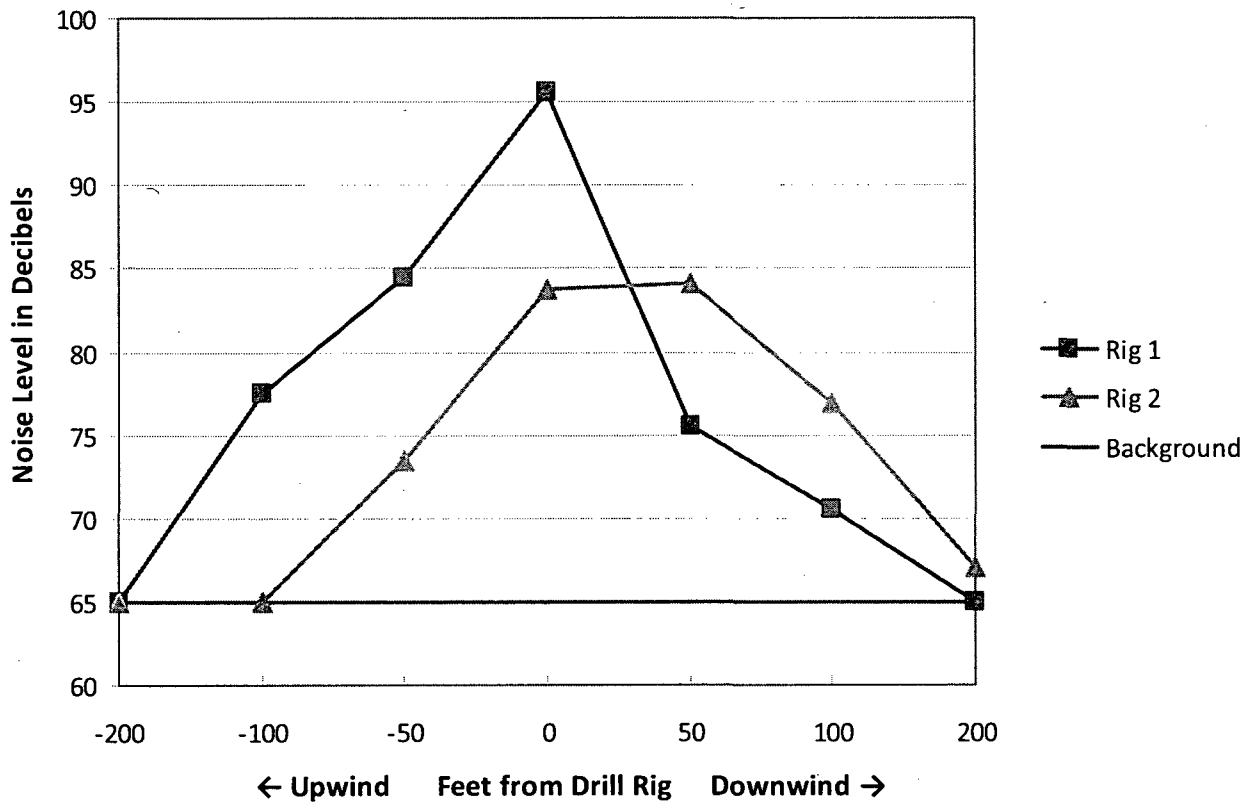


Table OP-A6-1 Mitigation based on Stipulations for Development in Core Sage Grouse Population Areas - Wyoming Game and Fi

WGF Oil and Gas Lease Stipulation [1]	LC ISR, LI
1) One well pad per 640 acres. No more than 11 well pads within 1.9 miles of the perimeter of occupied sage grouse leks with densities not to exceed 1 pad per 640 acres (Holloran 2005). Clustering of well pads may be considered and approved on a case-by-case basis.	a) Production of oil and gas generally occur by draining, pum rate of production depends on the permeability of the h progresses, secondary and tertiary production techniques, w 'wash' more fluid from the host formation. Permeability er to improve fluid movement in oil and gas fields. In cont Rather, it is part of solid mineral assemblages. ISR dep mobilize the uranium into ground water and then pumping not appropriate for ISR development as they allow for prefe b) Oil and gas development is generally grouped by 'fields', e for decades. ISR development generally occurs by 'mine u cover about 50 acres (**Section OP 1.0**, **Figure OP-2a**). A water restoration and surface reclamation are required on reclaimed in succession. At Lost Creek, six mine units are **2.1**, **Figure OP-4a**). c) Oil and gas wells are required to be spaced apart for optim owners (i.e., to reduce the possibility of 'draining' petroleur of ISR wells is dependent upon the ore distribution, whic (**Figure OP-2b**), and on the permeability of the host rock. area than oil and gas development. In addition, once the g the more detailed delineation drilling necessary to determ narrow deposit outline. Geophysical exploration technique deposits. d) Well pads for oil and gas development may be on the order large drilling rigs and associated equipment and on the or equipment. In contrast, the well pads for drilling of ISR we the area is reclaimed with the exception of the wellhead, wh e) The closest lek to the Mine Units is the Crooked Well Lek No sage grouse have been seen on the lek during seasonal s

Table OP-A6-1 Mitigation based on Stipulations for Development in Core Sage Grouse Population Areas - Wyoming Game and Fi

WGF Oil and Gas Lease Stipulation [1]	LC ISR, LI
2) Surface disturbance will be limited to <5% of sagebrush habitat per 640 acres. Distribution of disturbance may be considered and approved on a case-by-case basis.	a) Surface disturbance will be limited to less than 6% of the P section, is outlined on **Table OP-A5-3**. The size of the Per Those factors include historic claims boundaries, spacing of b) The type of disturbance in an ISR permit area differs from pads are smaller because the rig sizes are smaller. Also, pickup, not the larger haul tankers used in oil and gas fields. ISR than for oil and gas wells. In contrast to the large-sca workover rigs are mounted on F550 pickup trucks and a garages, and other support facilities are also proportionately c) Unlike many oil and gas exploration and development generally occurs only during the day, not round-the-clock..
3) No Surface Occupancy within 0.6 mi of the perimeter of occupied sage grouse leks. (Carr 1967, Wallestad and Schadweiler 1974, Rothenmaier 1979, Emmons 1980, Schoenber 1982 as analyzed by Colorado Greater Sage Grouse Conservation Plan Steering Committee 2008).	a) No surface occupancy is planned within 0.6 miles of the sage
4) Locate main haul trunk roads used to transport production and/or waste products to a centralized facility or market point >1.9 miles from the perimeter of occupied sage grouse leks (Lyon and Anderson 2003). Locate other roads used to provide facility site access and maintenance >0.6 miles from the perimeter of occupied sage grouse leks. Construct roads to minimum design standards needed for production activities while minimizing surface disturbance and traffic.	a) Main roads to the vicinity of the site include the already est Gap Road (Sweetwater County Road 23), which are both p needed for use of either of these roads. The Green Ridge I the Discover Lek is located about 1.5 miles east of the Wam b) Access to the site from the Sooner Road and Wamsutter- minimize new habitat disturbances. The two-track will nee miles from the access roads; however, line-of-sight analy Roads within the site will also follow existing two-tracks, lowest appropriate standard, to adequately accommodate the
5) Locate electrical supply lines at least 750 m (0.5 miles) from the perimeter of occupied sage grouse leks. Design electrical lines to be raptor- proof by installing anti-perching devices, or burying them when possible.	a) All supply lines will be located greater than 0.5 miles from on all new power poles and cross-arms to reduce raptor and

Table OP-A6-1 Mitigation based on Stipulations for Development in Core Sage Grouse Population Areas - Wyoming Game and Fi

WGF Oil and Gas Lease Stipulation [1]	LC ISR, LI
6) Exploration and development activity will be allowed from July 1 to March 14. In Core Population Areas that also contain sage grouse winter concentration areas, exploration and development activity will be allowed only from July 1 to December 1 in the winter concentration areas.	a) LC ISR, LLC has, and will continue to limit, exploration a delineation drilling and development within the Permit Are only within two mine units at one time. In order for surfa granted to allow for year-round activity once topsoil is str (development) in that area, Although topsoil is not strip Stipulation 2), the beginning of delineation drilling is analog in mining. Therefore, a similar exemption for ISR mine uni b) No data on winter concentration areas has been found for the
7) Limit noise sources to 10 dBA above natural, ambient noise (~39 dBA) measured at the perimeter of a lek from March 1 to May 15 (Inglefinger 2001, Nicholoff 2003).	a) Baseline noise measurements were made in 2007 and again in 2009, the noise measurements ranged from 68 to 89 dB(the measurements were made in 2009. b) Noise measurements for various equipment indicate the hi levels declining below background (wind noise) within a co 4b).

[1] http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/FINALStateLandCoreAreaSageGrouseStips7312008.pdf. The oil and gas le provision: "There is no published research on specific impacts on sage grouse. Since development scenarios (well density, roads, activity) are si development. Use same stipulations used for oil and gas. In-situ uranium permitting should include a requirement to acquire data on sage grouse

Table OP-A6-2 Surface Activity Restrictions for Protection of Wildlife

Species	Exclusion Period		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Sage Grouse	Occupied Leks	No surface disturbance or occupancy within ¼-mile of lek.												
		No human activity between 6 pm and 9 am from March 1st through May 20th within ¼-mile of lek.												
	Active Lek in Suitable Nesting Habitat	No surface disturbance or other disruptive activity from March 1st through July 15th within 2 miles of lek.												
Raptors	Avoid disturbance within 1-mile nest buffer from February 1st to July 31st.													

Notes:
(1) Includes species, observed at the site, for which timing restrictions are in place per the Rawlins BLM 2007 Draft Resource Management Plan (RMP). If additional species, listed in the RMP, are observed then BLM will be consulted to determine applicable timing and distance restrictions for those species.
(2) The timing and distance restrictions are based on the most conservative alternative in the Draft RMP. If the Final RMP includes different restrictions, those will be adopted after consultation with the BLM.

Table OP-A6-3 Disturbance Acreage by Section and Year (Page 1 of 4)

	Year							
	2010	2011	2012	2013	2014	2015	2016	201
Section 13, T25N, R93W								
Main Road	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.7
MU 5 Secondary Road					0.08	0.08	0.08	0.0
Deep Well Road	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.3
Deep Well Pad	2.80	0.20	0.20	0.20	0.20	0.20	0.20	0.2
Deep Well Trunkline	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sub-Total	8.06	4.20	4.20	4.20	4.28	4.28	4.28	4.2
% of Section	1.26	0.66	0.66	0.66	0.67	0.67	0.67	0.6
Section 14, T25N, R93W								
Main Road	3.61	3.61	3.61	3.61	3.61	3.61	3.61	3.6
Sub-Total	3.61	3.61	3.61	3.61	3.61	3.61	3.61	3.6
% of Section	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.5
Section 15, T25N, R93W								
Main Road	3.61	3.61	3.61	3.61	3.61	3.61	3.61	3.6
Sub-Total	3.61	3.61	3.61	3.61	3.61	3.61	3.61	3.6
% of Section	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.5
Section 16, T25N, R93W								
Main Road	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.8
Sub-Total	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.8
% of Section	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.4
Section 24, T25N, R93W								
MU 5 Pattern Area					38.50	38.50	38.50	38.5
MU 5 Two Track Road					1.36	1.36	1.36	1.3
MU 3 Two Track Road			0.14	0.14	0.14	0.14	0.14	0.1
Secondary Roads					0.87	0.87	0.87	0.8
Deep Well Trunkline	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.0
MU 5 Trunkline					1.20	0.00	0.00	0.0
Sub-Total	1.24	0.00	0.14	0.14	42.07	40.87	40.87	40.8
% of Section	0.19	0.00	0.02	0.02	6.57	6.39	6.39	6.3

Table OP-A6-3 Disturbance Acreage by Section and Year (Page 2 of 4)

	Year							
	2010	2011	2012	2013	2014	2015	2016	201
Section 25, T25N, R93W								
Deep Well Road	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.6
Deep Well Pad	2.80	1.00	1.00	1.00	1.00	1.00	1.00	1.0
Deep Well Trunkline	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sub-Total	4.62	1.64	1.64	1.64	1.64	1.64	1.64	1.6
% of Section	0.72	0.26	0.26	0.26	0.26	0.26	0.26	0.2
Section 16, T25N, R92W								
Main Road	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.5
Secondary Road	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.5
Deep Well Pad	2.80	0.20	0.20	0.20	0.20	0.20	0.20	0.2
Deep Well Trunkline	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sub-Total	7.38	4.36	4.36	4.36	4.36	4.36	4.36	4.3
% of Section	1.15	0.68	0.68	0.68	0.68	0.68	0.68	0.6
Section 17, T25N, R92W								
Main Road	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.7
Secondary Road	0.08	0.08	0.08	0.08	0.08	0.35	0.35	0.3
MU 4 Pattern Area				30.37	30.37	30.37	30.37	30.3
MU 6 Pattern Area						2.73	2.73	2.7
MU 4 Two Track Roads				0.25	0.25	0.25	0.25	0.2
MU 6 Two Track Roads						0.31	0.31	0.3
MU 2 Two Track Road		0.34	0.34	0.34	0.34	0.34	0.34	0.3
Deep Well Trunkline	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
MU 4/6 Trunkline				1.33	0.00	0.74	0.00	0.0
Sub-Total	5.08	4.12	4.12	36.07	34.74	38.79	38.05	38.0
% of Section	0.79	0.64	0.64	5.64	5.43	6.06	5.95	5.9

Table OP-A6- Disturbance Acreage by Section and Year (Page 3 of 4)

	Year							
	2010	2011	2012	2013	2014	2015	2016	201
Section 18, T25N, R92W								
Plant Compound	10.00	4.40	4.40	4.40	4.40	4.40	4.40	4.4
Main Road	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.0
Secondary Road	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.1
MU 1 Pattern Area	10.51	10.51	10.51	10.51	10.51	10.51	10.51	
Deep Well Pad	2.80	1.00	1.00	1.00	1.00	1.00	1.00	1.0
MU 1 Pattern Area	10.51	10.51	10.51	10.51	10.51	10.51	10.51	
MU 4 Pattern Area				4.02	4.02	4.02	4.02	4.0
MU 1 Two Track Road	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
MU 2 Two Track Road		0.11	0.11	0.11	0.11	0.11	0.11	0.1
MU 4 Two Track Road				0.09	0.09	0.09	0.09	0.0
Laydown Area/Drillers Shed	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.1
Deep Well Trunkline	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Main Trunkline	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sub-Total	43.18	33.05	33.05	37.16	37.16	37.16	37.16	15.9
% of Section	6.75	5.16	5.16	5.81	5.81	5.81	5.81	2.4
Section 19, T25N, R92W								
MU 1 Two Track Road	0.62	0.62	0.62	0.62	0.62	0.62	0.62	
MU 3 Two Track Road			1.10	1.10	1.10	1.10	1.10	1.1
MU 2 Two Track Road		0.16	0.16	0.16	0.16	0.16	0.16	0.1
MU 5 Two Track Road					0.28	0.28	0.28	0.2
MU 4 Two Track Road				0.11	0.11	0.11	0.11	0.1
MU 1 Pattern Area	25.39	25.39	25.39	25.39	25.39	25.39	25.39	
MU 2 Pattern Area		3.89	3.89	3.89	3.89	3.89	3.89	3.8
MU 3 Pattern Area			36.80	36.80	36.80	36.80	36.80	36.8
Deep Well Road	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.4
Deep Well Pad	2.80	1.00	1.00	1.00	1.00	1.00	1.00	1.0
WF Trunkline	1.81	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Deep Well Trunkline	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.0
MU 1 Main Trunkline	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Table OP-A6-3 Disturbance Acreage by Section and Year (Page 4 of 4)

	Year							
	2010	2011	2012	2013	2014	2015	2016	201
Section 20, T25N, R92W								
MU 6 Pattern Area						36.18	36.18	36.1
MU 2 Pattern Area		31.51	31.51	31.51	31.51	31.51	31.51	31.5
Secondary Road						0.14	0.14	0.1
MU 1 Two Track Road	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
MU 2 Two Track Road		0.44	0.44	0.44	0.44	0.44	0.44	0.4
MU 4 Two Track Road				0.18	0.18	0.18	0.18	0.1
MU 6 Two Track Road						0.52	0.52	0.5
Sub-Total	0.01	31.96	31.96	32.14	32.14	68.98	68.98	68.9
% of Section	0.00	4.99	4.99	5.02	5.02	10.78	10.78	10.7
Section 20, T25N, R92W								
MU 6 Two Track Road						0.18	0.18	0.1
Sub-Total	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.1
% of Section	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.0
Section 14, T25N, R92W								
Main Road	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.8
Sub-Total	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.8
% of Section	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.2
Section 15, T25N, R92W								
Main Road	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.6
Sub-Total	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.6
% of Section	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.5
Section 23, T25N, R92W								
Main Road	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.8
Sub-Total	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.8
% of Section	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.2
Section 24, T25N, R92W								
Main Road	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.4

Table OP-A6-4 Estimated Water Quality of the Storage Ponds

Analyte	Estimated Range (mg/l)	
Major Constituents	**Low**	**High**
Aluminum	ND	0.2
Ammonia as Nitrogen	ND	4
Bicarbonate as HCO_3	1,200	2,500
Calcium	50	300
Carbonate as CO_3	ND	25
Chloride	200	1,000
Magnesium	4	50
pH	7	9
Potassium	10	200
Ra-226 (pCi/l)	200	1,500
Silica	14	20
Sodium	150	2,000
Sulfate	50	500
TDS	1,600	6,500
Uranium as U_3O_8	1	15
Trace Parameters	**Low**	**High**
Arsenic	0.002	0.020
Barium	ND	ND
Boron	ND	ND
Cadmium	ND	ND
Chromium	ND	ND
Copper	ND	ND
Fluoride	0.2	0.5
Lead	ND	ND
Manganese	0.04	0.5
Mercury	ND	ND
Molybdenum	ND	ND
Nickel	ND	ND
Selenium	0.01	0.2
Vanadium	ND	0.01

Table OP-A6-5a Background Noise Measurements

Cardinal Direction	Date	
	June 13, 2007	April 28, 2009
	dB(A)	dB(A)
N	<40	69
NE	<40	73
E	<40	87
SE	<40	85
S	<40	68
SW	<40	89
W	<40	89
NW	<40	73

Table OP-A6-5b Spot Noise Surveys of Equipment at the Lost Creek Project (Page 1 of 2)

Equipment	Location	Comment	Noise Level in Db [1]		
			Low	High	Avg
Background	Northwest Hi-Vol Station	Hi-Vol station off & no other equipemnt running; light breeze	60.1	70.1	65.7
Pulling Unit (swabbing)	100' upwind	Light breeze blowing east; unit running	60.0	70.0	65.0
	50' upwind	Light breeze blowing east; unit running	60.0	68.0	65.0
	At operators station at end of truck	Light breeze blowing east; unit running	66.0	77.0	70.0
	50' downwind	Light breeze blowing east; unit running	64.0	70.0	67.0
	100' downwind	Light breeze blowing east; unit running	64.0	67.0	65.0
Eu 6500is Honda Generator	100' upwind	Light breeze blowing east; unit running	65.0	65.0	65.0
	50' upwind	Light breeze blowing east; unit running	65.0	65.8	65.2
	At unit	Light breeze blowing east; unit running			80.9
	50' downwind	Light breeze blowing east; unit running	65.0	66.1	65.3
	100' downwind	Light breeze blowing east; unit running	65.0	65.1	65.0
110KeV 75 HP Generator	100' upwind	Light breeze blowing east; unit running	65.0	65.1	65.1
	50' upwind	Light breeze blowing east; unit running	65.0	65.0	65.0
	At fender of unit	Light breeze blowing east; unit running			76.6
	50' downwind	Light breeze blowing east; unit running	65.0	65.3	65.0
	100' downwind	Light breeze blowing east; unit running	65.0	65.2	65.1
John Deere 710J Backhoe (idling)	100' upwind	Light breeze blowing east; unit running	65.0	65.0	65.0
	50' upwind	Light breeze blowing east; unit running	65.0	65.1	65.1
	At unit	Light breeze blowing east; unit running			81.5
	50' downwind	Light breeze blowing east; unit running	65.0	65.7	65.4
	100' downwind	Light breeze blowing east; unit running	65.0	65.0	65.0

Table OP-A6-5b Spot Noise Surveys of Equipment at the Lost Creek Project (Page 2 of 2)

Equipment	Location	Comment	Noise Level in Db (1)		
			Low	High	Avg
Water Truck (idling)	100' upwind	Light breeze blowing east; unit running	65.0	65.1	65.0
	50' upwind	Light breeze blowing east; unit running	65.0	65.8	65.1
	At front left fender	Light breeze blowing east; unit running			76.6
	50' downwind	Light breeze blowing east; unit running	65.0	65.2	65.1
	100' downwind	Light breeze blowing east; unit running	65.0	65.0	65.0

(1) Surveys performed by Ahmad Jodeh on February 6, 2009. The instrument was checked against a calibrated standard both before and after the spot surveys were completed and found to be within 0.1 decibals of the standard. The standard had been calibrated within the past year by the manufacturer. It appears that the wind is the dominant source of noise once the meter is greater than 50 feet away from these specific pieces of equipment.

Table OP-A6-6 Summary of the Wildlife Monitoring Schedule [1]

Species [2]	Purpose of Monitoring [2]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Big Game	Winter Habitat Use	1 aerial survey 1 ground survey											
	Spring & Summer Habitat Use				1 ground survey		1 ground survey		1 ground survey				
Sage Grouse	Search for New Leks				3 aerial surveys 3 ground surveys								
	Lek Attendance				3 ground surveys								
	Brood Survey							2 ground surveys					
Raptors	Nest Location		1 ground or aerial	1 ground or aerial	1 ground or aerial								
	Production Success					1 ground or aerial							
Lagomorphs	Prey Abundance						1 ground survey		1 ground survey				
Non-Game Birds, including MBHFI	Breeding Numbers						1 ground survey						
All	Occurrence	Incidental Observations											

Notes:
(1) Details of the monitoring timing and protocols are described in Section 2.0 of Attachment OP2-8.
(2) Species selection is based on observed wildlife within and near the Lost Creek Permit Area (Appendix D9).

Table OP-2 Acreage of Expected Disturbance, Vegetation Type, Topsoil Salvage (Page 1 of 3)

Facility [1]	Term of Disturbance [2]	Total Disturbance (acres)	Area of Disturbance (acres)		Area within Disturbance from which Topsoil to be Removed (acres)		Topsoil Salvage [3] (cubic yards)
			Upland Big Sagebrush	Lowland Big Sagebrush	Upland Big Sagebrush	Lowland Big Sagebrush	
PLANT	LT	**10.00**	**4.20**	**5.80**	**4.20**	**5.80**	**32,234**
STAGING AREAS							
Permanent	LT	1.20	1.20	0.00	1.20	0.00	3,868
Potential	ST	1.50	1.50	0.00	1.50	0.00	4,835
Potential	ST	1.50	1.50	0.00	1.50	0.00	4,835
TOTAL - STAGING AREAS		**4.20**	**4.20**	**0.00**	**4.20**	**0.00**	**13,538**
DEEP WELLS							
Drilling pad and mud pits	ST	15.00	11.54	3.46	11.54	3.46	48,352
Well House	LT	5.00	3.85	1.15	3.85	1.15	16,117
TOTAL - DEEP WELLS		**20.00**	**15.39**	**4.61**	**15.39**	**4.61**	**64,469**
PIPELINES (outside patterns) [5]							
Trunklines	ST	2.98	2.70	0.28	2.70	0.28	9,606
Mine Unit 1	ST	1.57	1.15	0.42	1.15	0.42	5,061
Mine Unit 2	ST	1.57	1.31	0.26	1.31	0.26	5,061
Mine Unit 3	ST	1.57	1.33	0.24	1.33	0.24	5,061
Mine Unit 4	ST	1.57	1.42	0.15	1.42	0.15	5,061
Mine Unit 5	ST	1.57	1.41	0.16	1.41	0.16	5,061
Mine Unit 6	ST	1.57	1.49	0.08	1.49	0.08	5,061
TOTAL - PIPELINES		**12.40**	**10.81**	**1.59**	**10.81**	**1.59**	**39,971**
DRILL PADS (outside patterns) [7]							
Delineation Holes	ST	7.52	5.49	2.03	5.49	2.03	24,240

Table OP-2 Acreage of Expected Disturbance, Vegetation Type, Topsoil Salvage (Page 2 of 3)

Facility [1]	Term of Disturbance [2]	Total Disturbance (acres)	Area of Disturbance (acres)		Area within Disturbance from which Topsoil to be Removed (acres)		Topsoil Salvage [3] (cubic yards)
			Upland Big Sagebrush	Lowland Big Sagebrush	Upland Big Sagebrush	Lowland Big Sagebrush	
ROADS (outside patterns) [8]							
Access Road within main Permit Area	LT	17.90	15.72	2.18	15.72	2.18	57,700
Access Road east & west of main Permit Area	LT	16.20	15.60	0.60	15.60	0.60	52,220
Secondary Roads							
Roads to Deep Wells	*LT*	*2.5*	*2.06*	*0.44*	*2.06*	*0.44*	*8,059*
Mine Unit 1	*LT*	*0.20*	*0.15*	*0.05*	*0.15*	*0.50*	*2,095*
Mine Unit 2	*LT*	*0.20*	*0.17*	*0.03*	*0.17*	*0.31*	*1,547*
Mine Unit 3	*LT*	*0.20*	*0.17*	*0.03*	*0.17*	*0.29*	*1,483*
Mine Unit 4	*LT*	*0.20*	*0.18*	*0.02*	*0.18*	*0.18*	*1,160*
Mine Unit 5	*LT*	*0.20*	*0.18*	*0.02*	*0.18*	*0.19*	*1,193*
Mine Unit 6	*LT*	*0.20*	*0.19*	*0.01*	*0.19*	*0.10*	*935*
Total for Secondary Roads		3.70	3.10	0.60	3.10	2.01	16,472
Two-Track Roads							
Mine Unit 1	*LT*	*1.37*	*0.72*	*0.26*	*0.72*	*0.26*	*3,159*
Mine Unit 2	*LT*	*1.37*	*1.12*	*0.23*	*1.12*	*0.23*	*4,352*
Mine Unit 3	*LT*	*1.37*	*1.30*	*0.24*	*1.30*	*0.24*	*4,964*
Mine Unit 4	*LT*	*1.37*	*0.98*	*0.10*	*0.98*	*0.10*	*3,481*
Mine Unit 5	*LT*	*1.37*	*1.75*	*0.19*	*1.75*	*0.19*	*6,253*
Mine Unit 6	*LT*	*1.37*	*1.24*	*0.07*	*1.24*	*0.07*	*4,223*
Total for Two-Track Roads		8.20	7.11	1.09	7.11	1.09	26,432
TOTAL - ROADS		**46.00**	**41.53**	**4.47**	**41.53**	**5.88**	**49,705**
PATTERNS (Figure OP-6b)							
Mine Unit 1	3% LT/ 10% ST	36.66	26.86	9.80	3.50	1.27	15,376
Mine Unit 2	3% LT/ 10% ST	36.66	30.53	6.14	3.97	0.80	15,376
Mine Unit 3	3% LT/ 10% ST	36.67	30.94	5.73	4.03	0.74	15,376
Mine Unit 4	3% LT/ 10% ST	36.67	33.10	3.56	4.30	0.47	15,376
Mine Unit 5	3% LT/ 10% ST	36.67	33.00	3.67	4.29	0.48	15,376
Mine Unit 6	3% LT/ 10% ST	36.67	34.72	1.95	4.52	0.25	15,376
TOTAL - PATTERNS		220.00	189.15	30.85	24.61	4.01	92,255

Table OP-2 Acreage of Expected Disturbance, Vegetation Type, Topsoil Salvage (Page 3 of 3)

Facility [1]	Term of Disturbance [2]	Total Disturbance (acres)	Area of Disturbance (acres)		Area within Disturbance from which Topsoil to be Removed (acres)		Topsoil Salvage [3] (cubic yards)
			Upland Big Sagebrush	Lowland Big Sagebrush	Upland Big Sagebrush	Lowland Big Sagebrush	

(1) Facility locations are shown on Plates OP-1 and OP-2.

(2) LT = Long Term topsoil stockpile, i.e., duration of project. ST = Short Term topsoil stockpile, i.e., a few days to a few months.

(3) For estimating topsoil salvage volumes, a topsoil depth of 24 inches was used. Recommended topsoil stripping depths were 24 inches or less (Attachmer

(4) Well WDW1 (SW corner of Permit Area) was the original exploration well drilled in 2008 & the area has been reclaimed.

(5) The width of disturbance for trunklines to deep wells is assumed to be ten feet. The width of disturbance for main trunklines between the plant and heade for both the trench and laydown of topsoil and subsoil.

(6) Because the mine unit acreages and boundaries are not yet finalized, it was assumed that all of the mine units cover the same amount of acreage (about 3 covering the approximate location of each mine unit as shown on Figure D8-1, to estimate the proportion of Upland and Lowland Big Sagebrush that wil is finalized, values for each mine unit will be updated, if necessary, in the mine unit package submitted to WDEQ-LQD prior to unit operation.

(7) Each drill pad, regardless if it is in a mine unit or for exploration, is assigned a total disturbance 33 feet by 33 feet which equates to 0.025 acres. This are vegetation created during reclamation efforts.

(8) Two track roads are assumed to create 6.4 feet of disturbance, secondary roads create 20 feet of disturbance and primary access roads create 30 feet of dis

(9) No credit is taken for pre-existing disturbance although areas of existing disturbance will be used when available, e.g., roads follow existing two-tracks