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Sevier Dry Lake Exploratory Testing

Location: Millard County, Utah

Applicant

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1.0 INTRODUCTION AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

This Environmental Assessment (Exploration EA) has been prepared to analyze the environmental consequences of the Sevier Lake Potash Lease Minerals Exploration Program (the Project) as proposed by Peak Minerals, Inc. (Peak Minerals). The Exploration EA is a site-specific analysis of potential impacts that could result from the implementation of the Proposed Action. This Exploration EA assists the U.S. Bureau of Land Management (BLM) in evaluating whether to grant an Exploration Permit to Peak Minerals for conducting minerals exploration and testing on public lands at Sevier Dry Lake (**Figure 1**). It also assists BLM in project planning, in ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions. “Significance” is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a “Finding of No Significant Impact” (FONSI). If the decision maker determines that this Project has “significant” impacts following the analysis in the EA, an EIS would be prepared for the Project. If not, a Decision Record (DR) may be signed for the EA approving the Proposed Action (or another alternative).

In February 2011, the BLM published an EA (DOI-BLM-UT-W020-2010-014-EA - the “Leasing EA”) disclosing and analyzing the environmental consequences of its Sevier Lake Competitive Potash Leasing Proposal (BLM 2011). The Leasing EA was not limited to the assessment of leasing per se, but rather analyzed the effects of reasonable scenarios for extraction of potash based on known available processes and technology.

The Decision Record for the Leasing EA allowed a competitive Sevier Lake potassium lease sale to move forward. BLM published Sevier Lake Potash Lease Sale notice for the lands under consideration on March 2, 2011 and the lease sale was awarded to Peak Minerals on June 2, 2011.

The lands included in the lease sale comprise approximately 95,172 acres in the following sections of Townships 20, 21, 22, 23, and 24 South and Ranges 10, 11, and 12 West, Salt Lake Base and Meridian (**Figure 2** and **Table 1-1**). The lease identification numbers are: UTU88387 - UTU88390, UTU88401 - UTU88430, UTU88443 - UTU88457, UTU88461 - UTU88463.

TABLE 1-1							
Lands in the Sevier Lake Potash Lease Sale							
Township	Range	Sections					
T 20S	R 10 W	7	8	17 – 20	29 – 31		
T 20S	R 11 W	3 – 36					
T 20 S	R12 W	11	12	13 – 15	22 – 28	33 – 36	
T 21S	R 11W	1 – 12	14 – 23	26 – 30	32 – 35		
T 2 S	R12W	1 – 4	9 – 17	20 – 29	33 – 36		
T 22S	R11W	3 – 10	17 – 21	29	30	31	
T22S	R12W	1 – 4	9 – 5	21 – 29	33 – 36		
T 23S	R11W	6	19	30	31		
T 23S	R12W	1 – 5	8 – 15	17	20 – 28	33 – 35	
T24S	R12W	1	3 – 5	7 – 12	14	15	17 – 18

The acquisition of a potassium lease provides an exclusive right to the mineral. The extraction and development of that resource only are allowed according to lease stipulations and under an approved mine plan, as well as other required state and federal approvals. Likewise, exploration and testing of the resource only are allowed according to lease stipulations and under an approved exploration plan. An Exploration Work Plan (EWP) for the Sevier Lake Potash Lease Minerals Exploration Program, prepared by Peak Minerals (Peak Minerals, 2011), describes the Project in detail and is available at the BLM Fillmore Field Office (FFO) or online at <https://www.blm.gov/ut/enbb>.

1.2 Purpose and Need for the Proposed Action

Peak Minerals has applied for a ROW grant from the BLM FFO for authorization to conduct exploration and testing activities on BLM-administered lands. The BLM Utah State Office in Salt Lake City is the office responsible for receiving and processing applications for leasing and prospecting for solid leasable minerals in Utah, pursuant to the 43 CFR 3500 regulations. The Mineral Leasing Act of 1920 promotes the mining of potash on the public domain. In addition, the BLM is mandated to establish multiple uses of federal lands in providing for present and future generations. This action is consistent with Sec. 102(a)(912) of FLPMA (90 Stat.2744) which states that "... it is the policy of the United States that the public lands be managed in a manner which recognizes the nation's need for domestic sources of minerals..." The BLM's FFO is responsible for management of the Sevier Lake playa for multiple uses, including minerals extraction.

The purpose of the Proposed Action is to support the potential future economic recovery of potash resources from federal lands by confirming the potential value of the resource and providing baseline data for assessing the potential environmental impacts of commercial production. Development of a commercial project would have the potential to supplement the global supply of potash, a highly desirable and necessary potassium fertilizer, and to contribute to local, regional and state economies.

1.3 Conformance with BLM Land Use Plan

The Leasing EA found the leasing action to be in conformance with the Warm Springs Resource Area (WSRA) Resource Management Plan (RMP; April 1987). The leasing program addresses the goals of the WSRA RMP minerals program, is not in conflict with any decisions for other resources, and is consistent with activities previously analyzed and permitted within the BLM FFO. Furthermore, Sevier Lake is situated in part of the resource area designated in the WSRA RMP as suitable for mineral extraction operations (BLM 2011). As a component of the Sevier Lake potash leasing program, the proposed exploration activities also are in conformance with the WSRA RMP.

1.4 Relationship to Statutes, Regulations, or Other Plans

The Leasing EA found the leasing action, including future exploration and development, to be consistent with other plans, programs, and policies of affiliated Tribes, other federal agencies, state, and local governments to the extent practical, including but not limited to the following (BLM 2011):

Federal Compliance:

- Federal Land Policy and Management Act (FLPMA) of 1976, as amended (43 U.S.c.1701 et seq.)
- Mineral Leasing Act of 1920
- Clean Air Act (42 U.S.C. 1857 et seq.), as amended and recodified (42 U.S.C. 7401 et seq.).
- Clean Water Act (33 U.S.C. 1251 et seq.)
- Rangeland Health Standards as developed by the Secretary of the Interior on February 22, 1995
- Endangered Species Act (16 U.S.C. 1531 et seq.)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) Environmental Assessment Page 7 Sevier Lake Competitive Potash Leasing Proposal February 2011
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.)
- Protection of Historic Properties (36 CFR 800)
- Native American Graves Protection and Repatriation Act of 1990 and 43 CFR Part 10
- American Indian Religious Freedom Act of 1978
- Native American Trust Resource Policy standards are presented in the Department of the Interior Comprehensive Trust Management Plan dated March 28, 2003
- U.S. Fish and Wildlife Service Bald and Golden Eagle Protection Act, as amended

State of Utah and Local Compliance:

- State Engineer’s Office
- Division of Oil, Gas and Mining
- Division of Air Quality

Local Compliance:

- Millard County General Plan

While few, if any, authorizations, permits, or other approvals were needed for leasing per se, the Leasing EA identifies potential authorizations, permits, reviews, and approvals that may be required for future development. **Table 1-2** identifies these, based upon a conceptual determination of realistically foreseeable development scenarios. Certain of these authorizations could be required for the exploration activities that are the subject of the Proposed Action.

TABLE 1-2			
Potential Authorizations, Permits, Reviews, and Approvals			
Action Requiring Permit, Approval or Review	Permit/Approval	Agency Authority	Statutory Reference
Federal			
Official survey	Review and approval	BLM, Utah State Cadastral Survey	43 CFR 3503.33
NEPA compliance to offer Solid Mineral BLM leases	BLM	40 CFR 1500-1508	
Competitive Potassium Leases	BLM	43 CFR 3508	
Dike construction and construction of ponds	Permit to dredge or fill in waters of the U.S. or wetlands	US Army Corps of Engineers	33 CFR 323
Off-lease activity	Rights of Way	BLM	43 CFR 2800
Mining Operations Plan	Review plan for dike construction, plant siting, water usage, water wells, ponds, facility operation, and reclamation; once plan information is complete, conduct NEPA analysis.	BLM	43 CFR 3592
State of Utah			
Dike construction	Water impoundment permit; water right approval	State Engineer’s Office	UAC R655.11
Water usage/well drilling	Water right approval; approval to install wells	State Engineer’s Office	UAC R655.4, Title 73, Chapter 3
Plant site/ponds	Groundwater discharge permit	State Division of Water Quality	UAC R317-6
Stormwater management	Utah Pollutant Discharge Elimination System; storm water permits for	State Division of Water Quality	UAC Title R317-8

TABLE 1-2			
Potential Authorizations, Permits, Reviews, and Approvals			
Action Requiring Permit, Approval or Review	Permit/Approval	Agency Authority	Statutory Reference
	construction activities and operational activities		
Mining and Reclamation activities	Notice of Intent to Conduct Large (over 5 acres) Mining Operations	State Division of Oil, Gas and Mining	UAC Title R647-4
Facility operation	Air quality approval order (AO)	State Division of Air Quality	UAC Title R307
Materials movement; surface disturbance	Fugitive Dust Control Plan	State Division of Air Quality	UAC Title R307-309
Local or Other			
Facility construction	Construction permit	Millard County	Millard County General Plan
ROWs	Conditional Use Permit	Millard County	Millard County Zoning Ordinance
Federal lands -proposed actions in Millard County	Review	Millard County	Millard County General Plan

In addition to analyzing the leasing decision, the Leasing EA describes the history of minerals prospecting, exploration, and development activities on the Sevier Lake playa, the importance of potassium as an essential plant nutrient and an essential nutritional requirement for animals and humans, and the use of various potassium compounds as agricultural fertilizers. This Exploration EA incorporates by reference the entire Leasing EA, including the environmental analysis of mineral extraction conducted in that document. Only activities related to Peak Minerals’ proposed exploration program are analyzed in this Exploration EA.

Additional project-specific information related to exploration and testing activities is provided here, as available. Activities proposed as part of the Proposed Action are summarized in this EA. More detail is presented in the Exploration Work Plan (Peak Minerals, 2011), which is also incorporated into this Exploration EA by reference.

2.0 DESCRIPTION OF ALTERNATIVES

2.1 Introduction

This chapter presents the Proposed Action (Alternative A) to grant an Exploratory Mining permit authorizing Peak Minerals to execute an exploratory well program to evaluate the mineral resources at Sevier Lake. Alternative B is the No Action Alternative, which assumes that the Action Alternative not would be approved. The No Action Alternative is considered and analyzed to provide a baseline for comparison of the impacts of the Proposed Action.

2.2 Alternative A – Proposed Action

Peak Minerals proposes three activities as part of the exploratory phase of development: Confirmation of Brine Resource, Hydrology Analysis, and Screening-Level Geotechnical Study.

Peak Minerals will conduct proposed brine resource confirmation sampling to develop a better understanding of the distribution of dissolved salts in groundwater occurring within the Sevier Lake potassium lease. Data from historic exploration indicates a substantial resource of mineral-saturated brine, but the testing data is nearly twenty years old and is not adequate for developing a site-specific operational extraction plan. Brine resource sampling will verify the economic viability of potential commercial production of marketable mineral products at Sevier Lake.

Peak Minerals has applied to collect baseline hydrologic data for future use in evaluating potential hydrologic impacts that could result from brine removal and freshwater extraction for project operations. The hydrologic investigations will evaluate groundwater and surface water resources to establish baseline conditions prior to the extraction of brine. These baseline data would be used for BLM's NEPA analysis that would be required should a commercial minerals extraction project be proposed for development. Conducting the hydrologic survey prior to surface disturbing activities is a condition of the Leasing EA (BLM 2011, Section 2.2.2, *Other Characteristics Common to Alternatives A and C*).

Peak Minerals would conduct a screening-level geotechnical study to assess the conceptual design and feasibility of structures that would be built to support the operation of a potash facility. This information will contribute to determining the feasibility of developing a commercial project.

Detailed aspects of each activity are presented in the *Exploration Work Plan* (Peak Minerals, 2011), and are summarized in this section).

2.2.1 Confirmation of Brine Resource

The focus of the brine resource confirmation sampling is to develop a better understanding of the distribution of dissolved salts in groundwater. Historic exploration indicates a substantial potential resource of mineral-saturated brine, which the current project will investigate in detail. The objective is to define a resource compliant with international standards such as U.S. Industry Guide 7 or Canadian NI 43-101. Additional laboratory evaluation will be required to determine quantities and qualities of potential mineral precipitates.

The confirmation sampling will focus on brine and lake sediments occurring between the lake surface and a depth of approximately 300 feet below the lake surface. Brine samples will be collected from intervals in the proposed borings and analyzed for chemical constituents. Core samples of the lake sediments will be taken and analyzed to determine their mineral composition, as well as their porosity and permeability characteristics (**Figure 3**).

The project expects to produce marketable mineral products through solar evaporation of the brine. A likely suite of products would include the following:

- Potash (potassium chloride [KCl] or potassium sulfate [K₂SO₄])
- Halite (sodium chloride [NaCl])
- Salt cake (sodium sulfate [NaSO₄])
- Bitterns (magnesium chloride [MgCl₂] and magnesium sulfate [Mg₂SO₄]).

These products are to be formed through controlled precipitation of the various salts in the brine material, and subsequent processing of the precipitated minerals. Past studies have demonstrated that the groundwater chemistry of the lakebed contains sufficient concentrations of the ionic constituents to produce these products.

The proposed brine confirmation sampling additionally aims to establish a network of monitoring wells that will be used to track groundwater levels and brine chemistry. Currently, a limited number of monitoring points exist over a small portion of the southern margin of the lakebed that are considered suitable for accurate groundwater measurements. The planned confirmation sampling would establish a network of wells throughout the lease at a suitable density for monitoring purposes.

The following two types of borings are anticipated for the planned confirmation sampling:

- Shallow borings averaging approximately 50 feet in depth and possibly extending to 100 feet. A total of up to 654 potential shallow locations are on state and federal land.
- Deep borings that extend to approximately 300 feet in depth. A total of up to 58 proposed deep locations are on state and federal land.

The variability of brine composition and sediment porosity is not currently well defined and the density of sampling required to suitably characterize the deposit is unclear at this time. The locations depicted on the proposed confirmation sampling map are expected to be the maximum required to define adequately the brine resource, and very likely more dense than will be proven necessary. The plan will begin by drilling a relatively sparse pattern of holes over a limited area and, after sampling and analysis of brine composition, determine the spatial variability of the deposit. Once the variability of key chemical components has been determined, the remainder of the program will be tailored to a suitable density of sample locations.

Only existing roads will be used for access to the lakebed. No road construction is needed on the lakebed surface as the lakebed is relatively flat with no vegetation.

Disturbance is anticipated to consist of shallow tracks from the proposed low-ground-pressure equipment. Tracks between drill locations will be minimized to the greatest extent possible. Drilling activities are planned for the late summer to early fall when the lakebed is driest and

most firm, although work may continue throughout the year. Transportation of crews and project personnel on the lakebed is planned to be by light rubber-tire vehicles such as all-terrain vehicles (ATVs) or by treaded vehicles, such as a snow cat. The use of a helicopter may be required to reach locations made inaccessible by lake surface conditions. If the lake contains standing water, other methods to transport the drilling equipment, such as barges or other specialized equipment may be employed.

The area of activity at each drill location will be approximately 25 feet by 45 feet for the shallow boring program and 30 feet by 60 feet for the deep boring program. Access to each drill pad will be by straight-line travel along 15-foot-wide tracks across the lakebed from one hole location to another. It is anticipated that drilling operations will move in a progressive manner along each east-west drill line and proceed to the next drill line over one north-south track.

Disturbance associated with accessing the drilling sites will consist of tracks across the lakebed connecting the drill locations. Drilling on the lakebed will be performed in a manner designed to minimize disturbance. Outside of the playa, only existing roads will be used to access the lakebed. There will be no construction of new roads or improvements to existing roads.

Disturbance is expected to consist of shallow marks or tracks on the lakebed surface caused by rig setup/breakdown and the coring activity. A minimal amount of drill cuttings created through drilling or extracting sediment samples may accumulate around each boring location.

Sonic drilling and direct-push drilling methods may be used for the shallow program, with one to three small drill rigs to accomplish the required work. Both sonic and direct push drilling rigs are commonly employed in soft-sediment or unconsolidated strata. Drills and drill support equipment will be mobile wheel and/or track-mounted units depending on ability to travel over the lakebed without causing excessive rutting. A unit compatible with helicopter transport may be used if areas of the lakebed are inaccessible by means of overland transportation. Drilling fluids (drilling mud) are not required for these drill methods.

Monitoring wells will be constructed at selected boring locations. They will be completed in the borings used for brine and sediment sampling. The shallow borings will be advanced to a total depth of 50 to 100 feet below ground surface (bgs), using a combination of direct push and sonic drilling methods. Shallow wells may be completed in both the direct push and sonic borings. The deep exploration borehole will be advanced up to 300 feet below lakebed surface, using sonic drilling methods.

2.2.2 Hydrology Analysis

The collection of baseline hydrologic data is required to evaluate potential hydrologic impacts resulting from future brine removal and from water-supply wells required for operation.

Objectives of this study are to accomplish the following:

- Gain a better understanding of local and regional hydrogeology

- Establish a long-term monitoring network to collect baseline data and on-going data during operations
- Collect adequate data to develop preliminary Conceptual Basin Model and develop a credible groundwater flow model to assess potential impacts of brine removal
- Collect data to identify an adequate source of groundwater for operations.

The hydraulic analysis of the basin will culminate in a Conceptual Basin Model. The Conceptual Basin Model will be developed to address stipulations in the BLM Decision Record of the Leasing EA. The data required to develop the Conceptual Basin Model includes a records review along with targeted field investigations.

Records Review and Field Reconnaissance - The records review task does not have any fieldwork associated with it and therefore is not considered part of the exploration program. However, a brief summary is presented to understand how the hydrology field program is being developed.

Relevant data for the Sevier Lake basin and basins immediately adjacent are being collected and assembled in a Project library and database. The Project library and database will assemble the following information:

- Geology and hydrology publications and maps
- Geophysical data (gravity and seismic surveys)
- Well and spring locations
- Water rights
- Borehole logs (lithologic and geophysical)
- Groundwater levels
- Spring discharge and stream flow records
- Water quality data.

The existing data will be presented in a graphical format (e.g., maps and cross-sections) that will serve as the preliminary Conceptual Basin Model. This model will be updated as more data are collected during the field investigation. Field reconnaissance is being performed to help orient and direct future site work. The field reconnaissance will focus on the collection of data from existing wells and springs in the Sevier Lake basin and immediately surrounding areas. Existing wells are being identified and their condition assessed. Available groundwater elevations and water quality will be requested from BLM and the U.S. Geological Survey (USGS).

Retrofit Existing Wells - Hydrologic monitoring includes using existing wells to establish basin-wide groundwater conditions. The existing wells will be inspected to assess whether they require repair or retrofit to accommodate the tests to be performed. This work will include the following.

- After gaining BLM approval (the approval for this action is not part of this EA, but will be acquired independently), retrofit up to six existing BLM water-supply wells to facilitate water level measurement by manual probes and recording transducers and

discharge measurement by flow totalizers. These wells include Ibex, Wah Wah, Black Hills, Black Rock, Lake View, and Mud Hole

- After well retrofits are completed, complete a survey of the network to establish horizontal and vertical coordinates of the measurement point location and ground surface

Hydrologic Investigation - Hydrologic investigations will evaluate the groundwater and surface water resources along with meteoric parameters to establish baseline conditions prior to extraction of brine. To establish the hydrologic baseline, additional monitoring wells will be installed (**Figure 4**). The new wells will consist of up to six deep (up to 1,500 feet deep) monitoring wells in pairs completed in the alluvium and bedrock and four shallow (up to 250 feet deep) monitoring wells.

Deep Hydrologic Investigation Wells - The six deep wells will not be located on the lease parcels, but on BLM lands where a separate ROW grant will be acquired. The deeper wells will be completed as 5-inch-diameter wells to accommodate both groundwater monitoring and aquifer testing, and will range in depth from 500 to 1,500 feet bgs.

Access to the locations where monitoring wells are proposed will be from existing roads. All proposed drill sites and monitoring locations are located immediately adjacent to -existing roads. Drilling pads will be cleared, as necessary, and, if any topsoil is removed, it will be stockpiled and used for rehabilitation of the site. Once areas have been cleared, the drilling pad and support truck area will be clearly staked out with lath and orange tape to identify the drilling pad area of impact. The area of temporary and permanent disturbance at each deep well site will be no larger than 0.25 acre, for a total of 0.75 acres. Within each site, only a short access road and a small (less than 100 square feet) well pad will permanently occupy the site.

The six monitoring wells (in three pairs) will be installed for evaluating the hydrology of the bedrock and deep unconsolidated sediments. These boreholes/wells will enable acquisition of hydrogeologic information, including stratigraphy, geophysical data, aquifer properties, water quality, and water levels. Some of these wells will also be used as exploration points to support siting of future water supply wells. This task includes the following:

- Boreholes (approximately 10 to 12 inches in diameter) will be drilled with reverse-circulation or conventional rotary methods, likely by advancing casing through unconsolidated formations.
- Wells will be completed as 5-inch-diameter wells with Schedule 80 PVC or appropriate steel casing and screen to facilitate aquifer testing. Screen slot size will be sized appropriately to hold back 90 percent or greater of the design filter pack. Filter packs will be sized based on the particle size of the lithology in the screened interval. The screen slot sizing and filter pack will be based on sieve analysis conducted on the collected cuttings from the identified screen interval.
- Wells will be finished with a surface completion to accommodate a permanent sampling pump and water-level transducer equipment.

The drilling system used for constructing these wells will use technologies that allow for the continuous recycling of drilling fluids. This equipment will consist of aboveground settling basins/fractionation tanks and shaker tables to remove cuttings from the drilling fluids. No pits or settling basins will be dug at any of the drilling sites for these activities. The drilling fluids that will be used may include air, water, or bentonite clay slurry (mud). In the event that mud is used, the density and viscosity will be maintained within levels approved for use in drilling water supply wells. Any drilling fluids or additives must meet criteria established by the National Sanitation Foundation for use in drinking water wells (Utah Division of Water Rights [UDWR], 2001). Drilling fluids will be properly disposed of offsite at an approved facility.

If the boreholes are stable, geophysical logging will be conducted in the open borehole prior to well installation. This logging will include traditional electric logging (resistivity, spontaneous potential), natural gamma, fluid resistivity (measure TDS in wellbore), and temperature. Additional sonic logging (lithology/porosity) and induction logging may be conducted. If the boreholes are unstable, a more-limited suite of logs may be conducted inside the complete well casing.

Shallow Hydrologic Investigation Wells - In addition to the deep monitoring wells, up to four 2-inch monitoring wells will be installed to maximum depths 250 feet to serve as additional observation points during aquifer tests and as additional monitoring locations. These wells will be located along transects between existing BLM pumping wells (Black Hills, CPMC) and the lakebed to better understand the hydraulic connection between the fine- and coarser-grained facies of the basin-fill sediments. Three of the wells will be on lease parcels, and one will be on off-lease BLM land, where a separate ROW grant will be acquired. These monitoring wells will likely be installed using the sonic rig used for lakebed drilling. Once installed, these wells will be incorporated into the baseline monitoring network, including the following:

- Boreholes (approximately 6 inches in diameter for the 2-inch wells) will be drilled with sonic rig.
- Wells will be completed as 2-inch-diameter wells with Schedule 40 PVC casing and screen.
- Wells will be finished with a surface completion to accommodate water level transducer equipment.

Borehole logs will be created for each boring based on visual description of the core. Logs, at minimum, will include the particle size based on the USCS soil classification scheme, color using a Munsell color chart, and, when possible, identify described geologic formations. Representative samples from the core at 5-foot intervals will be collected in chip trays. The core will also be photographed.

The area of temporary and permanent disturbance at each monitoring well site will be no larger than 0.25 acre, for a total of 0.75 acres. Within each site, only a short access road and a small (less than 100 square feet) well pad will permanently occupy the site.

Handling of Groundwater and Cuttings - Extracted groundwater generated during well development and aquifer testing will be routed to the nearest drainage swale via piping or hoses. Prior to discharging, reconnaissance of the drainage swale will be conducted to ensure free passage of water downgradient and that pumped groundwater does not flow out onto a road or backup on a human-made structure (e.g., roads or fill). If a drainage swale is not immediately available, the extracted groundwater will be fanned out on tarps outside of the working area and allowed to pass through hay bales to reduce the erosive potential of the flowing water. This method of discharge will only be implemented where a road or other structure will not be adversely affected by the discharged groundwater. Water discharged in either manner will be allowed to gravity flow and dissipate into the soil, and the rate will be moderated so erosion does not occur.

During the aquifer testing portion, extracted groundwater may be temporarily stored to prevent immediate recharge of the pumped water. Instances where groundwater may not be immediately discharged directly to the ground surface include the following: (1) the water table is shallow and discharged groundwater may recharge the shallow aquifer invalidating the aquifer test and (2) a stock watering tank is available at the location of the well. Once the test is completed, the water will be released from the tank unless there is a stock watering need in the near future. In the event that groundwater is not discharged to the ground surface and a stock tank is not available, clean portable containers will be used to hold the water until completion of the testing. Once testing is complete, the groundwater will be drained to the ground surface.

Borehole cuttings and core from the hydrologic drilling investigations will be managed by segregating coarse- and fine-grained materials into separate stock piles. Upon completion of the monitoring well, the stockpiles will be spread with the coarse-grain fraction used for filling in ruts in surrounding roads and the fine grained portion spread across the drill pad. The cuttings spread at the drill pad will not be in excess of 4 inches deep and will be graded to follow local topography. Following completion of drilling, the site will be graded and prepared for reseeded using a seed mixture approved by BLM.

Samples collected from this portion of the project will include sieve analysis for well screen design. Samples submitted to laboratories for sieve analysis will be disposed of by the laboratory following completion of the analytical work. The only samples retained from the installation of monitoring wells will be representative borehole samples in chip trays from each 5-foot depth interval. Each chip tray will be labeled with the well identification, dates drilled, and collected depth intervals.

Drilling fluids (water and drilling mud) will be disposed of by one of the following methods. Drilling fluids consisting principally of clear water will be disposed of at the site by discharging into a local drainage swale or onto the ground through hay bales. Mud-based drilling fluids will

be removed from the site and disposed at an approved and permitted facility suitable for such materials.

2.2.3 Screening-Level Geotechnical Study

A screening-level geotechnical study will be performed to assess the conceptual design and feasibility of structures that will be built to support the operation of a potash facility. This may include the construction of evaporation ponds, collection trenches, and potentially the construction of a dike to protect the operations in the south from being inundated with water. Objectives of this study include the following:

- Assess the lithology, strength, consolidation, and other characteristics of the fine-grained lake bottom sediments that may affect construction of the evaporation ponds and dike embankment
- Evaluate the permeability of the lake bottom sediments that will affect infiltration from the ponds and the ability of collection trenches to produce brine for production
- Determine the suitability of the lake bottom sediments and local borrow sources for construction of embankments.

Figure 5 shows potential locations for geotechnical drilling, test pits, and cone-penetration tests (CPTs). All of the geotechnical fieldwork, with the exception of up to four test pits, will be performed within the footprint of the lake. The following five types of geotechnical sampling are anticipated for the investigation:

- Ten shallow geotechnical borings, up to approximately 75 feet in depth
- Four deep geotechnical borings, up to approximately 150 feet in depth
- Six CPT locations, up to 150 feet in depth
- Twenty lakebed test pits, up to 20 feet in depth
- Four borrow test pits on Needle Point, up to 20 feet in depth.

Access roads onto the lakebed surface and between the planned locations are planned. Similar to the brine and hydrology investigations, existing roads and trails or previously disturbed areas will be used to access the lakebed. No road construction is needed on the lakebed surface and disturbance is anticipated to consist of shallow tracks. The size of the disturbance for each boring or CPT location on the lakebed is expected to be similar to the brine study and is anticipated to include an area of activity about 25 by 45 feet. Drilling on the lakebed will be performed in a manner to minimize disturbance. However, in the event that significant rutting occurs, this area will be regraded to remove the ruts and to approximately match the existing grade of the lakebed assuming that the project does not advance to an operational phase. If the project advances to an operational phase, it will not be necessary to reclaim ruts or other exploration disturbance since any surface impacts will be naturally reclaimed during operations. In the event that the project does not advance to an operational phase, areas of rutting or surface disturbance will be evaluated and reclaimed as appropriate to match the local topography.

The disturbance from the test pits will be larger due to the size of the excavation and the stockpiling of the material being excavated. The disturbed area at the test pits is estimated to be as large as 100 by 100 feet for each test pit. It is assumed that the excavated material will be broadcast to the side of the trench excavation and will be placed back into the excavation at the completion of testing. The test pits will be open for a maximum of 5 days and during the time that they are open they will be marked with flagging to prevent entry.

In the event that the lake contains standing water, other methods to transport the drilling and trench excavation equipment, such as barges or other specialized equipment may be employed. Due to the methods of transport across the water, disturbance to the lakebed when there is standing water will be negligible.

Standard drilling methods will be used and may include HSA, direct push, sonic, or CPT. It is assumed that excavation of the test pits will be performed with a track hoe. The geotechnical program that will be implemented to meet the objectives is presented below.

2.2.4 Schedule

The exploration program is anticipated to begin as soon as the Exploration EA is approved. The fieldwork for the brine confirmation and geotechnical testing is expected to take up to 4 months to complete.

The hydrology wells will be installed in two phases. Some of the wells will be installed in 2011. The second group of wells will likely be installed during the spring or summer 2012. The BLM will be notified at least 30 days prior to mobilization for the second phase of work.

Water level measurements, groundwater sampling, inspections, and other period work will continue after the wells have been installed. This work will consist of light vehicle traffic only, following established roads. Reclamation inspection activities will continue for at least 3 years after reclamation has been completed, or until vegetation has been re-established, where appropriate.

2.2.5 Environmental Protection Measures

Surface and Ground Water

Water from development of wells or the performance of pump tests will be clean water that will be directly discharged to the ground surface. No water will be injected into the wells, nor will chemicals or other potential contaminants will be applied to the ground surface or subsurface. Therefore, protection of surface and groundwater is assumed to be limited to erosion and potential surface water sedimentation associated with surface disturbance related to equipment access and drilling and excavation activities. Erosion of soil at water discharge locations will be avoided by ensuring that infiltration of water into the soil is occurring, and that flows are not so high that surface soils are eroded.

All drilling outside of the lakebed will be located near existing access roads to minimize the amount of disturbance of vegetation and soils. Off-road transportation of drill rigs will be limited to times when the soils are reasonably dry to minimize disturbance. These areas will be reclaimed. Water from well development will be directly discharged to the nearest drainage feature. Due to the arid nature of the site and the lack of water, the water will quickly infiltrate into the ground.

On the lakebed, drilling would occur in areas with a wide range of surficial conditions. Drilling and excavation on the lakebed will be done using track-mounted vehicles or other suitable methods which will minimize rutting, natural restoration will occur due to seasonal flooding and re-deposition of sediment. Much of the lakebed is sufficiently solid to allow passage of drilling rigs and geotechnical testing equipment without causing deep rutting, but other portions would have saturated soils or the presence of shallow water. Peak Minerals will restrict movement on the lakebed to established travel lanes to reduce the aerial extent of disturbance. While the lakebed surface would be disturbed from access in the wetted locations, it is expected that following drilling the soils would re-level to their original topographic contours. Natural restoration will occur due to seasonal flooding and re-deposition of sediment. Water from wells or test pits on the lakebed will be discharged directly to the surface where it will evaporate or infiltrate.

Fire

Within the potash lease areas, there is minimal vegetation to support a fire. Along the foothills sufficient vegetation may exist to support a fire. To prevent the possibility of creating a fire, care will be taken to park vehicles and run generators in areas where vegetation does not come into contact with hot engines or mufflers. When conducting “hot” activities, torches, welders, etc. will be limited to areas that are clear of flammable materials or have been cleared of flammable materials. A fire extinguisher and a spotter will be present during any “hot” activities. The spotter’s job is to watch for possible ignition of flammable materials while “hot” activities are conducted and to alert others of a potential ignition and extinguishing any ignited material.

Fugitive Dust

Under the reasonable development scenario, ground-disturbing activities on and off lease have the potential to create fugitive dust. Sevier Dry Lake constitutes a large source of dust during high-wind events but, per Utah Division of Air Quality (UDAQ) requirements, any drilling or excavation activities will require a dust-control plan. A Fugitive Dust Control Plan has been developed and is included in **Appendix A**.

Cultural Resources

As outlined in the Programmatic Agreement, cultural inventories will take place prior to ground disturbing activities.

All identified cultural sites will be avoided through project redesign.

No surface disturbing activities may occur until permission is given by the AO.

Grazing

Cattle and sheep grazing occur on lands surrounding Sevier Lake; the lakebed itself is not managed for grazing due to lack of forage. The lands around Sevier Lake support very sparse vegetation with poor forage value due to the low elevation, aridity, and proximity to the salty Sevier Lake playa. No significant direct effects to the forage resource would occur. Additionally, reclamation of these areas will be performed, and revegetation stipulations would require a return to near-previous vegetation cover.

Wildlife

Disturbance to potential nesting and foraging habitats for migratory birds will be minimized through careful site-selection and installation of the wells. Disturbance will be limited to the drill sites, which will be located near existing roads. Raptors are not likely to be affected by exploration activities because sounds from exploration would be dispersed across the vast area, a prey base is lacking on the lakebed, and the closest mountains that may provide suitable nesting habitat are far from the lake.

Negligible habitat value for large mammals exists on the Sevier Lake bottom, although the Utah Division of Wildlife Resources heritage database identifies substantial to critical habitat value for pronghorn and mule deer around the perimeter of the lake and the surrounding area. However, because the area that will be disturbed is very limited, impacts are expected to be negligible.

Public Safety

The project area is bounded on the north end of the lakebed by U.S. Highway 6/50. The project area on the south end of the lakebed is bounded by Blackrock Road. There is likely to be limited recreational and potentially livestock-related traffic near the project areas during the time the exploratory work is performed. During heavy construction activities (drilling and excavation), access to the immediate vicinity of the work will be blocked off using traffic cones and/or barricades to discourage entry. All open test pits will be continuously manned and identified with flagging to prevent traffic on the lakebed from entering the excavation. Test pits will be backfilled after completion of testing.

Under no circumstances will workers be allowed to enter a test pit deeper than 5 feet unless side slopes have been cut back to acceptable U.S. Occupational Safety and Health Administration (OSHA) standards and an experienced geologist or engineer has determined the pit safe to enter. Material excavated from the pit will be piled far enough from the edge of the excavation so that pit stability will not be influenced by the weight of this surcharge.

No chemicals, debris, equipment, or other materials will be left onsite after work has been completed. The site will be cleaned up and will be reclaimed.

2.3 Alternative B – No Action

Under the No Action Alternative, the BLM would not issue an Exploratory Mining permit to Peak Minerals. Previously authorized uses of BLM-managed lands would continue. Mineral resources would not be explored in the Sevier Lake basin as approved in the Leasing EA and awarded by sale to Peak Minerals, Inc.

3.0 AFFECTED ENVIRONMENT

3.1 Identification of Issues

The Leasing EA identified issues related to the Sevier Lake Potash leasing program through public scoping, consultation with federal, state, and tribal entities, and development of an Interdisciplinary Team (IDT) resource checklist (IDT Checklist; **Appendix C**). Most of the relevant issues would not result from the lease action itself, but rather from resulting development activities. Issues were identified based upon a conceptual determination of realistically foreseeable development scenarios. Several resources were dismissed from further analysis in the Leasing EA for the reasons provided in the IDT Checklist (BLM, 2011).

Issues relevant to the Exploration EA were developed by reviewing the Leasing EA. Specifically, resource areas brought forward for analysis in the Leasing EA were considered for analysis in the Exploration EA. The particular issues analyzed for each resource area in the Leasing EA were reviewed with respect to whether they would apply in any way to the project's exploration phase.

The ID checklist for the Leasing EA also was reviewed for other potential issues that might be germane to the Exploration EA. One issue, Special Status Plant Species, had the analysis deferred to the project development phase and, for that reason, it was not analyzed in the Leasing EA. Therefore, Special Status Plant Species was added as a resource area potentially needing analysis in the Exploration EA. Consequently, a survey was performed to determine the presence of rare plants. The survey yielded no suitable habitats for these species within the areas proposed for ground-disturbing activities, so Special Status Plant Species was eliminated from further analysis (CH2M HILL, 2011a).

A request to establish Sevier Lake as an Area of Critical Concern (ACEC) was submitted to the BLM. BLM completed a preliminary evaluation of the proposal, and concluded that the area does not meet the requirements to be eligible as an ACEC.

Additionally, during preparation of the EA, the public was notified of the proposed action by posting on the Environmental Notification Bulletin Board. Scoping was initiated on June 6, 2011; the Fillmore Field Office did not receive any public input. A 30-day public comment period was open from August 3, 2011 through September 2, 2011, and was then extended through September 9, 2011, at the request of the Southern Utah Wilderness Alliance (SUWA). Comments were received from SUWA, the Utah Audubon Council, and Terry Morasco. A summary of the comments are provided in **Appendix B**, with a brief response to each comment.

The rationale for including or excluding a particular resource and issue is presented in the IDT Checklist for the Exploration EA (**Appendix C**). Through this issues analysis, the following resources were determined to warrant analysis in the Exploration EA:

- Air Quality
- Cultural Resources
- Livestock Grazing
- Migratory Birds
- Water Resources
- Wetlands and Riparian Zones
- Wildlife Other than Special Status Species
- Threatened, Endangered, Candidate, or Sensitive Animal Species.

Of the resource areas brought forward for analysis in the Leasing EA, the following resources were determined not to warrant analysis in the Exploration EA:

- Floodplains
- Socioeconomics
- Visual Resources.

As explained above, Special Status Plant Species also was eliminated from further analysis in this Exploration EA. In addition, the BLM FFO completed a Wilderness Character inventory in 2011, which found that the Project area does not have wilderness characteristics. No Project features are within a proposed or designated wilderness area. Therefore, this resource area was not analyzed in the Exploration EA.

3.2 General Setting

3.2.1 Geography

Sevier Lake, in Millard County, is about 30 miles southwest of Delta and 25 miles north-northwest of Milford, in west-central Utah. The lake's northern end is accessed from U.S. Highway 6/50, about 37 miles southwest of Delta. The lake's southern end is accessed from State Road 257, about 48 miles south of Delta to the Black Rock railroad siding, and then about 13 miles west (**Figure 1**).

Sevier Lake is located in a broad valley 10 to 15 miles wide, bounded by the north-trending, Cricket Mountains to the east and by the Black Hills and House Range to the west. The San Francisco Mountains lie just south of the lake and the Wah Wah Mountains are to the southwest with the Wah Wah Valley between them. To the north of Sevier Lake is the gently south-sloping surface of the Sevier Desert.

Sevier Lake lies at an elevation of about 4,517 to 4,520 feet above mean sea level (amsl). The lake is a flat, vegetation-free playa at the terminus of the Sevier Lake basin. Since the late 19th century, surface water inflow from the Sevier River to Sevier Lake has progressively diminished

because of the expansion of irrigation in the area upstream; surface water flow rarely exceeds upstream demands and provides inflow to the lake. This inflow occurs only during periods of excessive precipitation or upstream reservoir spillage. Since the early 1900s, substantial inflow from the Sevier River to Sevier Lake has been documented in 1909-10, 1914, 1923, in the early 1980s, and 2011. For most of the 20th century, Sevier Lake has been dry (Wilberg, 1991). The current year has had unusually high snowmelt and has inundated much of the northern portion of the lake as of July 2011, when the wetted extent began shrinking in size. When water flows into Sevier Lake, it is generally limited to the northern half of the Lake and is shallow, as observed in 2011.

3.2.2 Climate

The climate zones in the Sevier Lake basin include desert (arid) on the playa floor and steppe (semiarid) on the alluvial slopes and at the higher mountain elevations. Stands of conifers indicate that limited areas of undifferentiated highland climate (sub-humid to humid) might occur at elevations above 7,000 feet (Wilberg, 1991).

Average monthly high and low temperatures and total precipitation data for the Black Rock, Delta, Deseret, Milford, and Wah Wah Ranch stations – all in the vicinity of Sevier Lake – are given in Table 4 of Gwynn (2006). These data show that neither temperature nor precipitation vary greatly across the Sevier Lake area. The average high daily temperature is 66.4 degrees Fahrenheit (°F), and the average low daily temperature is 33.5°F, with an average of 8.03 inches of annual precipitation (Gwynn, 2006).

3.2.3 Vegetation

Within the study area, the following five vegetation zones exist, in order of greater altitude: salt flats, salt desert scrub, sagebrush-grassland, desert woodland, and montane forest. The salt-flats zone, which includes pickleweed, iodine bush, salt grass, and other halophyte associations, is next to the mudflats and playa and is characterized by highly saline soils and abundant soil moisture. The salt-desert scrub zone, which includes greasewood, shadscale, and kochia plant associations, is on slightly higher ground and is characterized by well-drained soils that have large salt and alkali content and small organic matter content. The sagebrush-grassland zone, which includes the grassland associations and numerous sagebrush associations, as well as rabbitbrush, is at higher elevations. The desert-woodland zone, dominated by the pinyon-juniper association, typically is found at elevations ranging from 5,000 to 8,000 feet. The montane-forest zone, which primarily consists of pine and fir conifer trees, is limited to the highest parts of the San Francisco Mountains that have north-facing slopes (Wilberg, 1991).

3.3 Air Quality

The Environmental Protection Agency (EPA) Office of Air Quality Planning and Standards and the Utah Division of Air Quality (UDAQ) have set National Ambient Air Quality Standards (NAAQS). The NAAQS identify the following criteria pollutants: nitrogen dioxide (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), particulate matter smaller than 10 microns in

aerodynamic diameter (PM₁₀), particulate matter smaller than 2.5 microns in aerodynamic diameter (PM_{2.5}), ozone (O₃), and lead (Pb). NAAQS are indicated in Table 3-1, *National Ambient Air Quality Standards*.

Tail pipe emissions and fugitive dust are of primary concern. Millard County is an attainment area for the NAAQS, for all criteria pollutants, including PM₁₀ and PM_{2.5}, components of fugitive dust. The majority of emissions in Millard County are attributable to fugitive dust from agricultural and construction activities. The air quality is generally very good, with the exception of dust storms. In addition, smoke from wildfires and prescribed burning can impact ambient air quality on a seasonal basis.

The soils on Sevier Lake are poorly developed and tend to have a high wind erodibility index (NRCS 1993). Frequent windy conditions in the wide open expanses of the West Desert pick up dust and salt, particularly from alluvial fans and playas such as Sevier Lake in basin areas, contributing to hazy conditions as far away as Salt Lake City and the Wyoming western border (Struthwolf 1997).

TABLE 3-1

National Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS
Carbon Monoxide	1 hour	40,000 µg/m ³
	8 hour	10,000 µg/m ³
Lead	Rolling 3-month average	0.15 µg/m ³
Nitrogen Dioxide	1 hour	100 ppb
	Annual	53 ppb
Ozone	1 hour	0.12 ppm
	8 hour	0.075 ppm
Particulate Matter (PM₁₀)	24 hour	150 µg/m ³
Particulate Matter (PM_{2.5})	24 hour	35 µg/m ³
	Annual	15 µg/m ³
Sulfur Dioxide	1 hour	75 ppb
	3 hour	0.5 ppm
	24 hour	0.14 ppm
	Annual	0.03 ppm

Source: NAAQS, 40 CFR Part 50

3.4 Cultural Resources

A Class I literature review was conducted that included a 1-mile buffer around the lease parcels (Baxter, 2010). Based on the review of records presented in the Sevier Lake potassium leasing proposal, 25 previously recorded archaeological sites are present in the APE. All of these sites

are located along the northeastern margins of Sevier Lake near the mouth of the Sevier River; 15 are located within the boundary of the Sevier Lake potassium leasing area and 10 are located on lands outside the leasing area. There is a moderate chance that additional prehistoric sites would be located near the margins of Sevier Lake. An updated Class I will be completed and included in the Class III inventory report.

Native American consultation was initiated on June 8, 2011, when BLM sent a letter to tribes inviting them to comment and provide assistance in identifying properties of traditional, religious, or cultural importance. To date, no concerns have been identified; however, consultation will remain open through the course of the exploration project.

3.5 Livestock Grazing

Livestock grazing is a primary land use in the area around Sevier Lake, although the lake itself is not managed for grazing due to lack of forage. Roughly 8,000 acres of the Sevier Lake leasing area falls within the edges of eight allotments that surround Sevier Lake. The lake basin itself is not part of an allotment.

Allotment lands that fall within the Sevier Lake lease area support very sparse vegetation with poor forage value, due to the low elevation, aridity, and proximity to the Sevier Lake playa. Stocking rates are low and livestock tend to graze areas away from the playa where forage is better. No fences separate allotments from the lake, or run between the allotments on land immediately surrounding the lake. There is a fence between the Seely and the Deseret Allotments at the northeast end of the lake that may be within the lease area, and there is cross fencing on the Deseret Allotment. Several stock watering locations are located near or within the Sevier Lake lease area.

3.6 Migratory Birds

The Migratory Bird Treaty Act of 1918 (MBTA) made it illegal for people to “take” migratory birds, their eggs, feathers, or nests. Migratory birds include various types of native birds from songbirds to raptors, or birds of prey, such as hawks, owls, and eagles. The Bald and Golden Eagle Protection Act affords additional protection to all bald and golden eagles (U.S. Fish and Wildlife Service [USFWS], 2010). The Sevier Lake leasing area is within the southeastern corner of the Great Basin Bird Conservation Region (BCR 9). The Birds of Conservation Concern (BCC) list for BCR 9 includes 28 species of birds, including ferruginous hawk, golden eagle, peregrine falcon, green-tailed towhee, brewer’s sparrow, and others. Some of these birds also are designated as U.S. Bureau of Land Management (BLM) sensitive species.

Bird surveys were conducted from March through September 2011 to document avian use within and around Sevier Lake. Surveys are continuing, and additional data will be collected and analyzed to document bird presence as per the Wildlife and Plant Inventory Plan (**Appendix D**). A list of the bird species and number observed at nine point count locations is provided in **Appendix E**, which supports the observation that very few waterbirds or shorebirds are present within Sevier Lake. There were a total of 459 bird observations from 10 monitoring periods at 9 stations for 20 minutes each, which yielded 0.26 birds per minute observed. There were no large flocks of waterfowl or shorebirds present within the Sevier Lake evaporation ponds or the wetted area north of Needle Point, indicating the Lake was not used as a stopover during the period of study. During field observations by the BLM, no brine flies or brine shrimp that would serve as a food resource were observed within the Lake. There was no consistent use by birds on the lakebed or in the solar evaporation ponds, although typical west Utah salt desert shrub upland species are present around the leasing areas. One golden eagle was observed flying over the project area during the bird surveys.

3.7 Water Resources

The Great Basin, an area of internal drainage within the Basin and Range Province, covers approximately 200,000 square miles and includes most of Nevada, a large part of western Utah, and portions of other states (see Figure 4 in Gwynn, 2006). The Sevier Lake basin (see Figure 5 in Gwynn, 2006) covers approximately 16,200 square miles, and comprises the larger Sevier River basin and the smaller Cedar/Beaver River basin.

3.7.1 Surface Water

Surface water inflows to the Sevier Lake area include the Sevier River and local, ephemeral streams that flow in response to snowmelt or rainfall. The nearly complete use of available surface water supplies by upstream water users or in storage retention facilities (i.e., reservoirs and irrigation) effectively limits the volume of water that flows into Sevier Lake. Unusually wet climatic conditions during the early to mid-1980s, however, resulted in record runoff of about 2.27 million acre-feet from 1983 to 1987 in the Sevier River, and inundated much of Sevier Lake, which reached a maximum lake level of 4,527 feet AMSL in June of 1985. The flooding that occurred in 1983-84 caused extensive damage well beyond the confines of the Sevier River (Walker 2001).

3.7.2 Groundwater

The carbonate rocks of western Utah and adjoining parts of Nevada are believed to form a regional aquifer system within the Great Basin. The regional groundwater flow system is suspected to move between basin-fill aquifers through fractures, faults, and solution cavities in the consolidated carbonate rocks, generally from east to west (i.e., from the Milford area and the Sevier Desert toward Tule Valley). However, data demonstrating this regional groundwater flow are uncertain.

Groundwater depths in the basin-fill aquifer within the Sevier Lake basin are known from water levels measured in existing wells. The basin-fill aquifer has been divided into two informal units – the coarse-grained facies (rock formations with specific characteristics), represented by the higher elevation alluvial slopes, and the fine-grained facies, represented by the lower elevations around the Sevier Lake playa. The basin-fill aquifer is recharged at adjacent mountain fronts by infiltration of ephemeral surface water runoff and from direct infiltration of precipitation. Additionally, recharge also occurs by subsurface inflow from consolidated rocks of adjacent mountain areas and from adjacent basin-fill deposits.

3.8 Wetlands and Riparian Zones

3.8.1 Wetlands

There are no Section 404 (Clean Water Act) jurisdictional wetlands within the Sevier Dry Lake leased area (BLM 2011). The northeastern portion of the lake, where the Sevier River enters, has some tamarisk present, but the three environmental parameters (hydrology, soil, and vegetation) required to make a jurisdictional determination are not present. A field survey for wetlands in and around Sevier Lake within Peak Mineral's leased parcels confirmed the determination that no jurisdictional wetlands are present within the parcels.

Impacts to Jurisdictional Waters of the U.S. (WOTUS) would be regulated by the U.S. Army Corps of Engineers (USACE).

Waters of the United States are regulated when they meet specific criteria or have been designated by the U.S. Army Corps of Engineers (USACE), but it is not obvious that Sevier Dry Lake meets the criteria, and no determination has yet been made for Sevier Dry Lake by the USACE. For purposes of exploratory testing, the work could be conducted with the assumption that, if the Sevier Dry Lake is a Jurisdictional Water of the U.S. (WOTUS), work could be conducted under Nationwide Permit 6 - Survey Activities. Use of Nationwide Permit 6 does not indicate that the BLM or Peak Minerals believes that Sevier Dry Lake is a WOTUS.

3.8.2 Riparian Zones

In spite of diminished stream flows in the lower Sevier River, there is a riparian corridor associated with some of its stream channel. Describing the river at a location about 10 miles upstream of the Sevier Lake, outside of the proposed leases, Milford Wind Corridor, LLC (2008) noted the presence of a relict riparian fringe along the main channel and along abandoned side channels and meanders. They further noted that tamarisk (or salt cedar; *Tamarix* spp.), a non-native invasive weed and State of Utah noxious weed, and salt grass (*Distichlis spicata*) were the dominant species in these streamside communities.

Along the shores of Sevier Lake, riparian vegetation is nonexistent, with the exception of some dead tamarisk along the northern edge near the mouth of the Sevier River outside of Peak Mineral's leased parcels (BLM 2011). An EA (BLM 1987) prepared in 1987 for a brine mining operation on Sevier Lake noted that vegetation above the lake's high water line consisted of

Indian ricegrass (*Oryzopsis hymenoides*), fourwing saltbush (*Atriplex canescens*), and horsebrush (*Tetradymia* spp.), all of which are upland plants. The EA did not mention any vegetation below that elevation, nor was there any mention of riparian or wetland conditions.

3.9 Wildlife Other than Special Status Species

Pronghorn are the primary large mammal species known to occur in the Sevier Lake leasing area and on adjacent lands. Pronghorn are often found in small groups and are usually most active during the day. From February through September there were a total of six antelope observed during the field surveys. Observations were of one or two antelope at a time, and all were on the south or southeastern lands around Sevier Lake. Utah Division of Wildlife Resources designated pronghorn crucial, year-long habitat on the north, east, and south sides of Sevier Lake. Mule deer yearlong habitat is present in areas off-lease, in the Cricket Mountains and House Range. No mule deer were observed during the surveys. The Cricket Mountains and House Range also provide Chuckar partridge habitat. A Wildlife Mitigation Plan has been developed that will accompany activities associated with exploratory testing (**Appendix F**).

3.10 Threatened, Endangered, Candidate, or Sensitive Animal Species

In the Leasing EA, the BLM FFO found that the federally listed animal species known to occur in Millard County do not occur within or reasonably near the project area and concluded a “no effect” determination for those species.

The Utah BLM adopts the existing UDWR Utah Sensitive Species List (UDWR 2011), which is available at <http://dwrcdc.nr.utah.gov/ucdc/viewreports/sslist.htm>. This means that the BLM uses the official UDWR Utah Sensitive Species List that is in place at the time of a given action. **Table 3-2** identifies Utah sensitive wildlife species with known or potential occurrence within the project area.

TABLE 3-2

Utah Sensitive Wildlife Species with Known or Potential Occurrence in the Project Area

Common Name	Scientific Name
Bald eagle	<i>Haliaeetus leucocephalus</i>
Short-eared owl	<i>Asio flammeus</i>
Burrowing owl	<i>Athene cunicularia</i>
Ferruginous hawk	<i>Buteo regalis</i>
Northern goshawk	<i>Accipiter gentilis</i>
Long-billed curlew	<i>Numenius americanus</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>

TABLE 3-2

Utah Sensitive Wildlife Species with Known or Potential Occurrence in the Project Area

Common Name	Scientific Name
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>
Western red bat	<i>Lasiurus blossevillii</i>
Big free-tailed bat	<i>Nyctinomops macrotis</i>
Kit fox	<i>Vulpes macrotis</i>

Burrowing owls were observed east of the project area in the course of the wildlife surveys conducted during March through June 2011, but no Utah Sensitive Species were observed within the project area.

4.0 ENVIRONMENTAL IMPACTS

4.1 Proposed Action

This section analyzes the impacts of the Proposed Action to those resources described in the Affected Environment, Chapter 3.

4.1.1 Air Quality

Project sources of air emissions, pollutants emitted, and factors contributing to the magnitude of project emissions are provided in Table 4-1, *Project Emission Profile*.

TABLE 4-1

Project Emissions Profile

Activity	Pollutants	Factors
Drilling	Particulates	Number of holes drilled
Vehicle Fugitive Dust from Unpaved Roads and Shallow Tracks	Particulates	VMT, road conditions (e.g., silt loading, silt content, moisture content and vehicle weight)
Disturbed Areas	Particulates	Acres disturbed

Support Equipment Exhaust	CO, NO _x , VOCs, particulates, SO ₂ , CO ₂	Hours of operation
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Ground disturbing activities on and off the Sevier Lake Potash Lease during the exploration phase have the potential to create low levels of fugitive dust. Activity levels associated with the exploration program would be relatively low, because traffic would be below 20 trips per day. The drilling operation would cause very limited dust, because the majority of the drilling tailings would be saturated. To minimize impacts from fugitive dust, the site will follow the dust control measures in the fugitive dust plan found in **Appendix A**.

Support equipment will meet new emissions standards for Nonroad Diesel Engines by meeting Tier 2 or better standards. Exhaust emissions as a result are minimal.

Total emissions from the Proposed Action are summarized in Table 4-2, Project Emission Summary. Detailed emission calculations can be found in **Appendix A**. With the exception of PM₁₀, proposed emissions are below levels that would be suspected to cause an exceedance of ambient air quality standards or degradation of regional air quality. The current background in the area for 24 hr PM₁₀ is 83 µg/m³, based on the data collected at Graymont Western US Inc.'s Cricket Mountain facility, which is approximately 55% of the NAAQS. Considering the low emission levels and the controls in place as part of the fugitive dust plan, the additional PM₁₀ emissions associated with this Proposed Action are not expected to cause an exceedance of the 24 hr PM₁₀ NAAQS.

TABLE 4-2

Project Emission Summary

Source	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)	Hydrocarbon (HC) Emissions (tpy)	Carbon Monoxide (CO) Emissions (tpy)	Nitrogen Oxides (NO _x) Emissions (tpy)	Sulfur Dioxide (SO ₂) Emissions (tpy)	Carbon Dioxide (CO ₂) Emissions (tpy)
Drilling	0.25	0.04	N/A	N/A	N/A	N/A	N/A
Unpaved Roads	3.01	0.30	N/A	N/A	N/A	N/A	N/A
Disturbed	19.18	2.88	N/A	N/A	N/A	N/A	N/A

Areas							
Tailpipe Emissions	0.87	0.84	1.54	9.67	25.29	0.03	3031.28
Total	23.31	4.06	1.54	9.67	25.29	0.03	3031.28

4.1.2 Cultural Resources

The Area of Potential Effects (APE) for the Project will include the 95,172 acre Sevier Lake Potash Lease area and an area extending one mile from the exterior boundaries of the lease area.

A Class III cultural resources inventory will be conducted for all new access roads, existing roads that will require improvements, and all drill locations. The Class III inventory will be conducted within a 100-foot wide corridor by archaeologists walking 15-meter wide, parallel transects. Drill locations will be placed within the 100-foot corridor inventoried for access roads. All archaeological sites identified will be recorded on IMACS site forms to BLM standards. Areas with standing water or areas where muddy sediments preclude pedestrian survey will not be inventoried.

All known or newly identified archaeological sites within proposed access roads or drill locations will be flagged and avoided. Alternative access routes and/or drill locations will be selected to avoid all archaeological sites.

4.1.3 Livestock Grazing

Though Sevier Lake is surrounded by grazing allotments, the lake bed itself is not part of any allotment. Therefore, the large majority of the exploration activities will have no impacts on grazing allotments. However, as the boundary between the lake bed and the allotments is not fenced, it is possible livestock in adjacent allotments could enter the lake bed during exploration activities. As there is no forage or water sources within the lake bed to draw livestock into potential conflict with the exploration activities, this is not expected to be an impact.

A few brine resource wells on the extreme margins of the lake bed may fall within the adjacent grazing allotments. These wells would be located along the lakeside margin of the allotment, not within its interior.

Peak Minerals will coordinate with the BLM and the grazing allotment holder to identify areas of potential conflict should exploration activities coincide with the allotment's active period. If necessary, Peak Minerals will schedule activities within grazing allotments to avoid potential impacts to livestock. Therefore, impacts to livestock grazing are not expected.

4.1.4 Migratory Birds

Exploration activities could result in disturbance of migratory neo-tropical birds, shorebirds, and waterfowl during the nesting season. In preparation for the exploratory drilling effort, wildlife surveys of the areas that may be disturbed by the drilling program have been conducted as required by lease stipulation. Use of the leased areas by birds is very low.

No direct impacts to migratory bird species or raptors on the playa are anticipated because suitable habitat is lacking and the playa experiences low use by birds. Direct impacts resulting from vehicle collisions and upland well development could occur.

Indirect impacts associated with exploration and testing activities (e.g., increased noise, traffic, human activity) could impact foraging, roosting, breeding, and nesting behavior. Survey results found very low quality avian habitat within the lakebed, and marginal habitat along its margins. No raptor nests or suitable raptor nesting habitat were identified within 1 mile of exploration activities. Raptors are not likely to be affected by exploration activities because sounds from exploration would be dispersed across the vast area, a prey base is lacking on the lakebed, and the closest mountains that may provide suitable nesting habitat are far from the lake.

Impacts would be minimized by conducting exploration activities outside the nesting season and situating exploration features to avoid nesting and foraging areas where suitable nesting habitat exists. If exploratory activities were to be conducted during the nesting season, then pre-disturbance surveys would be conducted by a qualified biologist. If any active nests are identified, appropriate spatial and temporal buffers will be instituted until the nest has been determined no longer to be active (i.e., the nest has failed, the young have fledged, etc.). With these measures in place, impacts to migratory birds, including raptors, is expected to be less than significant.

Some of the wells are scheduled to be installed during the spring or summer of 2012, which includes the sensitive raptor season from January thru August and the sensitive passerine season from March 1 thru July 15. Upland well sites will be surveyed by a qualified biologist 72 hours prior to any ground disturbance, and spatial and temporal buffers will be established if active nests are identified. The BLM will be notified at least 30 days prior to mobilization of work during sensitive raptor or migratory bird seasons.

4.1.5 Water Resources

The Leasing EA identified water rights related to consumption from deep brine wells as an issue. During exploration and testing, extraction from deep brine wells will be limited to the withdrawal of very small amounts of fluids for well development and testing.

Under Utah Administrative Code Rule R655-4-9, The Approval Process for Non-Production Wells, the State Engineer can grant approval to construct a test well to for the purpose of determining characteristics of an aquifer. Although approval of a "Request for Non-Production Well Construction" is required for test wells deeper than 30 feet, a water right is not required for test pumping. Although the definition of Test Well in R655-4 stipulates that water from a test well cannot be put to beneficial use, R655-4-9.2.1 states: "Using available information and sources, the Division (of Water Rights) will evaluate the potential for the non-production well to become a contamination source or otherwise negatively impact the groundwater resource prior

to approval.” Further, the rule states that the Division shall deny the issuance of a well permit in areas where drilling and construction of wells can impact other water rights.

Peak Minerals will therefore submit a Request(s) for Non-Production Well Construction as directed by the state. Test wells will be installed in conformance with the applicable Rules and authorizations. Therefore, impacts to water resources, particularly water rights, are not expected.

4.1.6 Wetlands and Riparian Zones

The Leasing EA found that there are no defined wetlands associated with the Sevier Lake lakebed and no defined wetlands known within the lease area. Likewise, there is no riparian vegetation on the lakebed, although there is an area of low-value riparian vegetation along the river bank and lake edges where the Sevier River enters the lake outside of Peak Mineral’s lease area. Therefore, there would be no potential to impact riparian areas. If any impacts to riparian zones occurred, impacts would be inconsequential since it consists mostly of dead or dying tamarisk (targeted for removal anyway) and some salt grass.

Impacts to WOTUS would be regulated by the USACE. Though consultation with the USACE has begun, the jurisdictional status of WOTUS that may be present has not been determined. Regardless of jurisdictional status (that would indicate the need for USACE permitting), activities of the Proposed Action are allowable under Nationwide Permit 6 – Survey Activities. Exploration activities will be designed to remain in compliance with the conditions of Nationwide Permit 6, although no jurisdictional determination of the dry lakebed has been made.

Given the absence of wetlands, no impacts to riparian zones, and compliance with the conditions of Nationwide Permit 6, no significant impacts to wetlands or riparian zones are expected.

4.1.7 Wildlife Other than Special Status Species

The dry lakebed’s wildlife habitat value is very low and supports only incidental use by animal species; therefore no direct or indirect impacts to wildlife on the playa are anticipated to occur. However, substantial critical habitat for pronghorn and mule deer exists around the perimeter of the lake and the surrounding area, so this upland habitat could be affected by well drilling and travel related to exploration activities. Impacts will be minimized by situating exploration features to avoid identified critical habitats to the extent possible. In addition, because the area to be disturbed is very limited and any surface disturbance will be reclaimed, impacts to wildlife habitat are expected to be negligible and temporary.

Direct impacts resulting from vehicle collisions also could occur, but due to the short duration of the drilling program, such impacts will be short-term.

Indirect impacts associated with the drilling program (e.g., increased noise, traffic, humans) could impact movement patterns, foraging, and breeding behaviors. Impacts would be

minimized by conducting exploration activities outside critical breeding and rearing periods to the extent possible. Due to the short duration of the drilling program, indirect impacts related to exploration activities will be short-term.

4.1.8 Threatened, Endangered, Candidate, or Sensitive Animal Species

As indicated in Section 3.10, above, the Leasing EA concluded a “no effect” determination for federally listed animal species for any activities related to developing the mineral resource at Sevier Lake, including exploration activities.

As described for migratory birds and wildlife in general in Sections 4.1.4 and 4.1.7, respectively, the wildlife habitat value of the dry lakebed is very low and supports only incidental use by animal species; therefore no direct or indirect impacts Utah Sensitive Species on the playa are anticipated to occur. However, although no Utah Sensitive Species were observed within the project area during the course of the wildlife surveys of the project area conducted from March through June 2011, some of these species, such as burrowing owls (which were observed east of the project area) and kit fox, could occupy upland habitats surrounding the lake. If so, the impacts to Utah Sensitive Species would be as described in Section 4.1.7.

4.2 No Action Alternative

The No Action alternative would deny Peak Mineral’s application to implement a minerals exploration program at Sevier Lake. This alternative would not meet the need of the Proposed Action, and it would not fulfill the purpose and need of the Leasing EA. The nature and extent of developable minerals at Sevier Lake would remain unknown. Mineral exploration at Sevier Lake would only proceed under some other exploration plan permitted by the BLM in conformance with the WSRA RMP.

There would be no environmental impacts from the Proposed Action as it would be denied. Existing authorized uses would continue, including incidental grazing from adjacent allotments, though Sevier Lake would remain largely undeveloped. Future uses would be reviewed and approved by the BLM and/or other appropriate agencies.

4.3 Cumulative Impacts

Cumulative impacts are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions. Cumulative impacts could only occur for those resources that are affected by the Proposed Action and also affected by other actions whose impacts occur within the same area and timeframe.

The resources analyzed in Chapter 4 that have the potential to be adversely impacted by the Proposed Action are:

- Air Quality
- Cultural Resources
- Livestock Grazing

- Migratory Birds, Including Raptors
- Water Resources
- Wetlands and Riparian Zones
- Wildlife Other than Special Status Species
- Threatened, Endangered, Candidate, or Sensitive Animal Species.

The cumulative impacts area (CIA) is typically a resource-based area. The CIA for air quality is the local environment downwind of the project area. The cultural resources CIA is defined as the area of the Class I inventory, which includes a one-mile buffer outside the Sevier Lake potash leasing area. The watershed provides a reasonable area to review cumulative effects to water resources, wetlands, and riparian zones. The CIA for migratory birds and wildlife is defined as the Sevier Lake potash leasing area plus an approximate 5-mile buffer. The CIA for livestock grazing includes the grazing allotments that border the leasing area. The purpose of this cumulative impacts analysis is to describe the interaction among the effects of the proposed action and the various past, present, and reasonable foreseeable future actions within the CIAs for each resource.

Past and Present Actions

Section 4.3.1 of the Leasing EA (BLM, 2011) identifies past and present actions that currently affect the same components of the environment as the Proposed Action in this Exploration EA. These actions remain an accurate representation, and are adopted for this analysis.

Reasonably Foreseeable Action Scenario (RFAS)

Section 4.3.2 of the Leasing EA (BLM, 2011) identifies the RFAP that currently affect the same components of the environment as the Proposed Action in this Exploration EA. These actions remain an accurate representation, and are adopted for this analysis.

Cumulative Impacts

Air Quality: Pipeline and transmission line projects in the RFAS have the potential to contribute fugitive dust to the CIA. Project-related fugitive dust will be analyzed and managed in each project's respective environmental analysis. Most fugitive dust would be construction-related; therefore, additive impacts from fugitive dust would occur only when construction activities coincide. This is not expected to cause significant cumulative impacts.

Cultural Resources: Only the Transwest and PacifiCorp Energy Gateway South Transmission Line Projects listed in the RFAS would occur within the cultural resources CIA. Cumulative impacts to cultural resources would be similar to those described for Alternative A, since minimal activity is known to have occurred or is proposed for the exploration area. Activities would be completed under the oversight of Section 106 of the National Historic Preservation Act (NHPA) if there were a federal nexus and thus project impacts would be individually

addressed. The effects of adding the Proposed Action to existing cultural resource disturbances would be negligible.

Livestock Grazing: Pipeline and transmission line projects in the RFAS have the potential to cumulatively impact grazing in the CIA. However, given that the impacts of the Proposed Action are expected to be negligible, the cumulative impact would be negligible.

Water Resources: Agricultural interests have greatly altered the hydrologic regime associated with lower Sevier River and Sevier Lake for more than 100 years. This is expected to continue for the long term future, thus the hydrology of Sevier Lake is and will continue to be impacted regardless of whether the Proposed Action is approved. The lakebed has been the site of fertilizer production activities in the past – remnants of associated structures remain in the lake’s floodplain. Any proposed operations that result from exploration would further affect an already artificially functioning surface/groundwater system.

Given that the impacts of the Proposed Action on groundwater are expected to be negligible, the cumulative impact of exploration activities would be negligible.

Wildlife and Migratory Birds: It is unlikely that there would be cumulative impacts to wildlife and migratory birds in the area. Other past, present, or reasonable foreseeable activities (e.g., grazing and recreation) affect the same resources as the Proposed Action, which diminishes the contribution of any incremental impacts from the Proposed Action to cumulative impacts.

Wetlands and Riparian Zones: Projects in the RFAS occur within the same watershed as the Proposed Action, but not within the same immediate area affecting the same resources. Given that there would be no impacts of the Proposed Action on wetlands and riparian zones, the cumulative impact of exploration activities would be negligible.

5.0 PERSONS, GROUPS, AND AGENCIES CONSULTED

The issue identification section of Chapter 3 identifies those issues analyzed in detail in Chapter 4. The IDT Checklist (**Appendix C**) provides the rationale for issues that were considered but not analyzed further.

A 30-day public scoping period was initiated on June 6, 2011, to invite comments on the Sevier Dry Lake Exploratory Testing Plan. A project description was available on the Environmental Notification Bulletin Board (ENBB) during the scoping period. The BLM did not receive any public input during scoping. Native American consultation was initiated during the scoping period; The Utah tribes consulted expressed no concern.

A 30-day public comment period was open from August 3, 2011 through September 2, 2011, and was then extended through September 9, 2011, at the request of the Southern Utah Wilderness Alliance (SUWA). Comments were received from SUWA, the Utah Audubon Council, and

Terry Morasco. A summary of the comments are provided in **Appendix B**, with a brief response to each comment.

The issues were identified through the public and agency involvement process involving parties identified below.

Table 5-1 List of all Persons, Agencies and Organizations Consulted

Name	Purpose and Authorities for Consultation or Coordination	Findings and Conclusions
U. S. Fish & Wildlife Service	Information on Consultation, under Section 7 of the Endangered Species Act (16 USC 1531)	No Threatened, Endangered or Candidate species likely to occur in project areas
Utah Division of Wildlife Resources	Information on big game use in Sevier basin	Some crucial year-round range is present for pronghorn antelope and yearlong range for mule deer, but outside of Sevier Lake
U.S. Army Corps of Engineers	Jurisdictional Status of Sevier Dry Lake under Section 404 of the Clean Water Act	Current exploratory plan would be covered under Nationwide Permit 6 with no pre-construction notification required
Utah State Historic Preservation Office (SHPO)	Consultation for undertakings, as required by the National Historic Preservation Act (NRHP) (16 USC 470)	Section 106 consultation has been initiated and will proceed as identified in the PA.

Paiute Tribe of Utah (PITU) Kanosh Band of Paiute Tribe Confederated Tribes of the Goshute Reservation Skull Valley Goshute Tribe Uintah Ouray Ute Tribe	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531)	Consultation letters were sent on June 8, 2011, providing information on the project and inviting the tribes to comment and identify any concerns. The Tribes have not responded identifying any concerns relative to the proposed action
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Table 5-2 presents the BLM and non-BLM preparers of this EA.

Table 5-2 List of Preparers

BLM Preparers

Name	Title	Responsibilities
Jerry Mansfield	Geologist	Project Lead
Bill Thompson	Rangeland Management Specialist	Soils
Steve Bonar	Outdoor Recreation Planner	Visual, ACEC, Wilderness, Recreation
Paul Caso	Rangeland Management Specialist	Range, Soils , Water, Air
Teresa Frampton	Realty Specialist	Lands and Realty
Jim Priest	Wildlife Biologist	Wildlife Biology, Threatened, Endangered, Sensitive Species, Migratory Birds
Joelle McCarthy	Assistant Field Manager	Cultural Resources, Native American Religious Concerns
RB Probert	Weed Specialist	Vegetation, Invasive Species/Noxious Weeds

Randy Beckstrand	Assistant Field Manager, Renewable Resources	Environmental Justice, Wildlife
Gary Bishop	Assistant Fire Management Officer, Fillmore	Fuels/Fire Management
Eric Reid	Wild Horse and Burro Specialist	Wild Horses and Burros
Bill Thompson	Rangeland Management Specialist	Range, Wetlands, Farmlands
David Whitaker	Rangeland Management Specialist	Range, Vegetation

Non-BLM Preparers – CH2M Hill, Inc.

Name	Title	Responsibilities
Deron Lawrence	Project Manager	Technical coordination, quality control, wildlife, migratory birds
Matt Kizlinski	EA Coordinator, Project Scientist	Air quality, livestock grazing, water resources, wetlands and riparian zones, cumulative impacts
Sandy White	Senior Scientist	Vegetation, special status animals, technical editing
Ashley Campsie	Senior Scientist	Air Quality
Aaron Fergusson	Cultural Resources Specialist	Cultural resources
Zach Valchar	GIS Analyst	GIS data, mapping
David Waite	Engineer	Proposed Action
Gary Colgan	Hydrogeologist	Proposed Action

6.0 REFERENCES

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FIGURES

Figure 1 - Project Location Map

Figure 2 - Sevier Dry Lake Leasing Area

Figure 3 - Brine Resource Confirmation Locations

Figure 4 - Hydrology Locations

Figure 5 - Geotechnical Locations

APPENDIX A Fugitive Dust Control Plan

APPENDIX B Comments and Comment Responses on Draft EA

APPENDIX C Interdisciplinary Team Checklist

APPENDIX D Wildlife and Plant Inventory Plan

APPENDIX E List of Birds Observed, April to September 2011

APPENDIX F Wildlife Mitigation Plan