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American Potash Green River Potash Project Exploration Plan

ENVIRONMENTAL ASSESSMENT

DOI-BLM-UT-Y010-2022-0026-EA

Location:

Township (T.) 24 South (S.), Range (R.) 17 East (E.), section 34;
T. 24 S., R. 17 E., section 24;
T. 24 S., R. 18 E., section 28; and
T. 25 S., R. 17.5 E., section 12.

Applicant Address:

American Potash, LLC
241 Ridge Street, Suite 210
Reno, Nevada 89501

**Moab Field Office
82 East Dogwood Avenue
Moab, UT 84532
435-259-2100**

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CHAPTER 1. INTRODUCTION

American Potash, LLC (American Potash or the Operator) submitted a Plan of Operations for Exploration (Exploration Plan) (American Potash, 2021) to the Bureau of Land Management (BLM) Moab Field Office (MFO) to drill four exploration holes on federal lands in Grand County, Utah, to collect geologic data about potentially valuable mineral deposits of potash minerals like KCl (the most common, sylvite), K_2CO_3 , KNO_3 , $KMgSO_4$, K_2SO_4 , and lithium minerals like Li_2CO_3 . The Exploration Plan accompanies the submission of eleven potash prospecting permit applications (PPAs) that cover an area of 25,480.23 acres to explore for potash minerals within an area designated by the BLM as the Red Wash Potash Leasing Area (PLA). The proposed exploration area is located approximately 21 miles northwest of the town of Moab, Utah and 27 miles southeast of the town of Green River, Utah in the Spring Canyon Point area between the geographic features of Spring Canyon and Ten Mile Wash that are adjacent to the Green River.

American Potash proposes to drill four exploration holes to collect geophysical data, rock core, and fluid samples to test for economic quantities of potash resources in the Paradox formation and lithium resources from the Leadville formation. Surface disturbance for the project would include the construction of drill pads and turnouts on designated roads (these are roads designated open for travel in the Moab Resource Management Plan (RMP; BLM, 2008)) and the construction of short access routes from the designated roads to the drill pad locations. The total proposed surface disturbance is approximately 16.97 acres. The drill holes would be plugged after data collection is complete. The drill hole pads, pad access routes and turnouts on the designated roads would be reclaimed after drilling is completed.

The Exploration Plan submitted to the BLM contained an additional four exploratory drill holes proposed on Utah School and Institutional Trust Lands Administration (SITLA) managed lands within the Red Wash PLA boundary (see Map 1). The proposed locations would be used to evaluate the extent and grade of potential potash mineral deposits and to determine the presence of lithium minerals and are independent of the locations proposed on federal lands. The drilling of the locations proposed on SITLA lands is not contingent on the drilling of the locations on federal lands. The exploration activities proposed on SITLA parcels are analyzed as part of the cumulative impact analysis in this Environmental Assessment (EA).

The BLM reviewed the Exploration Plan for content as required in 43 C.F.R. § 3505.45 and accepted it as complete on January 28, 2022. The Exploration Plan is being evaluated in this EA in compliance with the National Environmental Policy Act (NEPA) to disclose and analyze the environmental consequences of the proposed exploratory activities. The EA assists the BLM in project planning by evaluating the potential significance of environmental impacts. As defined by the Council on Environmental Quality, the significance of a federal action is determined by the context of the action in relation to the overall project setting, as well as the intensity of direct, indirect, and cumulative effects resulting from the project.

If the BLM determines that the preferred alternative would not result in significant impacts beyond those already addressed in the RMP, a Decision Record (DR) and Finding of No Significant Impact would be prepared approving the selected alternative. If the project is found to result in significant impacts, an Environmental Impact Statement (EIS) may be prepared.

1.1. Background

1.1.1. Potash Prospecting on BLM-administered Federal Lands

Potash refers to a variety of ore-bearing minerals and refined products that contain the element potassium in a water-soluble form. Potash is classified as a non-energy solid leasable mineral on federal lands and may be leased for development in one of two ways:

(1) If it is unknown whether an area contains valuable potash deposits, an interested party may obtain a potash prospecting permit, which grants it the exclusive right to explore for potash, and, if a valuable deposit is found, that party may qualify for a noncompetitive lease; or

(2) If the BLM has access to information which shows that valuable deposits of potash exist in an area, the area may be classified and designated a Known Potash Leasing Area (KPLA), where prospecting permits may not be issued, and any leasing must be done on a competitive basis.

Potash prospecting permits are part of the noncompetitive leasing process for potash exploration and development conducted outside of a KPLA (43 C.F.R. § 3501.10). Prospecting may be necessary to establish the presence, location, and value of a potash deposit in any unclaimed, undeveloped area where potash leasing is available outside of a KPLA. The BLM determines and defines PLAs in areas where potash leasing is available and potash is identified but the quality and extents are not known. Prospecting permits may be granted to interested parties in PLAs for prospecting if there is no potential for conflict with existing salable, locatable, or other leasable minerals.

Prospecting permits for potassium can hold up to 2,560 acres for a single permit and up to 96,000 acres maximum acreage for multiple permits in any one state (43 C.F.R. § 3503.37). A permit for the lands is issued under the Mineral Leasing Act, 30 U.S.C. 181 et seq., and is subject to all regulations found in 43 C.F.R. Part 3500 and to the terms and conditions, including any special stipulations, in the permit agreement. A permittee is granted the exclusive right to prospect on and explore the lands to determine the existence of a valuable deposit of the mineral applied for or any compound of that mineral in accordance with the terms and conditions of the permit. The permittee must diligently prospect by core drilling or other acceptable methods. The permittee may remove only such material as is necessary to demonstrate the existence of a valuable mineral deposit (BLM Form 3510-1).

The BLM requires that an Exploration Plan be submitted with a PPA that is reasonably designed to determine the existence and workability of a valuable potash mineral deposit. Exploration is defined by the BLM as “the removal of overburden, drilling, trenching, construction of roads, or any other disturbance of the surface for the purpose of determining the location, quantity, or quality of a mineral deposit” (BLM, 1992). An Exploration Plan contains operator information, a description of the exploration methods and operation, and the environment the Exploration Plan may affect, including the measures the Operator will take prevent damage to natural resources, hazards to public health and safety, and to meet all applicable laws and regulations.

The number of drill holes that would be required to adequately explore for potash is proposed by the Operator in the Exploration Plan and the BLM will evaluate if the proposal exhibits the reasonable diligence necessary to establish the extent and grade of potash deposits. The BLM will determine if enough holes or other comparable prospecting techniques are used to explore the permit area within the time allowed (43 C.F.R. § 3505.62).

Exploration plans shall be consistent with and responsive to the requirements of the lease, license or permit for the protection of nonmineral resources and for the reclamation of the surface of the lands affected by the operations on federal leases, licenses, or permits (43 C.F.R. § 3592.1). A plan for the reclamation of the surface disturbance caused during exploration is a required component of an Exploration Plan. A reclamation plan contains specific procedures and techniques to be used to restore the disturbed land to a post-exploration use approved by the Authorized Officer to meet the applicable performance standards to prevent unnecessary or undue degradation of the lands and to achieve the conditions required by BLM at the conclusion of exploration operations. Reclamation is required at the earliest feasible time and must address impacts to federal lands that are both directly and indirectly attributable to the project; meaning that the reclamation must be accomplished as soon as possible without interfering with planned future operations. Plans for such anticipated future operations must either be under actual review or in active development at the time of the exploration to be considered “reasonably incident” (43 C.F.R. § 3715.0-5) to the exploration and therefore included in the reclamation plan. Areas may not be withheld from reclamation because future development may be possible given some yet-to-occur technical or economic change.

Prospecting permits may be granted for exploration upon the approval of the Exploration Plan after a NEPA review and FONSI. A prospecting permit is effective for an initial term of two years and may be extended for up to an additional two years under conditions specified at 43 C.F.R. § 3505.62. A permittee is granted the exclusive right to prospect on and explore the lands that are defined in the permit. If exploration conducted under the prospecting permits results in identifying a valuable potash deposit, then the permittee can qualify for a preference right lease without competition for the lands held in the prospecting permits, as outlined in 43 C.F.R. § 3507.11. An applicant for a noncompetitive lease must show that a valuable deposit of the mineral specified in the prospecting permit was discovered within the permit area and during the life of the permit. For noncompetitive lease applications for potash, it additionally must be shown that the lands are chiefly valuable for that potash (as opposed to nonmineral disposition of the lands). At this point, additional NEPA would be prepared for leasing and/or development of leases for additional potash exploration and production operations.

1.1.2. American Potash Exploration Plan and Potash Prospecting Permits

Sweetwater River Resources filed 33 PPAs in 2008 and 2011 that covered an area of approximately 65,495 acres of BLM-administered land in the MFO. In 2009, American Potash entered into an option agreement with Sweetwater River Resources for interest in these PPAs and was established as the Operator by the BLM in 2012. The same year, the MFO designated the Ten Mile KPLA, which subsequently reduced the overall area where PPAs can be filed. In 2013, American Potash submitted an Exploration Plan in accordance with 43 C.F.R. § 3505.45 for fourteen of the original 33 PPAs filed by Sweetwater River Resources that remained outside of the Ten Mile KPLA.

This Exploration Plan was titled “Green River Potash Exploration Project” (2013 Exploration Plan) and was designed to test for potash on approximately 29,585 acres of federal PLA lands and 5,694 acres of state lands in Grand County, Utah. The 2013 Exploration Plan included four exploratory drill holes on federal lands and four exploratory drill holes on SITLA lands to confirm the extent and grade of potash mineralization indicated by historic electronic well logs. An EA was completed on the proposal (DOI-BLM-UT-Y010-2013-0015-EA) and a DR was signed in 2013 authorizing the 2013 Exploration Plan operations in the 14 PPA areas. American Potash secured the bond amount required by the BLM on January 13, 2014 (UTB608). American Potash did not act on their approved 2013 Exploration Plan and no exploration activities were executed in the proposed area.

In 2016, the MFO and BLM Utah State Office approved a Master Leasing Plan (MLP) and accompanying RMP Amendments (BLM, 2016b) that address oil and gas and potash leasing and development on approximately 785,567 acres of BLM-administered land in Grand and San Juan Counties, Utah. The MLP replaced the mineral leasing decisions in a portion of the Moab and Monticello Resource Management Plans completed in 2008 that pertain to mineral leasing; and, on pages 19-23, identified three PLAs where potash exploration is allowed, and potash prospecting permits can be authorized. The three PLAs established in the MLP Planning Area are: Upper Ten Mile (29,127 acres), Red Wash (29,956 acres), and Hatch Point (44,536 acres).

In 2022, American Potash submitted a modification to the approved 2013 Exploration Plan to account for the mineral leasing decisions in the MLP and the resulting changes in PPA acreages. The proposed Exploration Plan modified project area is inside the Red Wash PLA. One of the eleven PPAs (Case File No. UTU-91378) contains 320 acres which are located outside of the designated Red Wash PLA boundary; these acres would be removed and are not being considered. In summary, American Potash is proposing again to explore for potash deposits in the Red Wash PLA and submitted eleven PPAs accompanied with an Exploration Plan.

1.2. Purpose and Need

The purpose of the BLM action is to respond to American Potash's Exploration Plan in consideration of granting PPAs to determine the existence and workability of a valuable deposits, and to verify that the Proposed Action complies with the terms and conditions of 43 C.F.R. Part 3505 and Part 3809.

The need is established by BLM's responsibilities under the Mineral Leasing Act of 1920 as amended (30 U.S.C. Part 181 et seq.), the Code of Federal Regulations at 43 C.F.R. Part 3505, and Title III of the Federal Land Policy and Management Act of 1976, as amended. The Mineral Leasing Act of 1920 enables leasing of public lands for developing deposits of coal, petroleum, natural gas, and other non-energy leasable mineral resources. 43 C.F.R. Part 3500 Leasing of Solid Minerals Other than Coal and Oil Shale authorizes the issuance of federal leases for solid minerals and provides for the issuance of prospecting permits in areas where the presence of solid minerals is not confirmed. Federal Land Policy and Management Act (FLPMA) recognizes mineral exploration and production of mineral resources as a "principal" land use within the BLM's multiple-use mandate.

1.2.1. Decision to be Made

The BLM will decide whether to approve the Exploration Plan in consideration of approving the PPAs as proposed, along with any Conditions of Approval.

1.3. Scoping, Public Involvement, and Issues

The BLM Interdisciplinary Team (IDT) met to discuss the project proposal on April 25, 2022. The conclusions of this meeting and the subsequent field surveys conducted are presented in the IDT Checklist in Appendix A of this EA. Table 1-1 presents the list of resources and associated issues analyzed in detail, based on potential impacts from the proposed project.

The Exploration Plan was posted on the BLM National NEPA Register on March 21, 2022, for public comment. The EA was posted to the BLM ePlanning website from November 17, 2023 to December 18, 2023 for a public comment period. A Comment Response Report will be prepared following the comment period and incorporated into the final EA in Appendix C.

Table 1-1 Issues Analyzed in Detail.

Issue Number	Resource	Issue
Issue 1	Air Quality	How would the construction of drill pads and access routes and the drilling of four exploratory holes contribute to the incremental addition of criteria pollutants as established under the National Ambient Air Quality Standards?
Issue 2	Geology/Mineral Resources/ Energy Production	How would potash exploration operations impact the current or potential future of leasable mineral resource exploration or development?
Issue 3	Greenhouse Gases	How would the potash exploration operations contribute to greenhouse gas (GHG) emissions and climate change?
Issue 4	Lands with Wilderness Characteristics	How would the location of the proposed drill sites impact the naturalness and wilderness characteristics of the Labyrinth Canyon Wilderness Inventory Area (WIA)?
Issue 5	Recreation	How would the location of the proposed drill sites and related exploration operations within the Labyrinth Rims/Gemini Bridges SRMA impact SRMA management objectives and recreation experiences?
Issue 6	Water	How would the potash exploration operations impact ground water resources?

CHAPTER 2. ALTERNATIVES

2.1. Alternative A – No Action Alternative

The No Action alternative is to reject or otherwise not approve the American Potash Exploration Plan and consideration of granting PPAs to drill four exploratory holes on federal lands in Grand County, Utah.

2.2. Alternative B – Proposed Action

American Potash submitted an Exploration Plan to conduct drilling and mineral testing activities on federal lands pursuant to 43 C.F.R. Part 3500 to obtain eleven prospecting permits within the BLM Red Wash PLA administered by the MFO in Grand County, Utah. The pending PPAs cover an area of 25,480.23 acres (Table 2-1 and Map 2).

Table 2-1: Prospecting Permit Application Numbers and Acres.

PPA 2022	Acres
UTU-091357	2559.52
UTU-091360	2091.11
UTU-091361	2559.54
UTU-091362	2080.00
UTU-091364	2202.87
UTU-091365	2560.00
UTU-091367	2560.00
UTU-091370	1827.19

PPA 2022	Acres
UTU-091372	2560.00
UTU-091375	2560.00
UTU-091378	1920.00
Total Acres	25,480.23

The Exploration Plan is designed to collect geologic data that would be used to define the extent and grade of potash mineralization in the subsurface and used to confirm the existence of hardrock minerals of economic importance. The proposed drill hole locations were selected to cover the maximum permit area for resource characterization within the area proposed in the PPAs. Only the material needed to demonstrate the existence of a valuable mineral deposit would be removed as outlined in 43 C.F.R. § 3505.10. If American Potash were to find economically valuable amounts of potassium mineral salts on federal lands, then the permittee can qualify for a preference right lease on federal lands.

The Exploration Plan proposes to drill, plug, and reclaim four exploratory holes to extract rock core samples and collect formation fluid samples from the Paradox formation on BLM-administered lands. Four exploratory holes would also be drilled as an independent action on SITLA lands that are inside of or no more than 2,500 feet from the BLM PLA boundary (Table 2-2). The data and samples collected from the four holes proposed on SITLA would be used by the Operator to describe the subsurface geology of the area and is discussed in the Cumulative Impacts Analysis (Section 3.1.3). The drilling of the locations proposed on SITLA lands is not contingent on the drilling of the locations on federal lands.

Table 2-2: Proposed Drill Locations.

BLM Application Number	Drill Hole Name	Public Land Survey System
UTU-091372	AP-F-34	NENE Sec. 34; T 24 S R 17 E
UTU-091375	AP-F-24	NWSE Sec. 24; T 24 S R 17 E
UTU- 091365	AP-F-28	NWNW Sec. 28; T 24 S R 18 E
UTU- 091364	AP-F-12	SWNW Sec. 12; T 25 S R 17.5 E

American Potash would construct four drill pad sites and associated access routes, as detailed below. Designated routes would be used to transport equipment to the proposed new access routes to the drill pad sites. The holes would be drilled vertically to total depths ranging from 8,132 to 9,132 feet to examine all possible formation intervals for the presence of economic minerals as allowed for in 43 C.F.R. § 3505.10(a).

The proposed rock cores would be taken from subsurface depths where historic data have indicated that potash mineralization may be present in the Pennsylvanian Paradox formation, an approximately 1,025-foot-thick interval where salt and potash are interbedded between layers of dolomite, shale, and siltstone. There are 29 salt and potash intervals in the Paradox formation, and several are potentially economically viable for mining. The intervals of the Paradox formation targeted in this operation are not revealed at surface outcrop, therefore the potential target potash horizons can only be evaluated through drilling and core analysis. Data obtained from the cores would facilitate the analysis of the extent and grade of potash mineralization. After coring operations, drilling would continue down to the Leadville formation and brine fluids from the rock would be collected using a Repeat Formation Test (RFT) wireline tool that would be delivered to a laboratory for multi-element

analyses of inorganic constituents, including potassium and hardrock minerals of economic importance, specifically lithium.

Drilling of the exploration holes on BLM-administered lands is proposed in two phases during the first year of the permit. Phase 1 would be the construction of two drill sites with access and the drilling of two holes that would require approximately three months—estimated 15 days per site for construction of the drill pad and access and an estimated 30 days to drill each hole. Phase 2 would be the construction of two drill sites with access and drilling of two additional holes in the second half of the first permitted year. Drilling for each phase would take an estimated 45 days per site and each hole would be drilled sequentially with one drill rig.

Drill hole plugging would occur immediately after logging, coring, and sampling is completed. The drilled holes would be plugged and abandoned, and the disturbed surfaces would be reclaimed.

Drilling of all proposed exploration holes is planned to be completed within the two-year potassium prospecting permit timeframe. However, due to unpredictable weather, drill rig and equipment availability, analysis of geologic data, and other factors, it is possible for American Potash to apply for a two-year extension as allowed under regulation 43 C.F.R. § 3505.61.

While implementing the Proposed Action, American Potash would obtain all necessary federal, state, county, and other permits, as applicable, and comply with all applicable regulatory requirements. American Potash would adhere to the details of construction, drilling, and reclamation operations provided in its Exploration Plan, and this project description.

2.2.1. Location and Access

A project area is defined as the area of land upon which the operator conducts exploration operations, construction, and maintenance activities, including the drill pad and access routes (BLM, 2008).

The drill pads would be reached by traveling north from Moab on U.S. Highway 191, then west on Class B Blue Hills Road (#138) south of Canyonlands Field Airport, to Class B Dubinky Well Road (#137). Dubinky Well Road would then be taken southward to Class B Spring Canyon Point Road (#338) to access all drill pad sites. A combination of designated Class B (maintained¹) and D (unmaintained) roads would be utilized (see Map 3 in Appendix B).

Construction operations on Class B and D roads would occur prior to drilling operations to ensure safe passage of equipment and would be conducted in consultation with the Grand County Road Department (GCRD). Two drill pads would be located adjacent to existing Class B roads, and two drill pads would be located adjacent to existing Class D roads. Four roads approximately 100-200 feet long would be constructed to connect the existing roads to the drill pad sites (Table 2-3). If road conditions prevent access via the Blue Hills Road, U.S. Highway 191 would be taken north to State Highway (SH) 313, then west to Dubinky Well Road. For both options, Spring Canyon Point Road would be taken westward to Class B and D roads that would connect to the proposed new access roads. Initially, 16.97 acres would be disturbed, 3.74 acres of which would consist of upgrades and maintenance to existing roads and construction of new access roads.

The total disturbance proposed for existing Class B roads is 0.17 acres. Approximately 530 feet (0.1 miles, 0.17 acres) of the Class B roads Duma Point (#337) and Spring Canyon Point (#338) would require maintenance of short segments to facilitate safe truck passage and would be within the existing right-of-way disturbance. On #337, fill would be added to either side of three cattleguards to

¹ Class B roads are typically maintained by Grand County, while Class D roads are not typically maintained.

improve (lessen) the road surface grade and approach for easier passage of vehicles (Spring Canyon Point, Needles, and Little Grand cattleguards). The Needles Cattleguard would require the removal, and subsequent reattachment, of the side wings to allow wider equipment to pass through. Class B road maintenance would take approximately five days.

The total disturbance proposed for access, including new route construction and maintenance to Class D roads is 3.57 acres (Table 2-3). A total of 1.82 miles of existing roads would be bladed to a width of 14 feet to provide for safe vehicle passage (3.09 acres). The road that would be used to access the AP-F-24 drill pad crosses three ephemeral washes. Two ephemeral washes have low water crossings and would be graded to facilitate safe vehicle travel. One of the ephemeral washes would be widened to 14 feet to facilitate safe travel for equipment by blading the steep wash banks and blading the slickrock surface across the wash. The extra rock material removed would be used as fill in the wash bottom. American Potash would construct 0.12 miles of access routes from Class D roads to the drill pads. The total Class D road improvements would take approximately seven days.

Turnouts would be constructed to ensure visibility and safe passage where the single lane Class B and D roads exceed 1,000 feet in length. Turnouts would be approximately 10-foot wide by 100-foot long with two 50-foot transitions (0.28 total acres). Turnouts would be temporary features, constructed only where visibility is restricted by terrain and vegetation and would be reclaimed when the access routes are reclaimed.

Table 2-3: Proposed Access Upgrades, Construction and Turnouts to the Drill Pad Sites.

Drill Hole Name	Existing D Road Upgrades (miles)	Existing D Road Upgrades (acres)	New Access Route Construction (miles)	New Access Route Construction (acres)	Number of Turnouts	Turnout Construction (acres)	Drill Pad Size (acres)
AP-F-34	0.42	0.71	0.03	0.05	2	0.09	3.67
AP-F-24	1.40	2.38	0.03	0.05	3	0.14	3.67
AP-F-28	0	0	0.02	0.03	1	0.05	2.58
AP-F-12	0	0	0.04	0.07	0	0	3.31
Total	1.82	3.09	0.12	0.20	6	0.28	13.23

The Operator has committed to incorporating best management practices contained in The Gold Book (BLM, 2007b) to minimize disturbance to floodplains and other surfaces that could be affected by water runoff:

- Conduct inspections after heavy or prolonged rainfall and repair drainage or erosion problems.
- Construct low water crossings on new access routes built to drill pads.
- Not using low water crossings in wet weather unless the crossing is surfaced.
- Locating the rock spoils and topsoil piles outside of drainages or washes.

2.2.2. Drill Pad

The Operator chose the four drill pad locations and configurations to:

- Maximize the quality of the data that would be recovered from the cores, in consideration of a 1.5-mile radius of influence from each core location.

- Maintain a distance of at least one-half mile outside of designated No Surface Occupancy (NSO) areas, see Moab MLP (BLM, 2016b) to avoid impacts to water sources in Tenmile Canyon and Spring Canyon.
- Avoid contact with surface waters by maintaining a distance of 330 feet from any known surface waters, springs, and ephemeral drainages.
- Avoid removal of wetland or riparian vegetation.
- Minimize impacts to wildlife by avoiding canyon rims and protected bighorn migration routes and rutting/lambing areas.
- Utilize existing roads to the maximum possible extent and minimize access road construction.
- Minimize the amount of cut-and-fill that would be required to construct a drill pad by selecting nearly flat ground surfaces.

The size of each of the four drill pads would be up to a maximum of 400-feet by 400-feet to accommodate drilling equipment, lined reserve pit, drill pipe, mud supplies, vehicle traffic and trailers for drilling personnel (see Table 2-3). The configuration of each drill pad would be designed to fit the topography and avoid water and wildlife resources, resulting in drill pads that are not a perfect square. The AP-F-28 and AP-F-34 drill pads were reduced in size to fit these constraints. Drill pad sizes are listed in Table 2-3 above. Construction operations for a drill pad and short access route would require approximately seven days.

2.2.2.1. Drill Pad Construction

Drill pad construction activities would include clearing the site of vegetation, earthwork, drainage, and other improvements necessary for safe operations. Each drill pad would be constructed to create a level pad for the drill rig and support equipment.

Eight inches of topsoil material, or whatever is available, would be stripped from the drill pad and stockpiled around the perimeter of the drill pad for efficient use during reclamation. Biological soil crusts (BSC) would be scraped up and preserved as much as practicable to be returned to the disturbed surface during reclamation. Spoils would be stockpiled on the drill pad separately. Stockpile slopes would not exceed 20% to minimize erosion potential.

A temporary lined reserve pit of 150-feet by 75-feet by 10-feet deep (15,000-barrel capacity) would be excavated inside the footprint proposed for each drill pad. Excavation may require small blasts to remove rock, depending on the depth to bedrock. Reserve pits would be lined with a minimum 12-millimeter-thick UV-resistant synthetic liner to resist leakage, breakage, or discharge of materials inside the pit. Sand or clay materials would be placed at the bottom of the reserve pit under the liner to prevent punctures from the underlying bedrock. Rock and soil excavated would be used in the construction of the drill pad. The drill pad would be leveled by balancing cut-and-fill areas and blasting where necessary. Locating the drill pads on nearly level surfaces would reduce construction needs and soil loss potential. Ditches, berms, water-bars, and sediment fences would be constructed as necessary to divert storm water from the drill pad or to trap sediment runoff.

2.2.3. Drilling Operations

American Potash would sequentially drill, core, and sample fluids from the four proposed holes over a period of up to 45 days each with the use of one conventional, mechanically powered mobile drilling

rig. The total depth proposed for each exploration drill hole would be between 8,445 and 9,132 feet below the surface.

A Tier II drilling rig would be used to reduce nitrogen oxide (NO_x) emissions. The Operator would use equipment that meets the stationary internal combustion engine standard of 2g NO_x/bhp-hour for engines <300 HP and 1g NO_x/bhp-hour for engines >300HP. Low bleed or no bleed pneumatic pump valves would be installed. The Operator would monitor and maintain Dehydrator and tank Volatile Organic Compound (VOC) emission controls to +95 percent efficiency.

Surface and intermediate casing depths are selected to isolate and protect water-bearing formations from exposure to the drilling fluids in the hole. After the surface casing is set and cemented back to surface, pressure control equipment would be attached for safety and to help monitor conditions in the hole. A Blow Out Preventer (BOP) stack would be installed to shut off the flow of gases or fluids from the hole if dangerous pressures are encountered during drilling. The BOP and the casing strength would be pressure tested after setting the 9-5/8-inch surface casing (test to 3,000 pounds per square inch (psi)) and after setting the 7-inch intermediate casing (test to 10,000 psi).

The drilling program would comply with 43 C.F.R. Part 3160 and the Onshore Oil and Gas Order, BLM Gold Book (BLM, 2007b), and Utah Division of Oil Gas Mining Rule R649-3 Drilling and Operating Practices to protect anticipated water, oil, gas, and other mineral zones. After coring and testing procedures are completed, each drilled hole would be plugged and abandoned according to the BLM-approved procedures. Drilling operations would use either an air rotary drilling system or a conventional mud system, depending on the depths, formation pressures, rock type, and the possible presence of water.

Air rotary drilling techniques use compressed air instead of drilling mud fluids to cool the drill bit and lift the rock cuttings out of the hole. Each of the proposed holes would be drilled to surface and intermediate casing depths with air. Air drilling allows for the detection of water influxes into the hole that can be used to identify water-bearing zones. The Operator would record all intervals where water is encountered during drilling operations and would provide qualitative information from the electric logs as it pertains to salinity levels in water-bearing zones. The Operator may sample apparent water-bearing zones during drilling and any data derived would be provided to BLM.

Conventional drilling techniques use a drilling mud fluid that is pumped into the hole during drilling to cool the drill bit, move rock chips up and out of the hole, and maintain pressures in the hole at deeper depths. Drilling mud fluids can be composed of fresh water and solids (water-based mud) or oil and solids (oil-based mud). The solids are primarily composed of clays (mud) that coat the borehole during drilling and create a barrier to prevent the exchange of fluids or pressures between the borehole and the surrounding formations.

A fresh water mud system would be used for drilling operations if water from the formations is encountered while drilling with air in the intermediate section of the hole down to the Paradox formation. The evaporite rocks in the Paradox formation contain mineral salts that a water-based mud system could dissolve during drilling which could cause the hole to collapse in on itself. To prevent hole instability, a closed-loop, salt-saturated oil-based mud drilling system would be used while drilling and coring in the Paradox formation and drilling and fluid collection in the Leadville formation. An oil-based mud system does not dissolve the mineral salts in the formation. In the proposed closed-loop system, the oil-based mud and cuttings would come to the surface and pass over a mud shaker system that would separate the rock cuttings from the drilling mud. The drilling mud would return to the mud tanks for reuse in drilling and the cuttings would pass on to another

shaker for drying where they would fall into a metal trough that would be transferred to a storage tank with a front-end loader.

Rock cuttings produced from drilling with a water-based mud system would be contained in the lined reserve pit that would be constructed on each drill pad. Reserve pits would be placed in an area of the drill pad that avoids shallow groundwater and natural water ways. Reserve pits would be fenced and lined with impermeable liners to prevent groundwater and soil contamination.

2.2.3.1. *Hole Testing*

The exploration proposal is designed to collect geologic data in each hole to facilitate resource characterization in the prospecting permits. Drilling would include four holes on lands administered by the BLM to confirm the extent and grade of potash mineralization indicated by historic electronic borehole logs.

The open hole testing program would include a mud log, wireline geophysical logs, cutting of whole rock cores with coring tools, and collection of brine samples using a RFT wireline tool such as Schlumberger's Modular Formation Dynamics Tester. The data collected from mud logging and wireline geophysical logging would be used to select multiple Paradox formation clastic zones for potash testing and coring and Leadville formation carbonate intervals for collection of formation water samples to test for economic quantities of lithium. A plug and packer system would be used in the hole to isolate the clastic intervals that would be sampled during coring and formation fluid sample extraction to prevent any sampling of minerals not approved for exploration in this Exploration Plan. A total of four conventional (whole) rock cores would be taken from prospective potash horizons in the Paradox formation between 5,000 and 7,000 feet below the surface and would be 60-90 feet long and 3-1/2-inch diameter in size. The formation waters in the Paradox and the Leadville formations are expected to be a brine. The Leadville formation brines would be collected in 1,000-liter intermediate bulk containers and the maximum amount of fluid collected for testing from each drilled hole would be 4,300 liters (1,136 gallons). The brine samples would be collected directly from the formation with the RFT and delivered to a laboratory for multi-element analysis of inorganic constituents, including potassium and associated metal salts, specifically lithium salts.

2.2.4. **Water Usage and Controls**

The Operator would use water during construction and drilling operations, primarily for dust suppression on the drill pad sites, access roads, in the drilling mud system used in the drill hole and to stabilize stockpiled soil areas. Water would be obtained from the Moab or Green River municipal water supplies, with appropriate approvals, and trucked to the locations. Water used for operations would be stored in skid-mounted 350-barrel water tanks stored on the drill pad sites. It is estimated that between 70,000 and 90,000 barrels of water would be needed during drilling, coring, and dust suppression operations for each of the four proposed drill locations.

The proposed drill holes could potentially encounter groundwater resources that are typically found at depths approximately 75-500 feet below the surface. The drilling practices as proposed adhere to the regulation of the Utah Division of Oil, Gas and Mining *Rule R649-3: Drilling and Operating Practices* to protect surface and subsurface waters in all stages. The following operating procedures in the Exploration Plan would be used to protect the surrounding groundwaters and prevent the mixing of groundwater classes as defined by Utah Code R317-6-3 as Class 1, Class II, and Class III (UOAR, 2016) as required by the Utah's antidegradation policy R317-2-3 (UOAR, 2018) and to

ensure the isolation of the testing procedures used in the drill holes from the surrounding connate formation waters²:

- Air drilling through the intermediate hole section to allow for the detection of groundwater influx into the hole and the determination of depths to the water-bearing intervals.
- Mud products would be onsite if needed to swap air drilling for a mud system to stabilize formation pressures.
- Installation of 7-inch-thick casing with cement to surface from intermediate casing depths proposed to be between 4450 and 5000 feet below the surface.
- Run cement bond and casing inspection logs to surface.
- Pressure testing at numerous steps and intervals to check the mechanical integrity of the system and casing and cement.
- Blowout prevention.
- Closed-loop, salt-saturated mud system with monitors to track volume gains and losses in the Paradox formation.

Waters from the subsurface that come up the hole during drilling operations (i.e., produced waters) would be dealt with in one of three ways: 1) sent to the lined reserve pit and allowed to evaporate, 2) transported from the lined reserve pit by truck to an existing disposal well or approved water disposal facility, or 3) utilized as fluid for the drilling of subsequent exploration drill holes. If produced water is allowed to evaporate after completion of drilling, the lined reserve pit would be fenced on four sides to prevent entry of wildlife or livestock.

There are no standing surface waters in or near the project area and the topography surrounding each of the drill pads is generally flat. In the event of heavy rains, surface runoff would be controlled using berms, diversion channels and sumps placed to reduce erosion and to channel runoff water to surrounding existing natural drainages. Ephemeral drainages that intersect roads or access routes could be damaged by flash flooding. The routes would be cleared of sediment and debris using equipment such as a front loader and hand tools, like shovels and buckets. The route would be cleared but the natural drainage pathways would not be blocked or diverted.

2.2.5. Solid Waste Management

All waste material would be transported and disposed of off-site at authorized disposal facilities. All trash would be stored in a trash cage and hauled to an appropriate landfill during and after drilling operations. Sewage would be contained in a portable chemical toilet during drilling.

Drilling fluids, produced water, and other wastes associated with the exploration for lithium/bromine minerals are excluded as a hazardous waste under 40 C.F.R. § 261.4(a)(17). Oil-based drilling muds would be contained in tanks on site and recycled for use on subsequent drill holes. At the end of exploration, oil-based drilling muds would be sold or disposed of at the approved disposal facility in Naturita, Colorado. Water-based drilling fluids would be removed by truck and recycled for use in subsequent drill holes or disposed at an approved disposal center.

² Connate fluids are liquids that were trapped between the grains and in the pores of sedimentary rocks as they were deposited. These liquids are largely composed of water, but also contain many mineral components as ions in solution.

2.2.6. Reclamation

Reclamation procedures as proposed by the Operator were prepared in consideration of *The Practical Guide to Reclamation in Utah* (Utah Division of Oil, Gas and Mining [UDOGM], 2001), *The Gold Book* (BLM, 2007b), Moab MLP (BLM, 2016b), and specific guidance from the BLM's MFO natural resource specialists.

Pad and road access reclamation operations would occur concurrent with operations when it is determined they would no longer be required for the duration of the entire drilling operation. Hole plugging would begin immediately after the coring and testing procedures are completed and after BLM has approved the plugging and abandonment plan. All drill pads, new access roads and turnouts created would be reclaimed within the two-year period of the permit. The BLM would determine if the reclamation were complete, adequate, and meets all the Exploration Plan requirements before releasing the Operator from further liability for the reclamation. The goal of reclamation would be to re-establish vegetation native to the region in sufficient density and diversity that approximates natural, undisturbed vegetation. The result of successful reclamation would be to return the land to a condition similar to what existed before disturbance.

The Operator's reclamation goals include:

- Minimizing sedimentation.
- Re-establishing surface and slope stability.
- Restoring topography to be consistent with existing features.
- Re-constructing and stabilizing draining features.
- Maintaining the biological, chemical, and physical integrity of the topsoil and subsoil.
- Re-establishing a desired self-perpetuating plant community.
- Re-establishing a complementary visual composition.
- Managing noxious and/or invasive plants.
- Developing and implementing a reclamation monitoring and reporting strategy.

At the completion of all drilling operations and demobilization of the rig, reclamation operations would commence, contingent on favorable soil and weather conditions. Pit liners would be cut, removed, and disposed of at an approved landfill. Reserve pits would be backfilled with stockpiled subsoil and rock. Pits would be free of oil and other liquid and solid wastes prior to filling during reclamation and may be allowed to air dry or may be solidified in place with BLM approval. Backfilled pits would be recontoured with a slight mounding above the surrounding grade to allow for settling and to promote surface drainage away from the backfilled pit. After the drill pad is recontoured, topsoil would be distributed for seeding.

Disturbed soils would be scarified to alleviate compaction, promote water infiltration, trap seed, encourage snow retention, control erosion, and facilitate root penetration. These soils would be ripped to an approximate depth of 18 inches or to bedrock, if shallower, with a minimum furrow spacing of two feet. Furrows would be created counter to the prevailing wind direction. The drill pads and associated access routes from the County B and D roads would be graded to approximate the original terrain contours and promote visual consistency with the surrounding undisturbed terrain. The surface would be left rough. Stored topsoil would be distributed over the disturbed area prior to reapplying

salvaged BSCs. Salvaging and spreading topsoil would not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment.

Class B road maintenance necessary for drill rig transport would be left as-is. Class D roads that have been upgraded would be reclaimed according to direction from the BLM. Class D roads that would be upgraded to facilitate access and drainage would be reestablished to approximate original road width and character.

Seeding with a BLM-approved native seed mix (see table below) would be performed between mid-October until mid-December when the ground surface is not frozen; however, seeding would be conducted no later than two weeks following completion of final seedbed preparation. The seed mix would be applied at 18 pounds per acre for broadcast seeding. Under consultation with the MFO, fencing may be installed to prevent livestock grazing for at least two growing seasons to allow for the regrowth and establishment of grasses that assist in soil stabilization, as stated in the Moab RMP (BLM, 2008) (GRA-11, page 69, "... rangelands that have been reseeded, or otherwise mechanically treated will be ungrazed for a minimum of two complete growing seasons following treatment.").

Table 2-4: Reclamation Seed Mix.

Species	Application Rate
Indian ricegrass (<i>Achnatherum hymenoides</i>)	5 lbs./acre
Needle-and-thread (<i>Hesperostipa comata</i>)	3 lbs./acre
James' galleta (<i>Pleuraphis jamesii</i>)	3 lbs./acre
Sand dropseed (<i>Sporobolus cryptandrus</i>)	5 lbs./acre
Four-winged saltbush (<i>Atriplex canescens</i>)	2 lbs./acre
Total	18 lbs./acre

As suggested by the MFO, the Operator may attempt to transplant grass plugs from one drill site to another, depending on the time of year for reclamation and timing of construction of successive drill pads. Plugs from a location under construction could be used to reclaim the most recent drill pad requiring reclamation. If transplants are attempted, the plugs would be planted in offset rows perpendicular to prevailing wind direction.

After reseeding has been performed, monitoring of the disturbed areas would include a report of seeds successfully distributed, seeding times, soil moisture before and after seeding, and an assessment of weed control for each location. If necessary to facilitate reclamation success, the Operator would confer with the MFO at that time to re-evaluate reclamation strategies and would modify the reclamation procedures as necessary or as directed by the BLM to achieve the desired reclamation outcome in consideration of the baseline conditions. The Operator would perform additional seeding or invasive species/noxious weed control measures as necessary to meet reclamation goals.

2.2.6.1. *Invasive Species/Noxious Weed Control*

The prevalent invasive species documented are Halogeton and Russian thistle. Proposed measures to prevent the spread and/or establishment of noxious weeds and invasive plants during operations include:

- The Operator would be required to clean equipment prior to bringing it on site to prevent weed propagules or seed from being transported from another location.
- Construction equipment and vehicles would be restricted to approved routes to avoid driving

through weed infested areas.

- Herbicide treatments to prevent the spread of invasive and noxious weeds would conform to the BLM guidelines (BLM, 2007c and 2016a). Specific herbicides, treatment protocols, design, monitoring, and reporting would be pre-approved by the MFO Authorized Officer.
- The Operator shall implement an intensive weed control program at the beginning of the first growing season after construction.

Reclamation operations would be initiated as soon as practicable after the cores are taken. The Operator has committed to ensuring successful revegetation by monitoring the progress of its reclamation operations and performing maintenance actions if needed to facilitate plant growth. After reseeding has been performed, annual monitoring would include an assessment of weed control for each location, and appropriate control measures would be taken under the approval and guidance of the MFO.

2.2.7. Summary of Surface Disturbance

Implementation of the Proposed Action would result in a total of 16.97 acres of surface disturbance from the construction of drill pads and new access routes including turnouts, all of which would be reclaimed. Drill pad construction would affect 13.23 acres. Road construction and upgrades would affect 3.74 acres, consisting of Class B road maintenance (0.17 acres), Class D road (3.57 acres) upgrades, and construction of turnouts. The acres shown as road surface disturbance was calculated conservatively without consideration of the disturbance corresponding to the existing Class D roads. Class D road upgrades, consisting of 3.09 acres, would be reclaimed, or left in place, according to direction of the BLM.

2.2.8. Design Features and Conditions of Approval

The following design features that would become Conditions of Approval (COA) added to the permits (if approved) include best management practices (BMPs) and apply to each drill hole being proposed. The design features were discussed during internal scoping, are proposed in the American Potash Exploration Plan (American Potash, 2021), and/or are specified in the Moab MLP (BLM, 2016b), the Moab RMP (BLM, 2008), and The Gold Book (BLM, 2007b). The Operator would secure all required permits and approvals from the BLM, State of Utah, and Grand County prior to construction. The Operator would adhere to all applicable federal, state, and county requirements while performing all operations associated with the Proposed Action. Should a need arise to change or modify the drilling or sampling plan submitted, American Potash would contact the MFO to discuss and coordinate a plan for modifications.

2.2.8.1. Access

- Maintenance performed on Class B roads would be performed in coordination with the GCRD to obtain permits and to make sure that the road meets regulation and safety guidelines.
- Upgrades performed on Class D roads would be performed in coordination with the BLM and GCRD. The upgrades would consist of the least amount of construction needed to facilitate safe access for the equipment and crews in the proposed exploration operations.
- When transporting equipment on Class B roads, the Operator would have flaggers in front of and behind the equipment and at intersections with other Class B and D roads. Signage would be placed at the intersection of Dubinky Well Road and Spring Canyon Road.

- The Operator would not impede or prevent public access on Class B or D roads for extended periods of time longer than one day. Road closures would be announced in the local paper and signage placed on Blue Hills Road, Highway 191, Dubinky Well Road, and Spring Hill Road. Closures would be temporary, lasting hours to one day, for maintenance and upgrade or to allow for equipment transport to the drill pad sites.
- The Operator would use water for dust control caused by equipment and motor vehicle use associated with the operation on Class D access roads and drill pads during all stages of the operation, as needed.
- Employees and contractors would be instructed not to exceed 20 miles per hour on any drill pad access road to discourage the generation of fugitive dust.

2.2.8.2. *Cultural Resources*

- Should cultural resources be encountered during ground disturbing activities, the Operator or their subcontractor would notify the MFO immediately and cease all activity until the situation is evaluated by a BLM archaeologist.

2.2.8.3. *Floodplains*

- No surface disturbing activities within 100-year floodplains or within 100 meters of riparian areas. Also, no surface disturbing activities within public water reserves or within 100 meters of springs.
- Upgrades and road construction would be performed to the minimum degree necessary to ensure safe transport of people and equipment, including crossing drainages with low water crossings, unless instructed otherwise by the MFO.
- Upon completion of drilling and reclamation operations, all road material would be removed from the three wash bottoms that cross the Class D road used to access the AP-F-24 drill pad to re-establish pre-disturbance wash gradient discharge conditions.

2.2.8.4. *Grazing Allotments and Range Improvements*

- Grazing lessees would be notified of exploration activities conducted by the Operator.
- Range improvements, such as fences and stock ponds, would be avoided. If inadvertent damage were to occur to range management facilities from project operations, the Operator would contact the MFO immediately and take measures according to direction from the MFO.
- Personnel would be instructed to minimize contact and avoid harassment of livestock.

2.2.8.5. *Paleontological Resources*

- Should paleontological resources be encountered during ground disturbing activities, the Operator or its subcontractor would notify the MFO immediately and cease all activity until the situation is evaluated by the MFO.

2.2.8.6. *Recreation*

- The Operator would not impede or prevent public access on Class B or D roads for extended periods of time longer than one day. Closures would be announced in the local paper and signage placed on Blue Hills Road, Highway 191, Dubinky Well Road, and Spring Hill Road.

- The Operator has been informed that the Moab Endurance Horse Ride, which uses routes in the vicinity of Bartlett Flat northward to Blue Hills Road, will take place over three days in fall of each year and that the days before and after the ride are also used by equestrians for staging. The event will occur on October 13-15, 2023. The Operator would ensure that through access on designated routes will be maintained from October 13-15, 2023, and during subsequent events, to avoid interference with the Endurance Ride. The Operator would coordinate with the ride organizer prior to the event if a drilling rig move were foreseeable during this period to minimize impacts from truck traffic to equestrians that will also be using designated roads.
- The Operator would conduct road construction, maintenance or upgrading operations outside of the weekend and week prior to Easter weekend of each year to prevent construction conflicts with recreational users during Easter Jeep Safari week. If road upgrades or maintenance operations are planned during this time period, the Operator would contact the MFO for direction regarding maintaining access along all designated routes.
- The Operator must inform the BLM of its road upgrades/maintenance operations near the Secret Spire Jeep Safari route during all other times of the year so the BLM can coordinate with motorized permittees, as this route is also used by motorized permittees other than Jeep Safari.

2.2.8.7. *Soils*

- No surface disturbing activities are allowed on slopes greater than 30% to minimize watershed damage throughout the Moab Planning Area in fragile soils. This restriction includes heavy equipment traffic on existing roads associated with drilling operations.
- Construction operations would be performed using the least amount of disturbance necessary to ensure safe access for people and equipment.
- Construction would not be conducted during wet conditions when soils are saturated.
- To reduce erosion and soil loss, storm water management in the form of ditches, berms, water-bars, and sediment fences, would be utilized to divert storm water from drill pad or trap sediment runoff, as appropriate.
- During construction operations, topsoil would be removed and set aside for reclamation. Topsoil would be managed to segregate BSCs to promote inoculation of a reestablished soil surface during reclamation. Hummocks would be recreated prior to reapplying salvaged BSCs near these features.
- Methods would be used to stabilize the topsoil piles and prevent wind dispersion during drilling. The methods include spraying with water to create a physical crust and/or covering the piles with natural biodegradable fabric.

2.2.8.8. *Vegetation*

- Reclamation operations would be planned to ensure that restoration cover requirements are expedited and met. Reclamation maintenance and monitoring would be performed to ensure successful results. The Operator would document baseline conditions prior to initiation of project operations and would compare construction operations to the specifics of the actions in the Exploration Plan and COAs. After reclamation, the BLM MFO would document site

conditions and reclamation progress on an annual basis until such time the MFO determines that reclamation goals have been met.

- Treatment to prevent the introduction or spread of invasive/noxious plants would conform to the guidelines and principles of the 2007 Vegetation Treatments Using Herbicides on the Bureau of Land Management Lands in 17 Western States PEIS (BLM, 2007c), and 2016 Vegetation Treatments Using Aminopyralid Fluroxypyr and Rimsulfuron on BLM Lands in 17 Western States Programmatic EIS (BLM, 2016a) which specify herbicides approved for use, treatment protocols, mitigation, and monitoring.
- Drilling and construction contractors would be required to have equipment arrive at construction sites in a clean condition, free of weeds and soil from previous work sites.
- Construction equipment and vehicles would stay on designated and cleared Class B and D roads and Operator created access routes to avoid driving through weed- infested areas.
- To minimize the potential of spreading weed seeds between drilling locations, clean and remove weed seeds and soil from equipment before it is mobilized to the next drilling location. The Operator would control weeds by the application of specific herbicides or other appropriate methods approved by the MFO.

2.2.8.9. Water Resources

- Project water would be purchased from the Moab or Green River municipal water supplies, as regulated by these municipalities.
- No holes would be drilled within 330 feet of perennial surface water features.
- No operations would be performed within 330 feet of springs, and no wetland or riparian vegetation would be removed.
- Drilling practices must protect surface and subsurface waters in all stages by adhering to UDOGM applicable well requirements outlined in Rule R649-3: Drilling and Operating Practices.
- The Operator would line the reserve pit with a 12-mil liner, or as specified by the MFO.

2.2.8.10. Wildlife, including Protected Species and Migratory Birds

- The Operator would perform biological surveys, as directed by the MFO.
- Between March 1 and August 31, all areas within 0.5 miles of the proposed project would be surveyed for the presence of raptor nests by a BLM-approved biologist. If occupied raptor nests are found, construction would cease during the nesting season for that species.
- The Operator would comply with the MFO requirement of surveys for special status wildlife species and for raptor timing stipulations and spatial offsets.
- To avoid displacement of kit foxes that may utilize the project area during pupping season, an inventory for active fox dens would be conducted if project operations would occur during kit fox pupping season, March 1 to July 31. Results of the inventory would be provided to the MFO, and, if present, an active den would be avoided by 200 meters.
- If water is produced and allowed to evaporate after completion of drilling, reserve pits would be fenced on four sides to prevent entry of wildlife and/or livestock.

- Project personnel would be instructed as to the following requirements: no harassing or shooting of wildlife; no dogs brought to the project area; and no littering.

2.2.8.11. *Monitoring and Compliance*

Monitoring would take place periodically during the life of the two-year project (with option for extension) or as required by law. During project operations, the MFO would monitor operations to ensure compliance with COAs. After project operations are finished, the project area would be inspected by the MFO to determine the need for reclamation measures and to ensure that all debris has been removed from the drill pads. During the surface reclamation, surface compliance inspections would be conducted by the MFO to ensure continued protection of the environment.

2.3. **Alternatives Considered but Eliminated from Detailed Analysis**

2.3.1. **Relocating Drill Pads Outside of a BLM Wilderness Characteristics Area**

Three proposed drill pads are located within the Labyrinth Canyon WIA. The locations of two of the drill pads (AP-F-12 and AP-F-34) are in areas that possess wilderness characteristics. In the MFO RMP on pages 27-28 (BLM, 2008), the MFO determined that wilderness characteristics were present in some portions of Labyrinth Canyon WIA but decided that those areas would not be managed for wilderness characteristics (BLM, 2008). The MFO is not required to manage lands that exhibit wilderness characteristics to a non-impairment standard. The MFO has chosen to manage the area in question for other resource values rather than to preserve, protect, and manage this acreage for wilderness characteristics; thus, the Proposed Action is considered an appropriate use of the surface under the decisions of the Moab RMP and the Moab MLP. The purpose of the exploration is to determine the extent and grade of potash and the placement of the drill holes were selected to provide specific data to assess the potash potential and moving drill holes outside of the Operator-proposed locations may not provide the data needed to correctly characterize the mineral deposits. Refer to the IDT Checklist in Appendix A.

2.4. **Conformance with BLM Land Use Plans**

The Proposed Action is in conformance with the following Land Use Plan:

Plan: Moab Field Office Record of Decision and Approved Resource Management Plan, as amended.

Date: October 2008

MINERALS (MIN):

“Goals and Objectives: Provide opportunities for environmentally responsible exploration and development of mineral and energy resources subject to appropriate BLM policies, laws and regulations.” (page 73)

MIN-9: “Locatable Minerals: To the extent possible, the stipulations developed for oil and gas leasing are applicable to all mineral activities (leasable, locatable, and salable). These stipulations are found in Appendix A [of the RMP]. Leasable minerals include oil and gas, coal, and potash. Locatable minerals include gold, copper, and uranium. Salable minerals include sand and gravel, clay, and building stone.” (page 74)

MIN-13: “Leasable Minerals: In accordance with an UDEQ-DAQ letter dated June 6, 2008 (See Appendix J [of the RMP]) requesting implementation of interim nitrogen oxide control measures for compressor engines: BLM will require the following as a Lease Stipulation and a Condition of

Approval for Applications for Permit to Drill: (1) All new and replacement internal combustion oil and gas field engines of less than or equal to 300 design-rated horsepower must not emit more than 2 grams of NO_x per horsepower-hour. This requirement does not apply to oil and gas field engines of less than or equal to 40 design-rated horsepower: (2) All new and replacement internal combustion oil and gas field engines of greater than 300 design-rated horsepower must not emit more than 1.0 grams of NO_x per horsepower-hour.” (page 75).

MIN-16: “Leasable Minerals (Potash and Salt: Non-energy Leasable): Within the MPA [Moab Planning Area], three areas fall within known potash leasing areas (KPLAs). KPLA designations, based on known geologic data, will remain in place until potash resources are depleted. In KPLAs, potash leases are acquired through competitive bidding. In areas where potash values are not known, MFO could issue prospecting permits, which could lead to issuance of a preference right lease.” (page 75).

“Those leases issued subsequent to the RMP will be consistent with the oil and gas leasing stipulations developed in the RMP [see Appendix A of RMP]” (page 76).

Plan Amendment: Moab Master Leasing Plan (MLP)

Date: December 2016

Minerals: Potash (MIN-POT)

“*Objective:* Provide opportunities for environmentally responsible exploration and development subject to appropriate BLM policies, laws, and regulations.”

MIN-POT-2: “To the extent possible, the stipulations developed for oil and gas leasing are applicable to potash leasing.” (page 19).

MIN-POT-3: “Apply a phased leasing approach to manage potash exploration and development within the Planning Area. The purpose of phased potash leasing is to minimize resource conflicts and to test the feasibility of solution mining (in-situ recovery) for deep deposits of potash on public lands within the Planning Area.

Phased potash leasing will provide an opportunity to issue prospecting permits and/or to lease within a specific portion of the Planning Area (identified as Potash Leasing Areas [PLA]) in order to determine the area’s production potential. Phased leasing provides an adaptive management approach so that if potash were successfully discovered and produced, there will then be an opportunity to consider additional potash permitting and leasing.

Potash exploration and development will be allowed only within PLAs. The BLM will not approve any application for potash prospecting permits or exploration licenses, or engage in competitive leasing unless it is within a PLA. Initially, PLAs include a total of about 103,619 acres and are shown on Map 12...” (page 19)

“The Red Wash PLA is located in the Red Wash area where potash prospecting permits have been issued. The Red Wash PLA includes a total of about 29,956 acres... Potash prospecting permits are part of a noncompetitive leasing process conducted outside of KPLAs. If exploration conducted on the prospecting permits results in identifying a valuable potash deposit, the permittee can qualify for a preference right lease...” (page 20)

“Within PLAs: The priority within a PLA will be to explore and develop potash deposits. New oil and gas leasing within a PLA will be considered only upon one or more of the following criteria being met:

- For areas currently under an existing preference right lease or competitive lease for potash, upon relinquishment or initiation of proceedings to cancel the lease, or upon expiration of ten years from the date of the MLP Record of Decision (ROD) is signed, whichever is latest;
- For areas currently subject to an existing prospecting permit or exploration license for potash, upon relinquishment, cancellation, or expiration of the prospecting permit, or rejection of an application for a preference right lease, or upon expiration of ten years from the date of the MLP ROD is signed, whichever is latest; or
- The Authorized Officer determines that there are compelling reasons why oil and gas leasing would be in the public interest, and that the potential for conflict with existing or future potash exploration and development is minimal or may be minimized.” (page 20)

MIN-POT-4: “Apply a CSU [Controlled Surface Use] stipulation for potash prospecting permits, preference right leases, and competitive leases. All new potash leases, as well as all potash leases subject to readjustment would be subject to the following diligent development requirements:

The Authorized Officer would pursue lease cancellation if after ten years from the date of lease issuance, potassium or related products are not being produced in paying quantities from:

- 1) The lease; or
- 2) The contiguous mining block; or
- 3) When the gross value of the potassium compounds and other related products produced from the lease or the contiguous mining block at the point of shipment to market does not yield a return in excess of all direct and indirect operating costs allocable to their production.... In addition, all potash prospecting permits would include a stipulation that, if a preference right lease is ultimately issued, it would include the diligent development stipulation above.” (page 21)

MIN-POT-8: Apply BMPs as appropriate to minimize the potential resource impacts associated with mineral development (page 23).

The Proposed Action is in conformance with the Moab RMP, as amended, which provides management direction for prospecting permits on federal lands. Based on the Reasonably Foreseeable Development Scenario (RFDS) for Potash in the MLP, the PPAs from American Potash are in an area where the MFO has identified that prospecting is necessary.

2.5. Relationship to Statutes, Regulations, or Other Plans

The following laws and regulations directly related to the Proposed Action and alternative(s):

- FLPMA (1976) – establishes the agency’s multiple-use and sustained-yield mandate to manage the lands and various resource values, including minerals.
- Mineral Leasing Act of 1920 – enables leasing of public lands for developing deposits of coal, petroleum, natural gas and other non-energy leasable mineral resources.
- Mining and Minerals Policy Act of 1970 – declares it is the continuing policy of the Federal Government to foster the development of domestic mineral resources.

- 43 C.F.R. Part 3500 Leasing of Solid Minerals Other than Coal and Oil Shale – authorizes the issuance of federal leases for solid minerals and provides for the issuance of prospecting permits in areas where the presence of solid minerals is not confirmed.

The Proposed Action is consistent with the goals and objectives in the Grand County General Plan Update (Grand County, 2022). The Grand County General Plan Update lists several policies related to a diversified economy, the management of natural resource development, multiple use of public lands. The Plan supports the development of incentives for use in collaboration with government and organizations to attract new industries and business sectors within and beyond the region, and encourages economic sector support for emerging industries that are compatible and complementary with the community and enhance existing residents’ job opportunities.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1. Overview

This chapter describes the aspects of the human environment that may be affected by the Proposed Action or the No Action alternative. Resources and resource values analyzed in this EA were identified as issues during the scoping process (Section 1.3), including the relevant concerns identified in the IDT checklist (Appendix A). A project area is defined by the MFO in the Moab RMP (BLM, 2008) as an area of land upon which an operator conducts mining operations, including the area needed for building or maintaining of roads, transmission lines, pipelines, or other means of access. The project area analyzed in this EA, refers to the four site-specific locations and access routes, including turnouts, that would be affected by the Proposed Action.

3.1.1. General Setting

The project area is locally called the Salt Wash-Big Flat area and is situated in the Colorado Plateau physiographic province of eastern Utah, specifically, the Green River Desert river and ecologic system and northern Paradox Basin geologic province. The Paradox Basin is a subsurface geologic structural element of the Colorado Plateau that is composed of sedimentary rocks that are the target of the proposed exploration. The surface is characterized by flat-lying Paleozoic and Mesozoic sedimentary rocks eroded into a landscape that is flat and marked by mesas and buttes (Stokes, 1986). The elevation ranges between 4,500-5,500 feet above mean sea level, with steep-walled canyons hundreds of feet deep created by the Green and the Colorado River systems and their tributaries. The topography has little relief and is relatively flat (less than four-degree slopes), except for the tributary cut canyons closest to the rivers. The ecology is within Blackbrush and Pinyon Pine-Juniper vegetation biomes. The climate is generally arid but seasonal monsoonal storms deposit most of the annual rainfall of 9.4 inches in the span of a few months in late spring and early summer (See Table below).

Table 3-1: Summary of Climate Data from 1893-2021: Moab, Utah.

Climate Component	Typical Value*
Temperature	Maximum: 98.2°F; Annual max average 71.4°F Minimum: 18.2 °F; Annual min average 40.5°F
Precipitation	Total annual rainfall: 9.4 inches Total annual snowfall: 10.0 inches

* WRCC, 1889-2021: <https://wrcc.dri.edu/>; 1893-2016 totals; <https://wrcc.dri.edu/Climate/>

The proposed project area is situated in the Upper Colorado-Kane Springs Hydrologic Unit between the Green and Colorado Rivers where all the streams, snowmelt, and rainfall in the drainage basin are funneled to a common outlet of the rivers.

The area is not within a municipal watershed. Access routes to the proposed project area would cross ephemeral drainages. These drainages only flow during and after precipitation events for short periods of time.

The proposed drill pads would be located in Spring Canyon Point between Ten Mile Canyon to the north and Spring Canyon to the southeast. These tributary canyons trend to the southwest toward the Green River. The geologic units exposed at the surface are Jurassic-aged Navajo Sandstone covered with up to ten feet of Quaternary-aged mixed loose alluvial and aeolian deposits. The nearly flat to gently rolling surface is characterized by slopes ranging between 2-4 percent.

Land use includes active but seasonal recreational use, peaking in the spring and fall months. Exact visitation is unknown. Other uses include livestock grazing and hydrocarbon production. Historically, potash has been solution-mined from the Paradox formation in the Kane Creek area west of Moab, approximately 25 miles to the south.

3.1.2. General Effects Analysis and Assumptions

General effects analysis used the following methodologies to analyze the proposed alternatives' potential effects on issues identified:

- GIS data, resource data and use data collected over a series of years form the basis of the analysis.
- Effects analysis is based on the best available data and resource specialist knowledge. Quantitative data was used where available and supplemented with detailed qualitative data where no quantitative data was available.

Assumptions used in the analysis of identified issues include:

- Exploratory activity for potash minerals may or may not result in future potash development through a mineral lease. Future activity for development of the potash resource is speculative, depending in part on the results of the data obtained from exploration operations. Issuance of a prospecting permits would not automatically grant approval for potash development activities.
- The RFDS for Potash in the Moab Master Leasing Plan Area (MMLPA) (BLM, 2014) was used to estimate future potash activity and to project a baseline scenario of potash exploration, development, production, and reclamation activities within the Planning Area.
- It is assumed that all surface disturbances associated with the exploration hole drilling operations would be successfully reclaimed within a scope of 10 years, depending on soils, vegetation, and rainfall (BLM, 2012a).
- The RFDS for Oil and Gas (BLM, 2012a), developed to support the RMP, was used to estimate future drilling activity from oil and gas exploration and development. The RFDS projection of future oil and gas well development in the Big Flat Field area is valid and independent of a project-specific action or denial of a particular action.

3.1.3. Cumulative Impacts Analysis

Past, present, and reasonably foreseeable future plans or actions that together make up the cumulative impacts scenario for the Salt Wash-Big Flat geographic area are described in Table 3-2 and Table 3-3, below, based on specific resource issues analyzed in this EA.

Table 3-2: Past and Present Projects, Plans and Actions Included in the Cumulative Impact Scenario.

Past and Present	Description of Project, Plan or Action
Recreation	<p>Hiking and biking (road and mountain bike)</p> <p>Motorized recreation</p> <ul style="list-style-type: none"> • 4x4 driving including Jeep Safari Routes • White Wash OHV [Off-Highway Vehicle] Open Area <p>Camping, including developed campgrounds (Horsethief, Lone Mesa and Cowboy Campgrounds) as well as dispersed camping. Past and present surface disturbance for recreation actions (i.e., campgrounds) is approximately 55 acres.</p>
Livestock Grazing	<p>Livestock grazing and associated range infrastructure, such as fencing and cattleguards. The Proposed Action would disturb and then reclaim 16.97 acres of the 49,094-acre Tenmile Point Grazing Allotment (UT05824). Three cattleguards and adjacent fencing would require temporary adjustments to allow for passage of exploration equipment.</p>
MLP RFDS	<p>The following RFDS for Oil and Gas data (BLM, 2012) when determining the cumulative impacts for the MMLPA.</p> <p>Existing oil and gas development averaged approximately two wells being drilled per year (66 wells during the past 30 years) in the MMLPA. The Salt Wash-Big Flat area averaged approximately 1.7 wells per year between 1982 and 2012. An upward trend from 2007-2012 hints at a projected level of drilling above past activity in the past 30 years. Wells drilled since 2007 in Salt Wash-Big Flat were predicted to average four wells per year. (BLM, 2012a).</p> <p>Actual drilling activity up to 2023 is recorded at the UDOGM website oilgas.utah.gov. Two wells were drilled between 2019 and March of 2023 in the Salt Wash-Big Flat area, and there are five approved permits for drilling.</p>
Mineral Activity	<p>Energy Leasable</p> <p>In 2022, the Big Flat Oil Field contained two new oil and gas well pads and 23 producing wells. The Salt Wash Oil Field contained zero new well pads and zero producing wells. The 23 producing wells in the Big Flat Field make approximately 8,400 bbls/month of oil and 6,823 bbls/month of water.</p> <p>The well pad and access disturbance associated with this oil and gas activity is approximately 3.7 acres during operations; these areas are concurrently reclaimed during operations to leave approximately 1.0 acres during production to allow for access to the well head.</p> <p>Non-Energy Leasable</p>

	<p>No potash exploration permits or federal potash leases have been issued within the MMLPA since 1985. Potash exploration and any subsequent leasing will only be allowed within a PLA. Potash development will be prioritized within PLAs.</p> <p>In the past, geophysical exploration has occurred in all portions of the Planning Area for oil and gas. Based on BLM records, none of the sixteen geophysical projects completed within the Planning Area since 1982 (BLM, 2014) were for potash.</p> <p>Locatable</p> <p>There are no locatable mining operations with authorized Plans of Operation in the proposed project area filed with the BLM MFO as of May 2023. Three Notice-level exploration proposals to explore for lithium were accepted by the MFO between 2018 and 2021 from A1 Lithium Incorporated and were assigned case file numbers UTU-92750, UTU-93341, and UTU-93817. Exploration operations for these projects reentered plugged and abandoned wellbores to sample brine fluids from formations greater than 5,000 feet deep in the Paradox Basin.</p>
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Table 3-3: Reasonably Foreseeable Projects, Plans and Actions.

Resource	Description of Project, Plans or Action
Recreation	Recreation activities of all types are expected to continue and most likely increase. Reasonably foreseeable surface disturbance for recreation actions (i.e., campgrounds and dispersed campsites) would primarily occur during peak visitation to the area (spring, summer, fall each year).
Livestock Grazing	Livestock grazing is expected to continue at its current use patterns and levels. No new grazing infrastructure is planned.
MLP RFDS	<p>The RFDS for Oil and Gas in the MMPLA (BLM, 2012a) projected oil and gas drilling in the Salt Wash-Big Flat areas to average four wells per year between 2012 and 2027 (15 years). As of August 2022, only twelve wells have been drilled since 2012, and five permits to drill are reported authorized. Oil and gas development has been less than what was analyzed in the MLP.</p> <p>The 2014 RFDS for Potash in the MMLPA (BLM, 2014) predicts the potash occurrence potential to be High based on the system outlined in BLM Manual 3031. Under this system, the potash occurrence potential ratings are strictly based on the geologic likelihood of the potash to be present and do not address the economic feasibility of development of the resource. The RFDS estimates that 752,512 acres of land has a High Certainty of High Occurrence Potential (page 11).</p> <p>The RFDS for Potash states in the Projections for Exploration Drilling on Prospecting Permits, page 13, that there were 223 PPAs within the Planning Area in 2014. It was projected that one well would be drilled per 2.4 prospecting permits and the exploration drilling on prospecting permits was estimated at about 74 wells. These 74 wells would amount to a total of about 333 acres (4.5 acres per well) of surface disturbance that would be reclaimed during timing approved in the Exploration Plan.</p>

<p>Mineral Exploration and Development</p>	<p>Mineral Exploration and development that is reasonably foreseeable in the MMLPA includes oil and gas, potash and associated mineral salts, and locatable minerals including lithium and uranium.</p> <p>There are no authorized Plans of Operation for mining non-energy leasable potash minerals or locatable minerals filed with the MFO in the BLM PLAs as of May 2023.</p> <p>Energy Leasable</p> <p>Four oil and gas wells are predicted to be drilled on well pads in the Big Flat – Salt Wash Fields in 2022 and 2023. Future development is predicted to continue at the current rate of 2-5 wells per year based on past development and the current approved permits to drill recorded with the BLM and with UDOGM.</p> <p>Non-Energy Leasable</p> <p>Although potash prospects may occur in the MMLPA, actual development of the potash resource, if present, is only reasonably foreseeable if potash exploration proposals are approved and carried out. American Potash is the only Operator to submit a proposal for potash exploration to the MFO since 2012.</p> <p>Four exploratory holes would also be drilled on SITLA-managed lands to proposed depths of approximately 9,000 feet below the surface that would result in approximately 18 acres of surface disturbance. As stated in the Proposed Action of this EA, American Potash proposes to drill all eight of the total exploration holes using an oil and gas drilling rig and the same drilling and sampling methods are proposed in all of the holes. The four proposed holes to be drilled on SITLA are considered to have very similar, if not the same, resource impacts as the four holes proposed on BLM-managed lands because they are in the same general area with the same topography, ecology, hydrology, and geologic setting; and therefore, the environmental impacts and the operational BMPs established in this EA could apply to all eight holes proposed.</p> <p>As of May 2023, the eleven PPAs that American Potash is applying for now are within the MMLPA and no drilling has occurred on BLM-managed or SITLA lands.</p> <p>Locatable</p> <p>Locatable mineral exploration is active. There are two authorized and one pending BLM case files for lithium exploration as of May 2023. In the event that exploration activities find economic quantities of locatable minerals, it is reasonably foreseeable for an operator to submit a Plan of Operations for Mining to the MFO.</p>
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3.2. Issue 1: How would the construction of drill pads and access routes and the drilling of four exploratory holes contribute to the incremental addition of criteria pollutants as established under the National Ambient Air Quality Standards?

3.2.1. Affected Environment

The impact analysis area for air quality is the airshed in which the proposed exploration holes would be drilled in Grand County. The BLM Utah 2022 Air Monitoring Report (AMR) (BLM, 2021b) discusses past, present, and foreseeable emissions and air quality data for counties in Utah.

Information from the AMR is incorporated by reference in this analysis to help describe the air quality in airsheds where the proposed drill holes are located.

The Environmental Protection Agency (EPA) has primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), sulfur dioxide (SO₂) and lead (Pb). Every three years the Utah Division of Air Quality compiles statewide emission inventories to assess the level of pollutants released into the air from different sources. Statewide and County emissions inventories from 2017 are provided in Section 3.1 of the AMR and listed in the following Table 3-4 for Grand County.

Table 3-4: Criteria Air Pollutant Emissions (Tons Per Year) in Grand County.

County	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOCs	NH ₃
Grand	13,788.5	2,695.9	3,427.4	491.5	8.1	40,911.2	197.1

The EPA has established National Ambient Air Quality Standards (NAAQS) for Criteria Air Pollutants (CAPs) (incorporated by reference from Section 2.2.1 of the AMR). The NAAQS are protective of human health and the environment. Compliance with the NAAQS is typically demonstrated through monitoring of ground-level concentrations of atmospheric air pollutants. Areas where pollutant concentrations are below the NAAQS are designated as attainment or unclassifiable. Locations where monitored pollutant concentrations are higher than the NAAQS are designated nonattainment, and air quality is considered unhealthy (BLM 2021b). Air pollutant concentrations are reported using design values. A design value is a statistic that describes the air quality status of a given location relative to the level of the NAAQS. Design values are used to designate and classify nonattainment areas, as well as to assess progress towards meeting the NAAQS. Design values that are representative for the airsheds in Utah are incorporated by reference from Section 3.2 of the AMR and are provided in Table 3-5, below. It is assumed that counties without reported design values have air pollutant concentrations below the NAAQS and good air quality since air monitoring is usually needed only when concentrations exceed 80% of the NAAQS (40 C.F.R. § 58.14 (c)(1)). Grand County is designated as attainment or unclassifiable for all CAPs. The main pollutants of concern are O₃ and PM_{2.5} as these are the pollutants with reported design values closest to the NAAQS.

Table 3-5: Criteria Pollutant Design Values 2018 to 2020.

Pollutant	Location	Averaging Time	Concentration ²	NAAQS
O ₃	San Juan County	8-hour	0.066 ppm	0.070 ppm
NO ₂	Uintah County	Annual	4 ppb	53 ppb
PM _{2.5}	Mesa County, CO ¹	Annual	5.7 µg/m ³	12.0 µg/m ³
PM _{2.5}	Mesa County, CO ¹	24-hour	17 µg/m ³	35 µg/m ³

¹ Complete monitoring data is not available in Grand and San Juan Counties so data from nearby counties is used as representative for the airshed.

² Concentrations in parts per million (ppm), parts per billion (ppb), microgram per cubic meter (µg/m³)

Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are known or suspected to cause cancer or other serious health effects, or adverse environmental effects, and are also regulated by the EPA. The EPA Air Toxics Screening Assessment tool is used to evaluate impacts from existing HAP emissions in Utah. The EPA has determined that for Grand County the total cancer risk is 10 in 1 million (EPA, 2022). This

cancer risk is within the acceptable range of risk published by the EPA of 100 in 1 million as discussed in the National Contingency Plan, 40 C.F.R. § 300.430.

Air Quality Related Values

The Clean Air Act Prevention of Significant Deterioration (PSD) requirements give more stringent air quality and visibility protection to national parks that are larger than 6,000 acres and wilderness areas that are larger than 5,000 acres; these are designated as Class I areas, but a PSD designation does not prevent emission increases. All other areas are designated Class II and have less stringent air quality requirements. Federal land managers are responsible for defining specific Air Quality Related Values (AQRVs), including visual air quality (haze), and acid (nitrogen and sulfur) deposition, for Class I areas and for establishing the criteria to determine an adverse impact on the AQRVs. The location of the proposed exploration activity is located within a PSD Class II area. However, one Class I area, Canyonlands National Park, is also found in the analysis area.

Visibility trends based on air monitoring data from the Canyonlands National Park monitoring site for the clearest, haziest, and most impaired categories is incorporated by reference from the AMR (Section 3.3.1 and Figures 3 through 6 of the AMR). Visibility in all three categories at Canyonlands National Park shows an improving trend over the past 30 years.

The National Park Service monitors and evaluates deposition to determine which parks are most at risk from air pollution and where conditions are declining or improving. Nitrogen deposition conditions at Canyonlands National Park are fair to poor with no trend for improving or worsening conditions, while sulfur deposition conditions are good and generally improving (See Section 3.3.2 of the AMR).

3.2.2. Environmental Impacts

3.2.2.1. Impacts of Alternative A – No Action Alternative

The BLM would not approve the Exploration Plan and therefore, the PPAs would not be approved, resulting in no impacts to air quality resulting from activities tied to the Exploration Plan. No emissions producing equipment associated with exploration drilling would be deployed. Any incremental addition of criteria pollutants as established under the NAAQS which could result from the Exploration Plan's activities would not occur.

3.2.2.2. Impacts of the Alternative B – Proposed Action

American Potash would be permitted to explore for potash resources by drilling four drill holes for data and sample collection. During exploration drilling, NO₂, CO, VOC, and HAP emissions would result from the drill rig generators and other drilling equipment; there is also potential for fugitive gases, and the potential for venting and flaring to be used as safety measures during drilling. Additionally, dust (PM₁₀ and PM_{2.5}) would be produced during drill pad and access route construction and upgrades, and by vehicles servicing the exploration activities. Emissions from the exploration activities would have short-term effects over the approximately 180 total days (45 days per drill location) needed to build the drill pads and access routes to Class B or D roads and drill and sample the holes. While the proposed duration of operations in the Exploration Plan is approximately 180 days, the exploration activities could occur over the entire two-year effective period of the initial term (43 C.F.R. § 3505.60), depending on working conditions and issues with drilling and sampling in the hole.

Emissions associated with potash exploration (construction of pads and access routes, drilling of holes, collection of data and samples, and reclamation) would be similar to those produced from oil and gas exploration drilling. An emissions inventory was prepared for the MLP FEIS, summarized in the BLM Utah AMR (BLM, 2021b) for a single location. This emissions inventory is used to estimate the emissions associated with drilling the four exploration holes, and are provided in Table 3-6.

Table 3-6: Estimated Emissions (tons/year).

PM ₁₀	PM _{2.5}	VOC	NO _x	CO	SO ₂	HAPs
10.2	1.7	3.0	5.3	8.4	0.090	0.110

Utah Administrative code R307-410-4 lists emissions thresholds for new or modified sources, and projects with proposed emissions increase below these thresholds would not violate National Ambient Air Quality Standard, including secondary standards for protection of the environment. The emissions listed in Table 3-6 are below the emissions thresholds in R307-410-4. Substantial air resource impacts are not anticipated from drilling the exploration holes based on the emissions estimates contained in Table 3-6, the small increase to county level emissions (Table 3-4), the project area attaining all ambient air quality standards, and the short duration of emissions (up to 180 days).

3.2.2.3. *Cumulative Impact Analysis*

This document incorporates by reference the projected changes to air quality and AQRVs that are evaluated in the BLM’s Air Resource Management Strategy (ARMS) Monitoring Report. This modeling study provides a reference for potential changes to the affected environment occurring from existing and foreseeable emissions producing activities, including oil and gas development. The Cumulative Impact Analysis Area (CIAA) for air quality is Grand County, Utah.

Emissions Trends

Past and present actions that have affected and would likely continue to affect air quality in the analysis area include surface disturbance resulting from oil and gas development and associated infrastructure, mineral exploration, geophysical exploration, ranching, and livestock grazing, range improvements, recreation (including OHV use), authorization of rights-of-way for utilities and other uses, and road development. These types of actions and activities can reduce air quality through emissions of criteria pollutants (including fugitive dust), VOCs, and HAPs, as well as a reduction in visibility. Emissions from these activities are listed in Table 3-4. In the future, emissions from vehicle exhaust, and from residential and commercial activities will likely increase as population and tourist visitation increases in the area.

Modeled Air Quality Projections

The BLM prepared the ARMS regional modeling study to evaluate foreseeable changes to air quality and AQRVs. While the primary purpose of the ARMS model is to evaluate the air quality impacts from oil and gas activities, it can also be used to evaluate overall air quality within the modeling assessment area. Foreseeable emissions for non-oil and gas emissions sources are incorporated from the Intermountain Data Warehouse WAQS 2011b air quality modeling dataset. Source apportionment is used in the modeling study to evaluate changes to air quality and AQRVs from all sources including Biogenic sources, BLM Uinta Basin Oil and Gas sources, other oil and gas sources (including BLM authorized sources outside Duchesne and Uinta Counties), and non-oil and gas anthropogenic

sources. Future year modeling results are compared with the NAAQS for criteria pollutants (O₃, PM_{2.5}, PM₁₀, NO₂ and SO₂) throughout the State of Utah. The model performed very well in simulating summertime O₃ at some representative sites in Utah over the year.

The ARMS 2017 model shows no exceedances of the evaluated NAAQS in Grand County. Modeled O₃ shows decreasing concentrations between the base year and future year model run. Evaluation of the Annual and 24-hour PM_{2.5}, and 24-hour PM₁₀ NAAQS show exceedances only occurring due to exceptional events such as wildfires and no exceedances due to anthropogenic activities.

AQRVs

AQRVs were also analyzed in the ARMS 2017 modeling study. Future year projections show improvements of AQRVs at Class I, Class II, and sensitive lakes in Utah compared to 2011 Base Year emissions. Biogenic emissions and non-OG emissions are the main contributors to Δ_{dv} (the change in visibility) exceedances in Utah National Parks. Oil and gas development, including BLM authorized drilling similar to the potash drill holes, are projected to produce visibility impacts exceeding the 0.5 and 1.0 dv thresholds for 21 and 2 days, respectively, at Canyonlands National Park.

The ARMS 2017 future year simulated sulfur and nitrogen depositions at sensitive areas were substantially less than those simulated during the base year. The simulated total annual nitrogen depositions by both base year and future year were below the corresponding critical loads at all assessed areas. All of Class I, Class II areas and sensitive lakes experienced nitrogen deposition improvements in future years compared to base year simulations. Similar conclusions are applicable to source impacts on total annual sulfur deposition. Base year and future year simulated sulfur depositions for all Class I, Class II and sensitive lakes were well below the critical load of 5 kgS/ha/yr. The future year also resulted in improvements on sulfur deposition at all areas.

The ARMS 2017 model results do not reveal any new air quality or AQRV impacts to those already disclosed in the MLP FEIS (BLM 2016b), which evaluated the air quality impacts from potash exploration and development.

3.3. Issue 2: How would potash exploration operations impact the current or potential future leasable mineral resource exploration or development?

3.3.1. Affected Environment

The Proposed Action would explore for potash mineral resources in the rocks within the Paradox Basin, a subsurface geologic depression with thick sequences of sedimentary evaporite rocks. The Paradox Basin is geologically defined as an asymmetric foreland basin approximately 33,000 square miles (85,470 km²) in size located mostly in southeast Utah and southwest Colorado. On the east it is bordered by the tectonically uplifted Uncompahgre Plateau, on the west by the Circle Cliffs Uplift, and on the northwest by the San Rafael Swell. The formation and burial history of the basin are the determining factors as to why potash and associated mineral deposits, including lithium salts, are likely to be present in this area and the basin boundaries reflect the extent of the potential mineral deposits.

The sediments that make up the rock formations in the Paradox Basin were deposited in a marginal marine environment that underwent cycles of restricted marine circulation 200 million to 300 million years ago when an ocean still existed in the region, resulting in thick sequences of interbedded evaporites, carbonates, and siliciclastic sediments. The Paradox formation in the Paradox Basin contains approximately 29 depositional cycles and is over 3,500 feet thick. The lithology of these

evaporite cycles contain halite and anhydrite facies with chemistries conducive to potash and lithium mineral exploration (Nuccio and Condon, 1996). The Leadville formation is situated under the Paradox formation and contains a variety of carbonate facies that have undergone extensive dolomitization, brecciation, and other types of diagenesis. These diagenetic processes made the formation highly porous and permeable and therefore is a common target for oil and gas exploration. Waters collected from the Leadville carbonate facies have been shown to contain lithium in both the formation brines and from the oil field produced waters (Meyhew and Heylman, 1965).

Potash is the generic term for a variety of ore-bearing minerals, ores, and refined products, all containing the element potassium in water-soluble form. Potash is most commonly in the form of the potassium chloride mineral sylvite, KCl, but the potassium can be found in a variety of mineral species within the Paradox Basin like carnallite (hydrated potassium magnesium chloride), and halite (sodium chloride) are found in the Pennsylvanian Paradox formation. These minerals do not occur together in all parts of the Paradox Basin and exploration techniques are necessary to define the quality and extent of potash deposits. Potash exploration and any potential for subsequent production, and development would be regulated as a non-energy leasable mineral under 43 C.F.R. Part 3500.

Potash deposits in the Paradox Basin were initially discovered during the exploration for oil and gas during the 1920's. Oil and gas exploration and production is primarily from the Mississippian Age Leadville formation the Pennsylvanian Age Hermosa Group (Honaker Trail formation and Cane Creek interval of the Paradox formation), and the Permian Age Cutler formation (Brown, Alan Lee, 2002). The Proposed Action would occur in an area adjacent to oil and gas extraction from the Big Flat and Salt Wash oil and gas fields. Production from these fields is recorded in the UDOGM Summary Production Report from September 2022 (Table 3-7).

Table 3-7: UDOGM Summary Production Report by Field from May 2023.

Field	Total Wells	Cumulative Oil Produced (BBL ³)	Active Wells	Monthly Oil (BBL)	Monthly Gas (MCF ³)	Monthly Water (BBL)
Big Flat	170	6,705,947	23	8,453	5,376	6,823
Salt Wash	245	1,653,792	0	0	0	0

Wells in the Big Flat Field have produced over 6,705,947 barrels (BBLs) of oil since the discovery well Big Flat #1 was drilled in 1957 (Smith, 1978). The field is currently producing over 8,400 BBLs/month from 23 active wells. There are no active producing oil and gas wells within a two-mile area of each of the four proposed locations on federal lands (UDOGM, 2023).

Exploration for potash in the Paradox Basin would use similar, if not the same, drilling technology as that used in conventional oil and gas exploration and development. Intervals of high potash concentration can be identified in drill holes with the use of wireline geophysical equipment lowered into the borehole. Potassium, the key element in potash, has a radioactive isotope that appears as a peak on a gamma log that can be used to identify the depth and thickness of the potash resources. Electronic well log data from historic nearby oil and gas (O&G) wells in the northwestern portion of the Paradox Basin indicate the presence of potash mineralization. The Proposed Action would require drilling equipment that can drill and collect rock and fluid samples from the same drill hole at multiple

³ Barrel (BBL) is 42 U.S. gallons; gas is a volume measured in increments of a thousand cubic feet (MCF). Utah Division of Oil, Gas and Mining, 2022

depths between 5,000 and 9,000 feet below the surface using vertical drilling, coring, and fluid sampling techniques. Horizontal drilling is not proposed during the exploration.

The Operator chose the core locations to provide relevant geologic data needed to assess the occurrence of economically viable leasable potash deposits. The cores would be taken from zones where historic data have indicated that potash mineralization may be present in the Paradox formation evaporites. Data obtained from the cores would facilitate analysis of the extent and grade of potash mineralization. The Operator would use the core data to provide geologic control for making resource characterization assessments through augmentation with existing geophysical data, providing the basis for evaluating the economic viability of potash resources in the exploration area. The locations of the core holes were designed to maximize the recovery of sufficient data to characterize the potash resource with respect to the Operator's PPAs.

In addition to testing to potash, the Operator would explore for locatable lithium mineral resources. the evaporite sequences of the lower Paradox Basin and the carbonate rocks Leadville formation. Historic O&G wells drilled in the potash area of the basin encountered super-saturated brines containing high potash, sodium chloride, magnesium chloride, lithium, bromine, boron and other potentially payable minerals. Lithium would be extracted for testing from the formation brine fluids using wireline RFT tools. Lithium exploration and any potential for subsequent production and development would be regulated as a locatable mineral under 43 C.F.R. § 3809.

There are currently no locatable mineral mining operations with active Plans of Operations in the proposed project area. Lithium exploration is occurring to the south of this proposed project area approximately three miles north of Canyonlands National Park and 3.5 miles west of Dead Horse State Park. The Proposed Action does not intersect, nor would it interfere with the sixteen existing active placer mineral claims in T. 26 S. R. 19 E., sections 3 and 14.

Potash development and production is occurring by Reunion Potash Company on federal lands in T. 24 S. R. 18 E., T. 24 S. R. 19 E., and on SITLA and privately managed lands in T. 26 S. R. 20 E. and T. 27 S. R. 20 E. The Reunion Potash Company holdings are located approximately eight miles southwest of the Proposed Action. There are no other active non-energy leasable mineral development or production (potash) on BLM-managed lands that are located within a six-mile radius of the Proposed Action.

Potash is also being solution-mined from the Paradox formation in the in the west central portion of the Paradox Basin at the Intrepid's Cane Creek Potash Mine located approximately 20 miles southwest of Moab and 22 miles south of the proposed exploratory core hole locations. Potash is being mined in this area from deposits down to depths of 6,000 feet below the surface, but potash deposits can be found at even deeper intervals. Due to the depths of the deposits, potash is mined by pumping a brine solution into injection wells and bringing the dissolved potash to the surface evaporation ponds. The dissolved potash precipitates out of solution and is removed from the ponds for more process refinement.

3.3.2. Environmental Impacts

3.3.2.1. Impact of Alternative A – No Action Alternative

The BLM would not approve the Exploration Plan and therefore the PPAs would not be approved, resulting in no impacts to current or potential future leasable mineral resource exploration or development from activities tied to the Exploration Plan.

3.3.2.2. *Impacts of Alternative B – Proposed Action*

The Proposed Action would result in the drilling of four holes to depths to between 3,000 and 5,000 feet below the surface to extract cores for potash testing in the Paradox formation. American Potash is proposing to explore for potash based on their interpretation of the subsurface geology. The geologic formation with potash potentials that are not revealed in surface outcrops and are only able to be evaluated through drilling and core analysis. BLM evaluated the proposed core and sample locations relative to the geologic data available and find the locations to be reasonable to explore the permit area within the time allowed (43 C.F.R. § 3505.62). After the exploration, the BLM will determine if the data from the geophysical logs and cores is sufficient to help establish the extent and grade of potash deposits. If exploration conducted under the prospecting permits results in identifying a valuable potash deposit, then the permittee can qualify for a preference right lease, as outlined in 43 C.F.R. § 3507.11. At this point, additional NEPA would be prepared for leasing and/or development of leases for potash production.

Exploration activity does not necessarily lead to leasing and production operations. Exploratory drilling and obtaining core and fluid samples are not considered to be actions that are connected to mineral development. The Proposed Action does not set a precedent for future actions that would normally require environmental analysis. A decision to approve the Proposed Action would not automatically trigger a decision to approve construction and operation of mineral development and production actions.

The proposal would target leasable potash minerals and locatable lithium minerals that are stratigraphically close or sandwiched between intervals with known and producing leasable O&G commodities that are not the target of this exploration. The proposed coring and perforating operations would avoid O&G bearing intervals, but the potential to encounter these leasable fluids while drilling and sampling is not zero. Therefore, a plug and packer system would be used in the hole to isolate the target clastic intervals that would be sampled during coring and formation fluid sample extraction to prevent any sampling of O&G from non-target intervals.

The O&G leasable minerals are subject to valid existing rights as outlined in the Moab MLP (BLM, 2016) and cannot be produced during the sample extraction of the non-energy leasable potash or locatable lithium mineral resources during exploration operations. In addition, under the Mining and Leasing Act operations, any mining or leasing activities would be conducted, so far as reasonably practicable, in a manner which would avoid damage to any known deposit of any mineral not so reserved from a mining claim or lease (30 U.S.C. Part 526).

3.3.2.3. *Cumulative Impact Analysis*

The CIAA for geology, mineral and energy production is the Paradox formation, which includes the targeted intervals for exploration of leasable (potash) and locatable (lithium) commodities. Past, present, or reasonably foreseeable actions contributing to cumulative impacts to geology, minerals and energy production within the CIAA include:

- Mineral exploration and development including O&G and locatable minerals such as lithium, potash and uranium.
- MLP and its associated RFDS for O&G and potash.
- Potential for Lithium Development.

Cumulative impacts to geology, minerals and energy production would be considered if both leasable potash and locatable lithium minerals are found in economic quantities. The Mining and Leasing Act states that where the same lands are being utilized for mining operations and Leasing Act operations, each of such operations shall be conducted, so far as reasonably practicable, in a manner compatible with such multiple-use (30 U.S.C. § 526 (a)). Production of lithium in the same exact tract from which potash would be produced would require a separate location, application, and mine plan of operations under 43 C.F.R. Subpart 3809. A Plan of Operations would have to account for the potential to interfere with existing energy and non-energy leasable resources development and production from the same tracts. A plan of operations for the development of either a locatable resource or for a leasable resource would be required to keep commodities separate during production in a manner compatible with multiple-use, and avoid damage to any other known regulated mineral deposits as described in the Multiple Mineral Development Act of 1954 at 30 U.S.C. Part 526.

3.4. Issue 3: How would the potash exploration operations contribute to greenhouse gas (GHG) emissions and climate change?

3.4.1. Affected Environment

Climate change is a global process that is affected by the sum total of greenhouse gases (GHGs) in the Earth’s atmosphere. There are uncertainties regarding the incremental contribution to global GHGs from a single proposed land management action and its potential effect on global climate change or any localized effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources. However, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to climate change from GHG emissions over time. GHGs influence the global climate by increasing the amount of solar energy retained by land, water bodies, and the atmosphere. GHGs can have long atmospheric lifetimes, which allows them to become mixed and uniformly distributed over the entirety of the Earth’s surface no matter their point of origin.

The continued increase of anthropogenic GHG emissions over the past 60 years has contributed to global climate change impacts. A discussion of past, current, and projected future climate change impacts is described in Chapters 8 and 9 of the BLM Specialist Report on Annual GHG Emissions and Climate Trends (BLM, 2022). These chapters describe currently observed climate impacts globally, nationally, and in each State, and present a range of projected impact scenarios depending on future GHG emission levels. These chapters are incorporated by reference in this analysis.

The table below shows GHG emissions data for the State of Utah. State energy-related CO₂ emissions include emissions from fossil fuel use across all sectors (residential, commercial, industrial, transportation, and electricity generation) and are released at the location where the fossil fuels are consumed. Emissions data is not generally available at the county level, and there are no facilities in Grand County that submit emissions to EPA’s GHG reporting program.

Table 3-8: State Level GHG Emissions as Reported to the EPA.

Scale	2016	2017	2018	2019
UT	74.1 Mt	74.3 Mt	77.1 Mt	78 Mt

Source: Annual GHG Report, Chap. 6, Table 6-3. Mt (megatonne) = 1 million metric tons

3.4.2. Environmental Impacts

3.4.2.1. Impacts of the Alternative A – No Action Alternative

The BLM would not approve the Exploration Plan and therefore the PPAs would not be approved, and no direct or indirect GHG emissions would occur from activities tied to the Exploration Plan.

3.4.2.2. Impacts of the Alternative B – Proposed Action

Drilling emissions occur over a short period and include emissions from heavy equipment and vehicle exhaust, drill rig engines, and exploration sampling procedures that may be used.

The table below lists the estimated GHG emissions resulting directly from the Proposed Action over the short time period for exploration (road and pad construction, drilling, and sampling) and is projected over longer time periods for comparison. There are no indirect GHG emissions (from production, processing and hauling) since the drill holes are exploratory and temporary.

Table 3-9: Estimated Emissions from Construction, Drilling, and Sampling of Exploration Holes (tonnes).

CO ₂	CH ₄	N ₂ O	CO ₂ e (100-yr)	CO ₂ e (20-yr)
9,949	33.76	0.160	10,999	12,778

Source: BLM Lease Sale Emissions Tool

Potential GHG emissions from the Proposed Action could result in GHG emissions of 10,999 metric tonnes CO₂e. This is below the EPA GHG reporting program threshold (25,000 metric tonnes CO₂e) for industrial facilities.

Monetized Impacts from GHG Emissions

The “social cost of carbon,” “social cost of nitrous oxide,” and “social cost of methane” – all together represent the “social cost of greenhouse gases” (SC-GHG) and are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year. The SC-GHG numbers do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other impacts analyzed in this document. SC-GHG is provided only as a useful measure of the costs of GHG emissions and the benefits of GHG emissions reductions to inform agency decision-making.

For federal agencies, the best currently available estimates of the SC-GHG are the interim estimates of the social cost of carbon dioxide (SC-CO₂), methane (SC-CH₄), and nitrous oxide (SC-N₂O) developed by the Interagency Working Group (IWG) on the SC-GHG. Select estimates are published in the Technical Support Document (IWG, 2021) and the complete set of annual estimates are available on the Office of Management and Budget’s website.⁴

The IWG’s SC-GHG estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damages associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less

⁴ <https://www.whitehouse.gov/omb/information-regulatory-affairs/regulatory-matters/#scghgs>

significant factor in present-day decisions). The current set of interim estimates of SC-GHG have been developed using three different annual discount rates: 2.5%, 3%, and 5% (IWG, 2021).

As expected with such a complex model, there are multiple sources of uncertainty inherent in the SC-GHG estimates. Some sources of uncertainty relate to physical effects of GHG emissions, human behavior, future population growth and economic changes, and potential adaptation (IWG, 2021). To better understand and communicate the quantifiable uncertainty, the IWG method generates several thousand estimates of the social cost for a specific gas, emitted in a specific year, with a specific discount rate. These estimates create a frequency distribution based on different values for key uncertain climate model parameters. The shape and characteristics of that frequency distribution demonstrate the magnitude of uncertainty relative to the average or expected outcome.

To further address uncertainty, the IWG recommends reporting four SC-GHG estimates in any analysis. Three of the SC-GHG estimates reflect the average damages from the multiple simulations at each of the three discount rates. The fourth value represents higher-than-expected economic impacts from climate change. Specifically, it represents the 95th percentile of damages estimated, applying a 3% annual discount rate for future economic effects. This is a low probability but high damage scenario, and represents an upper bound of damages within the 3% discount rate model. The estimates below follow the IWG recommendations.

The SC-GHGs associated with estimated emissions from all drilling and development in the proposed project area are reported in Table 3-10. These estimates represent the present value (from the perspective of 2021) of future market and nonmarket costs associated with CO₂, CH₄, and N₂O emissions from potential drilling and operations, and potential end-use, as described in Subsection 1.2.1 of the Federal Greenhouse Gas Accounting and Reporting Guidance. Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given emissions year and BLM’s estimates of emissions in each year. They are rounded to the nearest \$1,000.

Table 3-10: SC-GHGs Associated with all Mineral Development (2020\$).

	Average Value, 5% discount rate	Average Value, 3% discount rate	Average Value, 2.5% discount rate	95th Percentile Value, 3% discount rate
Total	\$171,000	\$569,000	\$840,000	\$1,677,000

3.4.2.3. Cumulative Impact Analysis

Past, present, and reasonably foreseeable future actions that have produced and would likely continue to produce GHG emissions within the geographic scope of this analysis are identified in Section 3.1.3 and would add to emissions from all global sources. Minor GHG emissions sources in the area include geophysical exploration, agriculture and grazing, recreation (including OHV use), mineral extraction (including O&G), fugitives, construction, public transportation, and residential. At present, there are no good estimates of emissions from these numerous minor sources for the local geographic scale.

3.5. Issue 4: How would the location of the proposed drill sites impact the naturalness and wilderness characteristics of the Labyrinth Canyon Wilderness Inventory Area (WIA)?

3.5.1. Affected Environment

The AP-F-12 and AP-F-34 drill pads are located within lands determined by BLM to possess wilderness characteristics. The Labyrinth Canyon WIA encompasses an area of 24,300 acres. The

BLM's Manual 6310 (Conducting Wilderness Characteristics Inventory on BLM Lands) defines "wilderness characteristics" as lands having naturalness, adequate size (generally, 5000 acres or more), and possessing outstanding opportunities for solitude and/or primitive and unconfined recreation. (BLM, 2012b). To satisfy the criterion of "naturalness", the area must appear to have been affected primarily by the forces of nature, and any work of human beings must be substantially unnoticeable. Factors or elements influencing solitude may include size, configuration, topographic and vegetative screening, and ability of the visitor to find seclusion. Solitude need not exist everywhere in a unit to possess this quality. A small area could also provide opportunities for solitude if, due to topography or vegetation, visitors can screen themselves from one another. BLM considers the impacts of sights and sounds from outside the inventory area on the opportunity for solitude only if these impacts are pervasive and omnipresent. Similarly, outstanding opportunities for primitive and unconfined recreation need be found only somewhere within the unit, and the acreage required for such is undefined by BLM policy. Although an area possessing wilderness characteristics often possesses outstanding opportunities for solitude *and* primitive and unconfined recreation, only one of these needs be present. Lands that clearly lack wilderness characteristics are those lands that fail to meet one or more of the above criteria or do not meet the size criterion of 5,000 acres or any of the size exceptions (BLM, 2012b).

For the BLM, the identification of lands with wilderness characteristics is strictly administrative and does not imply a recommendation regarding wilderness or wilderness study area (WSA) designation or alter management of these lands. The BLM decided to not manage lands in which AP-F-12 and AP-F-34 would be located for wilderness characteristics in the RMP (BLM, 2008). The decision considered, in part, that some parts of the inventoried area were used as travel routes and some parts were leased for O&G exploration and development.

3.5.2. Environmental Impacts

3.5.2.1. Impacts of Alternative A – No Action Alternative

The BLM would not approve the Exploration Plan and therefore the PPAs would not be approved, resulting in no impacts to wilderness characteristics from activities tied to the Exploration Plan. The loss of naturalness and the impacts to solitude and/or primitive and unconfined recreation which could result from the Exploration Plan's activities would not occur.

3.5.2.2. Impacts of Alternative B – Proposed Action

Construction of the AP-F-12 and AP-F-34 drill pads and access routes would affect 7.1 acres of the 24,300 acres within the Labyrinth Canyon WIA. The appearance of naturalness and opportunities for solitude and/or primitive and unconfined recreation would be lost in the vicinity of these two drill pads. Based on noise modeling in the MLP, impacts to solitude and/or primitive and unconfined recreation could extend as far as 2.5 miles from the activity site. This itself, however, also is dependent on noise diminishing factors such as topography and vegetative cover. Impacts would likely be temporary, and most obvious during the period of actual exploration. Construction and drilling activities would be an estimated 45 days at each proposed location. Later development, should it occur, would be addressed in a separate NEPA analysis.

Restoration of natural topographic features and regrowth of native grasses are designed to effectively eliminate visual impacts from road and pad construction, approximating a natural appearance over time. Sight and sound impacts from human activity and the presence and operation of people, vehicles, and drilling equipment would occur in the WIA over approximately 45 days for each drill

pad in the vicinity of the AP-F-12 and AP-F-34 drill pad locations. Impacts perceived by visitors to the areas with wilderness characteristics would be most noticeable during times of higher recreational use in the spring and fall seasons. The AP-F-12 drill pad location is immediately adjacent to the Class B Spring Canyon Point Road #338. The AP-F-34 location is immediately adjacent to a Class D road, across from which wilderness characteristics are not present. These roads are open to vehicular travel by the public, resulting in an adjacent landscape whose naturalness is already diminished. The WIA would still be of sufficient size to qualify as possessing wilderness characteristics, should the BLM decide to manage this area for such characteristics in the future.

3.5.2.3. *Cumulative Impact Analysis*

The CIAA potentially affected by the Proposed Action consists of 24,300 acres where wilderness characteristics were determined by the BLM to be present within the Labyrinth Canyon WIA (BLM, 2007a). Two exploratory drill holes, the AP-F-12 and AP-F-34, would be located in areas determined to exhibit wilderness characteristics. The potential loss of wilderness characteristics acreage, however, would leave what acreage remains above the 5000-acre minimum size requirement. The time frame for the cumulative impact analysis for wilderness characteristics is approximately 11 years, which includes the 6-month period needed to perform the Proposed Action (Phase 1 and Phase 2) plus up to 10 years that may be needed to fully reclaim the areas disturbed by implementation of the Proposed Action.

Past, present and reasonably foreseeable actions contributing to cumulative impacts to lands with wilderness characteristics within the CIAA include:

- Recreation use including use of roads, trails, and campgrounds.
- Mineral exploration and development including O&G and locatable minerals such as lithium, potash and uranium (See Table 3-2 and 3-3).
- MLP and its associated RFDS for O&G and potash (See Table 3-2 and 3-3).

No past surface disturbance has resulted from O&G or recreation actions in the portion of the Labyrinth Canyon WIA where wilderness characteristics are present. Past disturbance from roads have been excluded from the wilderness characteristics area.

Because the identification of lands with wilderness characteristics is administrative and does not accompany a recommendation regarding wilderness or WSA designation, the right to explore for potash and explore/develop existing O&G leases on lands that display wilderness characteristics remains valid. Reasonably foreseeable potash exploration would result in the disturbance of 7.1 acres of lands with wilderness characteristics, corresponding to the surface that would be used by the AP-F-12 and AP-F-34 drill pads and access roads. WIA acreage within the KPLA totals approximately 5,847 acres. Although not reasonably foreseeable, this represents the acreage which could theoretically be developed.

The amount of reasonably foreseeable O&G activity in the CIAA was estimated by comparing the acreage displaying wilderness characteristics (24,300 acres) relative to the encompassing RFDS area (276,552 acres) (BLM, 2021a). O&G development is estimated to result in approximately two wells that may be drilled in the Big Flat RFDS area during the next 7.5 years, comprising a maximum of 10 acres of surface disturbance. Thus, reasonably foreseeable O&G development may result in an additional ten acres (above and beyond the Proposed Action) that would no longer qualify as lands with wilderness characteristics. Total reasonably foreseeable disturbance in the WIA from mineral

activities is estimated to be 17.1 acres. Sufficient acreage would remain in the 24,300 acres that display wilderness characteristics within Labyrinth Canyon WIA to meet the size criterion. Implementation of the Proposed Action would contribute to the removal of 7.1 acres from the 24,300 acres of lands with wilderness characteristics until topographic features and vegetation are restored. Cumulative impacts from development would most likely take place above the rims of the canyons contained within the wilderness characteristics area.

3.6. Issue 5: How would the location of the proposed drill sites and related exploration operations within the Labyrinth Rims/Gemini Bridges SRMA impact SRMA management objectives and recreation experiences?

3.6.1. Affected Environment

The project area is located within the central portion of the 300,650-acre Labyrinth Rims/Gemini Bridges Special Recreation Management Area (SRMA), which includes most of the area between the Labyrinth Canyon of the Green River to the west, U.S. Highway 191 to the east, the Colorado River and the Island in the Sky District of Canyonlands National Park to the south, and Blue Hills Road to the north. The BLM's management goals for the SRMA include providing quality camping, hiking, and scenic driving experiences. Recreational activities in the SRMA include hiking, mountain and road biking, roped activities such as climbing, rope swinging and BASE jumping, equestrian use, and backcountry driving with all types of motorized vehicles.

Within the SRMA, vehicle use is limited to designated routes, unless otherwise authorized by the BLM. State Route (SR) 313, a designated State of Utah scenic byway, provides access to Dead Horse Point State Park (DHPSP) and the Island in the Sky District of Canyonlands National Park. Both parks are located 10 to 15 miles south of the nearest drill hole. SR 313 receives heavy recreational use as an in-and-out drive to the parks and to Labyrinth Canyon. This highway also provides access to developed campgrounds, trails, and scenic viewpoints. SR 313 may be used as an alternative access route to the drill pads.

The SRMA is popular for events, including the Moab Canyons Endurance Ride and Easter Jeep Safari. The Moab Canyons Endurance Ride uses a route that passes adjacent to the AP-F-28 location on Class B road #337 (see Map 3). The Easter Jeep Safari, a permitted activity that takes place in the 10 days prior to Easter every year, utilizes the Secret Spire jeep trail and travels the uplands along Spring Canyon Point near the proposed drill pads. Ten Mile Wash, one mile north of the proposed AP-F-24 drill pad, contains designated all-terrain vehicle trails, and White Wash, approximately 7.5 miles north of the AP-F-24 drill pad is open to unrestricted OHV travel. Approximately 50 motorized permittees are authorized to utilize the Jeep Safari routes in the SRMA.

Dispersed camping is allowed in the general vicinity of the drill pad locations but typically is concentrated near the terminus of Spring Canyon Point Road and within Ten Mile Wash. Backcountry hiking occurs mainly in the canyon bottoms, including Ten Mile Wash and Spring Canyon, which is located approximately one mile south of the AP-F-12 drill pad. Spring Canyon is managed as a Hiking Focus Area in the RMP. Due to its distance from artificial light sources, people enjoy viewing the night skies from their remote camping locations.

Traffic on SR 313 is primarily recreational and is highest in spring and fall, as supported by park visitation data. In 2019, the annual average daily trips on SR 313 was 2,700 vehicles per day traveling in both directions. That is, 1,350 vehicles per day utilized SR 313, for a yearly traffic count

of 492,750 vehicles traveling both in and out of SR 313. It is therefore likely that, at three people per vehicle, 1,478,250 people traveled on SR 313. In 2021, 1,147,708 people were counted entering DHPSP; all people entering that park had traveled on SR 313.

Blue Hills Road, which would be used as the primary access to the drill pads from U.S. Highway 191, is one access route to the White Wash OHV area and provides the most direct route to recreational areas near Ten Mile Wash. Traffic use data for Dubinky Well or Blue Hills Road are not available.

3.6.2. Environmental Impacts

3.6.2.1. Impacts of Alternative A – No Action Alternative

The BLM would not approve the Exploration Plan or approve the PPAs, and therefore any temporary impacts to recreational users in the Labyrinth Rims/Gemini Bridges SRMA or other impacts to the SRMA management objectives would not occur as a result of activities tied to the Exploration Plan.

3.6.2.2. Impacts of Alternative B – Proposed Action

Implementation of the Proposed Action would initially disturb 16.97 acres in the SRMA, 3.74 acres of which would consist of upgrades and maintenance to designated roads. After reclamation operations restore the approximate original contours of the land and vegetation has begun to regrow, the residual disturbance would consist of 3.25 acres corresponding to the running surfaces of the existing Class B and Class D roads.

The location of project activities, which is between Spring Canyon and Ten Mile Wash, is less likely to impact many recreational users of the SRMA since the majority of recreational use is concentrated at the southern portion in the SRMA, in the vicinity of DHPSP and Canyonlands National Park, in the designated campgrounds, and along the SR 313 scenic byway.

General Recreational Impacts

Project operations would be conducted sequentially for each drill hole location over an approximate 45-day period (includes construction of drill pad site and drilling of the hole), extending over a period of up to two years. As such, impacts to recreational users of the northern portion of the SRMA would consist primarily of indirect, but temporary, effects from equipment noise and the appearance of a drilling rig, which would be illuminated at night and may compromise the perception of solitude and the appearance of a dark night sky to observers in the area. The magnitude of the temporary noise and visual impacts to recreational users would vary according to the time of year when the construction and drilling activities occur, spatial separation between the project activity and the recreational user, and presence of mitigating terrain features. Noise and visual impacts are less likely to impact recreational use of the SRMA during the winter and summer months when recreational activity is low. Construction and drilling operations that occur during the spring and autumn months would result in greater noise and visual impacts to recreational users who travel to the northern portion of the SRMA.

Impacts to the Camping Experience

Campers who utilize the northern portion of the SRMA would have abundant opportunities within areas open to dispersed camping to select an alternate campsite at a greater distance from drilling operations. The drill pads would be located approximately two to three miles away from popular campsites at Dripping Spring, and while drill rig noise may be audible at times, the noise would be likely not be loud enough to disturb campers. Noise from construction equipment or

the drill rig at the AP-F-24 or AP-F-12 locations may be audible at times during the 45-day construction and drilling time frames, depending on wind direction, to hikers in the bottoms of Ten Mile Wash or Spring Canyon. The White Wash open OHV area is 7.5 miles north of the proposed drill hole locations, and construction or drilling rig noise is not expected to be audible; however, the lights on a drilling rig, particularly the AP-F-24, may be visible in the distance at night.

Recreational Access

General access to the SRMA by recreational permittees along SR 313 is not likely to be affected since primary access is planned via the Blue Hills Road unless wet conditions prevent its use. Since most recreational users engage in activities nearer to the SR 313 scenic corridor, in the state and national park areas, and/or in the designated campgrounds, impacts to the majority of tourists, campers, hikers, bicyclists, runners, and 4WD enthusiasts would be marginal and temporary. As committed to by the Operator, public access would not be impeded on the Class B Dubinky Well, Spring Canyon Point, and Dripping Springs roads during maintenance actions or by truck traffic. Upgrades to these arterial roads may benefit those recreationists who utilize them to access their chosen recreational activity.

Upgrading two Class D designated routes in the Spring Canyon Point area may temporarily prevent their use over a period of five days each while the road improvements are being performed; however, the Class D roads would remain open during drilling operations. The SRMA contains abundant Class D designated routes, several of which may provide access to a common destination. OHV users and other recreational users would be able to utilize other designated routes and avoid the approximate five days of construction/upgrading operations on each road. Temporary unavailability of portions of two Class D routes is not anticipated to discourage future use of these routes. Upgrading designated Class D roads may, however, alter the character of the landscape by providing a more easily traveled route. Those who enjoy a driving challenge may find these routes less appealing after the upgrades. Vehicle traffic may increase along the upgraded sections of the Class D roads after project completion. Road conditions beyond the drill pads, however, would not be improved. Since the drill pads would be reclaimed, and would not be a destination, it is likely that, with time, prompt reclamation, and lack of future maintenance, that the upgraded sections of the road would eventually appear less attractive to the casual recreational traveler and more consistent with current road conditions.

The Secret Spire Jeep Safari route (which is also authorized for use by other motorized permittees) utilizes the Class B Spring Canyon Point Road #338 and would approach the Class D road that provides access to the AP-F-24 and AP-F-34 drilling locations. Road upgrades would not be authorized during the week prior to Easter to ensure the road remains accessible for the event. There are numerous other permitted motorized events that utilize the Secret Spire Jeep Safari route. These events occur throughout the fall and spring months. Road upgrades on Class B #338 could disrupt these operations.

The Moab Canyons Endurance Ride uses the Dripping Spring Road and Dubinky Well Road as a ride route. This road would also be used to access the AP-F-28 drill pad. Drilling operations on the AP-F-28 pad adjacent to an Endurance Ride route would not prevent use of the road by equestrians, who would observe drilling operations at this location in close proximity. The Operator has committed to ensuring through access on this road for vehicles and other users during drilling operations; road construction operations would not take place during this event in the fall of each year.

3.6.2.3. *Cumulative Impact Analysis*

The CIAA for recreation consists of the 300,650-acre Labyrinth Rims/Gemini Bridges SRMA because it is a management area for recreational activities that contains the proposed exploratory drill holes. The time frame for the cumulative impact analysis for recreation is approximately 11 years, which includes the 6-month period needed to perform the Proposed Action plus up to 10 years that may be needed to fully reclaim the areas disturbed by implementation of the Proposed Action (See Section 3.1.2).

Past, present and reasonably foreseeable actions contributing to cumulative impacts to recreation within the CIAA include:

- Recreation use including use of roads, trails, and campgrounds.
- Livestock grazing and associated range infrastructure.
- Mineral exploration and development including O&G and locatable minerals such as lithium, potash and uranium (See Table 3-2 and 3-3).
- MLP and its associated RFDS for O&G and potash (See Table 3-3).

Future O&G drilling activity in the SRMA was estimated according to the RFDS projections, or approximately fifteen reasonably foreseeable locations in the Big Flat area and eight locations in the Salt Wash area. Reasonably foreseeable potash exploration activities include the four drill holes as proposed and four additional exploratory drill holes (30 acres total) on lands managed by SITLA (American Potash, 2021). Although surface disturbance that would result from future potash exploration would be temporary, reclamation operations may require up to 10 years for vegetation reestablishment (See Section 3.1.2). Planned recreational facilities include the Bartlett Flat campground (15 acres), and White Wash Sand Dunes staging area (15 acres) and numerous dispersed camp sites (which are not quantified). Recreational use of the SRMA is likely to continue to increase in the future. Designated routes may continue to be identified or closed to guide appropriate use. Future parking areas may also be designated but have yet to be identified.

Past, current, and reasonably foreseeable actions may result in the disturbance of 448 acres within the SRMA from O&G exploration and development, potash exploration, and recreational actions. The cumulative surface disturbance, including the eight exploratory drill pads, would comprise just 0.15 percent of the 300,650 acres designated by the SRMA.

Historic, current, and future developments have reduced, and will likely continue to reduce, the amount of natural undisturbed areas that would have otherwise been available for recreational use. The impacts of minerals development on the SRMA would result primarily from O&G development. The magnitude of cumulative impacts to recreation would be strongly influenced by the placement of O&G facilities and potash exploration activities in relation to areas of high recreational use. The Proposed Action would add temporary direct impacts to the dark night sky and campers and from noise in the northern portion of the SRMA over a period of six months. OHV travel within the SRMA would essentially remain unaltered. Impacts to recreation would result from people avoiding areas of operational infrastructure where their presence is noticeable and/or may otherwise interfere with desired recreational pursuits, which could affect the quality of a recreational experience. The Proposed Action would not result in the construction of operational infrastructure or add to the effects of long-term development operations, such as from O&G production.

By designating a SRMA that contained active O&G leases and allowing for the exploration for potash resources, the BLM assumed that the management of recreation resources and activities under the RMP would allow the MFO to 1) protect, manage, and improve recreation resources, and 2) continue to manage the MFO RMP Planning Area for a broad range of recreational opportunities that meet recreational user expectations and avoid recreation resource degradation (BLM, 2008a).

3.7. Issue 6: How would the potash exploration operations impact ground water resources?

3.7.1. Affected Environment

The proposed project area is situated in the Upper Colorado-Kane Springs Hydrologic Unit that covers an area of approximately 3,000 square miles (7,800 sq kilometers) between the Green River and Colorado River. The watersheds for all the streams, snowmelt, and rainfall in this hydrologic unit are funneled to the common outlet of the two rivers. The proposed project area is not within a municipal watershed, specifically the Moab Area Watershed Partnership or the town of Green River Watershed usage boundaries.

The topography has little relief, and the surface is relatively flat (2–4-degree surface slopes), except for the deep tributary cut canyons closest to the rivers. Springs are important sources of surface water and occur where groundwater naturally flows out of the ground, saturates the soil, or collects in a pool. Outside of the rivers and springs, accumulations of surface waters occur from seasonal or temporary precipitation events, such as in ephemeral streams or shallow temporary pools.

Groundwater from aquifer systems can be found at shallow depths starting at approximately 75 feet below the surface and potable groundwaters can be found at approximately 75-500 feet below the surface (Rush, et. al., 1982). Groundwater can be found in shallow Mesozoic porous sandstone aquifers and in deep Upper Paleozoic aquifers that are sandwiched between low permeable confining beds and evaporite beds composed of mostly salt. The Mesozoic sandstone aquifer system is one of the most permeable hydrogeologic units of the area and the subsurface flow into the Green and Colorado Rivers and is measured by the U.S. Geological Survey (USGS) to be about 100 million cubic meters per year. All other components of outflow are relatively small. No brine discharges have been identified at the surface and natural springs are fresh waters. The average annual recharge to the aquifer is about 130 million cubic meters, of which about 20 million cubic meters is from local precipitation. For the Paleozoic aquifer system, all recharge and discharge is most likely by subsurface flow (Rush, et. al., 1982).

The Exploration Plan proposes that core and fluid samples be collected from Paradox Basin Paleozoic rocks at depths greater than 5,000 feet below the surface where the chemical composition of the groundwaters, including the waters in the Paleozoic aquifers, are brine, (i.e., salt-saturated). The composition of deep subsurface waters is typically controlled by the initial composition of the water trapped during the deposition of the sediments (i.e., connate water) and by the mineral composition of the sediments themselves that react with the connate waters. In the Paradox Basin, the initial water composition was likely sea water, and the sediments were deposited in a marine environment; therefore, the rocks were primarily formed by marine sediments with organic matter and sea water evaporation into mineral-salt-rich rocks with brine connate waters.

Brine waters are encountered at depths thousands of feet below those waters used for households or agriculture. These brines have high concentrations of total dissolved solids (TDS) in water. TDS is made up of inorganic salts, as well as a small amount of organic matter. The State of Utah classifies

ground water according to the amount of TDS concentration and contaminant concentrations. Classification is important for the proper handling and drilling and sampling operation procedures to protect potential usable water-bearing formations and to meet water quality standards. For classifications, see <https://deq.utah.gov/water-quality>.

3.7.2. Environmental Impacts

3.7.2.1. Impacts of Alternative A – No Action

The BLM would not approve the Exploration Plan and therefore would not approve the PPAs, resulting in no impacts to surface or groundwater resources from activities tied to the Exploration Plan.

3.7.2.2. Impacts of Alternative B – Proposed Action

The Proposed Action would drill, core, and collect fluid samples from four holes to a maximum total depth of 9,132 feet below the surface that could potentially encounter potable or usable ground water resources. The project area occurs near tributaries to the Green River that include the streams in Tenmile Canyon and Spring Canyon located in the Upper Colorado-Kane Springs Hydrologic Unit. All proposed drill holes are located at least one-half mile outside of NSO designated areas associated with these canyons to avoid potential impacts to water sources.

A petroleum drill rig that would be used to drill the exploration holes is subject to the applicable federal and state drilling and operating requirements to protect the surrounding ground waters and prevent the mixing of ground water classes (Class II and Class III) per Utah's Ground Water Quality Protection Rules (UAC R317-6) and antidegradation policy (UAC R317-2-3). These procedures protect the surrounding ground waters from drilling fluids in the exploration holes and prevents the mixing of ground water classes at any stage of the operation. The BLM consulted UDOGM to ensure the Plan and proposed exploration operations would be consistent with the state's water quality requirements. The drilling and operating procedures proposed in the Plan follow the BLM regulation in Onshore Oil and Gas Order No.2, Drilling Operations (43 C.F.R. Part 3160) and The Gold Book (BLM, 2007b) and the regulation from UDOGM at Utah Administrative Code R649-3: Drilling and Operating Practices (UOAR, 2003).

The intervals of interest for coring and fluid sampling would be isolated from the formations above and below by using a plug and packer system to prevent interaction of waters between intervals. Any sources of downhole water encountered during drilling would be protected by casing and cement behind the casing to prevent fluids in the hole from interacting with formation fluids, per the downhole specifications identified in the Exploration Plan Section 2.4. The total amount of water that would be used for drilling and coring operations per drill hole is approximately 70,000 to 90,000 barrels of water (2,940,000 – 3,780,000 gallons or 11,136 – 14,318 cubic meters). The maximum amount of ground water that would be collected for lithium testing from each drilled hole would be 4,300 liters (1,136 gallons, 4.3 cubic meters). The proposed water usages are amounts that are expected to be used by a drilling rig for this type of operation; and in comparison, the average water usage for an O&G drilling rig to drill a hole to depths of 9,000 would typically be between 3,000,000 and 4,000,000 million gallons for drilling and casing one well.

The waters used for drilling, construction, or dust suppression would not affect the immediate surface or ground waters because they would be trucked in from local municipalities that have specifically allocated a certain amount of their waters for industrial sale and use. The primary aquifer systems that municipalities collect water from for use and consumption in Grand County, Utah are in the

shallower Mesozoic aquifer systems found from surface down to depths of 3,000 below the surface and are below Class I and II waters for municipal uses.

Drill pad surfaces and improvement of road surfaces for exploration operations would avoid any standing surface waters or ephemeral drainages to avoid damaging the natural drainage patterns. Berms, diversion channels and sumps would be built to manage runoff that may arise from heavy rain events to ensure that surface waters follow the least impactful path and keep surface water out of areas of potential contamination, such as the reserve pit.

The waters proposed for use in drilling, operating, and construction procedures are in the Exploration Plan (American Potash, 2021) and summarized in Chapter 2, Section 2.2.4 Water Usage and Controls in this EA. There would be no mixing of groundwater or degradation of water quality because the Plan follows federal and state subsurface water protection guidelines and surface water drainage controls.

3.7.2.3. *Cumulative Impact Analysis*

The CIAA for water quality and quantity is the Upper Colorado-Kane Springs Hydrologic Unit which includes depths the targeted intervals producing leasable commodities.

Past, present or reasonably foreseeable actions contributing to cumulative impacts to water quality and quantity within the CIAA include:

- Mineral exploration and development for potash and locatable minerals such as lithium, and uranium.
- Possible lithium development and production.
- MLP and its associated RFDS for O&G and potash. If potash development does not occur in the PLA by 2026, then the areas become open to O&G exploration and development.
- Livestock grazing and associated range water infrastructure.
- No agriculture water permits are active within the project area.

Cumulative impacts to water quality include future mineral exploration and/or development using an O&G drilling rig that has the potential to encounter groundwater resources and impact water quality. Design features and BMPs specific to this project were developed to eliminate or reduce the potential for groundwater contamination by adhering to Utah's groundwater antidegradation rules. Drilling practices that reduce effects to water resources include the use of air drilling to allow for detection of groundwater while drilling so protection measures can be employed, such as using mud-systems in the hole to stabilize pressures and stop water exchange in the hole or installing casing and cement over water zones. Cement bond and casing inspection logs would be run from the total depth of the borehole to the surface to ensure proper placement and setting for complete isolation of the drill hole from the surrounding formations.

Reasonably foreseeable leasable and locatable mineral development from areas within the Upper Colorado-Kane Springs Hydrologic Unit may result in cumulative impacts to water quantity. The current production of O&G in this hydrologic unit comes from 23 producing wells in the Big Flat Oil Field. The Salt Wash Oil Field contained zero new well pads and zero producing wells. The 23 producing wells in the Big Flat Field make approximately 8,400 bbls/month of oil and 6,823 bbls/month of water. There are five permits for new O&G wells in the Big Flat Oil Field as of May 2022.

The BLM acknowledges that water would be used in drilling operations as part of potash non-energy mineral resource development and that the extraction of potash could include the production of formation waters that would need to be handled in a manner that complies with federal, state and local regulations. Additional site-specific NEPA would occur for any future development proposals.

Potash production is active approximately 25 miles south of the proposed project area on SITLA and private lands along the Colorado River that can be used as examples of water usage during potash development and production. One example is Intrepid Potash-Moab, LLC that has operated the Cane Creek potash and in-situ solution mining facility located approximately seven miles southwest of Moab, Utah since 1985. The facility use of water is regulated under the Utah Underground Injection Control (UIC) Program, and its UIC Class III Area Permit UTU-19-AP1C3C2E8. The BLM can estimate how much water is used by referring to the current water permits from the State of Utah for use of the Colorado River and incident water wells. The current UIC wells at the Intrepid Potash-Moab, LLC project site are used to inject solutions into the salt sequences of the Paradox formation and recover brine to produce potash via its solar evaporation ponds and processing plant. The facility has six evaporation ponds that hold up to 1,200,000 gallons each for the evaporation process of potash production. The Intrepid-Moab processing plant uses 350 million gallons per year of river water to produce 350 million gallons per year of NaCl-saturated (21% by weight) evaporation pond feed solution at 6.5–7.5% KCl. The nearby Colorado River provides the Intrepid-Moab mining operation with makeup water under existing water rights with the State of Utah for a water supply of nine cubic feet per second (Intrepid Potash, Inc., 2022). The majority of the water used for processing the potash comes from the Colorado River.

CHAPTER 4. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

4.1. Public Involvement

The BLM posted the Exploration Plan for external scoping on the BLM National NEPA Register on February 2, 2023, to provide the public with the opportunity to review and provide comment.

Future addition: The environmental analysis of the Exploration Plan was posted to the BLM ePlanning website for Public Comment November 17, 2023 through December 18, 2023.

The BLM notified the public through a news release on November 16, 2023. A Public Comment Report will be prepared and included as Appendix C.

4.2. Consultation and Coordination

Table 4-1: List of all Persons, Agencies, and Organizations Consulted.

Name	Purpose and Authorities for Consultation or Coordination	Findings & Conclusions
State Historic Preservation Office (SHPO)	National Historic Preservation Act	In 2012, 43.4 acres of a 67.2-acre Area of Potential Effect (APE) was surveyed (U12ME0864) and a No Historic Properties Affected determination was consulted on in 2019. The remaining 23.8 acres of survey were completed in 2022 and the project was consulted on with SHPO (Case No. 22-2435) No Historic Properties Affected.

		Concurrence was received on 12/12/2022.
Affiliated Tribes	National Historic Preservation Act	On September 28, 2022, the BLM sent letters inviting potentially affected Tribes to initiate government-to-government consultation. Tribal 106 consultation responses were received from the San Felipe Pueblo and Paiute. San Felipe Pueblo wants to be kept informed if there are any disturbance of items covered under North American Graves Protection and Repatriation Act (1990) or materials unearthed by this project. The Paiute is currently not aware of any cultural resource sites, practices, or locations of importance in the tribe's traditional religions or culture.
Affiliated Tribes	Tribal consultation	Tribal consultation was initiated through letters mailed on September 28, 2022. No concerns about Proposed Action were received.

4.3. List of Preparers

See Appendix A for the BLM preparers of the document.

CHAPTER 5. REFERENCES

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APPENDIX A: INTERDISCIPLINARY TEAM CHECKLIST

Project Title: American Potash Green River Potash Project

NEPA Number: DOI-BLM-UT-Y010-2022-0026-EA

SPECIALIST DETERMINATIONS: (Choose one of the following options for the “Determination” column)

NP = not present in the area impacted by the proposed action or alternatives

NI = present, but not affected to a degree that detailed analysis is required

PI = present with relevant impacts that need to be analyzed in detail in the EA or EIS

The following elements are not present in the Moab Field Office and have been removed from the checklist: Farmlands (Prime or Unique), Wild Horses and Burros.

Table 1: Resources and Uses Considered (Including Supplemental Authorities Appendix 1 H-1790-1).

Resource/Use	Determination	Rationale for Determination	Name of Assigned Specialist	Date
Air Quality Greenhouse Gas Emissions	PI	The effect of the Proposed Action has been analyzed in the EA at Section 3.2 for Air Quality. The Proposed Action would produce Greenhouse Gas Emissions and the extent of these impacts are analyzed in the EA at Section 3.4.	N. Huber T. Murdock	12/07/22 9/26/23
Areas of Critical Environmental Concern (ACEC)	NP	No ACECs are within the project area. See RMP, Map 21.	K. Stevens K. Stevens	5/9/22 9/21/23
BLM Natural Areas	NP	No BLM Natural Areas are within the project area. See Moab RMP, Map 15 (BLM 2008).	B. Stevens B. Stevens	5/9/22 9/21/23
Cultural Resources	NP	In 2012, 43.4 acres of 67.2-acre APE was surveyed (U12ME0864) and a No Historic Properties Affected determination was consulted on in 2019. The remaining 23.8 acres of survey was completed in 2022 and the findings were consulted on with SHPO (Case No. 22-2435) with a determination of No Historic Properties Affected. All areas proposed for project use, including the existing roads, were inventoried including a buffer zone and therefore the areas surveyed is larger than the area of proposed new disturbance. Concurrence with the determination occurred on 12/12/2022. Tribal 106 consultation responses were received from the San Felipe Pueblo and Paiute. San Felipe Pueblo wants to be kept informed if there are any disturbance of items covered under North American Graves Protection and Repatriation Act (1990) or materials unearthed by this project. The Paiute is currently not aware of any cultural resource sites, practices, or locations of importance in the tribe’s traditional religions or culture.	A. Schlosser	1/17/23 8/7/23
Environmental Justice (EO 12898)	NI	Low-income populations have been identified within Grand County. See: https://ejscreen.epa.gov/mapper/ The Census, however, has determined that low-income data for Grand County is considered very unreliable, due to sampling error inherent with small populations, making a confident identification of this Environmental Justice population problematic.	B. Stevens B. Stevens	5/9/22 9/21/23

Fisheries – Non-designated Species (including UT BLM sensitive species)	NP	There are no fish bearing streams within the area impacted by the Proposed Action. No water withdrawals within the Upper Colorado River Basin are proposed.	G. Bissonette G. Bissonette	4/29/22 9/25/23
Fisheries – Threatened, Endangered or Candidate Species	NP	There are no fish bearing streams within the area impacted by the Proposed Action. No water withdrawals within the Upper Colorado River Basin are proposed.	G. Bissonette G. Bissonette	4/29/22 9/25/23
Floodplains	NI	Disturbance to ephemeral floodplains would occur as a result of construction of drill pads and access roads that cross drainages and washes on up to 1.7 acres of the total proposed disturbance of approximately 17 acres. Disturbance to floodplains, streambanks, and streambeds can decrease vegetation cover and bank stability, increase erosion and downstream sediment delivery, and floodplain functionality downstream of a road crossing. Decreased stability or connectivity of a floodplain may also result in gully development, channel incision, and the need for road maintenance. Existing road use is not causing unacceptable erosion or floodplain damage. The Operator has minimized possible adverse impacts to floodplains by choosing drill pad locations to avoid washes, minimizing cut-and-fill, and utilizing designated roads for access as much as possible. The Class B and D roads that would be used for access to the drill pad locations would be upgraded to provide sufficient width and a stable surface suitable for the safe equipment access. The Operator has committed to, and has incorporated into their Exploration Plan (see EA Section 2.2), design features and construction techniques contained in the BLM's Gold Book (BLM, 2007b) for drill pad construction and maintenance, drilling operations, and reclamation and abandonment procedures. These design features and construction techniques would adequately minimize and avoid disturbance to floodplains from the project-related traffic and further analysis of floodplains is not required.	G. Bissonette G. Bissonette	4/29/22 9/25/23
Fuels/Fire Management	NI	After overlaying the American Potash Analysis Area shape file with the BLM Fire Management Unit's (FMU) it was determined to fall within 22,711 acres in FMU 5: Cisco Desert and 3,648 acres in FMU 1: Green River Corridor. FMU 1 is primarily composed of a mixture of cottonwoods, willows and grasses. Fire history within this area is low averaging on one fire and 69 acres burned per year. FMU 5 has a mixture of sagebrush, saltbush, desert shrubs, various native grasses, Pinyon pine, juniper, and non-native cheatgrass. Fuel loadings vary widely and are dependent on winter/spring moisture. Dense cheatgrass can occur	J. Relph	5/9/22 8/17/23

		during wet years. This FMU can historically have heavy fire occurrence with an average of 14 fires and 1,828 acres burned per year. Fire history within the project analysis area is only showing one fire in the last 20 years that burned seven acres. After further review, fuels within the proposed disturbance areas are sparse and fire potential is very low. This, combined with the fire prevention measures in the Exploration Plan (page 15) would result in a very low potential for fire, therefore no additional analysis is required.		
Geology/ Mineral Resources/ Energy Production	PI	<p>Proposed Plan to explore for potash includes procedures to test for lithium. Potash is classified as non-energy leasable mineral and exploration is regulated under 43 C.F.R. Part 3500. Lithium is classified as a locatable mineral and exploration is regulated under 43 C.F.R. Part 3809. The use of an oil and gas drilling rig and the associated drilling methods proposed to explore for each of these minerals is the same, but the sampling and testing procedures must be kept separate and adhere to the respective mineral regulations.</p> <p>The proposed reserve pits are described in the Surface Use Section of the Exploration Plan on page 52 and would be located entirely in the cut material inside the proposed drill pad area and would be constructed in accordance with BLM Gold Book Standards on page 16 to avoid natural water pathways and shallow groundwaters.</p> <p>The depths proposed for potash mineral testing and coring in the Paradox formation are at 5,300-7,000ft below the surface and are stratigraphically above the historic oil and gas producing Cane Creek formation at approximately 6,800 to 7,800ft. The lithium is proposed to be sampled from the Leadville formation at depths between 7,732 and 8,900ft below the surface. Each interval would require isolation between formations to prevent interference between or commingling of fluids during sampling procedures.</p> <p>Oil and gas resource exploration and development is active in the proposed exploration area. The proposed exploration operations must adhere to 30 U.S.C. § 526 Mining and Leasing Act operations to avoid interference with other mining operations and violation of mineral law.</p>	J. Whittington J. Whittington	5/23/22 8/18/23
Lands with Wilderness Characteristics	PI	The effect of the Proposed Action on Lands with Wilderness Characteristics has been analyzed in the EA at Section 3.3.	B. Stevens B. Stevens	5/9/22 9/21/23
Lands/ Access	NI	The Proposed Action is subject to valid, existing rights. The proposed road improvements are authorized under the Exploration Plan, so a BLM right-of-way is not required for the proposed road work. Road work on existing county roads generally needs an encroachment permit from the county so the proponent will work with	L. Wilkolak	5/4/22 9/21/23

		the Grand County Road Department to determine if an encroachment permit is needed.		
Livestock Grazing	NI	<p>Livestock Grazing allotments Ten Mile Point, Ruby Ranch, and Little Grand Allotments are within the proposed the acreage proposed in the PPAs.. The four exploration wells proposed would be on the Ten Mile Point allotment but would not affect the grazing to a degree that detailed analysis is required because the combined disturbance for the four proposed 400' x 400' drill pads and access routes is only 13.35 acres of the 49,094 acres of the allotment which livestock can easily avoid and find forage elsewhere.</p> <p>The proposed Exploration Plan includes reclamation after exploration that would result in disturbed areas being reseeded with a native seed mix to replace any removed forage. Fences or other rangeland improvements would not be compromised by project activities and most activity would occur during periods when livestock are not present in the allotment.</p>	A. Vollmer A. Vollmer	6/21/22 9/21/23
Native American Religious Concerns	NI	See Table 4-1 of the EA.	J. Stephenson	11/15/22 9/21/23
Paleontology	NI	<p>BLM Potential Fossil Yield Classifications (PFYC) are based on surface exposures of geologic units and are used as a tool to predict potential impacts to fossil resources from planned actions. Areas with PFYC 4 and 5 in the MFO require a paleontological resource survey (RMP, MLP). A Paleontological Resources survey was completed 11/10/2022 of the proposed project area. No paleontological resources were identified in the proposed areas.</p> <p>Each proposed project area is covered with 1-6 feet of modern Quaternary alluvial and aeolian unconsolidated sediments that would not have a significant fossil yield. The underlying geologic units are listed in the proposed Exploration Plan and the drill hole would have a diameter of 7-inches to 9-5/8 inches in size. Any occurrence of fossil material during drilling would be reported to the MFO.</p> <p>If fossil material is encountered during surface disturbing activities or during operations, activity would cease at that location and the MFO Project lead would be notified. For these reasons, further analysis is not required.</p>	J. Whittington	5/23/22 11/10/22
Rangeland Health Standards	NI	The construction of the drill pads and access roads would not result in any acreage not meeting Rangeland Health Standards because the total disturbance proposed for the four drill pads and access routes are only 13.35 acres of the 49,094 acres of the Tenmile Point allotment. The Resources of Soils, Riparian, Vegetation/Habitat/T&E species, and Water Quality, which are the Utah Standards, are found elsewhere in the	A. Vollmer A. Vollmer	10/27/22 9/21/23

		checklist. Each of these resources are analyzed under their component elements. Depending on the range of affects to these resources by alternative, achieving Rangeland Health Standards could be affected positively or negatively.		
Recreation	PI	The project area is within the Labyrinth Rims/Gemini Bridges SRMA. The area receives considerable recreation use by a myriad of users. The effect of the Proposed Action on Recreation, specifically in the SRMA has been analyzed in the EA at Section 3.6.	K. Stevens K. Stevens	5/3/22 9/21/23
Socioeconomics	NI	Exploratory wells themselves produce little socioeconomic impact. Exploration crews, supplies and equipment are highly likely to be from outside Grand County and produce minimal impact relative to overall economy of Planning Area, creating little employment, labor income, value added or output. If exploration proves successful, there may be future impacts meriting a more detailed analysis. According to data from U.S. Department of Commerce Census Bureau, County Business Patterns (2021), minerals employment accounted for 1.45 per cent of total employment in Grand County. The proposed project would add few workers to this total, even assuming that they all were from Grand County.	B. Stevens B. Stevens	5/9/22 9/21/23
Soils	NI	Soils would be disturbed by the construction of four 400'x 400' drill pads and the access routes to the drill pad sites and turnouts. The roads used to reach the access routes to the drill pad sites would be existing B and D roads and would not represent new disturbance. The use of existing designated roads for access would reduce the need to construct new roads. Because the Proposed Action is a short-term project, soils would not be subject to long-term use, except on the running surfaces of existing roads. Prompt implementation of reclamation of surfaces disturbed would assist in maintaining soil viability (See Section 2.2.6 of the EA). Recontouring the drill pads to their approximate natural orientation and ripping the soil surface would also alleviate any compaction, and enhance water infiltration, thereby encouraging microbial growth and maintenance of soil viability. All the soils consist of Quaternary-aged residuum, colluvium, and aeolian materials derived primarily from sandstones of the Navajo Formation (i.e., sandy soils). The suitability for rangeland seeding is good-to-fair for all project area soils; however, suitability may be limited by low precipitation. Therefore, the physical and chemical properties of the affected soils would not be altered for the long-term and more likely to support successful revegetation efforts. Soil disturbance can increase susceptibility to wind erosion. Wind erosion strips the surface horizon of fine	A. Vollmer A. Vollmer	10/27/22 8/16/23

		<p>soil particles and nutrients necessary for seed germination and plant recruitment. Wind erosion and subsequent redeposition can result in the formation of sand dunes. Project area soils display a moderate to severe tendency to particle dispersion from wind if plant cover would be removed. Stabilization of soil piles, as committed to by the Operator in its reclamation plan, would diminish wind erosion during the approximate 45 days of operations at each drill pad until reclamation operations are initiated.</p> <p>The policies in place for exploratory activities regarding soil disturbance and runoff control are adequate and would be applied as appropriate from the Storm Water Pollution Prevention Plan and the Moab 2016 RMP MLP Amendment Appendix A.</p> <p>The Biological soil crusts (BSCs) in the project area are dominated by early successional, smooth surface cyanobacteria without pinnacles. BSCs do not develop in areas of frequent compression and disturbance, such as roads and are not expected to be impacted along the existing Class B and Class D roads proposed for use. Mosses have grown on some of the sandy soil slopes near small hummocks that appear on the gently sloping surfaces of the drill sites. Their growth is generally discouraged by the presence of grasses growing on the project area's sandy loams, particularly at the AP-F-24 and AP-F-28 locations. The visible evidence of BSC coverage on the proposed drill pads was estimated to range from 10 to 20 percent.</p> <p>The Operator has committed to removing and retaining approximately three inches of topsoil containing the darker cyanobacteria and mosses near the hummocks. Retaining BSC source material for use in reclamation, as committed to by the Operator, would accelerate cyanobacteria recolonization on the disturbed areas and may preserve the viability of the mosses.</p> <p>The proposed design features for initial construction would result in minimal soil disturbance and would not affect the soils to a degree that detailed analysis is required since it is planned to also reclaim the disturbed areas following the exploratory action.</p>		
Vegetation – Non-designated Species	NI	The construction of drill pads, new access routes, and turnouts would amount to 16.97 acres of non-designated species being disturbed out of 49,094 acres of the Ten Mile Point allotment. The reclamation plan as proposed has been determined as an effective set of measures to reclaim vegetation following construction and exploration.	A. Vollmer A. Vollmer	10/27/22 8/16/23
Vegetation – UT BLM Sensitive Species	NP	No populations of UT BLM Sensitive Plants Species are known to this area.	P. Riddle T. Murdock	5/5/22 9/22/23

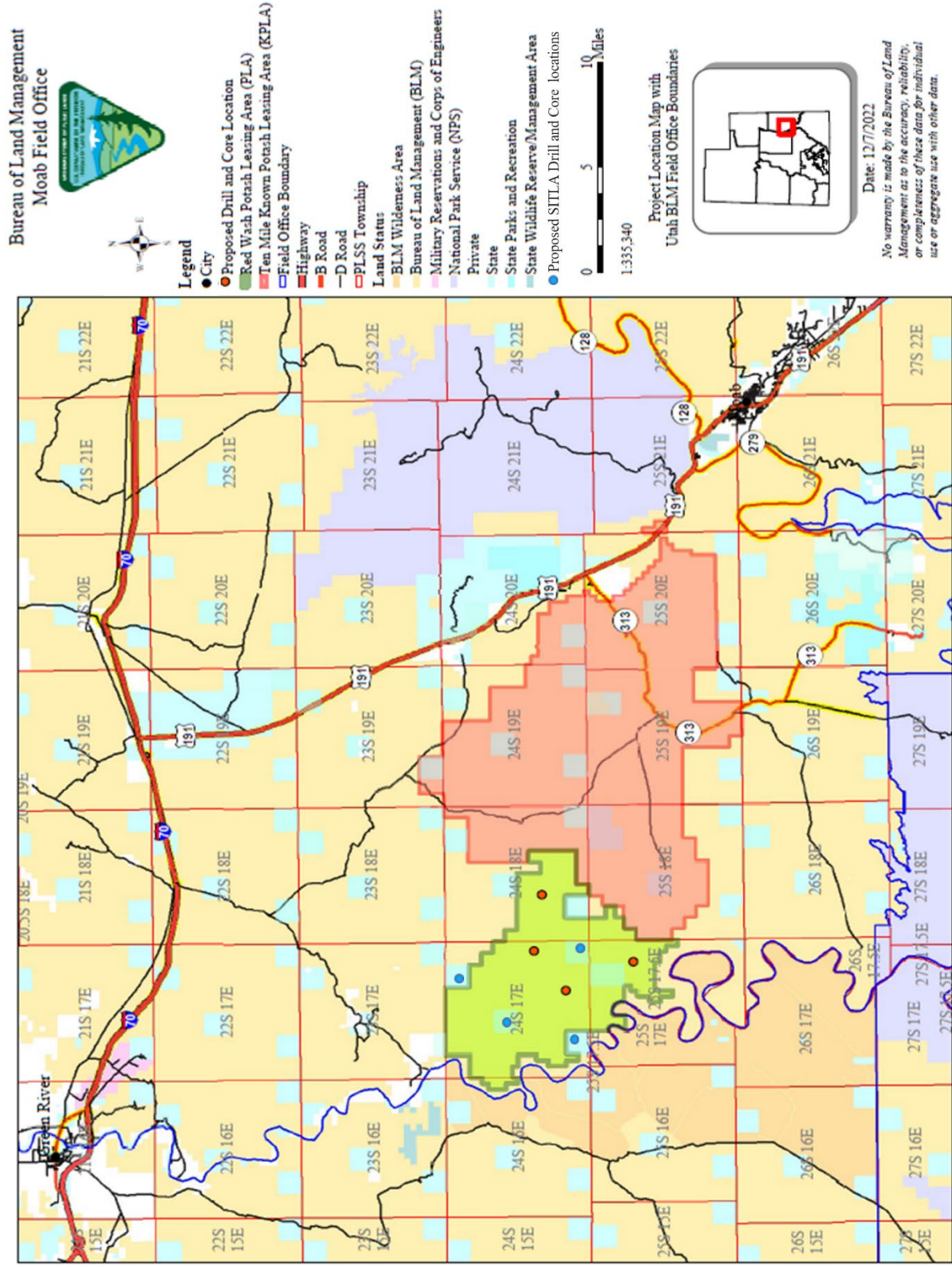
Vegetation – Threatened, Endangered or Candidate Species	NP	No populations of UT BLM TEC Plants Species are known to this area.	P. Riddle T. Murdock	5/5/22 9/22/23
Vegetation – Invasive Species/Noxious Weeds	NI	Surface disturbance resulting from drill pad and access road construction has the potential to spread noxious weeds. The weed prevention, reclamation and monitoring plans outlined on page 56/57 of the Exploration Plan should be an adequate mitigation for the noxious/invasive weeds threat.	C. Marlor T. Murdock	7/4/22 9/22/23
Visual Resources	NI	The four project locations are in lands that are managed as Visual Resource Management (VRM) Class III, where moderate changes to the characteristic landscape are allowable. Activities may attract attention, but should not dominate the view of the casual observer. The locations are also in lands that are Visual Resources Inventory Class II but are designated as VRM Class III. During the period of construction, there would be short-term intrusions to visual resources as viewsheds are compromised by the equipment. The Key Observation Points in the SRMA are not located near the project area, and while some recreationists would have their views temporarily impaired, the majority of visitors to the SRMA would not be visually impacted. Activities would attract the attention of casual observers, but these activities would not dominate the landscape.	K. Stevens K. Stevens	5/3/22 9/21/23
Wastes (hazardous or solid)	NI	Drilling fluids, produced water, and other wastes associated with the exploration for mineral species in the subsurface are excluded as a hazardous waste under 40 C.F.R. § 261.4(a)(17). Waste management during drilling operations proposed in the Exploration Plan would adhere BLM Gold Book standards.	J. Whittington J. Whittington	5/23/22 8/18/23
Water Resources/ Quality (drinking, surface, ground)	NI/PI	Drilling practices must protect surface and subsurface waters in all stages by adhering to Utah Admin. Code R649-3: Drilling and Operating Practices. Protection of surface and groundwater during drilling and sampling in the proposal would be employed by using applicable R649-3 drilling requirements, as addressed on page 15 of the Exploration Plan and also outlined in the drilling procedures section of the Exploration Plan. Proposed drilling pad sites are configured to avoid major surface water drainages and would be 300ft from any surface waters. To control surface water runoff, the installation of berms and the placement of equipment would be in consideration of the ground surface slope and potential drainage patterns on the drill pad. Because the proposal is adequately designed to avoid and reduce impacts to surface water drainages and control runoff, impacts to surface water would not need to be analyzed in detail.	J. Whittington J. Whittington	5/22/22 8/18/23

		<p>Water to be used in construction activity and dust suppression would be purchased from adjudicated sources, trucked to location, and stored in enclosed tanks that would be installed at each location. The proposed storing of water in closed storage tanks as opposed to open ponds onsite would keep waters clean and free from debris and animals, and from evaporating, or seeping into the ground. Waters proposed to be used in the drilling and sampling operations would be a mixture of purchased waters from adjudicated sources and waters produced from the formations during drilling that would be recycled and re-used in the drilling fluids.</p> <p>Because of the small scale (4 holes) and short-term nature (2-years max) of this proposed Exploration Plan, it is difficult to extrapolate what the long-term impacts would be for full-scale potash development and production. However, the BLM acknowledges that water would be used in the drilling and production operations in this type of potash mineral resource development; and that the extraction of potash could include the production of formation waters that would need to be handled in a manner that complies with federal, state, and local regulations. Additional site-specific NEPA would occur for any development proposals.</p>		
Wetlands/Riparian Zones	NP	There are no riparian or wetland habitats present within the proposed project area.	G. Bissonette G. Bissonette	4/29/22 9/25/23
Wilderness / WSA	NP	No Wilderness or WSAs are present within the project area. See RMP, Map 23.	B. Stevens B. Stevens	5/9/22 9/21/23
Wildlife – Non-designated species	NI	Potential impacts from disturbance to general wildlife may occur. Bighorn sheep may utilize the area, but the project is outside of lambing and migration habitat identified in the RMP.	P. Riddle M. Crane Y. Argov	5/5/22 11/28/22 9/21/23
Wildlife – UT BLM Sensitive Species	NI	<p>Habitat for Ferruginous hawk, kit fox and sensitive bats may be found in project area. Soils are sandy and may not offer needed substrate to provide suitable prairie dog and burrowing owl habitat. If surface disturbing activities were to occur between 3/1-8/31, American Potash would conduct pre-construction surveys 7-10 days prior to construction. The MFO would issue a Notice to Proceed depending on survey findings. Conducting a survey for active ferruginous hawk nests during the nesting season would result in the application of spatial and seasonal offsets to active nests, thereby preventing disturbance during the breeding season.</p> <p>Conducting an inventory for active kit fox dens and avoiding an active den by the 200-meter offset would provide sufficient protection to kit fox.</p> <p>Disruption of bat roosting activities would be unlikely because project operations are planned to take place away from the preferred roosting areas of rocky cliff faces and canyon walls. Drilling activities, which result</p>	P. Riddle M. Crane Y. Argov	5/5/22 11/28/22 9/21/23

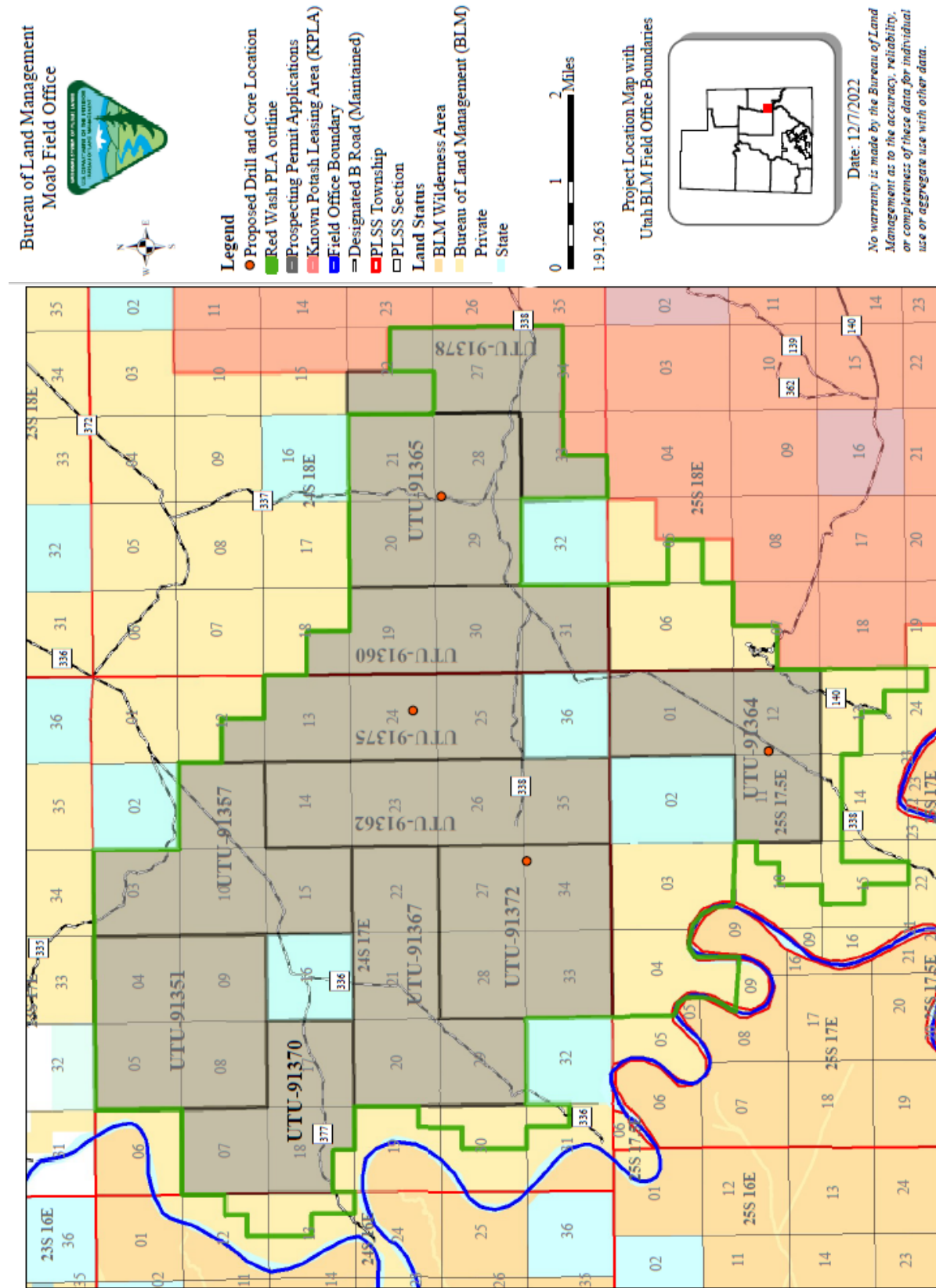
		in machinery noise and night lighting, may temporarily displace foraging bats at night, but sufficient suitable habitats are available nearby for temporary relocation of foraging activities.		
Wildlife – Migratory Birds (incl. raptors)	NI	Surface disturbing activities have the potential to disturb nesting birds (4/1 - 7/31) and nesting raptors (3/1 -8/31). Activities outside of nesting season would have minimal disturbance as non-nesting birds and raptors would seek to occupy other areas. If surface disturbing activities were to occur between 3/1-8/31, migratory bird surveys would be conducted pre-construction. MFO would issue a Notice to Proceed dependent on survey findings. As a result of applying spatial and seasonal offsets to active nests, as specified by the RMP, no disturbance to nesting raptors, including golden eagles or other ground-nesting species, would result.	P. Riddle M. Crane Y. Argov	5/5/22 11/28/22 9/21/23
Wildlife – Threatened, Endangered or Candidate Species	NP	No known TEC species or habitat are known to the project area.	P. Riddle M. Crane Y. Argov	5/5/22 11/28/22 9/21/23
Wild and Scenic Rivers	NP	No WSR corridors are present within the project area. See RMP, Map 22.	B. Stevens B. Stevens	5/9/22 9/21/23
Woodland/Forest ry	NP	Proposed locations are not within identified woodland areas.	J. Stephenson J. Relph	6/10/22 9/25/23

APPENDIX B: MAPS

Map 1: Red Wash Potash Leasing Area and American Potash Proposed Drill Locations



Map 2: American Potash Permit Application Locations.



Map 3: American Potash Proposed Drill Locations.

