Draft Green River Exploration Project Description

Introduction

American Potash, L.L.C. (the Operator) has submitted an Exploration Plan to the Bureau of Land Management's (BLM) Moab Field Office (FO) to conduct exploration and testing activities on federal lands pursuant to the 43 CFR 3500 regulations. The Operator proposes to drill and reclaim four exploratory drill holes to obtain stratigraphic data and ascertain the occurrence of potash. Cores would be taken at zones where historic electronic well logs associated with nearby oil and gas wells have indicated that potash mineralization may be present in the subsurface. Geologic data obtained from the cores would facilitate analysis of the extent and grade of potash mineralization. The drill holes would be drilled vertically to depths ranging from 6,698 to 7,666 feet to the Paradox Formation in the northwestern Paradox Basin. The Proposed Action would require constructing four drill pads and four short access roads in addition to upgrading two Class D roads. Upon completion of drilling operations, the drill holes would be plugged and abandoned, and the disturbed surface would be reclaimed. Construction and drilling is planned to begin in 2013 after permit approval.

While implementing the Proposed Action, the Operator would obtain all necessary federal, state, county, and other permits, as applicable, and comply with all applicable regulatory requirements. The Operator would adhere to the details of construction, drilling, and reclamation operations provided in its Exploration Plan, and this project description. The BLM and the Operator participated in onsite inspections on October 24, 2012, to assess the proposed pad locations and access road routes in consideration of surface resource considerations.

Location and Access

The proposed drill pad locations are approximately 21 miles northwest of Moab, Utah, and 27 miles southeast of Green River, Utah, in Grand County. They are located generally northwest and north of Spring Canyon in an area known as Spring Canyon Point between Spring and Tenmile Canyons. Map TBD displays the drill pad locations.

Table 1: Proposed Drill Pad Locations

Drill Pad	Location	Coordinates (NAD 83, Zone 12)	Elevation (feet ASL)	Total Depth (feet)
AP-F-12	SWNW Section12; T25S-R17.5E	4,277,952.0 N, 586,756.0 E	4,932	± 7,666
AP-F-24	NWSE Section 24; T24S-R17E	4,284,557.0 N, 587,499.0 E	4,660	± 7,215
AP-F-28	NWNW Section 28; T24S-R18E	4,284,062.5 N, 591,515.34 E	4,855	± 6,698
AP-F-34	NENE Section 34; T24S-R17E	4,282,453.95 N, 584,702.88 E	4,595	± 7,100

The Operator chose the drill pad locations to:

- Utilize existing roads to the maximum possible extent and minimize access road construction.
- Minimize impacts to wildlife.

- Minimize the amount of cut-and-fill that would be required to construct a drill pad by selecting nearly flat ground surfaces.
- 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.

The drill pads would be reached by traveling north from Moab on US Highway 191, then west on Blue Hills Road south of Canyonlands Field, to Class B Dubinky Well Road. Dubinky Well Road would then be taken southward to Spring Canyon Point Road. If road conditions prevent access via the Blue Hills Road, US Highway 191 would be taken north to State Highway 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. Class B roads are maintained by the county, but Class D roads are not.

Construction Operations

Drill pad and road construction/upgrades on Class D roads would be undertaken in consideration of the standards detailed in *Surface Operating Standards for Oil and Gas Exploration and Development, 4th Edition* (Gold Book) (USDI and USDA, 2007) and according to Moab FO specifications. Class B roads would only require relatively minimal maintenance to allow for their use. Because the drill hole pads would be used only temporarily over a period of months, construction operations would be undertaken with the objective of performing the least level of effort needed to ensure safe access for men and equipment. Personnel performing construction and drilling operations would commute from the Moab area daily.

Roads. Access to the drill pads would require constructing four short access roads. The four access roads would be bladed to a width of 14 feet to smooth the terrain to connect each drill pad to an existing road. They would not be graveled. To facilitate truck traffic, the Operator would also upgrade two Class D roads and coordinate with the county to perform maintenance on Class B roads #337 and #338.

Class D roads would be used to access the AP-F-24 and AP-F-34 drill pads. The two Class D roads would be bladed to a width of 14 feet to provide sufficient width for truck passage. Dry wash crossings would be used exclusively for access; i.e., culverts would not be installed. High wash banks would be bladed, and the extra material would be used as fill in the wash bottoms and on adjacent sections of rough road. Where slickrock exposures or rocky areas exist along the roads that would otherwise prevent safe access, materials remaining from blading would be used to temporarily smooth out the surface. Turnouts would be constructed where needed to provide an adequate line of sight where visibility may be obscured by terrain or vegetation. Each turnout would measure approximately 10 feet wide and 200 feet long, including transition length.

Class B road #338, also known as the Spring Canyon Point Road, would be used to access the AP-F-12 drill pad. Class B road #337, also known as the Dripping Springs Road, would be used to access the AP-F-28 drill pad. Although travel on the roads is possible with 2-wheel drive passenger vehicles, some sections of each of these roads would require maintenance to facilitate safe truck passage. The

Operator has been in contact with Grand County, and all maintenance actions performed on Class B roads would be made in coordination with the Grand County Road Department. Maintenance operations performed on a Class B road would remain within the road rights-of-way.

Road construction and maintenance actions specific to each drill pad location are described in Table 2. In total, the four drill pads would require the construction of 527 feet, or 0.10 mile, of new roads for access and 9,584 feet, or 1.82 miles, of upgrades to Class D roads. Details of the proposed Class D road upgrades and Class B road maintenance are displayed on Map TBD.

Table 2: Access Road Construction/Upgrades

Drill Pads	Access Road Construction (feet)	Class D-Road Upgrade (feet)	Number of Turnouts	Additional Information
AP-F-12	176	0	0	• No other construction other than the access road specifically needed for this well.
AP-F-24	193	7,391	3	• 2 wash crossings on Class D road where high banks would be graded and used for fill. • 1 wash crossing on Class D road where original route has been by-passed by a user-created alternate route. The high banks of the original route would be graded and used for fill. The user-created by-pass would be reclaimed. • 1 area of slickrock on Class D road where fill would be added to temporarily smooth the running surface.
AP-F-28	107	0	1	• 1 curve would be straightened on Class B road #337.
AP-F-34	51	2,193	2	• 1 area of slickrock on Class D where fill would be added to temporarily smooth the running surface. • 1 rocky area on Class B road #338 where fill would be added to temporarily smooth the running surface.
General access to all drill pads on Class B road #338		• 1 wash crossing where high bank would be bladed and used for fill. • 1 cattle guard where fill would be added to smooth the approach. • 1 cattle guard that is not sufficiently wide to allow truck traffic would be bypassed by traveling through the adjacent gate, where fill would be added to prevent precipitation from draining through the gate. • 1 cattle guard where wings would be lowered for truck clearance. • 1 intersection that may be widened/redesigned to allow trucks to make turns, allowing them to remain within running surface. The redesign would depend on drilling sequence.		

Drill Pads. The size of each drill pad would be approximately 400 by 400 feet, which is sufficient to accommodate drilling equipment, a reserve pit, drill pipe, mud supplies, trailers for drilling personnel, and the areas needed to temporarily store excavated spoil materials and topsoil. The well pad would be bladed to remove vegetation. Salvaged soil materials would be managed to maintain their viable use for drill pad reclamation after exploration activities are complete.

During construction operations, soil would be managed to segregate biological soil crusts (BSCs) to promote inoculation of a re-established soil surface during reclamation. Approximately three inches of topsoil containing BSCs near the hummocks would first be removed and stockpiled to facilitate re-growth of BSCs. Approximately eight inches of topsoil, or whatever is available, would be removed and

stockpiled around the perimeter of the drill pad to facilitate its efficient redistribution during reclamation. Salvaging and spreading topsoil would not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment. Because sandy soils are susceptible to wind erosion, one or more of several methods would be used to stabilize the topsoil piles and prevent wind dispersion during drilling. The methods include: application of a tackifier; spraying with water to create a physical crust; or covering the piles with natural biodegradable fabric.

A temporary reserve pit would be constructed to hold approximately 15,000 barrels of drilling fluid within the cut portion within the drill pad. Wellbore pressure would be relieved by safely burning any natural gas encountered during drilling in a blow pit. Excavation for the reserve and blow pits may require blasting, depending on the depth to bedrock. The pits would be constructed to not leak, break, or allow discharge. Each pit would be lined with a 12 mil (minimum) ultraviolet-resistant synthetic liner to prevent fluid migration to the subsurface. Bedding materials, such as sand or clay, would be used in areas where rock could puncture the liner.

Subsoil and spoils from the reserve pit cut would be used to construct a drill pad, which would be leveled by balancing cut and fill areas. Spoils from excavation would be piled separately from the topsoil and used as pit backfill during reclamation. Stockpile slopes would not exceed 20 percent to minimize erosion. To reduce erosion and soil loss, ditches, berms, water-bars, sediment fences, or other best management practices (BMPs) would be utilized as needed to divert storm water from a drill pad.

Drilling and Evaluation Operations

Each drill hole would be drilled and cored over a period of 40 to 50 days. Drilling and coring all four drill holes would require approximately six months with the use of one drilling rig. Each drill hole would be drilled sequentially until completion. The Operator has yet to determine the drilling sequence, which would depend on evaluation of the core results as they are obtained. During drilling operations, approximately five trailers would remain on the drill pad for use for the drilling crew supervisor, mudlogger, and equipment storage.

A conventional, mechanically-powered mobile drilling rig would be transported to the drilling site and erected on the drill pad. A Tier II drilling rig would be used to reduce rig emissions of nitrogen oxides (NO_x). Surface casing would be set at the start of the drilling operations to isolate and protect surface formations and to attach pressure control equipment. The surface casing would be cemented back to surface. Intermediate casing would be set and cemented in place to protect any water-bearing zones that may be encountered.

Drilling fluids would vary according to depth and the possible presence of water. The hole would be drilled initially with air. Fresh water mud would be used for drilling if water is encountered. Cuttings from air drilling would be contained in the blow pit. The blooie line would be misted to control dust. Fresh-water cuttings-mud would be diverted to a cuttings tank before being transferred to the reserve pit. Water for drilling operations would be obtained from the Moab municipal water supply. A closed-loop oil-based mud drilling system would be used for drilling and coring in salt to maintain drill hole stability. As oil-based mud and cuttings come to the surface, they would pass over a shaker or “dryer”

system that allows the mud to return to tanks as part of the closed loop system and the cuttings to pass on to a second dryer. After cuttings pass over the second dryer, residual oil-based mud would also be returned to the closed loop mud system. The dried cuttings would fall into a metal trough where they would be scooped up with a front end loader and transferred to a storage tank. Oil-based drilling mud would be reused for subsequent drill holes until the end of drilling operations.

Electric logs would be run to evaluate the subsurface formation prior to obtaining cores. The logs would include spectral gamma, sonic, neutron, density, caliper, and temperature logs. The cores would consist of 3.5-inch subsurface samples that would allow testing of prospective potash horizons in salt cycles 5, 9, 13, and 18 of the Paradox Formation.

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.

At end of the drilling program, oil-based drilling mud would be sold or disposed of appropriately. Oil-based cuttings would be disposed of at approved disposal facility near Naturita, Colorado. Any water produced during drilling would be initially contained in the reserve pit and then used as drilling fluid for subsequent drill holes, allowed to evaporate, or transported from the reserve pit by truck to an existing produced water disposal well. If produced water is allowed to evaporate after completion of drilling, a reserve pit would be fenced on four sides to prevent entry of wildlife or livestock.

Reclamation

Reclamation procedures are included in the Operator's Exploration Plan. The Operator's reclamation plan was prepared in consideration of the *Approved Resource Management Plan* (RMP) for the BLM Moab Field Office (MFO), (USDI-BLM, 2008), *The Practical Guide to Reclamation in Utah* (Utah Division of Oil, Gas and Mining, 2001), *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (The Gold Book, USDI-BLM, 2007), and specific guidance from the BLM's Moab Field Office natural resource specialists during the onsite inspection on October 24, 2012.

Initial pad and road access reclamation operations would occur when it is determined they would no longer be required for the duration of the entire drilling operation. All drill pads ,new access roads, and turnouts on Class D roads would be reclaimed. Grand County prefers that upgrades to Class D roads remain in place, but the final dispositioin of upgrades to Class D roads would be based on coordination with BLM and conformance with the BLM's and Grand County's Travel Management Plans.

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 drainage features.
- Maintaining the biological, chemical and physical integrity of the topsoil and subsoil.
- Re-establishing a desired self-perpetuating plant community.
- Re-establishing a complimentary 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 and removed above the solids level and disposed of at an approved landfill. Reserve pits would be backfilled with stockpiled subsoil and rock. A backfilled pit 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 re-contoured, 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. A drill pad and its access road beyond the county road would be graded to approximate 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 near re-created hummocky areas. 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. Where upgraded to facilitate access and drainage, features of a Class D road would be re-established to approximate original road width and character. The user-created by-pass along the Class D road used to access the AP-F-24 would be reclaimed.

Seeding would be performed at times determined by the Authorized Officer (AO) to be appropriate. Seeding would not occur from April 15 to September 15; however, seeding would be conducted no later than two weeks following completion of final seedbed preparation. As determined by BLM, the following mixture would be applied at 18 pounds per acre for broadcast seeding. If so directed by the BLM, fencing would be installed to prevent livestock from grazing until vegetation is established.

Table 3: Reclamation Seed Mix

Species	Application Rate
Indian ricegrass (*Achnatherum hymenoides*)	5lbs/acre
Needle-and-thread (*Hesperostipa comata*)	3lbs/acre
James' galleta (*Pleuraphis jamesii*)	3lbs/acre
Sand dropseed (*Sporobolus cryptandrus*)	5lbs/acre
Four-winged saltbrush (*Atriplex canescens*)	2lbs/acre

As suggested by the BLM, 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. Although transplanting grass plugs has been successfully accomplished by the BLM in the past, transplanting plugs in the summer would prevent re-growth of grasses in a different location. In addition, because of the exploratory nature of the project, drilling/coring operations would depend entirely on the appraisal of initial coring results. At best, 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.

The Operator would provide a report to the BLM documenting the progress of its reclamation operations in June of each year, or until 70 percent of the baseline vegetation cover of an adjacent undisturbed site is achieved. After reseeding has been performed, annual monitoring of the disturbed areas would include an assessment of weed control for each location. If necessary to facilitate reclamation success, the Operator would confer with the Moab FO at that time to re-evaluate reclamation strategies. The Operator would modify reclamation procedures as necessary or as directed by the BLM to achieve the desired reclamation outcome in terms of cover in consideration of the baseline conditions. The Operator would perform additional seeding or weed control measures as necessary to meet reclamation coverage goals.

Surface Disturbance Summary

Implementation of the Proposed Action would result in surface disturbance from the construction of drill pads, new access roads, and turnouts, all of which would be reclaimed. Class D road upgrades would be reclaimed or left in place, according to direction of the BLM. Maintenance actions that would be taken along Class B roads incorporated within county and BLM Travel Plans were not quantified because they would be conducted in cooperation with the county and would apply to discrete short sections of these roads.

Table 4: Surface Disturbance Summary

Drill Pad	Drill Pad (acres)	Access Road Construction (acres)	Class D-Road Upgrade (acres)	Road Turnouts (acres)	Total Disturbance (acres)
AP-F-12	3.67	0.06	0	0	3.73
AP-F-24	3.67	0.06	2.38	0.14	6.25
AP-F-28	2.58	0.03	0	0.05	2.66
AP-F-34	3.31	0.02	0.70	0.09	4.12
Total Disturbance	13.23	0.17	3.08	0.28	16.76

Applicant-Committed Project Design Features

The Operator would secure all required permits and approvals from the BLM, State of Utah, and county prior to construction. The Operator would adhere to all applicable federal, state, and county regulations while performing all operations associated with the Proposed Action. The Operator would incorporate the resource protection measures described below as part of the Proposed Action in addition to measures contained in the Operators Exploration Plan.

Access:

- Maintenance performed on Class B roads would be performed in coordination with the Grand County Road Department.
- Upgrades performed on Class D Grand roads would be performed in coordination with the BLM as well as Grand County. The upgrades would consist of the least amount of construction needed to facilitate safe access but not essentially change the character of the route over the long-term.

Air Quality:

- The Operator would perform dust mitigation on unpaved Class D access roads and drill pads, during all phases 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 further discourage the generation of fugitive dust.
- The Operator would use a Tier II drilling rig for drilling operations to reduce NO_x emissions.

Cultural Resources:

- The Operator would conduct a Class III cultural resource survey on lands that would be affected by surface-disturbing activities and would avoid all sites determined to be eligible to the National Register of Historic Places.

Floodplains:

- The Operator would construct the minimum length of access road needed to connect existing county roads to the drill pad.
- Upgrades and road construction would be performed to the minimum degree necessary to ensure safe transport of men and equipment, including crossing drainages with low water crossings, unless instructed otherwise by the AO.

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 impacts were to occur to range management facilities from project operations, the Operator would contact the AO immediately and take measures according to direction from the AO.

Recreation:

- The Operator would not impede or prevent public access on Class B roads.

Soils:

- Construction operations would be conducted in consideration of the *Surface Operating Standards for Oil and Gas Exploration and Development, 4th Edition* (Gold Book) (USDI and USDA, 2007).
- Construction operations would be performed using the least level of effort needed to ensure safe access for men 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, sediment fences, and/or other BMPs would be utilized to divert storm water from drill pad or trap sediment-runoff, as appropriate.
- One or more of several methods would be used to stabilize the topsoil piles and prevent wind dispersion during drilling. The methods include: application of a tackifier; spraying with water to create a physical crust; or covering the piles with natural biodegradable fabric.
- The Operator would line the reserve and cuttings pit with a 12 mil liner, or as specified by the AO.

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.
- If so directed by the BLM, fencing would be installed to prevent livestock from grazing the reclaimed area until vegetation is reestablished.
- 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 not be allowed to drive through weed-infested areas.
- The Operator would control weeds by the application of commercial herbicides if necessary.

Wildlife, including Protected Species and Migratory Birds:

- The Operator would perform biological surveys, as directed by the AO.
- The Operator would comply with BLM requirements regarding special status wildlife species, including raptor timing stipulations and spatial offsets.
- Exploration activities were planned to avoid canyon rims by at least 0.5 mile to minimize impacts to raptors, including Mexican spotted owls.

- Exploration activities were planned to avoid bighorn sheep migration corridors and lambing and rutting habitat as delineated by the Approved RMP (BLM, 2008).
- 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 or livestock.