TEP Rocky Mountain LLC

Proposed Drill Cuttings Management Plan for the

DOE 1-M-18 Well Pad (COGCC Location ID 335744)

January 18, 2019

Purpose

TEP Rocky Mountain LLC requests approval to manage drill cuttings produced from the DOE 1-M-18 pad (COGCC Location ID 335744) at the locations as described below.

Drilling activities will commence at the DOE 1-M-18 well pad in late March 2019, where 15 new wells are planned to be drilled. The total volume of drill cuttings to be generated from these 15 new wells is approximately 5,000 cubic yards. Due to the size and physical constraints / limitations of the DOE 1-M-18 well pad, there will be no permanent disposal of drill cuttings on the well pad itself. Therefore, the drill cuttings from these new wells will need to be transported to and managed in separate, off-site drill cuttings management areas as described below:

Primary Cuttings Management Area. The primary cuttings management area (DOE 1-M-18 Cuttings Management Area) is located approximately 0.5 miles south of the actual DOE 1-M-18 well pad. This location will accommodate approximately 2,000 cubic yards of drill cuttings. The Primary Cuttings Management Area has already been approved via a Form 2A (document number 401671641) and has been assigned the Location ID 456106.

Secondary Cuttings Management Area: The remaining 3,000 cubic yards of cuttings are proposed to be disposed and stabilized at a secondary location to be constructed at the existing Clough RWF 44-18 (COGCC Location ID 335146) well pad location which is located approximately 1 mile below the DOE 1-M-18 well pad. A drilling pit will be constructed within the boundaries of the previously disturbed area of the RWF 44-18 pad and will accommodate the remaining volume of drill cuttings from the DOE 1-M-18 well pad. Excavated material from the drilling pit will be used to expand the pad to the south to support drill cuttings management operations at this location. Excess material excavated from the drilling pit will be stockpiled north of the pad. Topsoil will also be stripped and stockpiled separately until it is needed for reclamation.

The purpose of this Cuttings Management Plan is to request authorization and approval to relocate drill cuttings from the DOE 1-M-18 well pad and manage them for permanent disposal and stabilization at the off-site locations as described above. The Primary cuttings management area is on fed surface (Naval Oil Shale Reserve) and is managed by BLM, whereas, the Secondary cuttings management area is located on fee surface (Clough Sheep Company). After consultation with all appropriate agencies and surface owners, all parties agree that this is an acceptable and reasonable plan for safely managing the drill cuttings from the DOE 1-M-18 well pad.

The locations and distances of each location relative to the DOE 1-M-18 well pad is shown on the attached Exhibit.

Need

The primary reasons for seeking approval of an alternative management plan for the drill cuttings from this pad are as follows:

1) Spatial constraints at the DOE 1-M-18 Well Pad. The DOE 1-M-18 pad is located on a steep side-slope of an unnamed gulch that is directly below East Anvil Point as shown on the attached Exhibit. This unnamed, ephemeral drainage is eventually tributary to the Colorado River which is approximately 2.65 miles due south of the well pad. Due to the extremely steep terrain and topography of this area, the size of the pad is very limited and there is no room for the on-site disposal of drill cuttings at this location. The only options for management of drill cuttings generated from this pad is to transport and manage the cuttings at another, nearby permitted oil and gas location, or to haul the drill cuttings off the mountain to an off-site commercial disposal facility.

2) Adverse and unacceptable safety and environmental risks associated with transporting the cuttings to an off-site commercial disposal facility. The only access to / from this well pad is the access road to the DOE 1-M-18 well pad that traverses the bottom and steep side slopes of the unnamed gulch. This is an unimproved, dirt road with grades that have been surveyed up to 20% in several locations. Additional details regarding the volumes of cuttings, truck trips per day, etc. are provided in the Safety and Environmental Considerations section below.

3) Disposal costs. As outlined above, approximately 2,000 cubic yards will be disposed / stabilized at the primary cuttings management area (i.e., DOE 1-M-18 Cuttings Management Area). The remaining 3,000 cubic yards will need to be managed at a secondary cuttings management area (i.e., the RWF 44-18 drilling pit).

4) Beneficial re-use of cuttings to improve prior reclamation efforts at the DOE 1-M-18 Cuttings Management area. The area approved for the DOE 1-M-18 Cuttings Management Area was formerly part of an oil shale processing facility known as the Anvil Points Facility. This facility was operated intermittently by the U.S. Bureau of Mines and other operators from approximately 1947 thru 1982. Eventually, the BLM was charged with the remediation and cleanup of this former oil shale processing and experimental facility. Remediation activities occurred at this site from approximately 2009 thru 2012.

   While planning the DOE 1-M-18 pad with BLM, BLM expressed a strong desire to beneficially re-use drill cuttings from the DOE 1-M-18 pad to improve the reclamation that was previously completed in the area of the proposed DOE 1-M-18 Drill Cuttings Management Area. The outcome of the previous reclamation activities in this area has not succeeded to the degree that was hoped for by BLM. Consequently, BLM strongly supports the drill cuttings to be managed as described in this Cuttings Management Plan, as it provides an opportunity to improve upon the previous reclamation efforts conducted in this area and will help to restore this area back to pre-disturbance conditions as much as possible.

The three options for off-site disposal / management, and their respective estimated disposal and trucking costs are summarized below:

Disposal Option (5,000 cubic yards)	Estimated Disposal Costs	Estimated Trucking Costs	Total Estimated Disposal Costs
DOE 1-M-18 pad to DOE 1-M-18 Cuttings Management Area and the RWF 44-18 Drilling Pit	0	$62,475	$62,475
DOE 1-M-18 to West Garfield County Landfill	$175,000	$81,250	$256,250
DOE 1-M-18 to Green Leaf Environmental Services	$135,000	$175,000	$310,000

Disposal at the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 Drilling Pit: There are no disposal fees associated with final disposal and management at the DOE 1-M-18 Cuttings Management Area and RWF 44-18 Drilling Pit. Trucking / transporting the cuttings from the DOE 1-M-18 to the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 Drilling Pit is the only cost associated with this option; therefore, the total estimated disposal costs for this option are approximately $62,475.

West Garfield County Landfill: The disposal fees associated with final disposal and management at the West Garfield County Landfill are estimated to be $175,000. Trucking costs for this option would be an additional $81,250. The total estimated costs for this option are $256,250. Disposal at the West Garfield County Landfill is over 4 times higher than disposal at the RWF 44-18 location.

Disposal at Green Leaf Environmental Services: The disposal fees associated with final disposal and management at the Green Leaf Environmental services are estimated to be $135,000. Trucking costs for this option would be an additional $175,000. The total estimated costs for this option are $310,000. Disposal at the Green Leaf disposal facility is 5 times higher than disposal at the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 location.

From an economic and efficiency standpoint, disposal of the remaining drill cuttings from the DOE 1-M-18 at either the West Garfield County Landfill or the Green Leaf Environmental Services commercial facilities is not justifiable. There are no compelling reasons to incur the added mileage, expense, and transportation-related risks that would otherwise be incurred by transporting this volume of drill cuttings off the mountain to either of these commercial disposal facilities.

Between both locations (the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 drilling pit), there is ample capacity to accommodate the entire volume of drill cuttings (5,000 cubic yards) that will be generated from the new 15 wells that will be drilled from the DOW 1-M-18 well pad.

Safety and Environmental Considerations

Worker Safety. As noted above, the only access road to this well pad is a narrow, single lane, unimproved, dirt road that travels through the bottom of the unnamed gulch below East Anvil Point. The road is built upon the steep, clay slopes of the Green River formation. As shown in Photos 1 and 2 below, not only is the grade of the road very steep (surveyed at 20% at several sections), but there are numerous

sharp, blind corners and the line-of-sight visibility is very limited. Because this is the only access road in / out of this well location, this road will also be very congested with other drilling, completions, roustabout / construction, and other oil field support services related traffic. Traffic management and controlling heavy truck traffic on the narrow access road is going be a very challenging aspect of safely working at this location – there is simply little or no room for two vehicles going in opposite directions to pass each other. Hauling drill cuttings down the mountain beyond the RWF 44-18 location for off-site disposal at a commercial facility will unnecessarily add additional heavy truck traffic on the road each day.

Photo 1. Narrow, steep, and curving access road leading to the DOE 1-M-18 well pad. Surveyed 20%

Photo 2. Preparing the DOE 1-M-18 well pad.

Drilling activities at this location will occur during springtime conditions when road conditions are typically muddy, slick, and occasionally frozen. TEP is deeply concerned about worker safety associated with hauling many truck-loads of drill cuttings per day down a very steep, slick and narrow road. In the interest of worker safety, TEP believes that it is critical to minimize the number of truck loads transporting drill cuttings for disposal, and to minimize the distance required to transport cuttings for final disposal.

The DOE 1-M-18 Cuttings Management Area and the Clough RWF 44-18 well pad are the closest and most practical existing locations where the remainder of the drill cuttings could be transported for management and final disposal. COGCC's approval to allow TEP's request to manage drill cuttings at these pads will greatly mitigate and reduce the risks associated with transportation of drill cuttings from this pad.

Community Safety. Community safety impacts are expected to be minimal for disposal at either the DOE 1-M-18 Cuttings Management Area and the Clough RWF 44-18 well pad option, or the West Garfield County Landfill. A comparison of the total vehicle miles required for transportation and disposal of cuttings to the DOE 1-M-18 Cuttings Management Area / RWF 44-18 pad option versus the off-site commercial disposal option are summarized in the table below.

Disposal Option (5,000 cubic yards)	Distance (round-trip miles)	Number of Loads (6 CY/load)	Total Vehicle Miles for Off-site Disposal
DOE 1-M-18 to DOE 1-M-18 Cuttings Management Area & RWF 44-18	DCMA: 1 RWF 44-18: 2	333 500	1,333 miles
DOE 1-M-18 to West Garfield County Landfill	DCMA: 1 RWF 44-18: 5	333 500	2,833 miles
DOE 1-M-18 to Green Leaf Environmental Services	DCMA: 1 RWF 44-18: 64.5	333 500	32,583 miles

The greatest impact to community safety would mostly be associated with transporting the drill cuttings to the Green Leaf Environmental Services disposal facility. This option would increase heavy truck traffic along the I-70 corridor and through the community of Debeque by the same number of trips as indicated in the table above. As shown in the table above, this option would put another 500 trucks on I-70 over a period of 90 days and would require an additional 32,250 miles of heavy truck traffic to be driven unnecessarily. This option poses an unnecessary and unacceptable risk to both the truck drivers and other motorists traveling I-70 during this time period.

Environmental Safety / Protection. As discussed above, the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 pad location are the closest and most feasible locations that are suitable for disposal of the remaining drill cuttings from the DOE 1-M-18 well pad location.

The access road to this pad mostly follows the bottom and side-slopes of the unnamed gulch that lies immediately below East Anvil Point. This is an ephemeral water way that is eventually tributary to the Colorado River. The added trips associated with the off-site, commercial disposal options would also pose an increased and unnecessary risk of accidental exposure of E&P wastes to these water ways. In the event of a spill of waste materials off the road and onto the steep side slopes below the road, the physical cleanup of the steep side slopes would result in considerable surface disturbance and might not even be possible in some areas due to the steepness of the slope.

However, if COGCC approves the management and disposal of drill cuttings at the nearby RWF 44-18 pad, much of these health and environmental risks become negligible. As explained in the variance request letter, the distance of the haul route from the DOE 1-M-18 pad to the RWF 44-18 pad is 0.96 miles, whereas the distance of the haul route from the DOE 1-M-18 pad to either of the off-site commercial facilities are several orders of magnitude greater in distance. Because the nearby DOE 1-M-18 Cuttings Management Area and the RWF 44-18 location are located in close proximity to the DOE 1-M-18 well pad, disposal at these locations would remove most, if not all of the truck traffic (associated with cuttings disposal) from the access road, the I-70 corridor, and the local communities. As a result, these safety and environmental risks would be greatly minimized / averted.

Outstanding Compliance Issues, Spills, Corrective Actions. Based upon a review of the COGCC database for the facilities associated with this proposal, there was one corrective action that was recently identified at the RWF 44-18 location (document number 689302827). The Corrective Action identified an un-used upright tank on the edge of location. This storage tank was being used for fresh-water storage during construction of the DOE 1-M-18 pad; however, it will no longer be needed after January 18, 2019, and will be removed from location. A FIRR has been submitted with the response that this Corrective Action has been addressed and the tank has been removed from location. There were no other un-resolved Corrective Actions, open spills, or other compliance issues for either location. Additionally,

both facilities were checked for any open action items within TEP's internal inspection and maintenance programs, and there are no unresolved equipment, storm water management, weed control, housekeeping, SPCC, or other issues identified at either pad. The results of this review are summarized in the table below.

Pad Name	COGCC Location ID no.	COGCC FIR Corrective Actions (CAs)?	Un-resolved spills?	Production / Equipment	Storm water, weeds, SPCC
DOE 1-M-18 pad	335744	Doc # 666804062; 9/12/17; no CAs	No	Pass. No issues.	Pass. No issues.
RWF 44-18 pad	335146	Doc # 689302827; 12/31/18; 1 CA; FIR submitted (doc# 401906756) – issue resolved.	No	Pass. No issues.	Pass. No issues.

Drill Cuttings Management Procedure

Drilling activities will commence at the DOE 1-M-18 well pad in late March 2019, where 15 new wells will be drilled. The estimated cuttings volume to be generated during drilling of the 15 new proposed wells on the DOE 1-M-18 pad is approximately 5,000 cubic yards. Due to the limited size and physical constraints of the DOE 1-M-18 well pad, there will be no permanent disposal of drill cuttings on the well pad itself.

The first 2,000 cubic yards of drill cuttings from these new wells will be transported by truck a distance of approximately 0.6 miles from the DOE 1-M-18 pad, where they will be stabilized at the DOE 1-M-18 Cuttings Management Area. The remaining 3,000 cubic yards will be transported by truck a distance of 0.96 miles from the DOE 1-M-18 pad to an off-site drilling pit to be constructed at the RWF 44-18 well pad.

The general protocol for managing cuttings at these locations is as follows: As drill cuttings are brought to the surface, they will be temporarily placed into a designated storage cell that is close to the rig shaker assembly. Once the temporary storage cell becomes full, a loader will place the cuttings into a dump truck where they will be transported to the DOE 1-M-18 Drill Cuttings Management Area. There, cuttings from each new well will be segregated and placed into the drilling pit and periodically sampled to determine if the cuttings meet COGCC 910-1 standards. Additional treatment or amendment of the cuttings may be needed occasionally to ensure that COGCC 910-1 standards are met prior to reclamation. If needed, clean fill material may be mixed with the cuttings to ensure that cleanup standards are met. Confirmation samples of the blended material will be collected and submitted to an approved analytical laboratory and analyzed for the full COGCC 910-1 list of organic, inorganic, and metal compounds (in soils) to ensure that these materials comply with COGCC cleanup standards. If sample results indicate that any of the inorganic parameters (i.e., Sodium Absorption Ratio, Electrical Conductivity, etc.) exceed their respective cleanup standards or background concentrations, these materials must be covered with a minimum cap of 3-ft of clean material (i.e., soils meeting 910-1 cleanup standards).

Representative samples from the entire volume of the drilling pit will be collected and analyzed to ensure compliance with COGCC 910-1 cleanup standards prior to reclaiming the drilling pit. If the composition of the cuttings is verified to comply with the entire list of 910-1 cleanup standards (including the

inorganic parameters), these materials may be either buried in-situ within the drilling pit, or they may be re-used on the fill slope as needed to help shape and contour the pad in preparation for interim reclamation activities as outlined in COGCC's Interim Reclamation requirements of COGCC Rule 1003. In addition, storm water BMPs will be installed and maintained as per TEP's site-specific Storm Water Management Plan that has been prepared and implemented for each location.

Once the Primary Drill Cuttings Management Area has reached it full design capacity of drill cuttings (approximately 2,000 cubic yards), the drill cuttings for the remainder of the wells to be drilled at the DOE 1-M-18 (approximately 3,000 cubic yards) will be transported and placed into the drilling pit to be constructed at the secondary Cuttings Management Area (RWF 44-18 pad). Again, cuttings will be segregated and placed into the drilling pit and periodically sampled to determine if the cuttings meet COGCC 910-1 standards.

After all cuttings from the DOE 1-M-18 have been received and tested for compliance with COGCC 910-1 cleanup standards, both the primary and secondary drill cuttings management areas will be closed. The moisture content of all drill cuttings will be kept as low as practicable at all times to prevent accumulation of liquids. Both pads are included in TEP's storm water management program and will be inspected and maintained per COGCC's Site Stabilization and Storm Water Management requirements, Rule 1002(f).

Interim reclamation of these areas will occur within six (6) months following closure of the drill cuttings management areas. The disturbed areas surrounding each location, including access roads if applicable, will be re-contoured to blend as nearly as possible with the natural topography. TEP will complete final grading of back-filled and cut slopes to prevent erosion and encourage establishment of vegetation. Existing drainages will be re-established where appropriate and topsoil will be spread in a uniform depth that will allow the establishment of desirable vegetation. All disturbed areas will be reseeded in the first favorable season following closure of each location. TEP operates under an integrated Noxious Weed Management Plan that complies with the Colorado Noxious Weed Act, Colorado Oil & Gas Conservation Act, and the BLM Gold Book. All interim reclamation activities will be conducted in accordance with COGCC Rule 1003 (Interim Reclamation).

Drill Cuttings Sampling Procedure

To demonstrate compliance that the drill cuttings generated from this pad complies with COGCC Rule 910-1, all drill cuttings produced from the new wells to be drilled will be characterized according to the following procedure:

Sampling Frequency. Prior to transportation from the original well pad, all drill cuttings will be dried to the greatest extent possible to minimize the accumulation of any fluids and to facilitate the physical management and handling of the material. As drill cuttings are brought to the surface at the DOE 1-M-18 pad, they will be loaded and hauled directly to the cuttings disposal trench. There, the cuttings will be placed in an orderly manner into the DOE 1-M-18 Cuttings Management Area or the RWF 44-18 Drilling Pit according to the order in which the wells are drilled.

First-Well Sampling: As discussed with COGCC, TEP will specifically target the cuttings from the first well drilled at the DOE 1-M-18 pad for a more intensive and thorough characterization process to ensure that the analytical data for the drill cuttings generated from this first well are representative of the cuttings to be generated from the subsequent wells to be drilled from that same pad. This sampling strategy is appropriate since all wells from this pad will be drilled through the same geologic formations, will have similar completion depths, and will all be drilled using the same equipment, drilling muds, and techniques. This more aggressive sampling design will ensure that the initial well and all subsequent

wells will meet applicable COGCC 910-1 standards. Samples from the first well on the DOE 1-M-18 pad will include one grab sample from the surface horizon (0 to 1,000 feet deep); one grab sample from the surface horizon to the "top of gas" interval (1,000 feet to 5,400 feet); and two grab samples from the production zone (5,400 feet to total depth – TD, which is estimated to average approximately 9,000 feet). As a precautionary measure, cuttings from the production zone will be segregated (for each well) within the cuttings management pit or drilling pit and will be managed separately. Cuttings from the Production Zone are more likely to contain elevated hydrocarbon constituents and may require additional treatment to ensure that they meet COGCC 910-1 standards prior to final disposal. It is anticipated that drill cuttings produced from the surface horizon through the top of gas intervals (0 – 6,500 feet) will not exceed 910-1 standards; however, this will be verified through the sampling design as shown in the table below:

<table>
<tr><th colspan="2">First-Well Sampling Frequency*</th><th colspan="2">Subsequent Well Sampling Frequency*</th><th colspan="2">Final Cell Confirmation Sampling **</th></tr>
<tr><td>Depth</td><td>Number of Samples</td><td>Depth</td><td>Number of Samples</td><td>Location</td><td>Number of samples</td></tr>
<tr><td>Surface (0 – 1,000 ft)</td><td>1</td><td rowspan="3">Production zone (6,500 ft – TD)</td><td rowspan="3">1</td><td rowspan="3">One sample from each third of pit</td><td rowspan="3">3-4</td></tr>
<tr><td>Top of Gas (1,000 to 6,500 ft)</td><td>1</td></tr>
<tr><td>Production Zone (5,400 – TD)***</td><td>2</td></tr>
</table>

* Before mixing / blending. Grab samples.
** After mixing / blending. Composite samples (5-point)
***Addition verification samples will be collected from any production zone materials that require treatment to meet COGCC 910-1 standards.

Subsequent-Well Sampling: To ensure that cuttings from subsequent wells continue to meet COGCC 910-1 standards, a single grab sample will be collected from drill cuttings produced from the production zone (6,500 feet to TD) of each subsequent well. It is anticipated that drill cuttings generated from the surface to the top of gas intervals (0 to 6,500 feet) will contain relatively minor concentrations of contaminants that would exceed COGCC 910-1 standards; therefore, targeting the production zone will capture those cuttings that have the greatest potential to exceed 910-1 standards and that may also require additional treatment prior to final disposal. Any drill cuttings that are found to exceed the COGCC 910-1 clean-up standards may be mixed with additional available clean soils until the 910-1 standards have been achieved. Mixing will be accomplished using a track hoe and blending clean soils in with the production zone cuttings at a ratio of approximately 1:1 until the material is thoroughly mixed. A second verification sample will then be collected after mixing to ensure that the COGCC 910-1 standards are met. All samples will be submitted to an approved, fully accredited environmental laboratory for COGCC 910-1 analysis as described in the table below.

Final Cell Confirmation Sampling: Once all drill cuttings have been placed at the DOE 1-M-18 Cuttings Management Area or into the RWF 44-18 drilling pit, and the soil samples collected up to that point indicate that all COGCC 910-1 constituents are below their respective allowable thresholds, the cuttings will be fully mixed using a track-hoe. After the cuttings have been thoroughly mixed, and as a final check to ensure that the entire volume of the cell contents meet COGCC 910-1 standards, the cuttings management area and drilling pit will be divided into thirds, and a composite sample (5-point) will be collected from each third of the cuttings management area or drilling pit. All samples will be submitted to an approved, fully accredited environmental laboratory for COGCC 910-1 analysis as described in the table below.

Until adequate characterization of the cuttings materials has been completed, personnel will segregate cuttings from individual wells inside the cuttings management area or drilling pit. Mixing the cuttings from multiple wells will not be allowed until the cuttings have been characterized as described above and are below applicable COGCC 910-1 cleanup standards.

Sample Analysis. It is proposed that all drill cuttings be analyzed in accordance with the following list of analytes from the COGCC 910-1 Table.

As shown in the table below, and through this variance, TEP is requesting relief for treating drill cuttings produced from the DOE 1-M-18 well pad for the inorganic constituents of Electrical Conductivity (EC), Sodium Absorption Ration (SAR), and pH. If present within the rooting zone, elevated concentrations of these inorganic constituents can affect soil characteristics and interfere with establishing vegetation that is needed for successful reclamation of the location. However, all cuttings from these wells will be buried in the cut-slope of the cuttings management area or the drilling pit and will be covered with at least three feet of clean fill. Any elevated concentrations of inorganic constituents will not impact or interfere with the reclamation activities planned for the cuttings management areas.

Additionally, TEP is requesting relief from meeting the 910-1 Arsenic standard due to the naturally elevated concentrations of this metal that is found throughout the Piceance Basin. Background concentrations for arsenic typically exceed the COGCC cleanup standard for this metal, and the standard is simply not attainable.

Record Keeping. TEP will maintain records of all drill cuttings generated from each well including total volume of cuttings per well, date cuttings were transported to the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 drilling pit, and the analytical data for all samples associated with each well. TEP will maintain these records for a period of 5-years and will provide data to COGCC upon request.

Table of COGCC 910-1 Contaminants Applicable to Drill Cutting Produced from the DOE 1-M-18 well pad.

Contaminant of Concern	COGCC Table 910-1 Threshold (mg/Kg)	Analytical Method
DRO	500	SW 8015M
GRO		SW8015D
BENZENE	0.17	SW 8260C
TOLUENE	85	
ETHYLBENZENE	100	
XYLENE TOTAL	175	
ACENAPHTHENE	1,000	SW 846, SW 8270D
ANTHRACENE	1,000	
BENZO(A)ANTRHACENE	0.22	
BENZO(A)PYRENE	0.022	
BENZO(B)FLUORANTHENE	0.22	
BENZO(K)FLUORANTHENE	2.2	
CHRYSENE	22	
DIBENZO(A,H)ANTHRANCENE	0.022	
FLUORANTHENE	1,000	
FLUORENE	1,000	
INDENO(1,2,3-CD) PYRENE	0.22	
NAPHTHALENE	23	
PYRENE	1,000	
ARSENIC*	0.39	SW 6010C, 6020A, 7471B, SW 7196A,
BARIUM	15,000	
CADMIUM	70	
CHROMIUM	-	
CHROMIUM (III)	120,000	
CHROMIUM (IV)	23	
COPPER	3,100	
LEAD	400	
MERCURY	23	
NICKEL	1,600	
SELENIUM	390	
SILVER	390	
ZINC	23,000	
ELECTRICAL CONDUCTIVITY (EC) (mmho/cm)*	<4 mmhos/cm or x2 bkgd	USDA H60
pH*	6 to 9	SW9045D
SODIUM ADSORPTION RATIO (SAR)*	12	USDA H60

*TEP is requesting relief for treating drill cuttings produced from the DOE 1-M-18 well pads for these constituents.

Preparing Drill Cuttings for Burial. All drill cuttings will be managed / handled as follows:

- The cuttings trench at the DOE 1-M-18 Cuttings Management Area has been designed and constructed to hold approximately 2,000 cubic yards of cuttings from the DOE 1-M-18 wells. This cuttings management area will be filled first.
- The cuttings trench at the RWF 44-18 has been designed to accommodate the remaining 3,000 cubic yards of drill cuttings produced from the DOE 1-M-18 wells. This drilling pit will be filled after the DOE 1-M-18 Cuttings Management Area has been filled to full capacity.
- All cuttings from each well produced from the Surface Zone and from the Surface to Top of Gas Zone will be placed into the cuttings management areas in a chronological manner. It is anticipated that drill cuttings generated from these intervals will contain relatively minor concentrations of contaminants that would exceed COGCC 910-1 standards and will require minimal treatment. This will be verified by the sampling protocol described for the first well to be drilled from this pad.
- All cuttings from each well produced from the Production Zone will be stored in a separate part of the cuttings management area or pit for specific sampling and potential treatment if needed. Based upon analytical data for samples collected from the Production Zone, if treatment is required, clean fill will be added to the Production Zone cuttings at a 1:1 ratio and will be thoroughly mixed with a track-hoe. After mixing, additional composite samples will be collected and submitted to the laboratory for analysis. This process will be repeated until all materials are below the applicable COGCC 910-1 standards.
- To ensure that cuttings from each well are kept separate and readily identifiable, TEP will mark cuttings from each well in such a manner that it will enable TEP to clearly identify cuttings from specific wells (e.g., installing lathe on the edge of the cuttings management area or pit, physically placing a barrier of clean fill between cuttings produced from each well, using GPS instrumentation to survey cuttings locations from specific wells, etc.). This will ensure that TEP will be able to clearly identify cuttings from specific wells for cuttings sampling and characterization purposes as described above.
- After all cuttings from the respective wells have been placed and successfully treated, the cuttings management area and/or drilling pit will be covered with a minimum of 3-feet of clean fill.
- After both cells have been completely filled and covered, each cuttings management area will be reclaimed per the reclamation plat prepared for each location.

Summary

Due to the size constraints of the DOE 1-M-18 pad, all drill cuttings from the upcoming wells to be drilled in March – June 2019 will require off-site management and disposal. TEP is requesting approval from COGCC to allow off-site treatment and disposal of drill cuttings at the DOE 1-M-18 Cuttings Management Area and at a proposed drilling pit to be constructed at the RWF 44-18 well pad for the following reasons:

Safety Benefit: The DOE 1-M-18 Cuttings Management Area and the RWF 44-18 well pad are the closest of the three off-site alternatives. This equates to significant reductions in the total vehicle miles driven as compared to the other two off-site commercial disposal facilities. This reduction in vehicle miles has a direct translation to reducing risk to both support personnel, the local community, and traffic on the I-70 corridor. Allowing use of the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 locations for cuttings disposal will result in 53% fewer miles driven than transporting to the West Garfield County Landfill, and 96% fewer miles driven than transporting to the Green Leaf Environmental Services disposal facility.

Economic Benefit: Utilizing the existing DOE 1-M-18 Cuttings Management Area and the RWF 44-18 well pad is by far the most economic option of the three off-site alternatives. Total disposal costs using the DOE 1-M-18 Cuttings Management Area and RWF 44-18 well pad are 75% less than total disposal costs at the West Garfield County Land Fill and are 80% less than total disposal costs at the Green Leaf Environmental Services disposal facility. Allowing disposal at DOE 1-M-18 Cuttings Management Area and the RWF 44-18 results in significant, verifiable cost savings, and is consistent with fostering the responsible and efficient development of natural resources in the State of Colorado. There are no compelling reasons to incur the added mileage, expense, and transportation-related risks that would otherwise be incurred by transporting this volume of drill cuttings to an off-site commercial disposal facility.

Environmental Benefit: Because the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 locations are the closest of all three potential off-site disposal options, this will result in reduced vehicle emissions, fugitive dust emissions, and potential impacts and disturbance to wildlife. Additionally, shorter transportation distances have a direct correlation to reduced risk in terms of vehicle accidents, and a reduced potential for spills and related cleanup costs. These drill cuttings are generated from a drilling process that uses exclusively water-based bentonitic drilling fluids and will be managed / disposed in accordance with COGCC Rule 907.d (1-3).

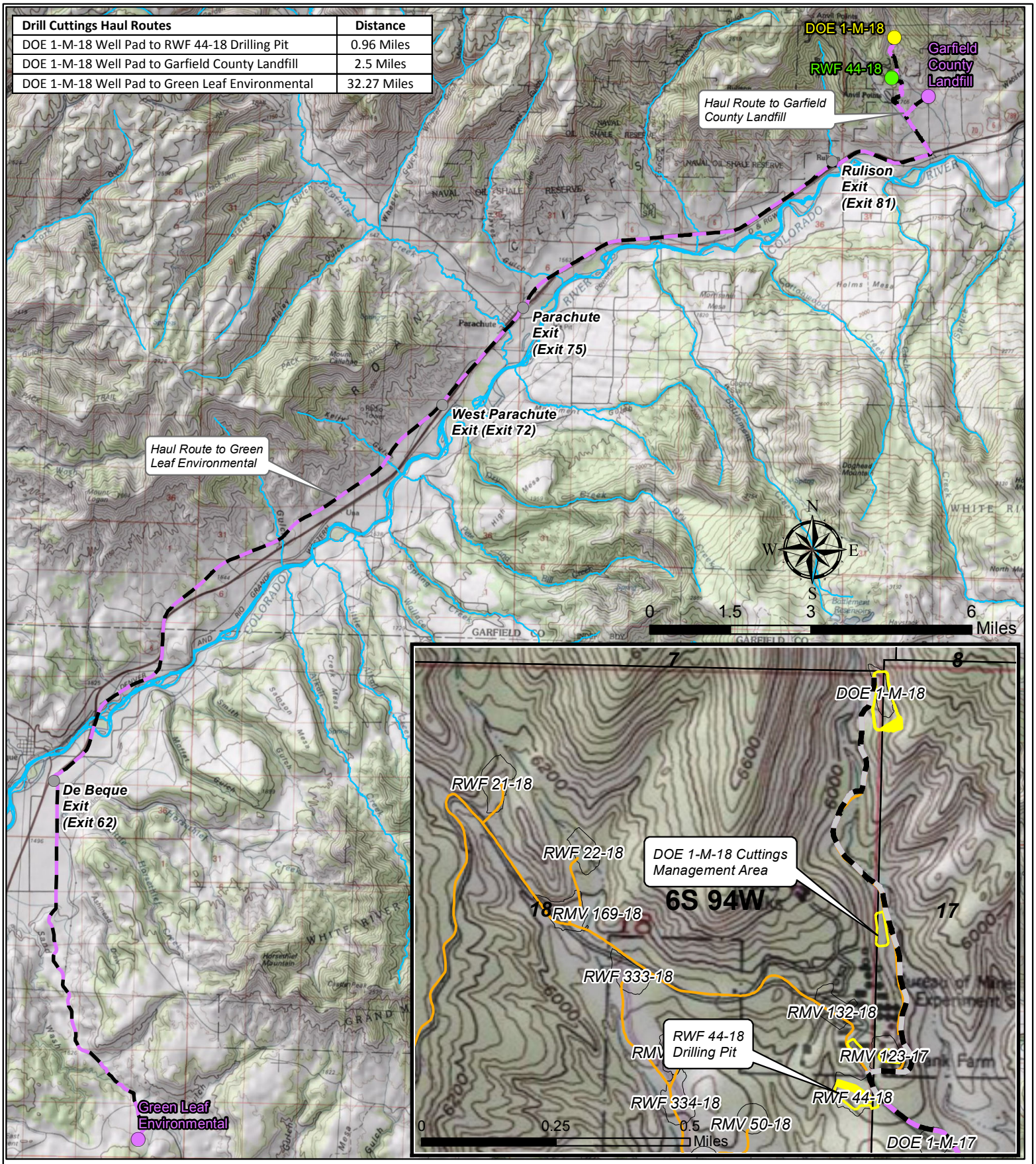
In addition to the arguments above, it should be noted that the RWF 44-18 location is on fee surface and is owned by the Clough Sheep Company. After multiple discussions and on-site meetings with the land owner, they fully support this drill cuttings management proposal as evidenced by the attached Letter of Agreement dated April 24, 2018. The DOE 1-M-18 Cuttings Management Area is located on Federal surface and is managed by the BLM. The BLM fully supports this drill cuttings management proposal as evidenced by the attached approved Application for Permit to Drill, which includes BLM's approval to construct and utilize the DOE 1-M-18 Cuttings Management Area for cuttings disposal.

Beneficial Re-use of Cuttings to Improve Reclamation: The outcome of the previous reclamation activities conducted at the DOE 1-M-18 Cuttings Management Area has not succeeded to the degree that was hoped for by BLM. Consequently, BLM strongly supports the drill cuttings to be managed as described in this Cuttings Management Plan, as it provides an opportunity to improve upon the previous reclamation efforts conducted in this area and will help to restore this area back to pre-disturbance conditions as much as possible.

In summary, transportation of drill cuttings to the DOE 1-M-18 Cuttings Management Area and the RWF 44-18 far out-weighs the safety and environmental risks that, otherwise, would be associated with the transportation and off-site disposal at other commercial disposal facilities. It is far safer and cost effective to manage these cuttings at the closest possible location to where they originated.

Based upon the reasons provided above, TEP requests permission to transport, manage, and dispose of drill cuttings generated from the new, permitted wells to be drilled at the DOE 1-M-18 pad to the DOE 1-M-18 Cuttings Management Area and RWF 44-18 well pad.

Drill Cuttings Haul Routes	Distance
DOE 1-M-18 Well Pad to RWF 44-18 Drilling Pit	0.96 Miles
DOE 1-M-18 Well Pad to Garfield County Landfill	2.5 Miles
DOE 1-M-18 Well Pad to Green Leaf Environmental	32.27 Miles



Legend

- Commercial Disposal Facility
- Existing Well Pad
- Proposed Drilling Pit
- Proposed Pad or Pit
- *Route to RWF 44-18 Drilling Pit*
- *Route to Commercial Disposal*
- Existing Road
- River
- Existing Pad

TEP Rocky Mountain LLC

DOE 1-M-18
Drill Cuttings Haul Routes
Variance Request Exhibit

December 14, 2018

TERRA ENERGY PARTNERS

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