C0410002
#5853

Canyon Fuel Company, LLC
A Subsidiary of Wolverine Fuels, LLC

Sufco Mine
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March 4, 2019

Permit Supervisor
Utah Coal Regulatory program
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, UT 84114-5801

Re: Clean Copies for the Phase Construction Amendment, Canyon Fuel Company, LLC, Sufco Mine, Sufco Waste Rock Site, Permit Number C/041/0002

Dear Sirs,

Clean copies (2 copies) for the amendment to the Sufco MRP is attached to this letter which contains clarification on details regarding the construction at the Sufco waste rock site. It was requested that the full chapter be submitted along with the page that contains the added text (Page 5-13).

Thank you for reviewing this and for your help in getting these changes approved. If you have questions or need additional information, please contact Bryant Bunnell at (435) 286-4490.

Regards,

Bryant Bunnell
Environmental Engineer
Canyon Fuel Company, LLC
SUFCO Mine
P: (435) 286 – 4490
E: bbunnell@wolverinefuels.com

Encl.
cc: DOGM Correspondence File

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change ☒ New Permit ☐ Renewal ☐ Exploration ☐ Bond Release ☐ Transfer ☐

Permittee: Canyon Fuel Company, LLC

Mine: Sufco Mine, Sufco Waste Rock Site **Permit Number:** C/041/0002

Title: Phase Construction Amendment

Description, Include reason for application and timing required to implement:

Instructions: If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

☐ Yes ☒ No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ ☐ increase ☐ decrease.
☐ Yes ☒ No 2. Is the application submitted as a result of a Division Order? DO# _____
☐ Yes ☒ No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes ☒ No 4. Does the application include operations in hydrologic basins other than as currently approved?
☐ Yes ☒ No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes ☒ No 6. Does the application require or include public notice publication?
☐ Yes ☒ No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes ☒ No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes ☒ No 9. Is the application submitted as a result of a Violation? NOV # _____
☐ Yes ☒ No 10. Is the application submitted as a result of other laws or regulations or policies?
Explain: _____
☐ Yes ☒ No 11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes ☒ No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
☐ Yes ☒ No 13. Does the application require or include collection and reporting of any baseline information?
☐ Yes ☒ No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes ☒ No 15. Does the application require or include soil removal, storage or placement?
☐ Yes ☒ No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☐ Yes ☒ No 17. Does the application require or include construction, modification, or removal of surface facilities?
☒ Yes ☐ No 18. Does the application require or include water monitoring, sediment or drainage control measures?
☐ Yes ☒ No 19. Does the application require or include certified designs, maps or calculation?
☐ Yes ☒ No 20. Does the application require or include subsidence control or monitoring?
☐ Yes ☒ No 21. Have reclamation costs for bonding been provided?
☐ Yes ☒ No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes ☒ No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Please attach one (1) review copy of the application.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Jacob D. Smith
Print Name

Sign Name, Position, Date Engr. Mgr. 3/4/19

Subscribed and sworn to before me this 4th day of March, 20 19

Amber Cook
Notary Public

My commission Expires: September 28 20 19

Attest: State of Utah } ss:
County of Salt Lake

Notary Public
AMBER COOK
Commission #684212
My Commission Expires
September 28, 2019
State of Utah

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining

Form DOGM- C1 (Revised 9/17/2013)

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: Canyon Fuel Company, LLC
Mine: Sufco Mine, Sufco Waste Rock Site **Permit Number:** C/041/0002
Title:

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☐ Add	■ Replace	☐ Remove	Sufco MRP, Volume 3 (WRS), Chapter 5
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.	**Received by Oil, Gas & Mining**

CHAPTER 5

ENGINEERING

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CHAPTER 5

ENGINEERING

510 INTRODUCTION

The activities associated with the construction and reclamation of the refuse pile will be designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plans.

511 General Requirements

This permit application includes descriptions of the proposed refuse pile area construction, maintenance, and reclamation operations together with the appropriate maps, plans, and cross sections. Potential environmental impacts as well as methods and calculations utilized to achieve compliance with the design criteria are also presented.

512 Certification

Where required by the regulations, cross sections and maps in this permit application have been prepared by or under the direction of, and certified by, qualified registered professional engineers, geologist or land surveyors. As appropriate, these persons were assisted by experts in the fields of hydrology, geology, biology, etc.

512.100 Cross Sections and Maps

The configuration of the waste rock pile and pile cross sections are provided on Historic Maps 2, 4 and Map Series 2, 3, 4, 5, 6, 7 and 8.

512.200 Plans and Engineering Designs

Plans and engineering design's presented in this submittal were prepared by or under the direction of and certified by a qualified registered professional engineer.

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Excess Spoil - No excess spoil will be generated from the refuse pile area.

Durable Rock Fills - No durable rock fills will exist in the refuse pile area.

Coal Mine Waste - If coal mine waste is generated by the Sufco Mine, it will be placed in the waste rock disposal site (WRDS).

Impoundments - A sedimentation pond impoundment was built at the refuse pile area in the late 1980's. The first sedimentation pond will be replaced by a second pond to be constructed in 2015/2016. (see Section 732).

Primary Roads - The access road to the refuse pile and the temporary road to construct the refuse pile are classified as primary roads.

Variance From Approximate Original Contour - CFC does not request a variance from the approximate original contour requirements of the regulations for this site. The proposed configuration of the site will comply with the post-mining land use and blend into the surrounding area.

513 Compliance with MSHA Regulations and MSHA Approvals

513.100 Coal Processing Waste Dams and Embankments

No coal processing waste dams or embankments will exist within the permit area.

513.200 Impoundments and Sedimentation Ponds

No impoundments or sedimentation ponds in the permit area meet the size criteria of 30 CFR 77.216(a).

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513.300 Underground Development Waste, Coal Processing Waste, and Excess Spoil

Underground development waste and coal processing waste will be stored at the WRDS. No excess spoil will be generated or stored within the WRDS area.

513.400 Refuse Piles

The design of the pile will meet the requirements of MSHA, 30 CFR 77.124 and 30 CFR 77.215 in accordance with Section 536.900.

513.500 Underground Openings to the Surface

No underground openings will be present in this area.

513.600 Discharges to Underground Mines

No discharges to underground mines will occur at the WRDS.

513.700 Surface Coal Mining and Reclamation Activities

No surface coal mining and associated reclamation activities will occur in the WRDS area.

513.800 Coal Mine Waste Fires

Coal mine and underground development waste may have high moisture content. Controlled placement and compaction of the refuse materials will minimize the potential for spontaneous combustion or ignition of these materials. In the unlikely event that burning waste is found during the regular inspections of the refuse pile area, it will be separated and extinguished either by burying the burning materials or by using water sprays. Once extinguished, the material will be placed, compacted, and buried on the active refuse pile bench. If necessary, a long-term plan will be formulated in discussion with MSHA and the Division to extinguish existing fires and prevent future fires.

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514 Inspections

514.100 Excess Spoil

Excess spoil will not be stored in this area.

514.200 Refuse Piles

During construction regular inspections (such as site preparation, foundation preparation, at various lifts during placement and compaction) will be made of the refuse piles by or under the direction of a registered professional engineer experienced in the construction of waste structures. Quarterly inspections of the piles will continue until final reclamation and release of the performance bond. A report of the inspection will be prepared by or under the direction of and certified by a registered professional engineer. The report will discuss the appearances of instability, structural weakness or other hazardous conditions and other aspects of the structure affecting stability. A copy of this report will be maintained at the mine site and submitted to DOGM in a timely manner.

514.300 Impoundments

Regular inspections were made during construction of the sedimentation pond(s) as well as upon completion of construction. These inspections will be made by or under the direction of a registered professional engineer experienced in the construction of similar earth and water structures.

Quarterly inspections of the sedimentation pond(s) will continue until removal of the structure or release of the performance bond. An annual certified report of inspection will be prepared by a qualified registered professional engineer and submitted to the Division. The report will discuss the appearances of instability, structural weakness or other hazardous conditions, depth of any impounded waters, existing storage capacity, and existing or required monitoring procedures, and other aspects of the structure affecting stability. A copy of this report will be maintained at the mine site.

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515 Reporting and Emergency Procedures

515.100 Slides

Slide or other damage at the disposal site which may have a potential adverse effect on public property, health, safety, or the environment will be reported to the Division by the fastest available means and will be remediated in compliance with Division instructions.

The "Waste Rock Pile Expansion, Slope Stability Analysis" located in Appendix II(A) contains the information pertaining to slides in Table 2, Summary of Slide Analysis, Attachment A, Slide Geometry and Output, Chapter 3 Introduction, Section 3.2 and 3.3 and results are discussed in Chapter 4. Settlement is part of the consideration incorporated in the program used for determining the potential for slides. Verification of material compaction by means of commitments in this permit should minimize settlement.

515.200 Impoundment Hazards

If the examination or inspection of an impoundment discloses that a potential hazard is associated with that impoundment that may have an adverse effect on the public, property, health, safety, or the environment, the Division will promptly be informed of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the Division will be notified.

515.300 Temporary Cessation of Operations

Prior to a temporary cessation of operations within the permit area that will last for a period of 30 days or more or as soon as it is known that a temporary cessation will extend beyond 30 days, CFC will submit to the Division a notice of intention to cease or abandon operations. This notice will include:

A statement of the number of surface acres affected by mining operations in the permit area prior to cessation of operations,

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A discussion of the extent and kind of reclamation activities which will have been accomplished prior to cessation of operations, and

An identification of the backfilling, regrading, revegetation, environmental monitoring, and water treatment activities that will continue during the temporary cessation.

520 OPERATION PLAN

521 General

521.100 Cross Sections and Maps

Existing Surface and Subsurface Facilities and Features - No buildings are located in and within 1000 feet of the WRDS. No surface or subsurface features are within, passing through or passing over the refuse pile area. An existing county road parallels the area.

Landowner, Right-of-Entry, and Public Interest - CFC is the current land owner of the property where the refuse pile is built. Refer to Chapter 1 for additional information.

Mining Sequence and Planned - This does not apply to this site (see Section 525).

Land Surface Configuration - Surface contours of undisturbed areas within the storage area are provided on Map Series 2, 4, 5 and 8 of this submittal. The hills surrounding the site range in elevation from 7600 to 8200, therefore the reclaimed elevation of the refuse pile of 7850 to 8,000 will blend with the surrounding area.

Surface Facilities - The surface facilities associated with the WRDS include: the refuse pile, temporary material/snow storage areas, soil stockpiles, access road, sedimentation pond(s), and drainage control structures (Refer to Map Series 2, 4, 7 and 8).

Transportation Facilities - A permanent road is not anticipated to be constructed, used, or

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maintained by CFC in the storage area. During construction of the pile, temporary access roads will be constructed and maintained. The temporary roads will be reclaimed and seeded with the permanent reclamation seed mix (Section 341of this amendment). Refer to Map Series 4 and 5 for the road locations.

Access to the site is via an adjacent county road. Access on the site is by a short haul road (less than l/4 mile in length). When no longer needed, the haul road will be promptly reclaimed. This haul road is shown in its initial location on Historic Map 2.

521.200 Signs and Markers

Mine and Permit Identification Signs. A mine and permit identification sign will be displayed at the WRDS. This sign will be a design that can be easily seen and read, will be made of durable material, will conform to local regulations, and will be maintained until after the bond is released for the site. The sign will contain the following information: Mine name, Company name, Company address and telephone number, MSHA identification number, and Permit identification number as obtained from the Division

Perimeter Markers - The perimeter of areas affected by surface operations will be clearly marked before beginning mining activities. The markers will be a design that can be easily seen and will be made of durable material, will conform to local regulations, and will be maintained until after the release of the bonds for the permit area. The extent of the disturbed area is marked with T-posts.

Buffer Zone Markers - Stream buffer zone markers are not required for this area.

Topsoil Markers - Markers will be placed on the soil stockpiles. These markers will be a design that can be easily seen and read, will be made of durable material, will conform to local regulations, and will be maintained until after the release of the bonds for the permit area.

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522 Coal Recovery

No coal recovery will be performed at this site.

523 Mining Methods

No mining will be performed at this site.

Major Equipment List -The waste rock will be loaded at the mine by a front-end loader or other available equipment. Transport to the disposal site will be by dump trucks. The waste rock will be spread and compacted by a self powered compactor of suitable size, a dozer of a suitable size, or with a large front-end loader. The equipment will vary according to the quantity of waste to be processed, hauled and compacted.

524 Blasting and Explosives

No explosives are to be used at this site.

525 Subsidence

Since no underground mining activity has occurred beneath the site, settlement of the fill will result only from the consolidation of the surface soils and elastic compression of the underlying bedrock. It is expected that total settlements on the order of 0.5 to l.0 inches will occur upon completion of the disposal area. Because no underground coal mining will occur beneath the WRDS there will be no effects on the site from coal mining related subsidence.

526 Mine Facilities

526.100 Mine Structures and Facilities

No buildings exist or are proposed at the WRDS, therefore, no existing buildings will be used in connection with or to facilitate this proposed coal mining and reclamation operation.

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526.200 Utility Installation and Support Facilities

No utilities are to be installed at this site.

527 Transportation Facilities

527.100 Road Classification

No permanent roads are to be built in association with the construction of the refuse pile. A temporary road will be used to access the site. The access road to the refuse pile and the temporary road to construct the refuse pile are classified as primary roads. The operational typical road section is provided as Figure 6 of this submittal. Refer to Section 521.100 of this amendment for additional detail.

527.200 Description of Transportation Facilities

The road will gently slope toward Existing Ditch No. 2 which drains to the Existing Sediment Pond (Map 5A). The road does not cross a natural drainage. Specific design information for the hydrologic/sediment control structures is located in Appendix VII.

The road is approximately 16 feet wide and is constructed of compacted subsoil. The road will have a grade of <3% within the site (See cross-section Figure 6). The runoff from the road will flow into drainage ditches and then into the sediment pond.

During operations, the access road and temporary access road will be maintained using equipment which may be necessary to ensure compliance. Drainage ditches will be maintained to ensure proper functioning.

Accidental spillage of coal mine waste during haulage from the mine site to the refuse pile will be cleaned up and transported to the WRDS, in a timely manner.

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If a catastrophic event's causes damage to access roads, the repair of the road/roads will begin as soon as practical following the catastrophic damage.

528 Handling and Disposal of Coal, Excess Spoil, and Coal Mine Waste

Waste rock will be loaded into dump trucks at the mine site and will transport the waste rock approximately 6.4 miles to the disposal site. Trucks will not be overloaded. Because of the damp nature of the waste rock, any wind losses will be minimal. If any spillage should occur in a route to the disposal site, it will be cleaned up and transported to the disposal site as soon as practical. Haulage to the disposal site will be on an intermittent basis. Entrance to the waste rock disposal site is shown on Maps 4A and 5A.

Non-coal waste will not be deposited at the waste rock disposal site. Final disposal of non-coal wastes shall continue to be in an approved sanitary land fill. Durable rock type construction materials such as cinder block, concrete, however, will be deposited at the disposal site.

Acid and Toxic Forming Materials - Based on analyses of material that has been placed in the waste rock disposal site to date, no acid forming problems are anticipated. There is a potential for borderline toxicity problems from boron. Samples of the waste material will be collected quarterly and will be analyzed for acid or toxic forming potential. Identified potential acid or toxic forming materials will be buried or otherwise treated.

Copies of laboratory reports on toxicity/acid-base accountability from representative waste samples are included in Volume 8 of the M&RP prior to 2005 and starting in 2005 will be included in the annual report.

529 Management of Mine Openings

No mine openings will be built in the area.

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530 OPERATIONAL DESIGN CRITERIA AND PLANS

531 General

This section contains the general plans for the construction of the sediment control measures and general construction and maintenance of the refuse pile area. This site will be used by CFC to handle coal mine waste or underground development waste that may be generated by the Sufco Mine. Based on prior experience, the refuse materials anticipated to be generated by the mine will generally consist of shale with some sandstone, bone coal, and in limited quantities, sandstone from paleochannels. Sediment pond wastes from either the mine site or refuse area sediment pond will be stored in the refuse pile. Also, a portion of the site will be used as a temporary storage yard for mine materials and a place for disposal of excess snow.

During operations, the runoff from the site area will be treated through the use of sediment controls such as diversion ditches and berms, a sediment pond, and silt fences and/or straw bales. These structures will be constructed, to handle the site runoff, before the initial refuse is placed.

Sufco Waste Rock Site Expansion Construction Steps

Construction of waste rock pile will be completed in sequential phases according to plans and details as follows.

Existing vegetation will be removed, either stockpiled for removal, shredded or it will be burned, then the stripping and stockpiling of topsoil and subsoil of active phase will be done by using earth moving equipment such as loaders, scrapers, excavators and haul trucks. The contractor will utilize the most effective piece of equipment for the area of work. As the topsoil and subsoil is being removed, the phase under construction will be lower than the existing ground on the adjacent phase. Creating a containment ditch to allow for the runoff of the active phase to be collected and directed into the sediment pond.

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Once the topsoil and subsoil has been removed (Sections 222 and 231), subgrade surface will be scarified and re-compacted to a minimum of 90% maximum density. Densities will be taken on subgrade at a minimum of one per 5000 square yards using a nuclear density gauge. Scarification will be done using earth moving equipment such as a grader, dozer or excavator. Compaction will be done utilizing the same type of equipment by wheel rolling the subgrade surface prior to any waste rock being placed. Water will be added to material as needed to obtain compaction.

Once subgrade has been scarified and compacted, waste rock will be delivered to the site using haul trucks such as 10 wheeled dump trucks and double trailer belly dumps. As the waste pile is being constructed a berm along the outside edge of the pile will be constructed to comply with MSHA regulations. In addition the berm will act as a diversion to direct on site water into the ditches and eventually into the sediment pond. As the waste rock is delivered on site, it will be handled and placed in its final position using earth moving equipment such as loaders, graders and dozers. The waste rock will be placed in +/-1 foot compacted lifts. As each layer is being constructed, it will be keyed into the adjacent slope at a minimum of 1 foot per lift or at a 1:1 keyed in slope (Map 3C). The material will be compacted to 95% of maximum laboratory compaction. To determine compaction, a nuclear density gauge will be used. When necessary due to the hydro carbons in the material, a density of the material may also be determined using a sand cone which will assist the nuclear density gauge results by providing an additional factor. Densities will be taken every 5,000 square yards per lift. Potholing down to each lift will be done if additional layers have been placed prior to density testing.

As the pile is constructed a 1:1 sideslope on the outside of the pile adjacent to the adjoining phases will remain. As the phase is completed, the top of the waste rock pile will be reclaimed by placing the designated depth of topsoil on the top of the pile. Once the topsoil is placed, extreme roughening techniques will be applied. Extreme surface roughening techniques may include pocking and gouging, ripping, or other erosion control roughening methods. When pocking and gouging, equipment will have a maximum bucket width of 30" or less.
As construction from one phase to the other occurs, steps above will repeat.

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As one cell is being filled waste rock can be placed in the next cell as needed. If a screen or other equipment is being used in a newly opened cell, waste rock can be placed as a foundation to avoid increased erosion and muddy conditions. Temporary culverts can be added to ditches during construction for access to each phase pad from the primary access road and between phases. It is anticipated that 2-3 temporary culverts could be needed for the construction of each phase. The culverts used will follow specifications in Appendix B-3 (Culvert Sizing) of the Hydrology Report found in Appendix VII, Volume 3 of the SUFCO MRP. Temporary culverts will be removed as construction is completed.

532 Sediment Control

Sediment-control measures for the site area are described in detail in Sections 732 and 742 of this submittal. Runoff-control structures at the WRDS area have been designed to convey runoff in a non-erosive manner. Sediment yields in the permit area are minimized by, disturbing the smallest practicable area during the construction or modification of surface facilities and contemporaneously reclaiming areas suitable for such reclamation.

533 Impoundments

533.100 Slope Stability

New Pond- The only impoundment with an embankment that will be constructed, used, or maintained by CFC will be the sedimentation pond at the WRDS. This pond is an incised pond with an embankment consisting of native materials. A slope-stability analysis was performed on this pond embankment material and is provided in Appendix II(A).

Expansion Area - Text from Earthfax Engineering Group, LLC, Slope Stability Analysis, Appendix II(A)

Background Information - This slope stability investigation was performed by EarthFax Engineering Group, LLC (EarthFax). The investigation included the installation of 5 test pits to log soils and collect sufficient soil samples for geotechnical laboratory analysis. These test pits were

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excavated to an average depth of 6 feet based on the estimated salvage depths for topsoil and subsoil within the proximity. Soil samples were analyzed for grain size distribution, shear strength, and Atterberg Limits. Shear strengths were determined by direct shear tests conducted on samples that were remolded to the same dry density and moisture contents that were recorded in the field from nuclear density/moisture tests conducted by Jones & DeMille Engineering (see Table 1 and Attachment C). Descriptions of the soils encountered in the test pits, together with the results of these laboratory analyses, are provided in Attachments A-D.

The EarthFax field investigation generally encountered sandy lean clay, lean clay with sand, and silty sand in the native soils at the test pit locations shown on Figure 1, as detailed below:

Lean CLAY with sand (Test Pits SMW-1 and SMW-3). The material contained 0.1 to 0.3% gravel, 18.7 to 26.1% sand, and 73.8 to 81% fines. According to the Atterberg Limits data, the liquid limit was 37-45, the plastic limit was 18 and the plastic index was 19-27. The angle of internal friction ranged from 40 to 29 degrees, and the cohesion intercept values ranged between 23 and 266 pounds per square foot ("psf"). The direct shear tests were conducted under consolidated, drained conditions.

Sandy lean CLAY (Test Pits SMW-2 and SMW-4). The material contained 0.3 to 9.8% gravel, 33.2 to 38.5% sand, and 51.7 to 66.4% fines. According to the Atterberg Limits data, the liquid limit was 32-36, the plastic limit was 17 and the plastic index was 15-19. The angle of internal friction ranged from 29 to 34 degrees, and the cohesion intercept values ranged between 162 and 265 psf. The direct shear tests were conducted under consolidated, drained conditions.

Silty SAND (Test Pit SMW-5). The material contained 9.3% gravel, 63% sand, and 27.7% fines. The angle of internal friction was 41 degrees and the cohesion intercept value was 49 psf. The direct shear tests were conducted under consolidated, drained conditions.

The sandy lean clay and lean clay with sand soils varied in depth and were encountered below the anticipated soil salvage depths. Additional detail on this investigation including test pit locations,

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detailed soil logs, and laboratory testing results can be found in the following subsections and attachments.

Evaluation Methods - Slope stability analyses were performed using the slope stability software *Slide 5.0 ("Slide")* by Rocscience. This program uses an iterative procedure to evaluate the factor of safety against rotational shear failure for tens of thousands of potential failure surfaces that may develop within a given slope. Each trial failure surface is discretized into small slices and the driving and resisting forces/moments are calculated for each according to Bishop's Simplified Method of Slices and Janbu Simplified Method of Slices. These forces are then summed over the entire failure surface to obtain a factor of safety defined as the sum of the resisting forces divided by the sum of the driving forces. Therefore, a factor of safety less that 1.0 indicates the potential for slope failure.

Sedimentation Pond Impoundment Embankment - It is our understanding that the sedimentation pond embankment is to be constructed with the following geometry:

Inner Slope. Maximum 16 feet tall at a 3H:1V slope

Crest. Minimum 12 feet wide

Outer Slope. Maximum 14 feet tall at a 2H:1V slope

The stability of the sedimentation pond embankment outer slope was analyzed under the steady-state seepage condition. This condition assumes the sedimentation pond is completely full of water with a phreatic surface fully developed within the embankment. The location of the phreatic surface was determined using *Slide's* finite-element seepage subprogram and assumed hydraulic conditions.

The stability of the sedimentation pond embankment inner slope was analyzed under a "rapid drawdown" condition. That is, it was assumed the pond is quickly drained such that the buttressing effect of the pond water is lost but pore pressures remain trapped within the embankment that had developed during the steady-state seepage condition, thus weakening the slope. This is the most critical condition for the inner slopes of the sedimentation pond embankment.

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Stability analyses for the sedimentation pond embankment assumed that all native soils below the phreatic surface were fully saturated and weakened. For this analysis, the sedimentation pond embankment was modeled at the maximum dry density of the surface soil and should be constructed as such in the field. These are conservative assumptions since in reality the sedimentation pond will only be filled intermittently and with a finite quantity of water incapable of saturating all underlying soils.

Results - The soil properties used as input for *Slide* analyses are summarized in Table 3. As discussed above, these data are taken from the EarthFax field investigation and laboratory testing results. In the interest of conservatism, soil properties and analyses were selected to provide worst-case estimates of geotechnical conditions at the refuse expansion site. are expected to remain stable under the geometry and loading conditions presented herein.

The minimum acceptable factor of safety promulgated by the DOGM for the sedimentation pond embankment is 1.3 under steady-state seepage conditions (R645-301-533.110). This factor of safety applies to NRCS (1985) Class A embankments and those not meeting the criteria of MSHA 30 CFR Sec. 77.216(a). The proposed embankment classifies as a Class A embankment given its rural location, low ponded depth (5 feet), low retention volume (less than 20 acre-feet), and water elevation less than 20 feet from toe of embankment. The calculated factor of safety of 1.3 is therefore considered acceptable and the impoundment embankment is expected to remain stable under the geometry and loading conditions presented herein.

Engineering Practices - The results of this investigation apply to the slope geometries and soil conditions discussed above. If actual conditions differ from those assumed in this report, the stability of the waste rock pile, stockpile, and sedimentation pond embankment slope stability should be re-evaluated as necessary.

The following are current engineering practices specific to the design and construction of the sedimentation pond embankments:

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1. The embankment should be placed on a well-prepared and compacted subgrade free from any organic soils, vegetation, debris, frozen soils, soft soils, or other deleterious materials (R645-533.220).
2. The embankments should be well keyed into, or otherwise secured to, the underlying subgrade and adjacent slopes.
3. Embankment soils should be compacted with an appropriate compactor to at least 95% of the Standard Proctor maximum dry density (ASTM D698) at ±2% of the soil's optimum moisture content. Compacted lifts should not exceed 8 inches.
4. It is recommended that topsoil be placed on the outer slope of constructed embankments and vegetation established in order to reduce the potential for erosion (R645-301-533.400). However, no trees, brush, or shrubs should be allowed to grow on the embankment. This can cause failure due to "piping" along root paths.
5. Embankments should be regularly inspected as promulgated by DOGM for signs of damage, erosion, and piping and repairs made as necessary.

Although not required by design the inside slope of the constructed pond embankment will be armoured with one foot of protective rock.

533.200 Foundation Considerations

During soil investigations, foundation conditions in the area of the proposed sedimentation pond were evaluated. Based on these investigations, no conditions were encountered which suggested that the materials in which the pond would be constructed would be unstable. The slope-stability analyses indicate that the pond embankments will also be stable under operating conditions. Detailed cross sections of the sedimentation pond are presented on Map 7 of this submittal.

533.300 Slope Protection

(Historic) The inslopes of the sedimentation pond and portions of the outslope disturbed by the spillway construction were revegetated following construction to minimize surface erosion and protect the embankments against sudden drawdown. The interim seed mix was used for these revegetation efforts (see Section 341.200 of this submittal). When required, pumping of the

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sedimentation pond, flow rates (and drawdown) will be controlled. Hence, it is unlikely that this drawdown will cause surface erosion of the embankment face.

533.400 Embankment Faces

(Historic) Embankment inslopes and portions of the outslopes were revegetated following construction of the sedimentation pond, as outlined in Section 533.300.

533.500 Highwalls

No highwalls will be located below the discharge lines of the sedimentation pond.

533.600 MSHA Criteria

The sedimentation ponds do not meet the size criteria of 30 CFR 216(a).

533.700 Pond Operation and Maintenance Plans

The sedimentation ponds have been designed as a total containment pond(s) to contain the 10-year, 24-hour storm event, and an adequate freeboard. Details of the design and the requirements for operation and maintenance of the pond(s) are presented in Chapter 7 of this submittal.

It is anticipated that the existing pond will not need to be removed from the site because of planned construction until Phase 6 (after 2020). The drainage from the waste rock site will be directed into the new pond once it is constructed during Phase 1 (2015/2016).

534 Roads

Location, Design, Construction, Reconstruction, Use, Maintenance, and Reclamation -
No permanent roads will be constructed in the WRDS area. The refuse will be transported to the refuse pile area using the existing county road. A temporary access road between the refuse pile area and county road will be constructed to allow equipment access to the pile. The temporary road will be reclaimed. The temporary road will be maintained in accordance with the approved M&RP. Refer to Section 527.200 for additional description of the transportation facilities.

The road access to the WRDS will be at the location shown on Map 5A. The first segment of the

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road will enter the site from the county turnaround located on the western edge of the WRDS. The first segment is approximately 235" long, the road then splits into an eastern segment which will allow the placement of refuse (approximately 975') and a segment going to the south which will access the new sediment pond and soil storage area (approximately 1200'). The lower portion of the road accessing the sediment pond will be temporary (approximately 645') and be used only during the construction of the new pond. Following the construction of the pond the southern end of the road will receive interim revegetation. Typical road design is provided as Figure 6.

Control of Damage to Public or Private Property - Roads will be designed in accordance with applicable county and State standards. By designing according to these standards, damage to public or private property will be minimized.

Road Surfacing - The temporary access road surface material will be compacted native subsoils. The characteristics of the substances used for road surfaces will be non-acid-and nontoxic-forming.

Environmental Protection and Safety - The design and construction of the temporary road will be in accordance with Section 5.3.4.2 of the approved M&RP.

535 Spoil

No spoil will be generated in the WRDS area.

536 Coal Mine Waste

Coal mine and underground development waste resulting from mining activities at the Sufco Mine will be disposed of at the refuse pile.

536.100 Design

Existing Piles - (Historic) Since the waste rock disposal area is relatively small and relatively small volumes of fill are placed annually, the fill will be constructed in segments. The original fill volume was estimated at 10,000 tons or 8,200 cubic yards per year. The average fill volume from 1996 through 2012 was 5,180 tons per year and ranged from 156 to 27,135 tons per year. At this

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projected rate, once the fill bench-slope configuration is established about 1.5 acres should be filled and reclaimed every six to nine years. The fill is expected to be completed in 2016. The waste rock disposal pile was surveyed in August 2005 and contains an estimated 163,748 tons of waste rock, at the end of 2012 there is estimated to be 199,700 tons of waste stored at the site. In 2013 the estimated available capacity remaining at the waste rock pile is 5,000 tons, the proposed expansion of Lift #5 will provide an estimated additional capacity of 40,000 tons. The maximum height of Lift #5 is estimated at 20 feet and will be adjusted lower if necessary for road visibility.

It should be noted that the active fill area will extend beyond the area shown for each year. This is best seen in cross-section G-G' of Figure 2 which shows the active fill areas in relation to the reclaimed area, topsoil removal area, and undisturbed area. Map 4V4 (historic map)has been revised to illustrate the current status of the reclaimed, active and undisturbed areas of the waste rock disposal area as of April 2013.

The following information is retained for historical record (prior to 2013 Site Expansion) { The fill area will eventually encompass about 8 acres and contain an estimated 204,700 tons of waste rock. Because of the irregularity of use, the fill will be constructed in segments envisioned to be about 300 feet long by 150 feet wide.} Reference Section 3.3 for additional information.

The following information is retained for historical record (prior to 2013 Site Expansion): { The 200 feet wide strips of waste will be placed beginning along the southern boundary and extend between the drainage diversion ditches. The eastern half of the disposal area will be completed first. The original Map 4V4 showed the areas that would be completed based on a waste rock volume of 10,000 tons per year. The average fill volume from 1996 through 2003 was 3,200 tons per year and ranged from 1,400 to 6,800 tons per year.}(Historic)

Following the completion of the construction on the Lift 5 expansion, the base (ground level) will be surveyed prior to the placement of waste. Beginning in the Fall of 2014 the volume of waste stored at the waste rock site will be estimated using the surveyed base. The volume will be presented in the annual report in 2016 and in the following years until the lift is full.

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Stability of Fill - (Historic) Static and pseudostatic stability analysis were performed on the rockfill by SHB assuming a critical surface propagating through both the in-situ soils and the fill, as well as through the fill alone. A maximum design embankment height of 20 feet was considered. Estimated strength parameters for the rock fill and in-situ soils are shown on the stability calculations sheets in Appendix C of the SHB report (Appendix II). Due to the open graded nature of the fill material, no pore pressure was assumed in the waste rock in the stability analysis.

The analyses performed by SHB indicate the likely deformation of the embankment structure during a seismic event would be sloughing of surface material. Deep-seated deformations would be a maximum of a few inches. Case history data indicates stability of rolled earth dams bearing on relatively stiff foundations have withstood extremely strong shaking ranging from 0.35g to 0.8g from earthquakes having magnitudes as large as 8.25. These data provide high confidence in the stability of the rockfill under similar extreme conditions.

A slope stability calculation using the fill configuration shown on Map 2 is included in Appendix III. The slope safety factor is 2.62. The slope stability and safety factor will be maintained throughout the expansion of Lift #5 and in the reconfiguration depicted on Map 2. (Historic)

Waste Rock Fill Construction Criteria - The waste rock generated at the mine at this time consists of a black to gray shale with some sandstone. Plasticity index, slake durability tests, and point load index tests performed on the present waste rock indicate it to be a sound, durable rock. It is anticipated that the waste rock will be flat, elongated pieces with a maximum size of 12 to 18 inches. The gradation of this material will most likely be coarse and poorly graded with a small percentage of sand size or smaller material.

Expansion - Text and Tables from Earthfax Engineering Group, LLC, Slope Stability Analysis, Appendix II(A), Tables, attachments and other information relative to the report can be reviewed in Appendix II(A).

Background Information - This slope stability investigation was performed by EarthFax

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Engineering Group, LLC (EarthFax). The investigation included the installation of 5 test pits to log soils and collect sufficient soil samples for geotechnical laboratory analysis. These test pits were excavated to an average depth of 6 feet based on the estimated salvage depths for topsoil and subsoil within the proximity. Soil samples were analyzed for grain size distribution, shear strength, and Atterberg Limits. Shear strengths were determined by direct shear tests conducted on samples that were remolded to the same dry density and moisture contents that were recorded in the field from nuclear density/moisture tests conducted by Jones & DeMille Engineering (see Table 1 and Attachment C). Descriptions of the soils encountered in the test pits, together with the results of these laboratory analyses, are provided in Attachments A-D.

The EarthFax field investigation generally encountered sandy lean clay, lean clay with sand, and silty sand in the native soils at the test pit locations shown on Figure 1, as detailed below:

Lean CLAY with sand (Test Pits SMW-1 and SMW-3). The material contained 0.1 to 0.3% gravel, 18.7 to 26.1% sand, and 73.8 to 81% fines. According to the Atterberg Limits data, the liquid limit was 37-45, the plastic limit was 18 and the plastic index was 19-27. The angle of internal friction ranged from 40 to 29 degrees, and the cohesion intercept values ranged between 23 and 266 pounds per square foot ("psf"). The direct shear tests were conducted under consolidated, drained conditions.

Sandy lean CLAY (Test Pits SMW-2 and SMW-4). The material contained 0.3 to 9.8% gravel, 33.2 to 38.5% sand, and 51.7 to 66.4% fines. According to the Atterberg Limits data, the liquid limit was 32-36, the plastic limit was 17 and the plastic index was 15-19. The angle of internal friction ranged from 29 to 34 degrees, and the cohesion intercept values ranged between 162 and 265 psf. The direct shear tests were conducted under consolidated, drained conditions.

Silty SAND (Test Pit SMW-5). The material contained 9.3% gravel, 63% sand, and 27.7% fines. The angle of internal friction was 41 degrees and the cohesion intercept value was 49 psf. The direct shear tests were conducted under consolidated, drained conditions.

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The sandy lean clay and lean clay with sand soils varied in depth and were encountered below the anticipated soil salvage depths. Additional detail on this investigation including test pit locations, detailed soil logs, and laboratory testing results can be found in the following subsections and attachments.

Refuse material to be placed at the site will originate as roof-fall and other rock materials removed from the SUFCO Mine. As part of this investigation, grain size distribution and angle of repose laboratory tests were conducted on the washed refuse material provided by Canyon Fuel Company. Results of these analyses are provided in Attachment B. This waste rock sample was obtained from a preparation plant laboratory reject material after a washing process which removes the majority of fines typically found within coal mine refuse.

According to the laboratory test analyses provided in Attachment B, the waste rock is angular with material sizes equivalent to about 91.9% gravel, 4.1% sand, and 4% fines. The material is classified as well graded, 3 inch minus grey gravel with a Unified Soil Classification of GW. The sample had an angle of repose of 33.6 degrees.

As indicated above, the sample used in this evaluation for analyses of engineering properties (i.e., the reject from a laboratory investigation of washability potential) was essentially devoid of fines, thereby resulting in a cohesionless sample. However, experience at other sites has indicated that the waste rock will not be devoid of fines, whether this waste rock is run-of-mine or the reject from a wash plant. Therefore, to estimate the cohesion intercept of the waste rock, the results of analyses conducted on waste rock from the former Castle Gate Coal Mine wash plant were reviewed (Golder Associates, 1978). Analyses of waste rock generated by the Dugout Canyon Mine were also reviewed (EarthFax, 1999). These investigations resulted in estimated cohesion intercepts of 800 and 490 pounds per square foot ("psf") for the Castle Gate and Dugout waste rock, respectively. To provide a conservative estimate of pile stability, the lower cohesion intercept of 490 psf was used for this evaluation. The results of laboratory analysis on the waste rock presented in this section are expected to be representative of the proposed waste rock pile.

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Evaluation Methods - Slope stability analyses were performed using the slope stability software *Slide 5.0 ("Slide")* by Rocscience. This program uses an iterative procedure to evaluate the factor of safety against rotational shear failure for tens of thousands of potential failure surfaces that may develop within a given slope. Each trial failure surface is discretized into small slices and the driving and resisting forces/moments are calculated for each according to Bishop's Simplified Method of Slices and Janbu Simplified Method of Slices. These forces are then summed over the entire failure surface to obtain a factor of safety defined as the sum of the resisting forces divided by the sum of the driving forces. Therefore, a factor of safety less that 1.0 indicates the potential for slope failure.

The analysis discussed herein relied on soils data collected during the EarthFax field investigation, as this investigation encompassed the same general area as the proposed waste rock pile expansion. Long term stability analyses were performed for the coal mine waste refuse stockpile, spoils topsoil and subsoil stockpile, and the proposed sedimentation pond embankment (see Figure 1). Details on each of the slope-stability scenarios analyzed and soil properties used for these analyses are included in the following subsections.

Coal Mine Waste Refuse Stockpile - It is our understanding that the waste refuse stockpile will be constructed to a maximum height of 65 feet with a maximum side slope of 2 horizontal to 1 vertical ("2H:1V"). Depending on the location within the waste rock pile, the contact with underlying native soils varies in elevation while maintaining an average height of 62 feet. The engineering properties summarized in Chapter 2 were assumed for this evaluation.

Spoils Topsoil and Subsoil Stockpiles - It is our understanding that the topsoil and subsoil stockpile will be constructed to a maximum height of 25 feet with a maximum side slope of 2H:1V. Depending on the location within the topsoil and subsoil stockpile, the contact with underlying native soils varies in elevation. However, as a conservative measure, the maximum height of 25 feet was assumed for this elevation. Because the toe of a portion of the stockpile slope will coincide with the location of the sediment basin, analyses were performed for slope stability with and without ponded water at the toe of the stockpile.

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The stability of the stockpile slope was analyzed under normal conditions for the sediment basin without water. This condition assumes the conservative variability (worst case scenario) of soils encompassing the stockpile. Because the underlying soils classify as similar soil types, both analyses were performed for the most critical soil type.

The stability of the stockpile slope with water in the sediment basin was also analyzed under the ponded condition. This condition assumes the sediment basin at the toe of the slope is completely full of water and the conservative variability of soils encompassing the stockpile. The effects of ponded water were determined using *Slide's* slope stability analysis and assumed hydraulic conditions. The conditions were modeled with a 2H:1V slope as this is the steepest slope observed in these soils along the edges of the topsoil and subsoil stockpile (see Figure 1).

Results - The soil properties used as input for *Slide* analyses are summarized in Table 3. As discussed above, these data are taken from the EarthFax field investigation and laboratory testing results. In the interest of conservatism, soil properties and analyses were selected to provide worst-case estimates of geotechnical conditions at the refuse expansion site.

The calculated minimum factors of safety for the various scenarios described above are summarized in Table 2. As shown in this table, the minimum factor of safety for against slope failure of the coal mine waste refuse stockpile is expected to be 1.3 if the material is cohesionless and 1.7 under the assumed condition of reasonable cohesion. The minimum factor of safety for the spoils topsoil and subsoil stockpile with or without ponded water is 1.7. The sedimentation pond in-slope embankment factor of safety, under rapid drawdown, is 1.3. The minimum factor of safety associated with the sedimentation pond impoundment out-slope, assuming steady-state seepage, is also 1.3.

The minimum acceptable long-term static factor of safety promulgated by the Utah Division of Oil, Gas, and Mining ("DOGM") for coal mine waste refuse stockpiles is 1.5 (R645-301-536.110). The minimum calculated factor of safety 1.7 under the assumptions made above is therefore considered acceptable and slopes are expected to remain stable under the geometry and loading conditions

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presented herein.

The minimum acceptable factor of safety promulgated by the DOGM for the spoils topsoil and subsoil stockpiles is 1.5 (R645-301-535.110). The minimum calculated factor of safety 1.7 under the assumptions made above is therefore considered acceptable and slopes.

The following are current engineering practices specific to the design and construction of the coal mine waste refuse stockpile:

Material shall be placed in a controlled manner.

Although the lift thickness should not exceed 2 feet ± 10% (uncompacted), it may be advantageous to reduce this to facilitate drainage and improve condition. This should be evaluated by trial and error early in the operation.

New lifts should be placed only over waste rock has been properly compacted to provide a stable base for a new lift.

The dump surface should always be graded to facilitate drainage away from recently placed fill toward surface drainage courses. It may be advantageous to bulldoze shallow ditches at each lift elevation to improve surface drainage.

In the unlikely event that severe waste rock handling, placement and compaction problems are encountered, consideration should be given to temporarily flattening of dump face slope angles or utilizing artificial waste rock stabilization measure. Other measures may be considered on a case-by-case basis.

Sequencing and QA/QC Information - Additional information located in Section 531.
QA/QC information will be gathered and available for review upon request for the following:

Photo documentation of clearing and grubbing prior to refuse placement on each phased

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foundation;

Proof of testing lift thickness;

Results of compaction test(s) for each phased area, to meet Standard Proctor maximum dry density at +/- 2%;

Quarterly compaction tests, until waste placement phase is completed.

(Historic) Atterberg limits, slake durability, and point load index tests were performed on samples of waste rock from the mine. The results of these tests are also presented in Appendix B of the SHB report

The eastern half of the waste rock disposal site will be built up first. Once the eastern portion is to design height, the fill will be extended to the western boundary by extending the fill in segments. As each segment of the fill is brought to final design height, it will be contoured to the approximate contours. Once this has been accomplished, topsoil will be distributed and revegetation will proceed as indicated in the Revegetation Plan contained in Section 4.6.(Historic)

New Piles (Phases 1 thru 6, 2015) - The designs and their associated evaluations were based on the results of detailed foundation and laboratory analyses of soils at the site of the refuse pile. These results are presented in Appendix II(A) of this submittal.

According to this analysis, The soil properties used as input for *Slide* analyses were taken from the "EarthFax field investigation and laboratory testing results. In the interest of conservatism, soil properties and analyses were selected to provide worst-case estimates of geotechnical conditions at the refuse expansion site."

"The calculated minimum factors of safety for the various scenarios described above are summarized in Table 2 of the Waste Rock Pile Expansion Slope Stability Analysis, Appendix II(A). "As shown in this table, the minimum factor of safety for against slope failure of the refuse pile is expected to be 1.7"

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"The minimum acceptable factor of safety promulgated by the Utah Division of Oil, Gas, and Mining ("DOGM") for coal mine waste rock stockpiles is 1.5 (R645-301-536.110). The minimum calculated factor of safety 1.7 under the assumptions made above is therefore considered acceptable and slopes are expected to remain stable under the geometry and loading conditions presented herein."

Based on the materials encountered in the WRDS area, the refuse pile can be constructed to an approximate height of 65 feet with 2H:1V outslopes on the native soils. Maps 2, 3A and 3B presents the proposed configuration of the refuse pile. Maps 8, 8A and 8 B show the reclamation topography and treatment for the refuse pile. The top of the reclaimed pile will be regraded to have an irregular plateau surface that drains toward the pile outslopes instead of draining only toward one side of the pile. Where possible the reclaimed slopes will be varied to blend into the shape of undisturbed areas. Outslopes of the reclaimed pile will be varied as much as possible to prevent long straight surfaces with uniform slopes.

Storage capacity of the pile is estimated to be approximately 938, 207 CY of refuse.

536.200 Waste Emplacement

(Historic) The waste rock material shall be placed in horizontal lifts not to exceed three feet in thickness. The material shall be dumped from the haul trucks in such a manner that precipitation falling on the piles can drain off the pad. The active pad area for waste placement will be sloped at approximately 2% toward the nearest drainage control structures to promote drainage of precipitation off the pad area. The drainage control structures will direct the runoff to the sediment pond(s) for treatment unless specified differently. An interception ditch will be routed down the slope of the fill of the active pad to the base of the fill where runoff will be collected by a ditch. This interception ditch will be extended up the slope as each lift is completed.

The waste rock material shall be reworked with suitable sized, compaction equipment suitable for moving the material and leveling the lifts. When necessary moisture will be added as required by the Air Quality Approval Order. This method will assist in achieving desired densities and prevent the formation of large voids. Additional compaction of each lift should be accomplished by routing

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the loaded trucks in a pattern over the lift surface in such a manner as to cover the area uniformly.

Loads of soft shale, clay spoil, or fine grained material (such as pond clean out material) shall be mixed with coarser graded loads in a controlled manner to limit concentrations of fine materials in the fill.

Due to the anticipated coarse, open graded nature of the waste rock material, most quality control work for the fill will have to be on a visual basis. Conventional in-place density tests will not give reliable results under these circumstances.

Intermittent construction slopes and the final exterior slopes of the fill should not be steeper than 2h:lv. Final slopes of the top surface of the waste rock area will be contoured to blend into the natural contour of the area. The final fill slope will be terraced on approximately 20 foot elevation increments.

536.300 Excess Spoil Fills

No excess spoil fills will exist in the WRDS area.

536.400 Impounding Structures of Coal Mine Waste

No impounding structures built from coal mine waste will exist at the WRDS.

536.500 Disposal of Coal Mine Waste in Special Areas

CFC does not intend to dispose of coal mine waste in special areas.

536. 600 Underground Development Waste

Refer to Section 513.

536.700 Coal Processing Waste

Refer to Section 513.

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536.800 Coal Processing Waste Banks, Dams and Embankments

CFC does not intend to construct waste banks, dams or embankments from coal processing waste. Hydrology information is located in Chapter 7 of this WRDS submittal.

536.900 Refuse Piles

Information pertaining to refuse piles and the WRDS are provided in the chapters of this WRDS document.

537 Regraded Slopes

537.100 Division Approval

No mining or reclamation activities will be conducted in the refuse pile permit area that require approval of the Division for alternative specifications or for steep cut slope.

537.200 Regrading of Settled and Revegetated Fills

Upon completion of the filling of the refuse pile, the site will be reclaimed. The refuse fill will be constructed in a prudent manner to ensure that the pile will be stable. Geotechnical analyses of the proposed configuration are presented in Appendix II(A).

540 RECLAMATION PLAN

541 General

The operation of the waste rock disposal site is designed for minimal areal disturbance at any given time. The waste material will be placed in compacted lifts and will be covered with topsoil/medium and revegetated. Routes required for access to active disposal areas will be revegetated as soon as practical. The final contours will be as shown on Map 2.

541.100 Commitment

Upon the permanent cessation of coal mining and reclamation operations at the WRDS, CFC will close, backfill, or otherwise permanently reclaim the affected areas in accordance with the R645 regulations and this reclamation plan.

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541.200 Surface Coal Mining and Reclamation Activities

No surface coal mining and associated reclamation activities will be conducted in the permit area.

541.300 Underground Coal Mining and Reclamation Activities

No underground activities are planned for this site.

541.400 Environmental Protection Performance Standards

The plan presented herein is designed to meet the requirements of R645-301 and the environmental protection performance standards of the State Program.

542 Narratives, Maps, and Plans

542.100 Reclamation Timetable

The waste rock disposal site will be used as required to dispose of rock generated during mining. The fill will be constructed in segments of varying widths and lengths. As segments are complete, they will be graded and vegetated. Final grading, topsoil application, seeding and other revegetation activities will be done in the Fall season when possible.

A timetable for the completion of each major step in the reclamation plan follows. The first phase consists of regrading the remaining site disturbance, but the majority of the site will have already received contemporaneous reclamation. The process will continue with the placing of soil medium, surface roughening, and seeding (vegetating) the site. This phase will take approximately six (6) months to complete based on the number and anticipated types of construction equipment to be used, the number of operators and laborers necessary to complete the work, and the number of weather days (when work cannot take place) anticipated occurring. Work will be completed sooner if bad weather is not encountered. The second phase will be an approximate 10 month period where the success of the surface reclamation will be evaluated in relation to the surface roughening

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and the initial seeding success. If the surface roughening and/or initial reseeding (vegetation) does not appear, successful, additional seeding or reworking of portions of the reclaimed surface may be necessary.

After vegetation and monitoring requirements have been fulfilled, the sediment pond will be leveled This stage of reclamation will consist of dozing the embankment into the pond and reestablishing the contour as shown on Map 2. Topsoil/soil medium will be placed over the area from the dedicated stockpile prior to reseeding. The remaining monitoring bore holes will also be closed as part of this stage of reclamation.

RECLAMATION TIMETABLE*

Phase/Lift	Year Constructed		Contemporaneous Reclamation	Final Reclamation
	Planned	Actual	Planned	Planned
Lift 4			2015/2016	2016
Lift 5		2011-2016	2015/2016	2016
Existing Sediment Pond			2018	2020
Ph. 1 Access Rd.	2015		2018	2020+
Ph. 1 Topsoil Rd.	2015		2020+	2020+
Ph. 1 Sediment Pond	2015		2020+	2020+
Phase 2	2015		2018	2019
Phase 3	2018		2020+	2020+
Phase 4	2020		2020+	2020+
Phase 5	2020+		2020+	2020+
Phase 6	2020+		2020+	2020+

* Dates/year are estimated + Beyond 2020

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542.200 Plan - Backfilling, Soil Stabilization, Compacting, and Grading

Based on the proposed construction plans, the pile will be constructed so that the pile will be at final configuration when the disposal of waste is completed. Therefore, it is anticipated that little regrading will need to be conducted. The construction plans for the refuse pile area were designed to meet the objectives of maximizing refuse storage quantities and maintaining a geotechnically stable base. The primary features of this plan are:

Constructing a 2H to 1V outslope for the refuse pile;

Placement of soil;

Revegetation and mulching of the soiled site; and

Breaching and filling of the sedimentation pond with embankment materials.

Grading activities during operations will develop a pile with a final surface configuration approximating that defined by Map 8. Details regarding soil placement and revegetation following regrading are provided in Chapters 2 and 3, respectively.

Sedimentation Pond Removal and Interim Sediment Control - The existing sedimentation pond will be retained for as long as practical during reclamation, but at a minimum 2 years after the last augmented seeding. Because the pond is constructed as an incised structure, the pond reclamation will consist primarily of breaching the pond and pushing the embankment into the pond, ripping and create a gentle slope. During reclamation the berm materials of the diversion ditches around the refuse pile will be pushed into the ditch and a free draining slope will be constructed to allow runoff from the pile site to enter the natural drainages. Once the sediment pond and ditch areas are adequately graded, the soil materials will be redistributed and revegetated in accordance with Chapters 2 and 3.

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542.300 Final Surface Configuration Maps and Cross Sections

Final surface configuration maps and cross sections for the WRDS are provided on Map 8, 8A and 8B.

542.400 Removal of Temporary Structures

No surface structures are planned to be associated with the refuse pile operation.

542.500 Removal of Sedimentation Pond

Refer to Section 542.200 of this amendment.

542.600 Roads

The temporary access roads constructed during refuse pile construction activities will be reclaimed when no longer needed for access to the site. The surfacing material will be removed depending upon the materials condition or incorporated , the area will then be regraded, ripped, and the final reclamation seed mix will be applied as specified in Chapter 3.

542.700 Final Abandonment of Mine Openings and Disposal Areas

No mine openings or disposal areas will exist in this area. The abandonment of well openings is discussed in Sections 728.300 and 748 of Chapter 7.

542.800 Estimated Cost of Reclamation

Refer to the existing M&RP, Appendix 5-9. It is anticipated that the cost of reclamation of the refuse pile is adequately covered within the existing reclamation bond.

550 RECLAMATION DESIGN CRITERIA AND PLANS

551 Casing and Sealing of Underground Openings

No underground openings will exist in the area.

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552 Permanent Features

552.100 Small Depressions

No small depressions will be created as part of the refuse pile construction and reclamation.

552.200 Permanent Impoundments

No permanent impoundments will be left following reclamation.

553 Backfilling and Grading

Reclamation design criteria and plans for the waste rock site are shown on the series of Maps 2, 3 and 8; and discussed in Sections 240, 340, 412, 540, and 760.

553.100 Disturbed Area Backfilling and Grading

Approximate Original Contour - As indicated earlier, the site of the WRDS is a previously disturbed site. The proposed configuration of the site will comply with the post-mining land use and blend into the surrounding area.

Based on the proposed plan, a portion of the existing ground surface will be raised by the construction of the refuse pile. Prior to placing refuse, the soils present on the site will be stripped and temporarily stored on the site. At contemporaneous and final reclamation, the stored soil will be redistributed and revegetated.

The reclaimed slopes of the refuse pile will have a similar shape to the slopes in the surrounding area, including concave slopes and slope breaks. The top of the reclaimed pile will be regraded to have an irregular plateau surface that drains toward all pile outslopes instead of draining only toward one side of the pile.

Erosion and Water Pollution - Sediment-control measures will be implemented during and following reclamation activities. The final surface will consist of mounds and depressions capable

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of holding runoff. Refer to Sections 355 and 341 regarding erosion-control and revegetation.

During these activities temporary sediment controls may consist of installation of silt fences, berms, and/or straw bales, surface roughening, and reestablishment of the vegetative cover for the limited areas. As vegetation becomes established on the reclaimed surfaces, erosion potentials will be further minimized. By minimizing erosion, water pollution will also be precluded.

Post-Mining Land Use - The disturbed area will be reclaimed in a manner that supports the approved post-mining land use.

553.200 Spoil and Waste

Spoil- No spoil will be generated within the permit area of the WRDS.

Coal Processing Waste - No coal processing waste will be generated within the permit area. However, should coal from the CFC mines be processed at a washing facility, there is potential for the processing waste to be returned to the WRDS for disposal.

Selected overburden materials may be used below the salvaged soils during reclamation operations, if sufficient soil materials are not available for the proposed reclamation activities. Equal portions of coal waste and subsoil may be used to create a blended cover material to be placed below the topsoil. Where overburden materials are used, the operator commits to demonstrating to the Division prior to salvaged soil emplacement that the overburden materials are non-toxic, non-acid forming, and non-combustible. Refer to Section 536.200 discussion of waste sampling/testing.

Vegetation and organic material will be removed from the area receiving coal processing waste prior to placement. The topsoil on the area will be removed, segregated, stored and redistributed in accordance with Sections 230 and 240 of Chapter 2.

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553.250 Refuse Piles

The WRDS is a previously disturbed area. The refuse pile surface will be prepared and the soil will be distributed and revegetated in accordance with the plans proposed in Chapters 2 and 3.

553.300 Exposed Coal Seams, Acid- and Toxic-Forming Materials, and Combustible Materials

No coal seams are present in the area.

553.400 Cut-and-Fill Terraces

No cut-and-fill terraces will be built at the site.

553.500 Highwalls From Previously Mined Areas

No highwalls exist or will be built at the WRDS.

553.600 Previously Mined Areas

The area has not been previously mined.

553.700 Backfilling and Grading - Thin Overburden

Backfilling and grading will occur during reclamation, as described in Sections 534.100 and 542.600.

553.800 Backfilling and Grading - Thick Overburden

Backfilling and grading will occur during reclamation, as described in Sections 534.100 and 542.600. The waste rock site does not require the use of spoil and waste materials to achieve a post mining slope or to return the area to approximate original contour.

553.900 Regrading of Settled and Revegetated Fills

No settled or revegetated fills currently or will exist at the storage site.

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560 PERFORMANCE STANDARDS

Coal mining and reclamation operations at the WRDS will be conducted in accordance with the approved permit and the requirements of R645-301-510 through R645-301-553.

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