T E C H N I C A L M E M O R A N D U M

Utah Coal Regulatory Program

May 9, 2004

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

THRU: Jim Smith, Hydrologist and Team Lead

FROM: Priscilla Burton, Environmental Scientist III, Soils

RE: Volume 11: North Rilda Area, Pacificorps, Deer Creek Mine, C/015/0018, Task ID #2195

SUMMARY:

This application to develop Rilda Canyon surface facilities for men and materials (only) was received on December 21, 2004. The existing Rilda fan portals occupy 2.33 acres (v 1, chap 1, appendix E). The proposed North Rilda facilities will add 13.1 acres, bringing the total disturbed area for Rilda Canyon to 15.43 acres and for the Deer Creek Mine to 97.44 acres (Supplemental Volume, Appendix G). The total permit area remains unchanged at 22,013.77 acres.

Supplement Volume, Legal and Financial Information Appendix C (incorporated 4/21/2005) provides the following information for the Deer Creek Mine:

Total Federal Lease Acres	15,470.95
Total Private Fee Acres	1,020.00
Total State Lease Acres	5,522.82
Total	22,013.77

TECHNICAL ANALYSIS:

GENERAL CONTENTS

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

The methods and descriptions of the soil surveys and analytical work are in the reports provided by the Professional soil scientists who conducted the soil surveys of Rilda Canyon (Volume 11 Appendix – Soils A and B.

- Mr. James Nyenhuis, Certified Professional Soil Scientist, ARCPACS2573, conducted the soil survey of the proposed North Rilda facilities area in July 2004.

- Mr. Dan Larsen, Soil Scientist, Environmental Industrial Services, Inc. conducted the soil survey of the proposed topsoil and subsoil storage area in Rilda Canyon, in September 2003 and April 2004.

- Intermountain Laboratories – Sheridan reports include dates of analysis and confirmation of analytical methods.

- Colorado State University Soil Testing Laboratory – Ft. Collins reports include dates of analysis and confirmation of analytical methods.

Findings:

Information provided in the application meets the minimum technical reporting requirements of the Regulations.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

MRP Volume 11, section R645-301-220 provides a summary of all existing soil survey information. The 2003 soil survey of the Rilda sediment pond area is found in Volume 11 Appendix Volume – Soils Appendix A The 2004 Order I soil survey for the North Rilda portal facilities and soil storage areas is found in Volume 11 Appendix Volume – Soils Appendix B. Both appendices include soils maps (scaled: 1" = 100'). The Rilda surveys build upon earlier investigations of Rilda Canyon found in Volume 1 Part 2 Environmental Resources, pp 2-181.1 through 2-181.39 and a 1990 soil survey of the "Rilda Canyon Lease Tract Extension Area," shown on Map 2-16 of Volume 4. A chart itemizing disturbed acreage by soil type for the North Rilda Facilities is found in Section R645-301-222.200-300.

North Rilda site development will occur north of the county road, between the Star Point sandstone outcrop to the north and the alluvial soils of Rilda Creek to the south, at an elevation of 7,600 to 7,730 ft. MSL. Approximately seven acres of North Rilda facilities development will occur on the south facing slope, in Map Unit E, named "colluvial toeslopes; bench." These soils are described as "Cryoborolls" with a brown, mollic surface layer (A horizon, 9 – 16 inches). An accumulation of calcium carbonate is coincident with the change in color of the soil to yellow brown at a depth of 20 –38 inches. 2003/2004 laboratory analyses of three map unit E soil pedons are found in Volume 11 Appendix Volume – Soils Appendix B. The soil calcium carbonate equivalent percentage increases with depth to 18% at location RC1 (20 –40 inches) and is constant at about 32% in pedons RC3 and RC4 from the surface to two feet in depth. These carbonate contents constitute baseline information and are considered the norm for the area. All other parameters (texture, pH, EC, SAR, etc.) indicate good suitability for salvage. The planned salvage depth is 24 inches. The existing vegetation is of the pinyon/juniper and grass/shrub types (see Environmental Resource - Vegetation section for more detail).

Topsoil will be stored south of the creek on 0.41 acres of map unit A and 0.69 acres of disturbed ground (map unit D) associated with the reclaimed Helco Mine site [information derived from that provided in Addendum 1 of Appendix B Soils Appendix Vol. 11 (hereafter referred to as Addendum 1) and Section R645-301-222.200-300]. The alluvial soils are Brycan stony very fine sandy loam, on a 5% slope at 7,500 ft. The pedon description of sample site RC7 indicates an eighteen inch mollic epipedon over C horizons extending to a depth greater than 72 inches. The existing vegetation is conifers, shrubs, aspen and grasses. The disturbed soils are described in the next paragraph.

About 3.5 acres of reclaimed/disturbed soils (map unit D) will be the site of the Rilda facilities sediment pond, topsoil stockpile and the subsoil storage area. The reclaimed sites have approximately 12 inches of topsoil, designated as AC horizon with 5 – 6% organic matter accumulation over a mixture of soil, coal fines and cobbles. A buried C horizon is underneath 3

– 12 inches of coal (Volume 11 Appendix Volume – Soils Appendices A , sample sites S1, S2, S3, S8 and Appendix B, sample sites RC 5 and RC 8). Due to the variable nature of the reclaimed site, the depth of soil to be salvaged for the sediment pond construction will be determined as material is handled (R645-301-231.100). The soils report indicates a salvage depth of twelve inches is possible (Addendum 1).

The subsoil storage area will also affect 1.3 acres of steep, rocky slopes in Map Unit B. The soil survey for this area was conducted in December 2004 (Volume 11 Appendix Volume – Soils Appendix B Addendum 1). These soils lie on a 60% slope and are described as very stony (20% in the surface layer) sandy loams, categorized as being in the Great Group Haplustepts or Ustorthents. The representative soil sample site RC 6 on an east facing slope had an A horizon four inches deep (Addendum 1). The C horizon (also with 20 – 25% stones) extended to lithic contact at 34 inches. This soil overlies the Starpoint sandstone.

Findings:

The information provided meets the requirements of the Environmental Resource-Topsoil requirements of the Regulations.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Volume 11 Section R645-301-720 provides a detailed discussion of the characteristics of the groundwater flow and alluvial aquifer in Rilda Canyon. The discussion includes quantitative and qualitative description of the water collected by the North Emery Water Users Association (NEWUA). In addition, Section R645-301-720 outlines the monitoring program for Rilda Creek and the NEWUA springs.

The information presented in Section R645-301-720 is supported by reports and maps found in Volume 9 of the MRP and by the geotechnical, soils, and vegetation surveys in Volume 11 Appendices. A synopsis is reiterated below.

Geotechnical investigations of Rilda Canyon in the vicinity of the proposed North Rilda facilities construction indicate that a bench of unconsolidated colluvial material grades into a thick deposit of fine grained alluvium (Volume 11 – Appendix Volume – Engineering Appendix F). The alluvial floor is composed of moderately compacted sandy gravel with boulders along with varying proportions of silt and clay, to depths greater than 50 ft (2004 AMEC Report in Appendix F, p. 11). North Rilda site groundwater levels are projected to be 25 ft or more below

the surface, becoming shallower nearer to the creek (p. 23). The 2004 AMEC study included pit 12 located 25 ft horizontally from the channel and vertically at an elevation 11 ft above the creek. Although the soil was moist, no standing groundwater was recorded in the pit at depth of 10 feet.

Soils on the south side of Rilda Creek (Soils Map 200-1, Unit A) were described as alluvial bottom land soils, having a periodic high water table at a depth of 18 – 30 inches, as evidenced by soil mottling. (Volume 11 Appendix Volume – Soils Appendix A appendix 6-4 and Appendix B pp 5,7). Brycan soils are dominant in Map Unit A. Schupert soils occupy the drainage channel bottom (Furst. 1991 soil survey of the Rilda fan portal area). A 1998 Energy West Mining Company ground stability analysis discusses the sub-surface hydrologic alluvial system and associated surface riparian vegetation zone (Volume 11 – Appendix Volume-Engineering Appendix A). For the most part, the proposed North Rilda Developmen will not affect these soils, except for the stockpiling of topsoil in the vicinity of the Helco Mine. Section R645-301-230 of the plan indicates that the topsoil stockpile will not affect the subsurface flow beneath the stockpile, since Well P4 (refer to Map 500-3) indicates the depth to saturation is 20 ft below the ground surface.

The above statements are supported by the April 2004, AMEC Earth and Environmental, Inc. geotechnical investigation of Rilda Canyon (Volume 11 – Appendix Volume - Engineering Appendix F), wherein AMEC described a channel 6 - 8 ft deep X 10 -15 ft wide incised through the bottomland sediments (p. 10) and near the NEWUSSD site, depth of alluvium exceeds 15 ft. (pg 11).

In addition to the above information provided in the MRP, the Division received a copy of the Vaughn Hansen Associates, Inc report titled, "Impact Analysis – NEWUA Rilda Canyon Springs," dated March 1983 (Incoming 2005 date folder 3/31/05). This document provides historical water quality information and a discussion of the nature of the ground water flow. In 1982, the report states that the ground water level was eleven feet below the creek above the north and south springs and was fed by the creek through a gravel drain. In the vicinity of the springs, the gravel drain is disrupted and the ground water flow is at the level of the creek. Downstream of the springs, the groundwater flow dipped below stream level again. Plate 3, Piezometric Contour Map indicates that the piezometric surface in the vicinity of monitoring wells R-4 and R-5 wad 7,552 ft. in 1983. That was 8 to 28 ft below the surface elevation of 7560 to 7580 ft., in the location of the North Rilda facilities topsoil stockpile.

The 1983 Vaughn Hansen Assoc. report concludes that as long as surface protection zones are maintained around the north spring, there should be no impacts from surface disturbance south of the springs. The protection zones are described in Section 6.3.4 of the State of Utah Public Drinking Water Regulations as all land (of equal or higher elevation) within 1,500 horizontal feet of the spring source and all land of lower elevation within 100 feet of the spring source.

Rilda Canyon Alluvial Valley Floor Determination

Rilda Canyon is the site of a small alluvial valley as evidenced by the water collection system installed by the North Emery Water Users. The alluvium in Rilda Canyon is outlined on Dwg 200-1. Most of the operation in Rilda Canyon will be above the level of the alluvium, however the topsoil storage area is situated in the alluvial bottomlands.

Rilda Canyon Applicability of Statutory Exclusions

None

Findings:

Based on information provided in the application, the Division finds that there is an alluvial valley holding Rilda Creek in the bottomlands of Rilda Canyon. The extent of the alluvial valley floor is shown on Dwg 200-1 as map unit A. There are streamlaid deposits in the bottomlands that have historically been the source of irrigation and culinary water in Emery County. Precautions are being taken to limit activity near the spring collection system, to monitor quality and flow in the canyon and to provide a buffer zone between facilities and the creek.

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

Previous non- prime farmland determinations made by the Soil Conservation Service for Rilda Canyon above the left and right forks of Rilda Canyon are found in Vol. 1 Part 2, pp 2-218.1 – 2-218.3. For the north Rilda facilities area, the non-prime farmland correspondence is found in Vol 11 – Appendix Volume Soils Appendix C.

The Division to consulted with the Natural Resources Conservation Service (NRCS) concerning the potential for prime farmland in Rilda Canyon. The matter was discussed with Leland Sasser of the NRCS Price Field Office in October 2004. The Division is in agreement with the NRCS that there are no prime farmlands in Rilda Canyon due to slope and rockiness of the soils.

Findings:

The Division concurs with NRCS in finding that there are no prime farmlands in the permit area.

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Removal and Storage

A qualified person (one who is familiar with the soil survey and salvage plan) will be on site to monitor the soil salvage operations in Rilda Cyn, because soil stripping depths for the site will vary based upon the depth of topsoil up to two feet (Vol. 11, Section R645-301-231.100). After construction, the Permittee will survey the topsoil stockpile to provide an As Built volume.

The plan describes removing the A and B horizon (to a maximum depth of 24 inches) in one step and salvaging this material as topsoil (Section R645-301-233). The Permittee will have a qualified person (familiar with the soil survey and salvage plan) on site to monitor the soil salvage operations (Section R645-301-231.100).

Map 200-1 illustrates the area of topsoil salvage and shows the 1.1-acre stockpile site. A three-foot diameter culvert UC12 will be placed on the existing soil surface (Volume 11-Appendix Volume- Hydrology Appendix B Table 8, and Map 700-2). Marker fabric will be used on 10 ft centers to denote the native soil beneath the stockpile. The topsoil stockpile is designed to hold approximately 25,000 cu yds with an average stockpile depth of 20 ft and slopes of 2h:1v (Map 500-4 Sheet 3 of 5, Section R645-301-231.100 and Section R645-301-234). As described in Section R645-301-234, the topsoil stockpile will be protected from erosion by surface roughness, a layer of grubbed brush, and with the sagebrush/grass seed mix described in Table 300-4 of R645-301-341. Silt fence will be installed at the toe of the stockpile and a fence will surround the stockpile to protect the vegetation from grazing animals (Section R645-301-231.400. After construction, the stockpile will be surveyed and the volume of topsoil stockpiled will be documented (Section R645-301-232).

Section R645-301-232 indicates 3,200 cu yds of buried A and B horizon could be encountered at the LeRoy Mine AML site beneath the coal mine waste buried in the location of the proposed sediment pond. These soils will be used to reclaim the sediment pond site and will be stored in the subsoil or topsoil stockpiles at the discretion of the qualified soil scientist (Section Plan for Experimental Practice. In. Section R645-302-218).

Construction of the facilities pad will require removal of subsoil to a depth of 35 ft (Map 500-4, Sections R645-301-234 and R645-301-521.150). The excess spoil will be stored as shown on Map 500-3 in a stockpile with dimensions 550 ft x 250 ft, having 2h:1v slopes and maximum heights of 70 ft (averaging 40 ft). The subsoil storage area will occupy 3.0 acres, some of which are previously disturbed (Rominger Mine). The capacity of the subsoil storage is 107,000 cu yds. There will be no topsoil salvage from beneath the storage area. Stockpiling the surplus cut soils on topsoil is an Experimental Practice discussed under R645-302-210.

Findings:

Information provided in the application does not meet the minimum requirements of the Regulations for topsoil and subsoil storage.

R645-301-200, There is an incorrect citation for the location of the topsoil storage pile cross-sections. The plan should indicate in Section R645-301-231.100 (pg 12) that Map 500-4 Sheet 3 of 5 provides the stockpile cross-sections.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Coal Mine Waste

Coal mine waste will be re-mined from a 0.7 acre previously reclaimed site (the LeRoy Mine AML site). The volume of this coal mine waste is estimated at 3,600 tons based on an average depth of 4 ft and a particle density of 60 lbs/ft^3 (Section R645-301-528). A sample of the LeRoy coal mine waste was analyzed (Volume 11 Appendix Soils Volume – Appendix 6.2 of Appendix A, Sample ID RIL 1003). This sample indicates that the waste does not have acid forming potential or high SAR value.

Small quantities of coal mine waste will be brought to the surface from the portal development and stored in locations shown on Map 500 – 2. Final disposal of coal mine waste

will be at the Deer Creek Waste Rock Site. Representative samples of the mine development waste are found in Volume 11 Appendix –Geology Appendix B, samples from cross cuts #6 and #10.

Findings:

Information provided meets the minimum requirements of the Regulations.

RECLAMATION PLAN

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

General

In Rilda Cyn, 97,259.65 yd^3 of subsoil will be salvaged for replacement during final reclamation (Vol 11, Section R645-301-232.500). Pad surface will be recontoured before subsoil is redistributed, effectively eliminating the compacted pad surface (Map 500-4 and Section R645-301-553).

Regraded subsoil will be sampled on 500 ft intervals to a depth of four feet as described in Section R645-301-231.300. The samples will be analyzed on site for pH and EC. Problem areas will be further sampled and sent to a laboratory for analysis. When subsoil testing is complete and any problems are resolved, topsoil will be hauled by dumptruck and redistributed by track equipment.

The construction of a sediment pond is briefly mentioned in Sections 645-301-521.180, 645-301-526, and 645-301-732.200, 645-301-742.220. More detail is provided in Volume 11 Appendix – Hydrology Appendix B section 3. Section 3 indicates that native fill will be used where possible. However, due to the very permeable sandy gravel below the surface soils, imported clay will line the sediment pond as suggested in the geotechnical reports included in Appendix F of Volume 11- Appendix – Engineering. The clay liner will be buried at least four feet below the surface during final reclamation (Volume 11 Section R645-301-533 and Volume 11 Appendix - Hydrology Appendix B).

Findings:

Information provided in the application meets the minimum requirements of the Regulations.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

The Rilda Canyon sediment pond and portal facilities areas will be recontoured with subsoil, scarified and covered with topsoil removed from the respective sites (R645-301-242 and R645-301-231.100).

Regraded subsoil will be sampled on 500 ft intervals to a depth of four feet as described in Section R645-301-231.300. The samples will be analyzed on site for pH and EC. Problem areas will be further sampled and sent to a laboratory for analysis.

When subsoil testing is complete and any problems are resolved, topsoil will be hauled to by dumptrucks and will then be redistributed by track-mounted equipment. Approximately 6.1 acres (excluding road and sediment pond) will receive 24 inches of stockpiled topsoil, depending upon actual recovery volumes (Section R645-301-242). Stakes will be used to monitor the replacement depth (Section R645-301-242). Three composite samples will be taken from the facilities area and sediment pond. Samples will be analyzed for parameters to be compared with baseline information and to determine the need for amendments, including fertilizer. Boulders will be replaced to provide 5% surface cover. The site will be gouged.

Topsoil storage sites will be reclaimed with roughening of the surface as described (Section R645-301-242 and Item 5 of Plan for Experimental Practice In. R645-302-218). If density values exceed baseline by 10%, the surface will be ripped or gouged to 1 ft depth. Slopes greater than 2h:1v will receive an application of anionic polyacrylamide (PAM). (Some details of this application are described in Item 5 of Plan for Experimental Practice In. Section R645-302-218.) Boulders will be placed randomly to achieve 5% coverage. Seeding and root stock planting will be as described in Tables 300-7 and 300-8. Root stock will be treated with PAM before planting. Slopes greater than 20% will receive a tacifier (R645-301-243).

Reestablishment of microbial activity in stockpiled soil material usually occurs as a result of the addition of straw or hay and with seeding. The plan might encourage rapid establishment

of locally adapted strains of microbes through the use of a slurry of native soil and water. The supernatant from this slurry could be added to the hydromulch for application to the soil.

Findings:

Information provided in the application meets the minimum requirements of the Regulations. However the following procedure is recommended:

R645-301-243, Reestablishment of microbial activity in stockpiled soil material usually occurs as a result of the addition of straw or hay and with seeding. The plan might encourage rapid establishment of locally adapted strains of microbes through the use of a slurry of native soil and water. The supernatant from this slurry could be added to the hydromulch for application to the soil.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Hay mulch (1 Ton/ac) will be blown over the redistributed topsoil surface. Small depressions (pocks) will be constructed for the purpose of retaining moisture and minimizing erosion (Section R645-301-552). Pocks will measure 2 ft in diameter and 18 inches deep. Wood fiber mulch will be applied to the surface, and on slopes greater than 2h:1v, a soil tackifier will be used (R645-301-244 and Plan for Experimental Practice - Rilda Canyon Portal Facilitiy Reclamation Plan In. Section R645-302-218.)

Boulders larger than 1 ft in diameter will be segregated during construction of the site for use in final reclamation (R645-301-232.500) when they will be redistributed over the surface to provide 5% surface cover (R645-301-244).

Rills and gullies will be reworked if they affect the post mining land use (wildlife and grazing and recreation) or if they affect water quality standards in Rilda Creek (R645-301-244). Sediment control on the reclamation site will be monitored by water quality measurements as described in Surface Monitoring Plan in Section F of Section R645-301-728 of the MRP.

Findings:

Information provided in the application does meets the minimum requirements of the Regulations.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

OPERATIONS IN ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR Sec. 822; R645-302-324.

Analysis:

Essential Hydrologic Functions

Monitoring

Findings:

EXPERIMENTAL PRACTICES MINING

Regulatory Reference: 30 CFR Sec. 785.13; R645-302-210, -302-211, -302-212, -302-213, -302-214, -302-215, -302-216, -302-217, -302-218.

Analysis:

A soil pile with dimensions 550 ft long X 250 ft wide X 40 ft (ave.depth) will be constructed in the Rominger Mine canyon to hold 107,000 cu yds of subsoil for storage and as a repository for boulders until use during reclamation. The storage site will occupy 3.0 acres as shown on Maps 500-3 (cross sections are on Map 500-4 sheet 4 of 5). Of these 3.0 acres, the Rominger mine reclaimed site occupies 1.4 acres, and 1.6 acres are undisturbed, very steep slopes (60% slope). A photo of the Rominger mine side canyon is provided in Volume 11-Appendix Volume – Engineering Appendix G.

Existing Soil Resources

The 1.6 acres of undisturbed soils on the slopes around the reclaimed Rominger disturbance is represented by soil sample site RC6 on Map 200-1 (Mt. Nebo Scientific Survey, Dec. 2004). The site description indicates that the soil is on a slope of 60% and has a 0-4 inch topsoil horizon, with a lithic contact at 34 inches. The soil was placed in the Great Group of Haplustepts and Ustorthents and is described as stony sandy loam (20% stones at the surface).

The disturbed soils in the Rominger side canyon are approximately eighteen inches deep over mixed coal/soil (AMR project report #AMR-015-904M). EIS sample S-8 is shown on Map 200-1, and a site description confirms 14 inches of topsoil over coal mixed with soil. The soils contain 20% gravels, 15% cobbles, 5% stones, and 5% coal fragments on the surface. The original soil surface was found buried under the coal at a depth of about 5 ft in AMEC pit 13 (discussed below). Disturbed soils of the reclaimed Rominger site were sampled for laboratory analysis by Jim Nyenhuis in December 2004 (site RC5, Volume 11-Appendix Volume Soils-Appendix B) to establish a baseline condition.

Disturbed soils were also investigated using both trenches and pits by AMEC Earth & Environmental Inc. in 2003 for geotechnical purposes. Test pits 13 and 14 shown on Map 200-1 fall within the Rominger mine location. The AMEC report is located in Vol 11. Appendix-Engineering, photographs accompanying this report are located in Vol 11. Appendix- Soils Appendix A. Photos of pits 13 and 14 represent the Rominger soils. Logs of these pits in Appendix A of the report indicate a six inch topsoil cover over colluvium (and a foot of coal waste in pit 13 only). The original soil surface was found buried under the coal at a depth of about 5 ft. These pits were dug to depths of 13 and 15 feet.

Protection of Soil Resources

Surface flows originating from the watershed above the stockpile will be channeled beneath the storage pile. Large vegetation will be removed and track equipment will be used to install 2 ft diameter culvert UC10 (Sections R645-301-231.100 and R645-301-231.400 and Volume 11-Appendix Volume- Hydrology Appendix B Table 8, and Map 700-2). Bulk density of the Rominger Mine soils will occur to a depth of 6 ft. prior to and after disturbance. This bulk density testing is mentioned in Subsoil/construction Fill - Experimental Practice pg.32, but is not itemized as a step to be taken during reclamation on page 35 of the Experimental Practice. The bulk density testing must follow an accepted agronomic procedure. Several methods are described in the following reference:

Soil Science Society of America. 1986. Series No. 9. Methods of Soil Analysis: Physical and Mineralogical Methods. Part 1. Second Edition. Arnold Klute, Ed.

Colored fabric markers will be laid over the entire surface of the storage area. The subsoil will be placed on top using track equipment.

Operational Monitoring

Section R645-302-218 indicates that the undisturbed bypass culvert inlet and outlet will be maintained, as required by R645-301-742.312, to be stable and to provide protection against flooding, etc.

Bulk density of the existing soil surface to a depth of six feet (or lithic contact) prior to and after disturbance will be conducted to obtain information about the depth of compaction resulting from long term storage of soil. The Permittee has developed a method of bulk density testing for the coal storage pile using a split spoon (personal communication with Chuck Semborski, May 9, 2005). The important aspect of the bulk density testing is that the same procedure is used before and after disturbance. The following reference has been provided to the Permittee: Soil Science Society of America. 1986. Series No. 9. Methods of Soil Analysis: Physical and Mineralogical Methods. Part 1. Second Edition. Arnold Klute, Ed., Chapter 13.

Anionic Polyacrylamide will be used at reclamation to enhance infiltration of water into the soils. The Division assumes that 20 years hence, advances will be made concerning the specifics of PAM application. The plan should indicate that details of the PAM application will be worked out prior to implementation.

For current information on the topic:

http://kimberly.ars.usda.gov/pampage.shtml
http://esce.ucr.edu/soilwater/spring_2001.htm
http://www.stormwater-resources.com/Library/114BPolymer.pdf
http://www.hydrosource.com/clpbbs02.htm

Reclamation of Soil Resources

At final reclamation, the stored construction fill soil will be removed to the depth of the geotextile fabric cover. The steep slope soil surface will be treated with an anionic polyacrylamide (PAM) during seeding to increase cohesion and infiltration of water without disrupting soil structure. Bareroot or containerized plant stock will be pre-treated with PAM and used as enhancement plantings on the re-exposed, steep slopes.

Re-exposed soil of the reclaimed Rominger Mine site (lesser slopes) will be tested for nutrient status and bulk density, then treated with 1 T/ac alfalfa hay mulch (fertilizer will be added pending test results and comparison with baseline information). The soil will be roughened. Excess boulders will be randomly placed to cover 5% of the surface. The seed mix described in Table 300-8 will be applied.

Section R645-301-242 indicates that [bulk] density information indicates that if the soil has undergone compaction, then the soil will be ripped to a depth of one foot or gouged.

Findings:

The information provided does not meet the requirements for reclamation of the Experimental Practice. Prior to approval, the Permittee must indicate the following:

R645-302-212.400, (1) Anionic Polyacrylamide will be used at reclamation to enhance infiltration of water into the soils. The Division assumes that 20 years hence, advances will be made concerning the specifics of PAM application. The plan should indicate that details of the PAM application will be worked prior to implementation. (3) Investigation of the infiltration and erosion control on the PAM treated experimental practice area is implied under the heading R645-302-214.100 (pg. 25 Experimental practice), but the monitoring must be included as a sixth item in the Experimental Practice plan outline on page 28 and details of the site monitoring during years subsequent to reclamation must be provided.

RECOMMENDATIONS:

The application is not recommended for approval at this time.

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