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July 17, 2002

TO: Internal File

THUR: Mike Suflita, Team Lead/ Reclamation Hydrologist

FROM: Priscilla Burton, Soils Reclamation Specialist, III

RE: Link Canyon, Canyon Fuel Company, LLC., SUFCO Mine, C/041/002-AM02E

**SUMMARY:**

The Permittee has submitted a proposal to develop an access road and portal pad in Link Canyon for the purpose of an air intake and emergency escape-way. The disturbed area boundary would encompass 0.23 acres, although the actual disturbance is planned for only 0.14 acres, of which 0.05 acres are riparian in nature due to mine water discharge from the pre-SMCRA portals. The soil survey includes classifications that are not readily identified by the Division and further information is requested. The Division has requested supplemental supporting information for the soil map unit designation TUL. The application describes topsoil salvage from zero to six inches depth. The Division has evaluated the soil consultant's information and suggests that the salvage could occur to a depth of twelve inches over two map units identified as TUE and CU and possibly TUL. The Division has made additional suggestions for rapid establishment of vegetation on the topsoil pile, by utilizing the existing vegetation (Mahonia repens) as transplants. The topsoil sampled and analyzed is uniquely fertile for the area.

**TECHNICAL ANAYLSIS:**

# GENERAL CONTENTS

## REPORTING OF TECHNICAL DATA

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

**Analysis:**

An Order I Soil Survey was conducted of the proposed Link Canyon pad and portal area in December 2001 by Dan Larsen, Soil Scientist, Environmental Industrial Services, Inc., Helper, Utah. InterMountain Laboratories, Inc. of Sheridan, Wyoming analyzed the soil samples.

**Findings:**

Information provided in the application does not meet the minimum Technical Data Reporting requirements of the Regulations. Prior to approval, the Permittee must provide the following in accordance with:

**R645-301-130**, Include in PAP the qualifications of the consulting soil scientist.

## MAPS AND PLANS

Regulatory Reference: 30 CFR 777.14; R645-301-140.

**Analysis:**

The application makes reference to previously disturbed areas in Section 2.3.1, page 2-11 and in Section 3.2.2.2, page 3-22. The previously disturbed areas must be located on a map.

**Findings:**

The information provided does not meet the minimum Maps and Plans requirement of the Regulations. Prior to approval, the Permittee must provide the following in accordance with:

**R645-301-142**, The application must include a map that distinguishes between disturbances which occurred prior to August 3, 1977, which are therefore pre-SMCRA disturbances.

# ENVIRONMENTAL RESOURCE INFORMATION

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

## CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

**Analysis:**

The Convulsion Canyon Mine site receives an average annual precipitation of approximately 12.51 inches. Precipitation in the form of rain peaks in August with 1.65 inches being received on the average for that month. Snow covers the ground from September through May. Appendix 7-5 provides detailed climatological information.

**Findings:**

The information reported meets the minimum Climatological requirements of the Regulations.

## 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:**

The proposed disturbance will affect 0.14 acres, with 0.05 acres being riparian in nature. The proposed mine facility is between 7,660 to 7,690 feet elevation. The average annual precipitation recorded at the mine site has been 12.59 inches with the majority of the precipitation falling as snow. The soil resources within the Link Canyon mine portal area are discussed in Section 2.1.3 and Appendix 2-9 of the PAP. The soils include steep side slopes and riparian areas in the drainages supported by mine water discharge.

Mr. Daniel Larsen, Professional Soil Scientist with Environmental Industrial Services conducted an Order I soil survey of the disturbed area in December 2001. His report is located in Appendix 2-9. The survey contains five soil profile descriptions (Appendix A), laboratory analysis of nine soil samples (Appendix B), soil and landscape photographs (Appendix D), and soils maps (Appendix E).

Soil Identification and Description and Productivity

Soils were not identified according to the standards of the NRCS's National Cooperative Soil Survey. The soils of the site were identified to their subgroup as either Typic or Calcic Ustocrepts, ranging from coarse silty to loamy-skeletal and are calcareous to carbonatic. The Division could not locate the Suborder and Great Group in the *Keys to Soil Taxonomy*, 8th Ed. (Soil Survey Staff, 1999) and the series names were not indicated for correlation. For example:

Order: Inceptisols (young, little horizonation; little pedogenesis)
Suborder: Ochrept (ochric epipedon) not in the *Keys to Soil Taxonomy*
Great Group: Ustocrept ((moisture control section is dry than less than ¾ of the time when the temperature is above 5 C and aridic soil moisture regime bordering on ustic). Not in the *Keys to Soil Taxonomy*.

Subgroup: Typic or Calcic
Family: coarse silty to loamy-skeletal, mixed, frigid
Series: name?
Phases: calcareous to cabonatic

The soils were mapped using the following designations:

| | |
|---|---|
| WC | Waste Coal |
| DR | Disturbed |
| CU | Calcic Ustochrepts |
| TUE | Typic Ustochrepts |
| TUL | Typic Ustochrepts |
| VS | very stony bouldery areas |
| RP | riparian sites |

The field sheets in Appendix A and the soils maps of Appendix E, describe soils supporting pinyon pine, juniper, rabbitbrush, ephedra, serviceberry, sagebrush and bunchgrass. (During a site visit on December 6, 2001, the Division noted extensive colonies of Mahonia repens, Creeping Mahonia). From the information submitted, there does not appear to be any supporting field description or soil analysis for the TUL soil type.

Soil Characterization

The soil horizons were sampled and analyzed according to DOGM guidelines for topsoil and overburden. Soil texture, rock fragment content (percent by volume), and Munsell color were determined in the field. Available Water Holding Capacity was estimated based upon texture and verified by saturation percent. Percent surface boulders and stones were noted on the field sheets as between 20 and 85%.

Soil sample sites number 6 and 7 were omitted from the Soil Description Location map in Appendix 2-9.

Soil samples were sent to InterMountain Laboratories, Inc. Sheridan, Wyoming, for analysis. Appendix B of Appendix 2-9 contains the laboratory data. Appendix C provides a comparison of the soil test results with the Division's soil suitability criteria.

Overall, soil laboratory test results show a good rating for soil chemistry and fair rating for soil water holding capacity after correction for coarse fragments except as noted below:

Site #2, along the access road, 12 –24" depth, Electrical Conductivity (EC) equal 18.1 and Sodium Adsorption Ration (SAR) equal 9.18 and 0.26ppm Selenium
Site #5, along the access road, 0 – 25" depth, EC equal 8.37 and carbonates equal 45%.

Although concretions of carbonate were noted at site #5, there was no calcic horizon formed. As would be expected in a zone of carbonate precipitation, soluble magnesium is more

abundant than soluble calcium at this depth. Roots were noted to a depth of 25 inches. Division photos of the site taken on June 5,2002 show a plant community that does not appear to be affected by the elevated EC or the carbonate content of the soil.

These soils are developing on weathered coal and presently have an "A" horizon that is between 4-6 inches in depth and a B or C horizon extending to 20 to 40 inches. The surface soils ("A" and "B" horizons represented by sample sites 1, 2 and 5) are very fertile with Nitrate Nitrogen between 8.54 and 50.8 ppm, Phosphorus ppm between 0.92 and 3.45, and Potassium between 62.3 and 224 ppm. (The weathered coal is likewise rich in nitrate nitrogen.) This provides and interesting baseline for fertilization during reclamation of the site.

A small riparian area (0.05 acres) has very stony sandy loam soils to a depth of six inches deep. The riparian soils will be salvaged.

In accordance with R645-301-232.200, since the A horizon is less than six inches deep, the topsoil recovered will be a mix of both the A and B horizon soils. Depths of salvage range from 6 to 18 inches over the site (see Available Soil Resources table in Section 232.100). Large stones, 36 inches or less, are considered part of the soil layer and are included in the topsoil volume estimates.

**Findings:**

The information provided does not meet the minimum Environmental Soil Resource requirement of the Regulations. Prior to approval and in accordance with

**R645-301-222.200**, The SubOrder and Great Group identified for the soils of the area could not be found in the Keys to Soil Taxonomy (Soil Survey Staff, 1999). The Permittee should provide soil identification based upon acceptable taxonomic Order, SubOrder, GreatGroups, Subgroups. The Permittee should locate soil sample sites number 6 and 7 which were omitted from the Soil Description Location map in Appendix 2-9. The Permittee should provide supporting information for the soil map unit TUL.

# OPERATION PLAN

## AIR POLLUTION CONTROL PLAN

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-420.

**Analysis:**

The operator will control fugitive dust by application of water to areas where needed (Section 4.2.2, page 4-17). The Convulsion Canyon Mine operates under Division of Air Quality approval order DAQE-714-98 dated October 28, 1998 found in Appendix 4-4.

**Findings:**

The information provided in the MRP is adequate for the Air Pollution Control Plan requirements of the Regulations.

## TOPSOIL AND SUBSOIL

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

**Analysis:**

**Removal and Storage**

Regulation 645-301-232.100 requires topsoil removal from all disturbed areas. The disturbed area boundary encompasses 0.23 acres. The boundary has been drawn wider than the expected area of disturbance. Topsoil will be removed along the portal access road and at the portal pad, approximately 0.14 acres of new disturbance, but not from beneath the proposed power distribution structures. Therefore, there will be 0.09 acres of undisturbed ground within the disturbed area. Should the area of disturbance expand to the disturbed area boundary and encompass the additional 0.09 acres, topsoil must be removed from those 0.09 acres prior to disturbance.

Soils will be removed from all disturbed areas with the exception of the power pole disturbance and from undisturbed islands within the disturbed area. Flagging of the actual disturbed area versus the disturbed area boundary would help to delineate the boundary of topsoil recovery.

The Permittee will have a qualified person on site during construction and reclamation phases (Section 2.3.1.1, page 2-13). Soil types and approximate salvage depth and area are related in a table in Section 2.3.1.1, page 2-13. In this table, the area of salvage sums to 0.1 acre and the recovery depth of six inches will be used on the riparian areas (RP), the Calcic Ustochrepts (CU), and the Typic Ustochrepts, light colored (TUL). But a recovery of only four inches is planned for the Typic Ustochrepts eroded, carbonatic (TUE) soils. The Division recommends that a recovery depth of 6 inches is planned for all locations.

Soil removal equipment was not noted in the application.

The plan indicates in Section 2.3.1.1 page 2-11 that topsoil will be carefully separated from the subsoil since most of the subsoils are not suitable as substitute topsoil or growth media, due to high carbonates in the subsoils.

Approximately 80 yards of topsoil will be stockpiled. The approximate dimensions are not shown. The yardage and dimensions of the stored topsoil can be reported in an As-Built submittal.

The topsoil stockpile is located on Plate 5-2F. Berms (and/or silt fences) and a three-strand barbed wire fence will be used to protect stored topsoil (Section 2.3.1.4, page 2-18). The stockpile will be vegetated (Section 2.3.4.2, page 2-23), but the seed mix was not mentioned.

The surface of the stockpile should be pitted to retain moisture and reduce erosion. This practice is described in the Practical Guide to Reclamation (DOGM, 2000), available at http://dogm.nr.state.ut.us. The stockpile will be mulched and seeded using the mix in Table 3-4, after September 15 (231.400).

The Division recommends that the colonies of Mahonia repens (Creeping Oregon Grape) are scooped from surface layer of soil and placed on top of the topsoil pile and lightly covered with additional topsoil. Transplanting these plants would provide immediate protection and erosion control on the topsoil pile. The surface layer of soil carried with the transplanting operation is valuable for it contains seeds, microorganisms, organic matter, elevated levels of nitrogen and phosphorus.

The Division recommends that the surface soil is brought to approximately 15% moisture either through water irrigation or precipitation prior to initiating topsoil removal operations.

**Findings:**

Several areas of deficiency have been identified with the topsoil salvage and storage plans. Prior to approval and in accordance with:

**R645-301-232.100**, The Permittee must flag areas within the disturbed area which will not have topsoil removed.

**R645-301-232.200**, The Permittee should commit to the salvage of six inches of topsoil from all disturbed areas including the TUE, TUL, CU, and RP soils.

**R645-301-231.400**, The Permittee must relate the volume of topsoil salvaged and dimensions of the topsoil pile in As-Built maps.

**R645-301-234.220**, The Permittee should evaluate an alternate location for storage of the topsoil pile, out of the drainage on a level slope.

**R645-301-234.230**, The application should describe surface pitting of the stockpile should to retain moisture and reduce erosion and should indicate what seed mix will be used to establish vegetation on the topsoil pile.

**R645-301-231.100**, The application should describe topsoil handling plans including the equipment to be used and moisture content below which soils will not be handled and the topsoil salvage described in the application should include separate handling of the Mahonia repens (creeping mahonia) for transplanting to the surface layer of the topsoil pile.

# HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

**Analysis:**

**Sediment control measures**

The slope adjacent to the Link Canyon Portal access road will be disturbed and excavated to create the roadway. Plate 5-2F indicates that a cut approximately six feet deep and 15 feet high will be made on the slope. What measures will be taken to provide interim reclamation and stability of the cutslope during mining?

**Findings:**

Information provided in the application is not considered adequate to control erosion as required by the Regulations. Prior to approval, the Permittee must provide the following in accordance with:

**R645-301-742.113,** The Permittee must indicate what measures will be taken during operations to provide interim reclamation and stability of the cutslopes disturbed for fill.

# SIGNS AND MARKERS

Regulatory Reference: 30 CFR Sec. 817.11; R645-301-521.

**Analysis:**

The plan indicates that the disturbed area is 0.23 acres, but that the alternate sediment control area and the actual disturbed area is only 0.14 acres (page 1-37). The requirement for placement of signs and markers is to delineate the perimeter of all affected areas. The plan describes placement of signs to delineate the affected area boundary in Section 5.2.1.2 page 5-16. In this case, the Division is uncertain whether the disturbed area boundary (0.23 acres) or the actual disturbed area (0.14) will be delineated.

**Findings:**

The information provided is not considered adequate to meet the Signs and Markers requirements of the Regulations. Prior to approval, the Permittee must submit the following in accordance with:

**R645-301-521.251**, The Permittee has designated a disturbed area and an Actual disturbed area on page 1-37 of the application, therefore, to avoid confusion, the application must specify plans for placement of signs and markers.

# RECLAMATION PLAN

## TOPSOIL AND SUBSOIL

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

**Analysis:**

**Redistribution**

Topsoil will be transported with wheel mounted equipment, but spread with track-mounted equipment (Section 2.4.2.1). Topsoil will be redistributed over the area to an approximate thickness of six inches (Section 2.4.2.1 page 2-25).

The MRP indicates in Section 2.4.3 that stored topsoil will be tested for levels of nitrate nitrogen, phosphorus and potassium at the time of reclamation. Application rates should attempt to re-establish baseline conditions.

**Findings:**

The information provided in the application is adequate for the purposes of the Regulations.

## STABILIZATION OF SURFACE AREAS

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

**Analysis:**

The final surface will be pitted (Section 2.4.2.1). All areas will be mulched (Section 2.4.4.1).

Placement of large rocks and boulders and and slash is also encouraged.

In accordance with R645-301-244.300, rills and gullies that contribute to a violation of water quality or that disrupt the post-mining land use will be filled, regraded or stabilized (Section 2.4.4.3).

**Findings:**

The information in the PAP does not meet the requirements of the Regulations with regard to stabilization of the soil surface and control of erosion and air pollution attendant to erosion. Prior to approval and in accordance with:

**R645-301-244.200**, The application should describe replacement of boulders and stones to the surface.

## RECOMMENDATIONS:

The Permittee should provide the information requested by this technical review prior to approval.

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