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August 7, 1998

TO: File

THRU: Joe Helfrich, Permit Supervisor

FROM: Priscilla Burton, Soils Reclamation Specialist

RE: Soils Technical Analysis of Phase II Revision of the Permit Application Package (PAP) and the Mining and Reclamation Plan (MRP), Dugout Canyon Mine, Canyon Fuel Company, PRO/007/039-SR98-1. Folder #2, Carbon County, Utah

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

SOILS RESOURCE INFORMATION

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

Analysis:

Chapter 2, Soils, Sections 220 through 224, discusses the soil resources within the proposed Dugout Canyon Mine disturbances. This information as provided in The Phase I submittal was reviewed and determined adequate by Robert Davidson in a Technical Analysis dated March 9, 1997. Mr Davidson summarized: '... the predominantly stoney to gravelly sandy loam soils formed from sandstone, shale colluvium, and alluvium. Soils within the Rock outcrop-Rubbleland-Travessilla complex and the Midfork family-Comodore complex are typically well drained with moderate permeability, rapid runoff, and are highly susceptible to water erosion. Soils within the Croydon loam have moderately slow permeability, and therefore, depending on slope, erosion characteristics vary from slight to severe. The main point is that because of steepness of slope and soil quality, all of these soils are highly erosive. Shallow soils dominate the east facing side slopes while generally deeper soils characterize the west facing toe slopes.'

The Phase II submittal updates the Order-I survey by including sites TP7 (below the

sediment pond in soil the Datino Variant complex[1], designated as TS); TP13 (located at the proposed water tank area, also Datino Variant, designated as TS) ; and TP16 (located on the slope above the coal storage area and designated 96 for Rock Outcrop - Rubbleland- Travesilla Complex). These soil test pit locations are located on soils map, Plate 2-2, Disturbed Area Soils Map. Laboratory data and analytical summaries for each of these samples are provided in Table 2-1 of the PAP.

According to the SCS Carbon County soils survey, the Datino Variant soil complex is characterized as very deep, well drained, moderate permeable soils on mountain slopes being formed in colluvium derived dominantly from sandstone and shale. The SCS survey defines Datino Variant soils as loamy-skeletal, mixed Typic Haploborolls. The typic subgroup of Haploborolls[1] is defined as freely drained soils with a moderately thick brownish mollic epipedon. Typic Haploborolls were formed in alluvium during the late-Pleistocene or Holocene ages, do not have a shallow lithic (stone) contact, and do not have deep wide cracks in most years. The USDA handbook further states that where slopes are suitable, Haploborolls are mostly under cultivation.

Findings:

The information provided meets the regulatory requirements of this section.

OPERATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

Chapter 2, Soils, Sections 230 through 234, discusses the soil's operation plan for the proposed Dugout Canyon Mine, including soil salvage, stockpiling, and topsoil substitutes and supplements.

Topsoil and Subsoil Removal

[1]Soil Conservation Service, U.S. Department of Agriculture, Agriculture Handbook No.436, pp 288-289.

Soils from the water tank, the coal storage area, the sediment pond area and the slope between the sediment pond and the facilities pad area (see Plate 5-2) will be used as substitute topsoil. It is estimated that 6,504 CY of soil can be retrieved from these locations at the time of reclamation. Soils to be salvaged prior to construction are those labeled with TS on Plate 2-2. The A, B and C horizons will be salvaged.

The estimated volumes of stockpiled soils are presented in Table 2-2 and in Appendix 2-5 (Soil Removal from Within the Culvert Expansion Area) and Appendix 2-6 (Topsoil, Substitute Topsoil, and Storage Pile Calculations). An estimated total of 28,455 CY of soil will be salvaged and stockpiled.

Installation of a culvert in Dugout Creek will result in the removal and storage of 1,568 CY of riparian soil. The soil removal volumes are based on the assumption and calculations provided in Appendix 2-5. Soils removed during culvert construction will be stored separately from other soils and are expressly designated for reclamation of the Dugout Creek, riparian area. Soils on the northwest facing slope of the stream on the opposite bank from the operations pad at the location of the sediment pond will not be salvaged due to their importance in stabilizing the steep stream bank. The idea of protecting the soils was discarded after it was determined that the stream bank would not be re-exposed during reclamation since the channel will be moved westward to improve stability of the slope. Therefore this 300 foot length of streambank soils will be buried in the fill in order to stabilize the entire slope above. The Division concurs with this judgement.

During a technical site visit on August 5, 1998 by Priscilla Burton, Robert Davidson, and Paul Baker of the Division and Scott Boylen of Canyon Fuels Inc., additional areas of TS soils were noted that were identified as either needing protection during operations or as requiring salvage during the expansion of the site in Phase II, as described below:

- the soils on the southwest facing slope where the north and east drainages of Dugout Creek unite. These soils will be impacted by proximity of the future coal storage pile and they should be salvaged during Phase II expansion.

- The soils on the west facing slope in the area of the coal storage pile. Most of this slope is undisturbed soil that must be salvaged during Phase II expansion. The area of salvage should be from the existing roadway at the north end of the pad to the rock outcrop at the location of the proposed transfer house (not as shown on Plate 5-2, but the new proposed location as explained by Scott Boylen, DugOut Project Engineer). The distance of salvage is approximately 300feet.

Findings:

Descriptions of topsoil and subsoil removal and estimates of salvage volumes during Phase II should include the two locations as described above as per R645-301-232.100.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

Chapter 2, Soils, Sections 240 through 250, discusses the soil's reclamation plan for the proposed Dugout Canyon Mine. Appendix 2-6 provides information on topsoil volumes. Chapter 5, section 542.200, and Chapter 3, section 341.200, address slope stability and erosion control, respectively. Reclamation Topography is shown on Plate 5-5 and Reclamation Cross-Sections are shown on six sheets of Plates 5-6.

Soil Redistribution

Cut and fill calculations for the site are found on page 5-61 and Appendix 5-5. An estimated 99,630 CY are needed for fill and an estimated cut quantity is 97,575 CY. This leaves a difference of 2,055 C Y of fill.

Topsoil will be replaced on all areas with slopes less than 2:1 (page 2-38). Based on the 28, 455 CY of salvaged soil (see Appendix 2-6) and 14.7 acres or 640,332 sq ft to receive topsoil, the average soil redistribution will be a depth of 14.4 inches as stated on page 2-39 of the MRP. Should the additional 6,504 CY of topsoil substitute material become available during reclamation, the topsoil depth would increase to 17inches. (Figures for square footage should be checked in App 2-6 as an error was noted.) As noted in the backfilling and grading section of the engineering review within this Technical Anaysis, all slopes should receive topsoil (R645-301-553.100). Any areas which will not receive topsoil should be identified on the Reclamation Topography Map, Plate 5-5.

Soil Stabilization

Soil stabilization practices include surface roughening techniques such as gouging and/or deep pocking, and "high -quality" erosion mat placement on slopes 2:1 or steeper (page 2-28, p2-41, pg 3-40, p3-45 and pg 3-51). No calculations for the added cost of the erosion matting and installation were found in Appendix 5-6 Bond Calculations. The Division is unclear as to how the application of erosion control matting will occur over the gouged surface.

Soil may be replaced at grades of up to 1.5H:1V (page 5-70). The steepness of these slopes will be reduced at their base, providing a concave slope. Slopes which are 3H:1V or or steeper will be gouged using a trackhoe (page 5-70).

Soil redistribution with the culvert expansion area will require placing soils on slopes greater than 2:1. According to the reclamation cross sections, these steep slopes exist throughout the reclaimed channel for Dugout Creek. Figure 3-1 shows a cross-section of the riprapped channel. The PAP does not discuss soil placement techniques on these steep slopes that drop directly into Dugout Creek.

Soil stabilization techniques after topsoil is placed on steep slopes greater than 2:1 are needed, especially within the stream corridor where the culvert will be removed. Specific techniques should be stated in accordance with slope steepness to ensure that soil will remain intact on the steep slopes while vegetation is being established.

Findings:

The permittee must provide the following, prior to approval, in accordance with the requirements of:

R645-301-233, Specific locations of erosion control matting use should be identified in the MRP and calculated into the bonding. Other possible soil stabilization techniques for slopes greater than 2:1 should be stated, should erosion control matting be eliminated from the plan.

R645-301-240, the MRP should be revised to indicate that all slopes will receive topsoil. Slopes which will not receive topsoil should be identified on the Reclamation Topography Map, Plate 5-5.