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November 6, 1998

TO: File

THRU: Joe Helfrich, Permit Supervisor

THRU: Daron Haddock, Permit Supervisor

FROM: Robert Davidson, Soils Reclamation Specialist RAD

RE: Soils Technical Analysis of the Link Canyon Substation Revision, Canyon Fuel Company, LLC, SUFCO Mine, ACT/041/002-SR98-1, Folder #2, Sevier 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, has been amended to allow construction of a proposed substation in Link Canyon. The original MRP revision contained provisions for a breakout to allow power to be taken into the mine. Because of a presumed active burn within the coal seam, the breakout proposal has been abandoned. The revision now contains a proposal to drill boreholes from within the mine out to the proposed substation pad for the purpose of allowing access to supply power to the mine. As a result, the substation pad size has doubled over what was originally proposed to allow extra room for placement of the regulators that were originally located just inside the portal. This Analysis section discusses soil resource information as follows:

- Prime Farmland Investigation
- Soil Survey Information
- Soil Characterization

Prime Farmland Investigation

Appendix 2-1 contains a Prime Farmland determinations for the Quitchupah Lease Tract as performed by the Natural Resource Conservation Service. The Quitchupah Lease Tract includes Link Canyon; therefore, no Prime Farmland exists in Link Canyon.

Soil Survey Information

An Order-2 soil survey was completed for the proposed Link Canyon breakout and substation disturbed area and is included in Appendix 2-2. The soils for this area are classified as Strych Pathead Podo families Rockland complex with 30 to 80 percent slopes. The complex contains 30 percent Strych soils, 30 percent Pathead soils, 15 percent Podo soils, 15 percent Rubbleland and 10 percent rock outcrops and finer textured soils. Strych soils are 47 inches deep with rooting depths from 40 to 60 inches. Pathead soils are 60 inches deep with rooting depths 30 to 60 inches. Podo soils are thin at 11 inches deep with rooting depths 20 inches or less. Map unit descriptions are given with an Order-2 soils survey soils map.

Additionally, an Order-1 soil survey was conducted for the substation pad area and is included in Appendix 2-6. This survey was completed on April 8, 1998 and includes two soil pits with profile descriptions. The investigation was completed by Chris Hansen and Mike Davis of Canyon Fuel Company, LLC and Robert Davidson of the Utah Division of Oil, Gas and Mining. Figure 1 illustrates the Link Canyon soil pit locations (LC-1 and LC-2) for the substation pad area. Both soil pits were hand excavated to 20 inches using a pick and shovel. For the Order-1 soil survey, the soils were not classified and no soils map for the substation area was generated. From the soils descriptions, the soils from LC-1 and LC-2 appear to be either from the Pathead or Podo family inclusions. However, the pit descriptions supply adequate information for determining the quality and quantity of soil available for salvage.

Soil Characterization

The Order-2 soil survey provides map unit descriptors for soil map unit 20, Strych-Pathead-Podo families-Rockland complex. Soil family descriptions identify taxonomic classifications, parent material, landscape position, slope, vegetation community, profile descriptions, rooting depths, hydrologic information, plus soil erodibility and hazard.

For the Order-1 soil survey, the soil horizons at each sampling location were sampled and characterized according to the State of Utah Division of Oil, Gas and Mining (DOGM)

guidelines for topsoil and overburden[1]. Sampled parameters included: soil texture; pH; organic matter percent; saturation percent; electrical conductivity; $CaCO_3$; soluble potassium, magnesium, calcium and sodium; sodium absorption ratio, and extractable selenium and boron. Soils in both pits (LC-1 and LC-2) have very similar characteristics, with all parameters in the DOGM acceptable range. Soil profile descriptions are provided and identify the volume and type of rock on the surface and within the soil profile. The A horizon contains 10% rock, principally pebbles. The C1 horizons contain 40 to 45% rock, principally pebbles and cobbles. The C2 horizon for LC-1 contains 50% rock fragments, predominantly cobbles. The surface has occasional boulders with a veneer of pebbles and cobbles. Approximately 20 inches of soil from the A and C horizons is available for salvage.

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:

The Analysis section discusses operation information for the proposed, substation and power line borehole in Link Canyon as follows:

- Topsoil and Subsoil Removal
- Topsoil Substitutes and Supplements
- Topsoil Storage

Topsoil and Subsoil Removal

In the Link Canyon Substation disturbed area, the A and C horizons will be removed together and stored on the pad outslope. The A horizon is between 6 to 8 inches deep with the C horizons extending down to 20 inches. Therefore, topsoil and subsoil will be salvaged together

[1]Leatherwood, J., and Duce, D., 1988. Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. State of Utah Department of Natural Resources, Division of Oil, Gas and Mining.

to an average depth of at least 19 inches across the site during construction of the Substation pad and access road. In-situ rock, cobbles and boulders, will be left in and on the surface of the side cast soils as resource protection.

Although the projected disturbed area is 0.94 acres, the actual area for salvaging topsoil is unknown. Therefore, the projected volume of topsoil salvage needs to be provided based on depth and actual topsoil salvage area.

If non-topsoil, side-cast material is going to cover a portion of the slope below the pad, then topsoil will need to be salvaged from this area.

Since the side-cast topsoil will cover the original topsoil surface on a portion of the slope below the pad, this un-salvaged topsoil needs to be preserved for later reclamation efforts. A marker layer, or marker flagging, needs to be utilized to mark the proximity of the original, undisturbed topsoil surface to help prevent surface damage during reclamation and excavation of the side-cast topsoil.

Topsoil Substitutes and Supplements

Since the topsoil is thin (6 to 8 inches), the C horizon subsoil will be salvaged with the A horizon topsoil. Based on analysis results for the C horizon subsoils as shown in Table 1 of Appendix 2-6, there are no problems associated with the C horizon subsoils being used as substitute topsoil.

Topsoil Storage

Soils salvaged from the Link Canyon Substation area will be stored on the pad outslope. The outslope stockpiled soil will be protected by placing berms and/or silt fences at the base of the slope. Additionally, the soil will be seeded with the seed mix specified in Section 3.30 of the MRP.

Topsoil signs will be placed on the Link Canyon Substation pad outslopes identifying the outslopes as "TOPSOIL." Additionally, since the Link Canyon Substation disturbed area is located within cattle grazing areas of the U.S. Forest Service, the pad outslopes will be fenced to prevent damage from cattle grazing to the stockpiled topsoil.

The submittal revision now contains a proposal to double the substation pad size from what was originally proposed to allow extra room for placement of the regulators that were originally located just inside the portal. As a result, excavation is much more extensive than originally proposed and requires much deeper side cuts to achieve the greater pad breadth. *Since the soil survey only describes soils down to 20 inches, the type and quality of residuum or*

colluvium material in the deeper cuts is unknown. The pad outslopes are identified for topsoil storage and cannot be contaminated from other less desirable materials. Therefore, segregation must take place to preserve the topsoil without contamination from the other cut material.

Findings:

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

R645-301-120, Although the projected disturbed area is 0.94 acres, the actual area for salvaging topsoil is unknown. Therefore, the projected volume of topsoil salvage needs to be provided based on depth and actual topsoil salvage area.

R645-301-230, The following two items need to be addressed in the MRP revision concerning the side-slope area below the pad:

- If non-topsoil, side-cast material is going to cover a portion of the slope below the pad, then topsoil will need to be salvaged from this area.

- Since the side-cast topsoil will cover the original topsoil surface on a portion of the slope below the pad, this un-salvaged topsoil needs to be preserved for later reclamation efforts. A marker layer, or marker flagging, needs to be utilized to mark the proximity of the original, undisturbed topsoil surface to help prevent surface damage during reclamation and excavation of the side-cast topsoil.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

The Analysis section discusses reclamation information as follows:

- Soil Redistribution
- Soil Stabilization

Soil Redistribution

The un-salvaged topsoil buried beneath the side-cast topsoil needs to be preserved for later reclamation efforts. A marker layer, or marker flagging, needs to be utilized to mark the proximity of the original, undisturbed topsoil surface to help prevent surface damage during reclamation and excavation of the side-cast topsoil.

Final reclamation of the pad will include the removal of the substation equipment and replacement of the fills and soils stored in the pad area. *The plan states that pre-existing slopes will be restored to AOC using the side-cast materials stored in the pad outslopes (pp 5-58 and 5-67). However, no mention is given concerning topsoil replacement. Topsoil replacement on the newly restored slope needs to be part of this discussion, including techniques to protect the original, undisturbed topsoil surface beneath the stockpiled topsoil.*

Soil Stabilization

Link Canyon is a steep canyon area with an average rainfall of only 11 inches. Therefore, the applicant plans to provide additional measures and other soil stabilization techniques (e.g., deep gouging) to help assure reclamation success. As explained in the revision, deep gouging or pocking provides the following:

- alleviates soil compaction
- increases soil stability
- increases water harvesting

Since the reclaimed area is within a USFS grazing unit, the reclaimed slope will be protected from grazing by fencing.

Findings:

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

R645-301-240 and R645-301-120, The following two items still need to be addressed concerning topsoil removal:

- The un-salvaged topsoil buried beneath the side-cast topsoil needs to be preserved for later reclamation efforts. A marker layer, or marker flagging, needs to be utilized to mark the proximity of the original, undisturbed topsoil surface to help prevent surface damage during reclamation and excavation of the side-cast topsoil.

- The plan states that pre-existing slopes will be restored to AOC using the side-cast materials stored in the pad outslopes (pp 5-58 and 5-67). However, no mention is given concerning topsoil replacement. Topsoil replacement on the newly restored slopes needs to be part of this discussion, including techniques to protect the original undisturbed topsoil surface beneath the stockpiled topsoil.

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