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TO: File

THRU: Daron Haddock, Permit Supervisor *DH*

FROM: Robert Davidson, Soils Reclamation Specialist *RAO*

RE: Technical Analysis of Mining and Reclamation Plan, Willow Creek Mine, Cyprus Plateau Mining Company, PRO/007/038, Folder #2, Carbon County, Utah

SYNOPSIS

Cyprus Plateau Mining Company (CPMC) has submitted a permit to develop a mine portal at the Willow Creek Mine site. This site was previously disturbed by Blackhawk Coal Company, reclaimed under the Abandoned Mine Reclamation Program (AMR) and recently excavated by CPMC in preparation for mining activities.

This permit application encompasses the Willow Creek Mine site as well as Crandall Canyon and Castle Gate Preparation Plant areas. The current permit contains a revised lengthy discussion of the soils, refuse, and coal sampled by previous mining operations over the last two decades in the Castle Gate mining area. Current resource information presented in the plan includes recent 1994 and 1995 sampling, sampling of the riparian areas where Willow Creek will be diverted and drilling cores of roof, floor and coal seams.

This Technical Review summarizes the environmental, operational and reclamation soil information presented for the proposed Willow Creek Mine site.



ENVIRONMENTAL RESOURCE INFORMATION SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-411, -301-233.

Analysis:

Section 3.1 of the text is largely devoted to discussion of soil, refuse and roof/floor information condensed from various published resources and from the Castle Gate Mine area operation records. The principal soils resource information is taken from a general area, Order-III soil survey, Soil Survey of Carbon Area, Utah, published by the Soil Conservation Service, United States Department of Agriculture in June 1988. In addition to the published soil conservation data, soils information from previous sampling programs in the immediate area is extracted from past mining activity, with the review and discussion incorporated into the SOILS INFORMATION section. Both 1994 and 1995 supplemental site-specific soils investigations were conducted by CPMC for the proposed mine surface disturbance areas and include both disturbed and undisturbed soils.

Exhibit 5 is titled "Profile Descriptions of Soils encountered at the Willow Creek Mine Facilities Area." The profile descriptions found within this exhibit are excerpted from the Soil Conservation Service soil survey of Carbon County; the actual profiles are located at great distances from the mine site. As stated above, these Order-III soil surveys are generalized soil information descriptions for large tracts of land. The actual pedon locations are not specifically located on any mine plan map within the specified facility's surface area; neither are they located within the proposed disturbances of the Willow Creek Mine. The information presented in Section 3.1 and Exhibit 5 implies that the Order-III soil survey information fulfills the regulatory requirement for supplying specific, clear, and concise soil resource information. The generalized information included in these sections isn't applicable in even a general sense as required for a Order-I soil survey. Please note that a Order-I soil survey supplies the critical and necessary information for accurately assessing specific soil resource information within a specific, delineated area. Finally, both the Division's Soils Guidelines and a Order-I soil survey will accurately assess the soil resource materials.

It is the responsibility of the mining company to provide a succinct, organized, clear and concise description of the soil and substitute soil resources. Although the SOILS INFORMATION section contains copious amounts of information, most of the material is extracted from previous soil studies in the immediate facilities area. Section 3.1 appraises these past studies as relevant and current soil resource information. Although these previous soil studies provide some useful information, the information is not completely relevant

because the soil studies were performed in active mining areas on disturbed soils that have since been modified through mining activities. Therefore, a concise and clear summation of the current and recoverable soil resource materials (both disturbed and undisturbed) from the planned disturbance areas is needed for the purpose of quantifying all suitable cover material identified for salvage. The summation should correlate with areas identified on Map 4, Facilities Area Soils Map, and include soil resource material amounts and recovery depths. Section 3.1 fails to **delineate** and **quantify** the recoverable soil resource. Thus the Division is unable to assess topsoil depth, recovery estimates or predict soil salvage volumes, stockpile size, placement and locations.

Adequate and up-to-date Order-I soil surveys of both disturbed and undisturbed soils are required before the soil salvage operation can begin and for proper determination and assessment of soil depth and recovery estimates. The prevailing, up-to-date surveys will enable prediction of soil salvage volumes, which will enable determination of stockpile size, placement and location. Thus, a proper soil removal isopach for both the disturbed and undisturbed soil resources is required to help assess the soil removal and salvage operations. With proper compiled and assimilated data, a soil removal isopach is not only feasible, but is without question. In addition, a properly prepared soil removal isopach contains relevant projections of the potential soil recovery depths, areas, and resulting volumes slated for salvage. Indeed, the resulting soil recovery volumes result from a reasonable estimation of the practical material, sites, and operational constraints.

In Section 3.1.2.4, Soil Availability and Suitability, a comparison of the existing surficial soil materials is made for evaluation of reclamation suitability. The section implies that coal refuse materials and mine development wastes will be used as substitute topsoil. The implication is given by the evaluation of the suitability of all materials which could be utilized as potential growth media, which includes the separate evaluations of coal refuse materials and mine development wastes. Handling and disposal of coal refuse materials and mine development waste is regulated by 30 CFR 817.81, Coal Mine Wastes: General Requirements, and R645-301-528, Handling and Disposal of Coal, Overburden, Excess Spoil, and Coal Mine Waste. **The Division does not approve or permit the use of coal refuse, coal, mine development wastes or waste rock as substitute topsoil.**

Disturbed soils may be used as substitute topsoil as referenced by R645-301-224, Substitute Topsoil, and R645-301-233, Topsoil Substitutes and Supplements. Section 3.1.2.4 evaluated the reclamation suitability of the disturbed soils as topsoil supplements as outlined by the Division's Topsoil/Overburden Guidelines. The Division recognizes that some contamination by coal materials of disturbed soils has occurred, is inevitable and does not present a reclamation hazard. However, prior to approval of selected disturbed soils

containing high amounts of coal, refuse, and/or waste rock material, the Division requires the positive demonstration results of field-site trials and/or greenhouse tests. Until acceptability is shown and approval is granted, the worst-case scenario must be assumed for reclamation purposes.

Findings:

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

**30 CFR Sec. 783.21 Soil Resources Information and R645-301-220
Environmental Description.**

The application must include a succinct, organized, clear and concise description of the soil and substitute soil resources. A concise and clear summation of the current and recoverable soil resource materials (both disturbed and undisturbed) from the planned disturbance areas is needed for the purpose of quantifying all suitable cover material identified for salvage.

The text implies greater understanding of the Willow Creek Mine site soil resources than the provided documentation can confirm. Current, site specific, Order-I Soil Survey investigations of the proposed disturbed areas for both disturbed and undisturbed soil materials should correlate with soil resource areas and proposed mine disturbances as shown on Map 4, Facilities Area Soils Map. Order-I Soil Surveys will meet the standards of the National Cooperative Soil Survey as incorporated by reference R645-302-314.100. Adequate and up-to-date Order-I soil surveys are required before the soil salvage operation can begin and for proper determination and assessment of soil depth and recovery estimates. The results of the site specific surveys will enable the exact prediction on the quantity, quality and availability of soil substitute material. An isopach map of the removal depth for the undisturbed sites and the disturbed regolith should be sketched to identify those areas where soil will not be salvaged and to ensure that all suitable cover material is identified for salvage.

30 CFR Sec. 817.200 Interpretative rules related to general performance, 30 CFR Sec. 817.81 Coal mine wastes: General requirements, R645-301-233 Topsoil Substitutes and Supplements, and R645-301-528 Handling and Disposal of Coal, Overburden, Excess Spoil, and Coal Mine Wastes.

All coal mine waste will be placed in new or existing disposal areas within a permit

area which are approved by the Division. Coal mine waste and refuse materials are not considered as approved selected overburden materials and will not be used as substitute topsoil. **It must be made clear that the Division does not approve the use of waste rock, refuse or coal as substitute soil materials.** Section 3.1 must be amended to correct and clarify the discrepancy of using refuse and mine waste materials as substitute topsoil.

Where the applicant proposes to use selected disturbed soils containing high amounts of coal, refuse, and/or waste rock materials as a supplement or substitute topsoil, the applicant must demonstrate to the Division the suitability of the material using field-site and/or greenhouse trials. If the operator demonstrates through an Order-I soil survey that the topsoil and unconsolidated material are insufficient, additional substituted materials may be used and must be analyzed in accordance with R645-301-233.300.

OPERATION PLAN TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-232, -301-233, -301-234, -301-242, -301-243.

Analysis:

The Division is unable to accurately assess the technical methods for topsoil removal, removal amounts, removal depths and storage amounts until succinct soil resource information is available. Therefore, the plan is not considered technically adequate with regard to a description of soil handling plans.

Section 4.2.2.2, Soil Suitability and Testing, references coal refuse materials as a topsoil substitute. **It must be made clear that the Division does not approve the use of waste rock, refuse or coal as substitute soil materials.** Waste rock, coal, refuse and mine waste must be sampled for acid and toxic forming materials and covered as required. The comparisons presented in Table 3.1-3 illustrate that coal refuse lacks adequate pH and texture (50% of the time). That, combined with a high percentage of coarse fragments, massive structure, lower available water holding capacity, some increased salts (EC) and dark color (increasing the temperature in the germinating and rooting zone) make it a hostile environment for reclamation. Coal mine refuse is prone to acidification as it oxidizes. Waste piles in the area have become quite acidic (pH 3.0) with time (see the Trash Canyon site in the AMR Monument Project file AMR\007\927 Fall 1995 for further information. Trash canyon is across Highway 6 from the power generating plant.)

Topsoil salvage volumes are recorded in Table 4.2-1. As explained in Section 4.2.2.1,

Soil Salvage Practices, soil will be salvaged from 12 to 18 inches in depth from the disturbed site at the Willow Creek mine site. Undisturbed areas will have 6-8 inches of soil salvaged. (The text indicates up to 18 inches from disturbed areas and up to three feet of soil may be salvaged from undisturbed areas.) It is not clear how the salvage depths presented in the table were determined, since no site specific survey information has been presented. Some locations will not have soil salvaged. These locations are identified as the Water Tank Area (1.0 acre) and the Office Trailer Area (3.1 acres). Other areas with limited depth or high rock content will also be avoided. No site specific study or information has been presented to identify the extent of these areas. The Division is unclear as to why the water tank area will be exempt from topsoil salvage.

Section 4.2.2.3, describes soil handling and stockpile storage. Soil from all horizons will go into a common stockpile. Stockpile side slopes will be 3h:1v or less. The soil will be protected from erosion by grading and up gradient berms. Stockpiles will be seeded with a temporary vegetation mix as described in Section 5.3, Habitat Restoration Plan. Seeding may not occur for 6 months. Note, that Map 8, Mine Surface Facilities Map, could not be located.

Findings:

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

R645-301-232 Topsoil and Subsoil Removal, R645-301-233 Topsoil Substitutes and Supplements and R645-301-234 Topsoil Storage.

All topsoil, substitute topsoil and unconsolidated material will be removed as separate layers from the area to be disturbed, and segregated. **It must be made clear that the Division does not approve the use of waste rock, refuse or coal as substitute soil materials.** Soil Stockpiles must be seeded promptly; allowing 6 months to pass between stockpiling and seeding will allow the weather to erode the pile and the soil will be hardened and crusted which is not a good environment for germinating seeds.

RECLAMATION PLAN TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-232, -301-233, -301-234, -301-242, -301-243.

Analysis:

Section 3.1.2.5, Soil Amendments, Section 3.1.2.5, Soil Amendments, recommends that soil mulching be limited to the existing gravel mulch present in site soil materials. It further states that the Willow Creek materials contain sufficient rock fragments to minimize erosion potential without the addition of and/or application of organic much materials. The concern here is the degradation of soils buried deep inside topsoil stockpiles which will increase the erodible characteristics of reclaimed areas when these degraded soils are applied. Pedogenesis of buried soils is severely restricted. Physical-chemical changes most likely to occur include nutrient loss, loss of micro-biological life forms, existence of anaerobic conditions, loss of organic matter and resulting soil-building humic acid, and structural breakdown of the soils. As a result, buried soils will be sterile, void of organic matter and humic supporting structure. Therefore, final soil reclamation efforts must include restoration of the soil's living and structural integrity using best available technology to restore microbial activity, organic matter, and soil surface stabilization.

The plan describes replacement of soil and soil testing for fertility and other amendments. Some confusion exists between reclamation practices as described in Section 3.1 (page 3.1-30) and that in Section 5.2.2.3. In the first instance Cyprus indicates that no mulch will be applied. Instead, the gravels in the soils will serve as mulch. In the second instance, Cyprus indicates that the ground will be deep ripped and mulch incorporated into the soil prior to seeding and applied after seeding as well. And earlier in Section 5.2.2.2 the plan says deep ripping will occur only when necessary.

Section 5.2.1.2, General Soil Replacement Requirements, does not list soil replacement thicknesses during reclamation. Text verbiage says only that CPMC will utilize all of the available stockpiled reserves of both soil and substitute material to establish a relatively uniform thickness. The recovered soil amounts to be applied and resulting soil thicknesses should be delineated according to each disturbed area and expounded to clarify the reclamation efforts. Otherwise, it is unclear where soil amounts and volumes will be placed. In addition, cover depth over the Schoolhouse Canyon Refuse has been omitted from the discussion in the text. A cover depth of 24 inches over the refuse was previously approved and is discussed in Exhibit 19.

Finally, the Division is unable to accurately assess the technical methods for reclamation for topsoil placement, depths and source until succinct soil resource information is available. Therefore, the plan is not considered technically adequate with regard to a description of soil replacement plans.

Findings:

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

R645-301-244 Soil Stabilization and R645-301-742 Sediment Control Measures.

All exposed surface areas will be protected and stabilized to effectively control erosion and air pollution attendant to erosion. Best available technology will be utilized to control erosion and to attain appropriate sediment control. Suitable mulch and other soil stabilizing practices will be used on all areas that have been regraded and covered by topsoil or topsoil substitutes. Clarify for consistency Sections 3.1.2.5, Soil Amendments; 5.2.2.2, Soil Replacement Practices; and 5.2.2.3, Soil Suitability and Testing. The soil stabilization practices described in each section should not be conflicting.

R645-301-242 Soil Redistribution and R645-301-244 Soil Stabilization.

More detail in the plan regarding the soil salvage (as requested in deficiencies listed under Operations Topsoil and Subsoil) is required before the Division can approve the soil reclamation plan.

Information in the plan should delineate reclamation area locations, topsoil and substitute topsoil volume amounts and thicknesses. Information on the planned cover over the Schoolhouse Canyon Refuse pile should also be clarified.