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DIVISION OF OIL, GAS AND MINING

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TO: File

THRU: Daron Haddock, Permit Supervisor *DRH*

FROM: Robert Davidson, Soils Reclamation Specialist *RAD*

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's Section 3.1, SOILS RESOURCE INFORMATION, encompasses the Willow Creek Mine site as well as Crandall Canyon and Castle Gate Preparation Plant areas. The current permit contains a revised and detailed discussion of the soils, refuse, and coal mining waste materials within the Willow Creek Mine and Castle Gate Facility areas. Current resource information presented in the plan includes recent 1994, 1995 and 1996 soil 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, SOILS INFORMATION, discusses in detail the existing types and characteristics of soil, refuse and roof/floor materials. The information is collected and condensed from various published resources, Castle Gate Mine area operation records and current soil surveys. Adequate soil survey information is provided for those portions of the Willow Creek Mine permit area to be affected by surface operations.

Regional soils conservation information is taken from a Order-III soil survey, Soil Survey of Carbon Area, Utah, published by the Soil Conservation Service, United States Department of Agriculture (USDA-SCS) in June 1988. In addition to the published soil conservation data, soils information from previous sampling programs in the immediate Willow Creek and extended Castle Gate areas is extracted and reviewed from past mining activity. These include 1979 Soil Investigations (Price River Coal Co.), 1981 Soil Investigations for Crandall Canyon (Price River Coal Co.), 1988 Soil Sampling and Characterization (Blackhawk Coal Co.), 1989 Soil Sampling (Blackhawk Coal Co.), 1990 Soil Sampling (Castle Gate Coal Co.) and 1991 Soils Mapping (Castle Gate Coal Co.). The 1979 soil investigations include complete soil profile descriptions for 10 soil pits excavated in Crandall Canyon, Willow Creek and Castle Gate Preparation Plant areas. Finally, 1994, 1995 and 1996 supplemental site-specific soil investigations were conducted by CPMC for the proposed Willow Creek area and includes both disturbed and undisturbed soils.

The 1996, Order-I soil survey for the Willow Creek area supplies the critical information that is necessary for accurately assessing the site-specific soil resources available for salvage. Twelve additional soil pits were evaluated and soil samples collected according to the Division's "Guidelines for Management of Topsoil and Overburden." CPMC accepted the stipulation that the Mine Reclamation Plan (MRP) will be amended when the laboratory soil results from the 1996 Order-I soil survey are completed. Four of the examined soil pits are in undisturbed soils and eight are located in disturbed soils. The undisturbed soils correspond to USDA-SCS soil mapping Unit 107 Shupert-Winetti Complex. Detailed soil profile descriptions include site description, horizon/layer identification, depth, color, texture, structure and fragment/rock descriptions. The 1996 soil survey complies with the standards of the National Cooperative Soil Survey.

Two soil maps are presented for those areas potentially affected by the mining and reclamation activities. These include a Regional Soils Map (Map 3) and a Facilities Area

Soils Map (Map 4). The Regional Soils Map shows the USDA-SCS Soil Survey mapping units for the entire mine permit area. This regional map reflects an Order-III soil survey. The Facilities Area Soils Map is a more detailed map which includes the site-specific soil sampling and surveys from the historical Castle Gate preparation plant and the proposed Willow Creek surface facilities.

A total of 6.7 acres of new ground will be impacted by construction in the Willow Creek Mine area with 4.7 acres in Soil Mapping Unit 107 Shupert-Winetti Complex, 1.5 acres in Unit 121 Travessilla-Rock Outcrop-Gerst Complex, and 0.5 acres in Unit 72 Pathead-Curecanti Family Association. According to the USDA-SCS Soil Survey, the Winetti soils correspond to the Loamy Bottom ecological or range site. Forage production of this soil is reported to be 1,000, 1,500 and 2000 pounds of air dry forage per acre for unfavorable, average and favorable precipitation years, respectively. Travessilla-Rock Outcrop soils corresponds to the Upland Very Steep Shallow Loam (Pinyon-Utah Juniper) woodland site. Potential production of wood products for this soil type are reported to be 1 to 2 cords of wood per acre with a potential forage production of 300, 500 and 700 pounds of air dry forage per acre for unfavorable, average and favorable precipitation years, respectively. Pathead soils occupy the undisturbed valley bottom areas along Willow Creek and correspond to the Mountain Valley Steep Loam (Salina Wildrye) range site. The potential forage production of this range site is reported as 1,000, 1,200 and 1,400 pounds of air dry forage per acre for unfavorable, average and favorable precipitation years, respectively.

Past prime farmland investigations for Price River Coal Company and Castle Gate Coal Company have concluded that soils within this area are excluded from consideration as important farmland. These conclusions are based upon the excessive amount of rock fragments, high erodibility and lack of reliable irrigation water within the Castle Gate mining permit area. Exhibit 5, SOILS INFORMATION, includes Prime Farmland Investigation correspondence, soil profile descriptions, soil field notes and soil laboratory data.

An evaluation of soil availability and suitability is made using the Divisions "Guidelines for Management of Topsoil and Overburden Materials." A comparison of the existing surficial soil materials is made for evaluation of reclamation suitability. In addition, the comparison includes the separate evaluations of coal refuse materials and mine development wastes. Since the implication is given that coal refuse materials and mine development waste may be used as substitute topsoil, CPMC has stated the following: "CPMC is not proposing to use coal or coal waste material as substitute topsoil material. Since the Willow Creek Mine area has been extensively disturbed in the past, there is coal waste material in many locations. This material has been covered in many locations by soil materials that are usable as growth medium. The growth medium has been demonstrated in this MRP to be adequate for reclamation. In areas where coal waste material will be covered

with growth medium, the demonstrations made in this MRP show that reclamation can be achieved with less than four feet of cover. The final topsoil depth for reclamation will depend on the final salvaged volume of growth medium."

Selected overburden materials and disturbed soils may be used as supplement or substitute topsoil as referenced by R645-301-224, Substitute Topsoil, and R645-301-233, Topsoil Substitutes and Supplements. The Division recognizes that some contamination by coal materials of disturbed soils has occurred, is inevitable and does not present a reclamation hazard. The Willow Creek disturbed soils are an acceptable substitute topsoil as shown by their physical and chemical analyses, section 3.1.2.4 Soil Availability and Suitability. However, prior to approval of selected disturbed soils and overburden materials containing high amounts of coal, refuse, and/or waste rock, the Division requires the positive demonstration results of field-site trials and/or greenhouse tests (R645-301-233, Topsoil Substitutes and Supplements). In addition, the Division will not allow the use of coal, coal refuse materials and mine development waste as substitute topsoil or as potential growth media materials. 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.

Findings:

This portion of the permit application is considered complete and accurate with the stipulation that CPMC must amend the MRP within 14 days of receiving the 1996 Order-1 soil survey laboratory data; both Section 3.1 SOILS INFORMATION and Exhibit 5 SOILS INFORMATION, will be amended with the 1996 Order-I soil survey data-resource discussion and chemical and physical analyses results, respectively. If analysis results indicate any departure from acceptance criteria as outlined in the DOGM Topsoil/Overburden Guidelines, CPMC must immediately cease soil salvage operations, consult DOGM for development and implementation of appropriate operation and remediation plans, and correct and update the MRP.

OPERATION PLAN TOPSOIL AND SUBSOIL

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

Analysis:

Section 4.2, SOIL HANDLING PLANS, describes the soil handling practices, related environmental control and environmental mitigation measures associated with the Willow Creek Mine Facilities. Soil materials will be recovered from any disturbance area

where natural soils exist and from previously disturbed areas where suitable disturbed soils exist. The majority of the existing Willow Creek areas surface materials represent disturbed soils which are intermixed with overburden and coal waste. Potential disturbance areas where natural undisturbed soils remain will generally be very small, typically occurring on the perimeter of previous disturbance areas where steep slopes and shallow soils limit practical soil availability.

Soil recovery will focus on removal and salvage of all reasonably recoverable soils to a maximum depth of 3 feet or until highly consolidated, coarse fragment content or clayey materials are encountered at a shallower depth. No effort will be made to segregate individual soil horizons. Where disturbed soils are to be recovered, recovery depths will range from a minimum of 12 inches to a projected maximum of 30 inches. To the extent operationally feasible, significant coal or coal refuse zones will be avoided during recovery. Any significant coal or coal waste deposits and accumulation will be excavated and disposed in the Schoolhouse Canyon Refuse Pile.

Table 4.2-1, Soil Recovery and Storage Plans, summarize soil material recovery areas and volumes for proposed mining and related surface disturbances. Table 4.2-1A, Justification for Soil Salvage Assumptions, provides supportive documentation for soil recovery. Existing topsoil stockpile volumes include Gravel Canyon at 87000 cy, Crandall Canyon at 18000 cy and Willow Creek Mine Facilities at 21200 cy. An additional 106270 cy of topsoil removal is projected at the Willow Creek Mine Facilities. Total surface disturbance at the Willow Creek Mine Facilities is approximately 55.8 acres. With a grand total of 127470 cy of salvaged topsoil over the 55.8 acres of surface disturbance, an average of 17 inches of soil removal is projected for the Willow Creek Mine Facilities. Willow Creek Mine Facilities disturbance subtotals include 31 acres previously disturbed areas, 6.7 acres undisturbed soils, 1.6 acres riparian soils and 16.5 acres reclaimed sites.

Soil removal volumes and quality are estimates based on extensive field sampling of both disturbed and undisturbed soils in the proposed surface disturbance areas. However, actual recovery and resulting soil quality will be dependent on site-specific conditions and practical operating limitations. CPMC commits to the following:

- CPMC plans to sample soil materials prior to removal and placement in temporary stockpiles to verify suitability and optimize reclamation success. Samples will be analyzed for all suitability parameters defined by the Division's Topsoil and Overburden Guidelines. Sampling results will be reviewed, summarized, and provided to DOGM.
- Soil recovery operations will be supervised and monitored by a qualified and experienced reclamation specialist/soil scientist. Actual soil recovery depths,

surface area and resulting volumes will be documented and any site-specific limitations on soil recovery will be noted. Following completion of soil removal operations, a narrative description of soil recovery operations along with appropriate supporting documentation will be prepared and incorporated into the next Annual Reclamation Monitoring Report for submittal to DOGM. Any variations between actual and projected soil recovery as outlined by Table 4.2-1 will be identified and explained.

Soil and substitute topsoil will be salvaged and placed in stockpiles for storage. Existing soil stockpiles include one located in Gravel Canyon and two in the Crandall Canyon area. One new soil stockpile is located in the Willow Creek area on the west side of an existing rock outcrop known as "Devil's Slide." Soil stockpiles will be protected from erosion, contamination, and soil loss by establishing sideslopes at 3H:1V or less, providing roughened surface conditions, seeding with vegetative cover, posting, and using appropriate drainage control measures. Seeding will normally occur as soon as reasonably feasible once active soil stockpiling operations cease for a given stockpile area. Stockpile areas will be inspected periodically and any significant erosion or other problems will be noted and repaired.

Findings:

This portion of the permit application is complete and accurate

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 5.2, SOIL REPLACEMENT PLANS, describes the soil reclamation plans for the Willow Creek Facilities area. Generally, soil replacement and revegetation efforts will be coordinated to allow the seed to "winter over" with spring germination when soil moisture conditions are elevated.

Following completion of final backfilling, grading, and drainage reestablishment for surface disturbance areas, stockpiled soil will be hauled and spread on the regraded surface. In order to provide for effective short and long-term surface stabilization and achieve optimal revegetation success, CPMC will utilize soil stabilization and enhancement measures in combination with surface drainage treatments. These measures include establishment of effective drainage, deep-ripping the regraded surfaces and application of

finely chopped hay prior to soil material replacement, leaving the soil surface in a roughened condition, disking or plowing the soil prior to seeding, selective application of Alternative Sediment Control Measures, and mulching subsequent to seeding with straw or native hay. ASCM's include soil pitting, surface ripping, contour furrowing, and installation of silt fences and hay bales.

The final topsoil depth for the Willow Creek Facilities reclamation will depend on the final salvaged soil volumes; Willow Creek soil salvage average depth is projected at 17 inches with the reclamation bond set for 18 inches. Details for soil replacement plans for the Willow Creek Facilities Area are found in Section 5.4.2, Reclamation Plans and Practices. Other details include the Castle Gate Prep Plant, Loadout, and Schoolhouse Canyon Refuse pile - Exhibit 19, Castle Gate MRP (Section 3.4); and Crandall Canyon - Exhibit 20, Crandall Canyon MRP (Section 3.7-5(5)).

Long-term storage of soil buried deep inside soil stockpiles results in soil degradation with increased erodible characteristics. 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.

Following soil replacement, soil suitability analysis will be performed to assess the need for any corrective measures or soil amendments. Soil samples will be collected and analyzed for suitability parameters listed in Table 3.1-2, Overburden Evaluation for Vegetative Root Zone, and for fertility parameters which include available nitrogen, phosphorus and potassium. If analyses indicate potential suitability concerns, confirmation sampling will be completed at an increased sampling density. If confirmation sampling verifies potential suitability concerns, CPMC will consult DOGM and implement specific remediation plans.

Findings:

The reclamation topsoil and subsoil information is complete and accurate.