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DEPARTMENT OF NATURAL RESOURCES
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August 14, 1998

TO: File

THRU: Joe Helfrich, Permit Supervisor

FROM: Priscilla Burton, Reclamation Soils Specialist

RE: Barn Canyon Ventilation Facility, Cyprus Plateau Mining Corporation, Willow Creek Mine, ACT/007/038-AM98B-1, Folder #2, Carbon County, Utah.

SUMMARY:

The clearing of 0.46 acres of land in Barn Canyon is proposed for the development of a ventilation shaft (and potentially a ventilation fan). The disturbed area will encompass 0.72 acres. Topsoil 904.6 CY of topsoil will be salvaged and stored in Gravel Canyon.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

SOILS RESOURCE INFORMATION

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

Analysis:

The Barn Canyon Ventilation Facility amendment contains adequate information regarding the soils environmental resources as follows:

- Order-I Soil Survey and Map
- Soils Identification, Description and Characterization

Order-I Soil Survey and Map

An Order-I soil survey supplies information for the ventilation facility area. Mr. Jim Nyenhuis, ARCPACS Certified Professional Soil Scientist, conducted the survey for Mt. Nebo Scientific on January 14, 1998. Mr. Robert Davidson, Soils Senior Reclamation Specialist, Utah Division Oil, Gas and Mining (DOGM), was also present on the site during fieldwork. Four soil pits were dug, described, and sampled for the survey. Two native, undisturbed soils (BC3 and BC4), and two disturbed sites (BC1 and BC2) were sampled. For site BC2, the surface had been disturbed with the underlying soil substratum (C horizon) still present. Standard soil descriptions were completed in the field and a total of eleven soil samples were collected from the four pits.

The amendment contains an Order-I soils map delineating each soil, sampling locations and soil descriptions for each map unit (Figure 3.1-1). The map scale 1:360 is within the required 1:15,840 or larger scale for Order-I surveys. Likewise, the 0.46 acre surveyed site is within the minimum delineation size (2.5 acres) for an Order-I soil survey.

Soils Identification, Description and Characterization

For the Order-I soil survey, the four soil areas described are listed as follows with their respective soil series and taxonomic class:

MAP UNIT	PIT LOCATION	SOIL SERIES	TAXONOMIC CLASS[1]
A	BC-4	Perma Sandy Loam 10-25% slopes	loamy-skeletal, mixed, Typic Haploboroll
B	BC-3	Pathead Cobbly Loam 35-65% slopes	loamy-skeletal, mixed (calcareous), frigid Typic Ustorthent
C	BC-2	Disturbed Hillside Pathead (C horizon) 4-12% slopes	loamy-skeletal, mixed (calcareous), frigid Typic Ustorthent
D	BC-1	Disturbed Drainage 3-8% slopes.	None

The Order-I soil survey provides (1) a description of each map unit in areas A, B, C, and D; (2) a profile description of each of the soils at the four sample sites, BC1 through 4; and (3) a copy of the soil laboratory data for the eleven soil samples taken from the four sample sites.

[1] Jensen, E.H., and Borchert, J.W., 1988. Soil Survey of Carbon Area, Utah Soil Conservation Service, United States Department of Agriculture, Washington D.C.

Samples were sent to Inter-Mountain Laboratory (IML, Farmington, NM) for analysis according to the Division's Guidelines for Management of Topsoil and Overburden[2] and by consultation with Mr. Robert Davidson, DOGM. Parameters analyzed include pH, EC, saturation percent, Ca, Mg, Na, SAR, texture, $CaCO_3$, soluble B, soluble Se, TOC, and organic matter.

With the exception of rock fragments, soils have physical and chemical properties that are within DOGM's acceptable range for soil and overburden guidelines. The Division recognizes that native soils contain high percentages of rock fragments, is inevitable and does not present a reclamation hazard. Certainly, to reclaim and restore the land to pre-mining conditions will require soils with indigenous rock fragment volumes and content. Therefore, it is not only acceptable, but desirable to salvage soils containing intrinsic rock, gravels, cobbles and boulders.

Findings:

The information provided is adequate for the requirements of this section.

OPERATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

The Order-I soil survey for Barn Canyon Air Ventilation/Fan Shaft site includes discussion of topsoil suitability and potential soil salvage depths for each of the four soil map units as follows:

- Topsoil Salvage
- Soil Storage in Gravel Canyon
- Topsoil Salvage Summary

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[2] Leatherwood, James, and Dan Duce. 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. Salt Lake City, Utah.

Topsoil Salvage

Soil salvage recommendations are based on the Order-I soil survey which identifies topsoil suitability and volumes calculated for each of the four soil map units. Soil will be salvaged prior to construction and will include long-term and temporary soil storage. The Permit Area encompasses 0.72 acres. Within the Permit area is the Potential Disturbed Area that is 0.46 acres. This area is incorrectly identified on Table 4.5-1 as 0.36 acres.

Map Unit A, Perma sandy loam, is mapped in an undisturbed area under predominantly Gambel's oak vegetation. An average 2 feet of suitable soil is available for salvage and will include a 0.107 acres. Pockets of soil salvage may reach depths of 35 inches, but are not included within the projected soil salvage volumes. This soil is classified as a Mollisol which have deep rich A horizons. Therefore, this soil needs to be salvaged and segregated from other soils salvaged from the site.

Map Unit B, Pathead cobbly loam, is mapped in an undisturbed area under mixed vegetation including scattered Juniper. An average of 18 inches of suitable soil is available for salvage. In the affected area, it occupies 0.216.

Map Unit C, disturbed hillside, is located in an old disturbed side-hill cut where a pad site was created (0.046 acres). Present vegetation consists of mixed grasses and some sagebrush. Six inches of this soil will be salvaged and stored.

Map Unit D, disturbed drainage, is located adjacent to the main dirt road in Barn Canyon and includes the Barn Canyon drainage channel bottom areas (0.091acre) . No soil salvage will occur from this unit because the exposed surface soils are compacted and the underlying soil substratum contain greater than 65% total gravels, cobbles and stones.

Long-Term Soil Storage

The amendment states that long-term storage of 906.4 CY will be in the existing Gravel Canyon stockpile. The Map Unit A Mollisol (345 CY) needs to be salvaged, segregated and stored separately from the other salvaged soils for the purpose of returning this topsoil as the final top dressing during reclamation.

Topsoil Salvage Summary

Potential topsoil salvage depths and volumes are summarized for each of the four soil map units in the following table:

MAP UNIT	AVERAGE SOIL SALVAGE DEPTH (INCHES)	LONG-TERM STORAGE (CUBIC YARDS)
A	24	345.8
B	18	523.4
C	6	37.2
D	0	-
Total	-	**906.4**

Findings:

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. Prior to approval, the applicant must provide the following in accordance with:

R645-301-232 and R645-301-234, The Map Unit A Mollisol (345 CY) needs to be salvaged, segregated and stored separately from the other salvaged soils for the purpose of returning this topsoil as the final top dressing during reclamation.

An error in typing the disturbed acreage was noted in Table 4.5-1. The Barn Canyon Shaft Facility disturbed area should read 0.46 acres.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

A summary of topsoil volumes available for reclamation is given. Topsoil will be used during final reclamation at mine closure. No further information is provided for reclamation commitments of the ventilation disturbance area other than those generally contained in existing Mine Reclamation Plan.

Findings:

The information provided meets the regulatory requirements of this section.

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