



State of Utah
 DEPARTMENT OF NATURAL RESOURCES
 DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
 Governor

Ted Stewart
 Executive Director

James W. Carter
 Division Director

355 West North Temple
 3 Triad Center, Suite 350
 Salt Lake City, Utah 84180-1203
 801-538-5340
 801-359-3940 (Fax)
 801-538-5319 (TDD)

February 26, 1996

TO: File

THRU: Daron Haddock, Permit Supervisor *DQH*

FROM: Robert Davidson, Soils Reclamation Specialist *RAD*

RE: Expansion of Crandall Canyon Mine Surface Facility Area, Crandall Canyon, Genwal Resources Inc., ACT/015/032, Folder #2, Emery County, Utah

SYNOPSIS

Genwal Resources, Inc. have presented a Major Permit Modification to expand across Crandall Canyon Creek for the purpose of creating a larger surface facility area. The creek would be contained and diverted by installing a 1200 ft. long, 6 ft. diameter culvert. Utilizing imported fill material, construction of the new surface pad would add 4.65 acres of additional surface disturbance to the existing 5.55 acres.

Genwal proposes salvaging topsoil and substitute topsoil to an average depth of one foot from the proposed new-disturbed area and stockpiling the soils on the upper pad area. The stream channel and side slopes, which is the first terrace above the stream bottom, are to be left intact to preserve the stream morphology during reclamation. After the vegetation is removed, the stream insitu colluvial soils and alluvial deposits, including boulders and cobbles, etc., would be left intact and covered with a geotextile fabric. Any significant boulders required to be moved will be salvaged for reinstallation during reclamation. For the purpose of assisting both culvert installation and final reclamation efforts, a sand layer will be placed immediately over the geotextile fabric to create the exact grade and to act as bedding for the six ft. diameter culvert. During final reclamation, it is proposed that the sand layer will be easily removed (i.e., vacuumed) from the fabric's surface without damaging the stream channel. Thus, the stream's original morphology and surrounding insitu colluvial soils and alluvial deposits will be reclaimed with minimal disturbance.



ENVIRONMENTAL RESOURCE INFORMATION SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-222, -223, -233.

Analysis:

- Chapter 2 Soils.
- Section 2.22 Soil Survey.
 - 2.22.2 Soil Identification.
 - 2.22.3 Soil Description.
 - 2.22.4 Present and Potential Productivity of Existing Soils.
- Section 2.23 Soil Characterization.
- Section 2.24 Substitute Topsoil.

In general, Chapter 2 Soils provides incomplete new-soil resource information for the north facing slopes of the proposed culvert expansion area.

The permit modification references earlier soils resource information contained in the current working permit. These references include both an original soil resource appendix and a subsequent soil study prepared by the U.S. Forest Service. The original reference is for the existing surface disturbances and includes a detailed soil survey, soil description, productivity data and soil characterization information for the immediate facility's area (Appendix 2-3 and Plate 2-1). As detailed, this inclusive survey only includes the south facing soils of Crandall Canyon. The subsequent reference, provides a general-area soil survey for portions of the Huntington River watershed surrounding and within the jurisdiction of Genwal's leases. Appendix 2-3A does not contain specific survey information for the immediate facility area's north facing soils, disturbed or undisturbed.

A supplemental soil investigation was recently conducted by Genwal personnel in July 1995. Laboratory testing data are contained in Appendix 2-3B for two, hand extracted soil samples from undisturbed soils within the proposed culvert expansion. Soil sample analyses presented in Appendix 2-3B indicate that good quality soil was sampled, but laboratory methods were not disclosed. Field notes are lacking, sample locations are not identified on any soil map and the samples were not adequately labeled. Therefore, the Division is unable to determine from what locations and to what depths topsoil should be salvaged.

Regulations (R645-301-222, -223, and -224) require topsoil and substitute topsoil characterization and that an Order-I Soil Survey be conducted according to the

standards of the Soils Conservation Service as published in the "National Cooperative Soil Survey." The Division requests that Genwal seek prior approval of pit location and that the pits be left open for Division inspection. The Division's "Guidelines for Management of Topsoil and Overburden" request that qualified soil scientists conduct a soil survey of any location prior to disturbance. The qualifications of Genwal personnel were not disclosed (R645-301-130).

The imported fill material is not adequately identified and/or analyzed. Since the fill material will be placed directly into a riparian environment for an extended period of time, analyses should be performed for acid/toxic/hazardous forming properties (R645-301-724.500). In addition, the information presented throughout the text in Chapter 2 and Appendix 2-3B is confusing and needs clarification. Supplemental survey information repeatedly referenced, intertwines extracted information from the earlier two soil surveys with the recently collected data. Therefore, since the requisite qualifications of sampling personnel were not disclosed and there is a lack of succinct soil survey information, the Division cannot sufficiently evaluate the soil profile information provided.

Findings:

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

R645-301-130 Reporting Technical Data, R645-301-222 Soil Survey, R645-301-223 Soil Characterization, and R645-301-224 Substitute Topsoil. All technical data submitted must be accompanied by the names of persons or organizations that collected and analyzed the data, dates of the collection and analysis of the data, and descriptions of the methodology used to collect and analyze the data. Technical analyses will be planned by or under the direction of a professional qualified in the subject to be analyzed. The application must include an organized, clear and concise description of the premining soils' resource, including a map delineating the different soils, soil identification, soil description, and productivity of existing soils. The Order-I Soil Survey will meet the standards of the National Cooperative Soil Survey as incorporated by reference in R645-302-314.100. Finally, if the application proposes to use selected overburden material as supplement or substitute topsoil, the application must include results of analyses as required under R645-301-233.

OPERATION PLAN TOPSOIL AND SUBSOIL

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

Analysis:

- Section 2.31 General Requirements
 - 2.31.1 Methods for Removal and Storage
 - 2.31.2 Analysis of Topsoil Substitute
- Section 2.34 Topsoil Storage
- Plate 5-3 Crandall Canyon Mine Surface Facility Map

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

Soils will not be removed in the area of the stream bank. Here, a geotextile fabric will be laid over the soils to protect them *in situ*. It is not made clear in the narrative how surrounding terrain excavation, construction activities and placement of the culvert will proceed without disturbing the stream bed soils, however.

Genwal Resources Inc. plans to remove soil to a minimum depth of one foot. This soil will be segregated into topsoil and subsoil piles and stored on the upper storage pad. Physical dimensions of the salvage piles should be provided, including breadth, depth and length, to help assess the piles' volumes and exact placement on the upper storage pad. Location of the upper storage pad (Plate 5-3) is not identified on Plate 5-3 and/or other appropriate plates.

Soil survey and chemical analyses for topsoil and substitute topsoil have been completed for past salvage operations within the current disturbance areas. However, additional surveys and chemical analyses need to be performed for the proposed new disturbance areas on the salvageable north facing soils, subsoils and topsoil substitutes.

Soil salvage plans should be based on the soil's morphological profile and the technical difficulties of recovery, not the amount required for a six-inch redistribution layer. An adequate soil survey is required before the soil salvage operation can begin and for proper determination and assessment of topsoil depth and recovery estimates. The survey will enable prediction of soil salvage volumes, which will enable

determination of stockpile size, placement and location.

Findings:

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

R645-301-232 Topsoil and Subsoil Removal and R645-301-234 Topsoil Storage. All topsoil will be removed as a separate layer from the area to be disturbed, and segregated and stockpiled. Evaluation of compliance with this regulation requires that the deficiency stated under soils resource information is completed. This deficiency is repeated here: *The application must include an organized, clear and concise description of the premining soils' resource, including a map delineating the different soils, soil identification and description and present and potential productivity of existing soils. The Order-1 Soil Survey will meet the standards of the National Cooperative Soil Survey as incorporated by reference in R645-302-314.100.*

**RECLAMATION PLAN
TOPSOIL AND SUBSOIL**

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

Analysis:

- Section 2.42 Soil Redistribution
- Section 2.44 Soil Stabilization
- Section 2.43 Soil Nutrients and Amendments

The reclamation plan cannot be considered technically adequate for redistribution of soils, use of soil nutrients and amendments and stabilization of soils.

Presently, the mine has 3,701 yd³ stored in three stockpiles. Salvage of 6,300 yd³ is planned. A total of 10,000 yd³ will thus be stored on the site. A six-inch topsoil replacement depth is planned for the site. Although volume calculations are presented in section 2.42, there is confusion and appears to be a conflict with the calculations. Clarification is needed to help distinguish between current and proposed disturbed acres and available topsoil resources for reclamation.

Since Genwal is now making a concerted effort to maximize disturbance by

expansion of the Crandall Canyon Mine surface facility area, they will be making a significant impact on the watershed, wildlife, soils, and vegetation. Therefore, a concerted effort should be made to maximize topsoil recovery to provide a greater volume of topsoil available during reclamation. Soil Salvage plans should be based upon the soil profile and not the amount required for a six-inch layer redistribution. Crandall Canyon Mine site has been operating with a deficiency of stockpiled topsoil, hence the description of substitute materials in the plan. This expansion provides an opportune time to recover large amounts of topsoil to replace the topsoil lost in previous salvage operations. Genwal Resources Inc. could take this opportunity to improve the reclamation plan so that more than six inches of topsoil can be replaced over portions of the site. Thus, pockets of deep mollisol-like soils could be created which would provide islands of lush vegetation.

Conventional topsoil replacement techniques will be used except where the slopes are too steep. Here other methods will be used as described in section 5.40 (not included with the submittal). Slopes considered too steep were not identified. It is mentioned on page 2-5 that after erosion occurs, mulch will be applied to the reclaimed slope. The Division requests that mulching (e.g., erosion control blanket) occur prior to the occurrence of erosion, as a means of avoiding erosion of the redistributed topsoil.

Stream channel reclamation and soil restoration need to be thoroughly discussed in the Reclamation Plan. The section needs to discuss reclamation methods for removing the surface expansion fill, buried culvert, supporting sand layer, and geotextile fabric. In addition, pedogenesis of the buried soils will have been 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 humic acid, and structural breakdown of the soils. As a result, buried stream channel 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 microbial inoculation, organic matter additions, and soil surface stabilization (e.g., grass sodding, erosion control blanket, etc.).

Findings:

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

R645-301-242 Soil Redistribution, R645-301-243 Soil Nutrients and Amendments, 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. The Division shall not approve the 6" cover over the entire reclamation site since during reclamation, pockets of deep mollisol-like soils could be created which would provide islands of lush vegetation. Slopes where soils will not be salvaged should be identified. Acreages to be reclaimed should be reviewed for accuracy. Stabilization practices should include mulching and stabilization efforts immediately after topsoiling. Stream channel reclamation and soil restoration methods need to be identified for soil redistribution, amendments, and stabilization.

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