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State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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TO: Daron Haddock, Permit Supervisor

FROM: Wayne H. Western, Reclamation Engineer *WHW*

DATE: February 18, 1993

RE: Analysis of SUFCO's Deficiency Response Received October 13, 1992,
Southern Utah Fuel Company, Convulsion Canyon Mine, ACT/041/002,
Folder #2, Sevier County, Utah

R645-310-500. Engineering
R645-301-512. Certification

Deficiencies:

1. The Applicant must provide the Division with cut and fill volumes derived from cross-sections shown in Plate 5-3 and Plate 5-4.

Response:

Cut and fill volumes and cross-sections are contained in Appendices 2-5 and 2-4 respectively.

Analysis:

Appendices 2-5 and 2-4 provide the volume calculations. The plate and appendices are not cross-referenced. Without the cross-reference the reviewer has a difficult time locating information.

Outstanding Deficiencies:

None. The Applicant should provide cross references information on plate, maps, drawings, appendices, and text.

R645-301-514.300. Impoundments

Deficiencies:

1. The Applicant needs to cite the R645 rules, instead of R614.

Response:

All reference to R614 have been changed to R645.

Analysis:

The changes from the R614 to R645 rules have been made.

Outstanding Deficiencies:

None.

R645-301-521.100. Cross-Section and Maps

Deficiencies:

1. The Applicant needs to show the location of all openings to abandoned and active workings, and the location of electrical transmission lines and pipelines.

Response:

Plate 5-1 shows openings to abandoned works and active works in normal fashion for mine maps. Does this need further clarification? Plates 5-2A and Plate 5-2B show electrical lines and pipelines as described in text.

Analysis:

Labeling openings on the mine maps would be helpful, but not required. Plates 5-2A and Plate 5-2B show the electrical lines and pipelines.

Outstanding Deficiencies:

None.

R645-301-522. Coal Recovery

Deficiencies:

1. The Applicant will submit his resource recovery protection plan as an appendix to the permit.

Response:

An approved R2P2 is on file with the BLM and has been determined to be adequate. The measure to maximize the use and conservation of the coal resource is included in the MRP.

Analysis:

The Division no longer requires that a copy of the R2P2 be included in the MRP.

Outstanding Deficiencies:

None.

R645-301-525. Subsidence

Deficiencies:

1. The Applicant shall mark and identify the two experimental room-and-pillar extraction areas on an appropriate map and that map shall be referenced in the MRP.

Response:

Room-and-pillar areas were not experimental, however those areas have been marked on Plate 5-1.

Analysis:

The areas that were referred to as experimental in the original MRP submittal are not experimental and do not need a special label.

Outstanding Deficiencies:

None.

R645-301-525.100. Subsidence Control Plan

Deficiencies:

1. The Applicant needs to address R645-301-525.160 by describing the measures that will be taken to mitigate or remedy any subsidence related material damage to the land or structures.
2. The Applicant will commit to submit a copy of the subsidence survey in the annual report.

Response:

These issues are addressed in the subsidence section of the MRP.

Analysis:

The commitment in the MRP to mitigate any subsidence damage and supply the annual report is considered adequate.

Outstanding Deficiencies:

None.

R645-301-525.140. Monitoring

Deficiencies:

1. The locations of the subsidence monitoring points shall be shown on Plate 5-10 as indicated in the MRP.

Response:

Plate 5-10 has been revised to show the location of the subsidence monitoring points.

Analysis:

The Applicant has complied with the terms of the deficiency.

Outstanding Deficiencies:

None.

R645-301-525.200. Subsidence Control

Deficiencies:

1. The Applicant needs to submit a report to the Division explaining why some support pillars failed and what steps have been taken in pillar design and construction to prevent future failure.

Response:

A discussion of the pillar failure in the 5 North area is included in the MRP text.

Analysis:

An adequate explanation of the pillar failure has been supplied to the Division.

Outstanding Deficiencies:

None.

R645-301-526. Mine Structures and Facilities

Deficiencies:

1. The Applicant will include the location of existing structures in the text as required by R645-301-526.111.
2. The Applicant will provide plans or photographs of the structures and their current conditions as required by R645-301-526.112

3. The beginning and completion dates for the existing structures must be given as required by R645-301-526.113.

Response:

The information on existing structures is shown on Plates 5-2A and 5-2B. The beginning and completion dates for all structures are included in Table 5-4.

Analysis:

The Division has modified its requirements for this regulation. The information provided in the MRP is considered adequate.

Outstanding Deficiencies:

None.

the standards of the National Cooperative Soil Survey.

Compliance:

Plate 2-1 should be amended as follows: add a legend for the substitute topsoil locations shown on Plate 2-1; and delineate the extent of each of the soil families identified in App 2-2, Map D (as per National Soils Handbook Title 430, Part 605.03(d)(8)(i)(B)[2]; and add known rock outcrops which are shown on Plate 5-3 (as per NSH Title 430, Part 605.03(d)(6)(ii).

Deficiency #2

SUFCA must identify within Chapter 2 of the MRP which supporting documentation from App 2-2 and 2-3 applies to the soil sample locations described on the revised Plate 2-1.

Analysis/compliance:

Approximate soil sample locations and corresponding Appendix location have been provided on Plates 2-1 and 3-1. Testing of the spoil slope south of the sediment trap and soils east of the office complex was conducted by ARS and presented in App 2-3. The Permittee is in compliance.

For areas other than the sediment pond, the information in the appendices has limited value for determination of soil types and depth of horizonation. Consequently determination of soil salvage depths for undisturbed areas within the disturbed area boundary may require a preliminary soil survey of each proposed disturbed area prior to disturbance of the topsoil, to ensure compliance with the topsoil salvage plan described within the MRP.

224. Substitute Topsoil.

Deficiency #1

SUFCA must identify contemporaneously reclaimed areas which will be redisturbed for substitute topsoil on a map and in the plan and distinguish these areas as interim revegetation/substitute topsoil storage.

Analysis:

Plate 2-1 has a shaded spoil slope (approx. 2 acres) which will be a source of substitute topsoil during final reclamation along with the soils of the sediment pond area and other suitable locations (pg 2-9) and from restored slopes (pg 2-14).

Compliance:

The legend on Plate 2-1 should identify the shaded area as a source of substitute topsoil.

The slope east of the office complex has been contemporaneously reclaimed. This should be indicated on the map as contemporaneous reclamation and substitute topsoil material as per pg 2-14 of the the plan.

Deficiency #2

SUFCO must provide within the text of the MRP: a) an evaluation of the soils which are presently within the pad, which have potential for substitute topsoil use and which are the best available material within the fill for cover; b) a commitment in Chapter 2 of the MRP to test all proposed substitute topsoil material at the time of final reclamation according to Table 6 of UDOGM's 1988 "Guidelines for the Management of Overburden and Topsoil," and to include in the testing analysis of sulfate and chloride concentrations prior to utilizing any pad fill for substitute topsoil; c) an outline of the number of tests to be conducted based on the volume or tonnage of substitute topsoil to be utilized during final reclamation.

Analysis/Compliance:

Part a) The Permittee refers to App 2-3, the results of a 1979 ARS study of the slopes south of the sediment trap. Although not mentioned, the 1981 D&M study and the 1986 SHB engineering study which provide further information of the pad materials.

Dr. Southard who conducted the survey commented upon the sodic quality of sample location 3 (Gob). An SAR value of 12 reported for sample 3 is considered poor for coarse textured material and unacceptable for fine textured material. No textures were provided for the soils sampled, but gob or waste rock is usually of a coarse nature. SUFCO should note this situation and plan for sampling during the grading process to ensure that the best available cover material is utilized for cover as per R645-301-233.100. The Permittee is in compliance with Part a.

Part b) The Permittee refers to a sentence on pg 2-15, section 2.3.3.3 which states, "The applicant will utilize the proposed topsoil subsequent to approval by the regulatory authorities." The plan further explains that SCS methodologies will be followed by the analytical laboratory. Section 2.4.3 further describes analysis according to the Division "Guidelines." Page B-9 of App 2-4 indicates that boring sample 5 from the pad may contain materials high in sulfates and is a potential source of acidity. Analysis by the Guidelines for Acid/Base Potential should allow determination of the need for burial or amending of this material. The Permittee is in compliance.

Part c) An outline of the frequency of testing to obtain said approval was not included in the

submittal and can not be adequately bonded for. For the purposes of determining adequate bonding and ensuring compliance with R645-301-224, it is recommended that SUFCO develop a sampling plan for the regraded spoil: to estimate the frequency of sampling per yard, acre or ton of substitute topsoil material during or after final grading. If sampling is conducted after grading, specify planned sampling depth of the substitute topsoil, and whether samples will be composite or segregated by depth.

The exposed south slope of the mine pad is a proposed source of substitute topsoil. Interim reclamation of this area will serve to protect the substitute material and demonstrate the suitability of the material for substitute topsoil. Demonstration test plots have been proposed, see R645-301-341.300.

Deficiency #3

SUFCO must correct the first statement made in Section 2.24 to indicate that substitute topsoil will be selected from pad fill and contemporaneously revegetated slopes, and; correct the last statement of section 2.3.2.7 to indicate that importation of substitute topsoil may be required depending upon revegetation success according to the standards of R645-301-356.

Analysis/Compliance:

Section 2.2.4 and Section 2.3.2.7 have been corrected. The Permittee is in compliance.

230. Operation Plan.

Deficiency #1

SUFCO must indicate in the text of the MRP: a) an average soil depth which will be salvaged from proposed disturbances or indicate that a topsoil survey will be conducted prior to new disturbance (page 4-10); b) that minor disturbances where SUFCO does not anticipate topsoil removal will meet with prior UDOGM approval (Section 2.3.2.4); c) that salvaged and stored topsoil will not be moved without prior approval from the Division (Section 2.3.4.3); d) that the A, B & C or A & AC & C horizons will be collectively segregated from the proposed disturbed area and stockpiled (Section 2.3.2.5 on page 2-13).

Analysis/Compliance:

Part a) Page 2-10 of the MRP is referred to in the response. This provides an assurance of salvaging topsoil and underlying horizons prior to disturbance. Sections 2.3.1.1, 2.3.2.2, 2.3.2.3, and 2.3.2.5 outline the removal of topsoil and subsoil from new disturbances. For areas with limited A horizon development (Section 2.3.2.3) the depth of soil to be removed and segregated is not specified. Will the operating performance standard for the depth of

salvage be according to Section 2.3.1.1.? In otherwords, salvage and storage of A through C horizons for areas of limited A horizon development? Section 2.3.2.3 and Section 2.3.1.1 must indicate an operating performance standard for the depth of salvage for areas with limited A horizon development.

Part b)

Page 2-13, Section 2.3.2.4 states "Topsoil will not be removed prior to construction resulting in only minor disturbances as described in R645-301-232.400..." Division approval of this wording will allow minor disturbances of all sites as described in R645-301-232.410 and 420. Therefore, Section 2.3.2.4 will become a performance standard as per R645-301-251. The Permittee is in compliance.

Part c)

Sections 2.3.4.2 and 2.3.4.3 state a commitment to seek DOGM approval prior to relocation of topsoil piles during operations. The Permittee is in compliance.

Part d)

Section 2.3.1.1 in combination with Section 2.3.2.5 indicate SUFCO's plan for segregation of topsoil (A horizon) and salvage of subsoils prior to new disturbances. The Permittee is in compliance.

Deficiency #2

SUFCO must indicate in the text of the MRP the volume of topsoil presently stored at the mine facilities and subsoil stored in the substation binwalls intended for final reclamation cover material.

Analysis/Compliance:

Section 2.3.1.4 itemizes the topsoil and subsoil which has been segregated for cover material. The sediment pond pile covers 0.105 acres and contains 1,200 yd³. The substation pile covers 0.02 acres and contains 27 yd³. How were the volumes determined?

Subsoil removed from the Run of Mine storage pile location is stored at the Waste Rock Disposal Site. Topsoil was removed from the storage site prior to placing the subsoil pile. There is 1000 yd³ of material in the topsoil pile designated for use on the adjacent subsoil storage area (pg 2-12, section 2.3.1.4).

2,160 yd³ of this subsoil was utilized in the construction of the bin walls of the substation. This subsoil along with the 5,300 yd³ of road base in the binwall will be available for cover

during final reclamation (Section 2.3.1.4). The Permittee is in compliance.

Prior to utilizing substation road base and binwall materials as substitute topsoil, the Permittee should ensure that there has been no contamination by oils, greases, diesel, gas or lubricants.

240. Reclamation Plan.

Deficiency #1

SUFCO must commit to ripping the subsoil to an 18-24 inch depth and applying substitute topsoil cover depths of 12 inches on slopes less than or equal to 2h:1v; and ripping to a depth of 12 inches and applying substitute topsoil cover depths of 8 inches on slopes greater than 2h:1v up to the angle of repose, 1.5h:1v.

Analysis:

Specification of ripping depth was not determined to be required by R645-301-242.200. The term "suitable" was determined to be acceptable for a description of ripping depth in an Administrative review as stated in letter form on 8/6/92 in the correspondence folder of ACT/007/005. SUFCO will scarify slopes with suitable equipment to a suitable depth, pg 2-19, Section 2.4.2.2.

Compliance:

The reclamation plan does not specify details of soil redistribution practices. Although Division Management does not feel that this information is warranted at the present time, I recommend that the Division acquire specific details for the site prior to final reclamation. These details will be required for a determination of compliance with the performance standard of R645-301-251 and for bond release inspections.

A commitment to replace 6 inches of substitute topsoil over compacted fill will not be comparable to predisturbance soil depths. A minimal 12 inch substitute topsoil cover depth on the lesser slopes equal to or less than 2h:1v and and 8 inch depth on the steeper slopes greater than 2h:1v up to the angle of repose, 1.5h:1v, should be required by the Division. Page 2-18, and bonding calculations should be revised accordingly.

Deficiency #2

SUFCO must commit to applying an amendment (such as alfalfa hay at a rate of 3T/ac) and

a complete (N, P, K) fertilizer to the topsoiled slopes prior to scarifying to a depth of 6 inches; as well as gouging with a track hoe all slopes less than 2h:1v after topsoiling and prior to seeding.

Analysis/Compliance:

The intent of this condition was not only to ensure compliance with the erosion protection regulations of R645-301-240, but also to incorporate a source of organic matter which would provide a source of nutrition for decay organisms, beginning the healthy development of soil in material which will have been stored for decades in the sterile environment of the mine pad and bin walls. This practice or any other method of incorporation of organic amendment to the soil (exclusive of seed mulch) is recommended as a suitable practice to promote revegetation success. Field trials can test the best methodology (see R645-301-341.300.

Section 2.4.3 states that soils will be analyzed according to the Division "Guidelines" to determine what amendments and fertilizers will promote revegetation. The Permittee is in compliance.

Deficiency #3

SUFCO must provide the Division with cut and fill volumes derived from Plate 5-3 Post Reclamation Surface Configuration and Plate 5-4 Post-Reclamation Cross Sections submitted with the MRP or revise Plates 5-3 and 5-4 to show cross-sections from which reported cut and fill volumes were calculated; and provide within the MRP a supporting discussion of the angle of repose for the spoil slopes to which topsoil will be applied.

Analysis:

SUFCO indicates that App 2-4 and 2-5 supply adequate information for calculation of cut/fill volumes.

Compliance:

Cut and fill volumes reported in App 2-5 and referred to on page 5-55 of the MRP are calculated from maps and cross-sections developed by the SHB engineering study of the mine pad. Total cut is calculated at 42,150 yd³. Total fill is calculated at 41,100 yd³ (App D of App 2-4, pg 12 of 12).

Plates 5-3 and 5-4 do not provide the reclamation cross-sections from which the above cut and fill volumes were calculated. The MRP (pg 5-55 of Section 5.4.2.2) quotes total cut and fill volumes of 74,734 yd³ and 71,173 yd³, respectively. The calculations are not provided for review and the cross-sections used to derive these cut/fill volumes are not identified. The reader is referred to App 2-4 where the lesser cut/fill volumes are derived.

The Division can not check the adequacy of the calculations of cut/fill volumes with the information provided in the MRP. Please provide cross-sections and calculations to the Division which were used to develop the cut/fill volumes in Section 5.4.2.2.

The commitments for replacing topsoil on slopes less than 1h:1.5v appears to have been derived from the EPS study in App 2-2, pg 35a. (This may be a typographical error which should read 1.5h:1v.) The Division requires that topsoil is replaced on all slopes of 2h:1v or less. SUFCO's commitment to replace topsoil on steeper slopes will require evidence that this angle is less than the angle of repose for an uncompacted surface (R645-301-553.130). Please indicate the angle of repose for the spoil slopes and make the appropriate corrections in page 2-18 of the MRP.

R645-301-341.300 Revegetation Feasibility Demonstration

Deficiency #1

SUFCO must provide a schedule for establishing revegetation test plots to demonstrate the suitability of substitute topsoil and final revegetation techniques at the mine site.

Analysis/Compliance:

SUFCO has stated in the submittal cover letter that a demonstration plot program will be developed with input from the Division. SUFCO anticipates development of these plots in the Fall of 1993. The Permittee is in compliance. The Permittee should submit an amendment for review by the soils and biologists on staff. An objective of the trials should be to determine the benefits of organic matter amendments to the soils (see discussion under R645-301-240, Deficiency #2).

553.620. Approval is obtained from the Division for incomplete elimination of highwalls in previously mined areas in accordance with R645-301-553.500;

Deficiency #1

SUFCO must provide a surface map with the highwall retention request of Appendix 5-2 to outline surface disturbance previous to the 1977 SMCRA regulations prior to receiving Division approval of this practice.

Analysis:

A request for incomplete elimination of highwalls is presented in Appendix 5-2. Slopes are identified along the west and north of the disturbed area and shown on App 5-2 Plate 1 "Highwall Cliff/Ledge Retention Map." A map showing pre-SMCRA surface disturbance was requested.

SUFCO indicates that Plate 5.1 has been revised to show pre-SMCRA disturbances. A revision of Plate 5.1 could not be found with the submittal. However, a revision of Plate 5.2B was found with the submittal which shows limited pre-SMCRA surface facility development with one legend and a second legend with much larger surface disturbance prior to 1977. Please clarify this discrepancy.

CONCLUSIONS:

As discussed in the body of this document, further information is recommended for a determination of compliance with the following deficiencies of Division Order 92A:

R645-301-121.200,	Deficiency #1
R645-301-222,	Deficiency #1
R645-301-224,	Deficiency #1, Deficiency #2 Part c
R645-301-230,	Deficiency #1 Part a
R645-301-240,	Deficiency #1, Deficiency #3
R645-301-553.620,	Deficiency #1

The reclamation plan does not specify details of soil redistribution practices. Although Division Management does not feel that this information is warranted at the present time, I recommend that the Division acquire specific details for the site prior to final reclamation. These details will be necessary for a determination of compliance with the performance standard of R645-301-251 and for bond release inspections.

I recommend that bonding is revised to require a minimal 12 inch substitute topsoil cover depth on slopes equal to or less than 2h:1v and 8 inch depth on the steeper slopes greater than 2h:1v.