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Technical Analysis and Findings

Utah Coal Regulatory Program

October 6, 2015

PID:	**C0410002**
TaskID:	**4982**
Mine Name:	**SUFCO MINE**
Title:	**WASTE ROCK SITE EXPANSION**

Environmental Resource Information

Permit Area

Analysis:

The application meets the minimum requirements of R645-301-521.140 due an updated Map 1 and Map 2 that were provided detailing that disturbance of the waste rock site will increase to 46.3 acres.

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Soils Resource Information

Analysis:

Analysis:

The information meets the requirements of R645-301-222 for pre disturbance soil survey. An Order II soil survey of the waste rock expansion area is found in Appendix V(A) and summarized in MRP Section 222.300 and Section 222.400. Figure 5 is the soils map of the expansion area.

The 46 acre site (cover letter) is at an elevation of 7,900 ft . Precipitation amounts to 17-18 inches annually (Section 220). Vegetation is dominated by an understory of bluegrass, crested wheatgrass, fescue and thickspike wheatgrass and an overstory of basin big sagebrush and mountain big sagebrush, gambel oak and quaking aspen (App. V(A)) Soils to be salvaged were mapped by the Fishlake National Forest as Typic Argiustolls and Pachic Argiustolls (Table 1, App. V (A)). The Order II soil survey further broke these map units in to five soil map units described in Section 2 of App V(A) and shown on Figure 5 of the MRP. Soil Map units 1 and 2 dominate the expansion area. These are very deep soils. Table 7 of App V(A) provides the estimated topsoil salvage depths and subsoil salvage depths for each soil profile. For instance, profile 13SF03 is representative of Kunz soil 1 in phase 1. For profile 13SF03, there could be fifteen inches of topsoil and fifty-two inches of subsoil salvaged. Additional tables in the soil survey provide average topsoil and subsoil salvage for each soil family (Table 8) and a weighted average depth for each map unit (Table 9). For soil 1 in phase 1 the weighted average topsoil salvage depth is 20 inches and the weighted average subsoil salvage depth is 38 inches.

Map unit 2 has aquic soil conditions within one meter of the surface. Soil mottles were observed between 84 - 200 cm indicating groundwater fluctuation between 33 - 78 inches.

The pre-disturbance soil survey information did not include analysis of N:P:K. Therefore section 222.200 states that a composite sample of topsoil will be taken at each phase and analyzed for a list of parameters, including available nitrate nitrogen, available phosphorus and extractable potassium. This information will be used for comparison with nutrient

analysis taken at final reclamation, to determine whether amendments to the soil are necessary.

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Operation Plan

Mining Operations and Facilities

Analysis:

On September 21, 2015, the Utah Division of Oil, Gas, & Mining received an application for an amendment to the Mining & Reclamation Plan (MRP) of the Sufco Mine. The application seeks approval to construct a expansion to the existing waste rock site. This memo addresses the application's compliance with the engineering (R645-301-500) and bonding (R645-301-800) sections of the Utah Coal Mining Rules.

The application meets the minimum requirements of R645-301-500 and -800 by presenting the mine plan details, plates, and drawings presented within the application detailing the operation and reclamation of the expanded waste rock site. The application was previously submitted to the Division under Task #4806 and #4953 and was denied due to missing engineering and hydrology details. The current application includes updated drawing that show appropriate level details as to how top/sub soil volumes will be handled, where waste will be tied into the existing waste rock pile, and operational waste rock elevations at each of the set phases. The bond will be increased to include construction through Phases 1 through 3 of the waste rock.
The application meets the minimum requirements of R645-301-523 and -526 by including
the addition of text to Chapter 1 Section 111, Chapter 5 Section 525, and Chapter 6 Section 624 detailing that no underground mining will or has occurred at the waste rock disposal site. Text within Chapter 5 section 523 was updated to reflect that that equipment will vary according to the quantity of waste to be process, hauled, and compacted at the site.

The application meets the minimum requirements of R645-301-528 by including a narrative explaining the construction, modification, use, maintenance of the proposed Coal Waste Rock Disposal keying into the existing Waste Rock pile specifically:
• Maps 2A through 2E show the topsoi/subsoil pile size as it will exist within the maximum disturbance at any given point of each phase to match the volumes shown in the tables on the top left of each corresponding map.
• The application show the proposed operational map tying into existing contours on all sides.
• Map 4A through 5E show the approximate footprint area of each phase of the waste rock pile construction.

The majority of text meets the minimum requirements of R645-301-528 as Chapter 5 Section 528 was updated to include a narrative explaining the basic cycle of how the waste will be conveyed to the site of the Coal Waste Rock Disposal. The application details the general plans and construction of the proposed waste rock pile in Chapter 5 Section 530. The text describes how the waste rock pile site will have the foundation area prepared, stages of construction of the sequential phases 1 through 6 in the proposed waste rock areas and how the previous phase's area will be contemporaneously reclaimed.

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Topsoil and Subsoil

Analysis:

Analysis:
The overall approach to soil salvage and stockpiling meets the requirements of R645-301-230 Operation plan, however there are two deficiencies on details of the operation remaining.

Soil Map units 1 and 2 dominate the expansion area. These are very deep soils. Section 231.100 (p. 2-11) describes the salvage of 17 - 35 inches of topsoil and 0 - 38 inches of subsoil. Topsoil and subsoil will be placed in separate piles. Topsoil and Subsoil salvage volumes are presented in the WRDS Expansion table (p. 2-5) and on Map 2 sequence A-F in a more precise table format. In the map table, the approximate soil salvage depth is given in inches and the area of salvage is given in square feet. The volume to be salvaged and stockpiled is derived from these two numbers and reported in cubic yards. The average soil salvage depths used in the table is the weighted average reported in Table 8 of App V(A). There was not time to check all the figures for each phase, but based upon the information provided on Map 2A for phase 1, the volume of soil salvage is plan is based upon the soil survey.

As described on the Map 2A table, there will be an average depth of 2.55 ft of topsoil removed from 5.09 new acres in Phase 1. The Phase 1 salvage of TOPSOIL will be as follows: 2.25 ft. (27 inches) from soil type 1; 2.91 ft. (35 inches) from soils type 2 and 1.58 ft. (19 inches) from soil type 4.

The plan describes a person with experience in soil salvage being present to supervise the soil salvage operation. That person will use soil trenches and the soil report to monitor salvage depth. An as-built survey of stockpiled soil will be provided as an update to the MRP (p. 2-13). The Division asks that this statement be clarified to indicate the as-built volumes will be provided for each Phase of operation, within 6 months of soil salvage.

In Section 531, the plan describes the use of loaders, scrapers, excavators and haul trucks to strip and stockpile topsoil and subsoil. The use of scrapers creates compact stockpiles that are difficult to vegetation. The use of scrapers is not recommended or desirable for topsoil and subsoil salvage.

Topsoil and subsoil will be salvaged and stockpiled separately. Grubbed vegetation may be shredded and incorporated into the piles (Section 231.100 p. 2-11). A few trees may be placed on top of the piles. The Division requests that shredded vegetation not exceed 30% of the surface and not exceed more than 10% of the total soil volume.

Stockpile will be constructed in horizontal lifts. Slopes will be graded (2h:1v to 3h:1v) and roughened, mulched and seeded . The mulch type is not specified, but a minimum of 1 ton/acre is specified. Stockpiled soil will be seeded with the grass and forb component of the final mix provided in Section 341.200. Stockpiled soils will be signed, bermed and fenced (Section 234.100, p. 2-19 and 2-20). Berms will be as shown in Appendix C of App. VII, Disturbed Berm Detail (Section 234.200).

Note:Information retained under the headings, Historic, has been changed with this amendment. Ideally, historic information should not be changed, because that defeats the purpose of the designation.

Deficiencies Details:

Findings:
R645-301-121.200, An as-built survey of stockpiled soil will be provided as an update to the MRP (p. 2-13). The Division asks that this statement be clarified to indicate the as-built volumes will be provided for each Phase of operation, within 6 months of soil salvage.

R645-301-121.200, Grubbed vegetation may be shredded and incorporated into the piles (Section 231.100 p. 2-11). A few trees may be placed on top of the piles. The Division requests that shredded vegetation not exceed 30% of the surface and not exceed more than 10% of the total soil volume.

R645-301-121.200, The meaning of the following statement on page 2-19 is not understood by the Division, "Prior to September 2015, there is insufficient information as to what methods or treatments were used on the existing topsoil and subsoil stockpiles." Please elaborate, since records of topsoil and subsoil salvage and treatments at the waste rock site have been kept since its inception.

R645-301-231.100, In Section 531, the plan describes the use of loaders, scrapers, excavators and haul trucks to strip and stockpile topsoil and subsoil. The use of scrapers creates compact stockpiles that are difficult to vegetate. The use of scrapers is not recommended or desirable for topsoil and subsoil salvage. Please remove the use of scrapers from consideration when creating the subsoil and topsoil stockpiles.

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Maps Affected Area

Analysis:

The application meets the minimum requirements of R645-301-521.100 through-521.130 by providing updated text and maps detailing the operational contours and grading plan for each phase of construction of the expanded waste rock site, specifically:

• Maps 2A through 2E fail to show grading of the operational surface tying into the existing ground.
• Maps 4A through 4E show the full extent of the area where waste rock is to be placed.

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Reclamation Plan

Backfill and Grading General

Analysis:

The minimum requirements of R645-301-553 are met within the application due information presented in Maps 2A through 2E and Maps 4a through 4E. As detailed previously in section 521 and 542, detail how the proposed operational surface will be tied into the exiting waste rock pile and ground surface. The text within Chapter 2, on page 2-4 and 2-5, details the various volumes of sub and top soil to be removed specific to each phase.

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Topsoil and Subsoil

Analysis:

R645-301-240, The application does not meet the requirements for topsoil redistribution because the MRP makes conflicting statements concerning redistribution depth of soils over the waste which do not conform with R645-301-553.250 and because maps illustrate a 26,934 CY subsoil stockpile remaining at final reclamation, which is not in conformance with R645-301-242.100.

Section 536 describes the waste rock pile reaching a height of 65 feet with a capacity of 938,207 CY of refuse, and having slopes that are 2h:1v (p. 5-29). There is no mention of the total acreage of the waste rock placement area. The table in Section 252 states contemporaneous reclamation acres during each phase of operation, including the final phase, with the total adding to 24.42 acres. This figure may include roads and sediment ponds as well as acreage dedicated to waste storage. Maps 8, 8A and 8B show the final reclamation topography.

Contemporaneous reclamation is anticipated at the waste rock site. Map 2 series states topsoil and subsoil replacement depths. A table provided in Section 252 describes waste rock area to receive topsoil and subsoil in acres. Contemporaneous reclamation during Phase 1 is 1.28 acres. For phase 2 the contemporaneous reclamation area is 4.23 acres. Phase 3 = 5.98 acres. Phase 4 = 4.93 acres. Phase 5 = 5.42 acres. Phase 6 = 2.58 acres. That is a total is 24.42 acres of reclaimed area at the waste rock site over the six phases of operation.

Section 542.100 provides a reclamation timetable for the existing lifts and each phase of operation.

Section 242.100 describes the placement of 30 inches of cover over the waste: 15 inches of topsoil and 15 inches of subsoil. The basis for this lesser cover is a forthcoming report on contemporaneous reclamation (p. 2-23). Section 553.200 states that selected overburden materials may be used below the salvaged subsoil to provide final cover. Where overburden materials are used, the operator commits to demonstrating to the Division that the overburden materials are non-acid and non-toxic forming and non-combustible (p. 5-38). The reader is referred to a waste sampling program in Section 536, however no information on waste sampling could be found. Approval of less than four feet of cover is dependent on the chemical characteristics of the waste, which can not be assumed to be equivalent to waste currently in the pile.

Section 242.100 (p. 2-24) describes variable replacement of cover from 42 inches to 54 inches depending upon topsoil and subsoil recovery during each phase of operation. Replacement depths will be confirmed by survey and as-builts will be provided (p. 2-24). The Division requests that the as builts are provided within 6 months of completion of each phase.

The argument over cover depths appears mute, because Map 8 Reclamation Contours shows the subsoil stockpile will be reclaimed in place. The volume of this subsoil stockpile is shown as 26,934 CY during Phase 6 as shown (Map 4F). That is enough subsoil to cover the approximately 21 acres of waste rock with an additional 9.5 inches of subsoil. In accordance with R645-301-242.100, all salvaged topsoil and subsoil will be redistributed over the reclaimed area.

All operational areas will be ripped to a depth of 1.5 to 2.0 feet prior to replacement of one foot of topsoil (Section 242.200). The surface of the waste rock will be left in a roughened state and the first lift of subsoil will be ripped into the waste rock to a depth of 12 inches. (Section 242.200 p 2-25). After topsoil is replaced. Samples will be taken for nutrient analysis. There will be one sample per acre to be collected and analyzed as described in Section 231.300 (p. 2-16).

Deficiencies Details:

Deficiencies:
R645-301-240, The application does not meet the requirements for topsoil redistribution because the MRP makes conflicting statements concerning redistribution depth of soils over the waste which do not conform with R645-301-553.250 and because maps illustrate a 26,934 CY subsoil stockpile remaining at final reclamation, which is not in conformance with R645-301-242.100.

R645-301-242.100, Map 8 Reclamation Contours shows the subsoil stockpile will be reclaimed in place. The volume of this subsoil stockpile is shown as 26,934 CY during Phase 6 as shown (Map 4F). That is enough subsoil to cover the 21 acres of waste rock with an additional 9.5 inches of subsoil. (In accordance with R645-301-242.100, all salvaged topsoil and subsoil will be redistributed over the reclaimed area.

R645-301-121.200, Replacement depths will be confirmed by survey and as-builts will be provided (p. 2-24). The Division requests that the as builts are provided within 6 months of completion of each phase.

R645-301-121.200 and R645-301-553.250 and R645-301-731.300, Where overburden materials are used, the operator commits to demonstrating to the Division that the overburden materials are non-acid and non-toxic forming and non-combustible (p. 5-38). The reader is referred to a waste sampling program in Section 536, however no information on waste sampling could be found. Please provide a sampling program for the waste.

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Stabilization of Surface Areas

Analysis:

Analysis:
The application is not in compliance with the requirements of R645-301-244.200. Section 244.100 describes the use of mulch or surface roughening or both. Mulch will be applied at a minimum rate of 1.5 tons per acre (p. 2-27). Section 341.200 states that the use of mulch will be evaluated on a case by case basis, because the use of mulch may delay seed germination. Mulch is much more important as an erosion control method than for seedling establishment (Practical Guide to Reclamation in Utah, 2000). The plan must not waiver on the use of mulch.

Deficiencies Details:

Deficiency:
The application is not in compliance with the requirements of R645-301-244.200. Section 244.100 describes the use of mulch or surface roughening or both. Mulch will be applied at a minimum rate of 1.5 tons per acre (p. 2-27). Section 341.200 states that the use of mulch will be evaluated on a case by case basis, because the use of mulch may delay seed germination. Mulch is much more important as an erosion control method than for seedling establishment (Practical Guide to Reclamation in Utah, 2000). The plan must not waiver on the use of mulch.

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Maps Reclamation Final Surface Configuration

Analysis:

Deficiencies Details:

Deficiency:
R645-301-242.100, Final reclamation Map 8 must show all stockpiled subsoil as redistributed.

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