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Technical Analysis and Findings
Utah Coal Regulatory Program

PID: C0410002
TaskID: 4584
Mine Name: SUFCO MINE
Title: SOIL NAIL SLOPE STABILIZATION

Operation Plan

Topsoil and Subsoil

Analysis:

Installation of a new metal building in the upper mine yard will require excavation of "coarse, boulder colluvium" from a 40 - 45 degree slope (1h:1v) that will be shored up with soil nails (Section 2.1 Design Criteria, App. 5-11, Intermountain GeoEnvironmental Services, Inc. (IGES). Drawing No. Appendix 5-11 shows the location of the excavation. The location is outlined on Plate 2-1, Soils Map as Soil Type O: loamy-skeletal, mixed, frigid Ustic Torriorthent. Section 2.2.2.3 of the MRP describes a typical pedon of Soil Type O. Topsoil is a slim 2 inches of sandy clay loam with 15% gravels. The AC horizon extends to twelve inches, also sandy clay loam with 45% rock fragments. The C horizon extends to 31 inches, also sandy clay loam, with 30% rock fragments. Bedrock is encountered at 31 inches.

Sheet 1.3 illustrates the area to be excavated for soil placement (an irregular shape about 20 ft high by 80 ft at its longest length). The Permittee has estimated that a volume of 81 yd³ of rock and soil will be placed in the waste rock subsoil stockpile from this excavation. This figure has been added to the subsoil accounting on page 2-20 of the MRP and to the WRDS volume page 3-5.

The table of topsoil and subsoil piles shown on WRDS p. 3-5 suggests that the additional subsoil will be placed on the existing subsoil stockpile, as no new acreage will be dedicated to storage. WRDS p. 3-4, Section 3.1.6 provides information on the subsoil stockpile configuration and states subsoil will be seeded with the mix found in Table 4.6.1-1.

Reclamation contours of the mine site slope are shown on Plate 5-3B and were not revised with this application.

This application is recommended for approval with a request for as-built information on the volumes of soil salvaged and transported to the waste rock site within 30 days of completion.

pburton

Hydrologic General

Analysis:

The Permittee has submitted an amendment to address the stabilization of a slope behind the previously permitted annex building. A soil nail wall will be constructed to stabilize the cut. In the Design Calculation Package, section 2.1, it states that groundwater is not known to occur on the slope and that if groundwater is encountered, construction will stop until the design engineer can properly assess the design. This is also state on plate 1.6.

Support Facilities and Utility Installations

Analysis:

The amendment requests permission to construct a soil nail wall to stabilize the slope directly behind the recently approved Annex building.

The technique uses grouted tension-resisting steel elements drilled into an exposed soil face and grouted into place. Design details and drawings associated with the soil nail wall (shotcrete) and soil nails is located in Appendix 5-11.

Sheet 1.2 illustrates the location of the wall and soil nails. The exact length of the wall will need to be field-fit, thus on the illustration the location of soil nails extends beyond the end of the wall.

Sheet No. 1.4 illustrates the soil material to be removed to facilitate the installation of the wall and facilitate the insertion of the soil nails.

The permanent wall has been designed assuming a 0.25H:IV cut (about 14 degrees batter). The application states that a minimum static factor-of-safety of 1.50 (permanent) and 1.20 (temporary) was considered acceptable for this project based on the available information and design assumptions.

This information is in compliance with the requirements of Utah State Law R645-301.553.530, which requires in place high-walls to achieve a minimum long term static safety factor of 1.3.

The application included all pertinent stability design calculations for the soil nail wall as well as the appropriate corresponding plans, maps, details, narrative, cross sections, and certifications. The stability design criteria is clear and concise.

jowen

Reclamation Plan

Backfill and Grading on Steep Slopes

Analysis:

The soil nails will remain in the slope and covered with soil during reclamation, the shotcrete wall will be broken up and buried during reclamation. Bonding for the removal of the shotcrete wall has been provided in Appendix 5-9. The reclamation contours of the slope are shown on Plate 5-3B of the application.

jowen

Bonding Determination of Amount

Analysis:

The bonding calculations were updated to accommodate construction of the new shotcrete wall. The subtotal for the demolition and removal direct cost increased from \$1,233,662.50 to \$1,232,440.50. There were no changes to the cost estimates for backfilling grading or revegetation.

Including indirect costs, the total cost increased from \$2,477,208.50 to \$2,475,58.50. The total direct cost was appropriately escalated 5 years to 2019 dollars using the Division's approved escalation factor of 1.9

After escalation, the bond amount increased from \$2,628,000 to \$2,722,000.

The current posted bond is \$2,874,000, which leaves \$152,000 (+5.29%) of excess bond in place.

Based on the above information, the bonding is adequate.

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