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**Technical Analysis and Findings**  
**Utah Coal Regulatory Program**

**PID:** C0410002  
**TaskID:** 4457  
**Mine Name:** SUFCO MINE  
**Title:** EXPANSION OF LIFT #5

**Reclamation Plan**

**Contemporaneous Reclamation General**

*Analysis:*

The waste rock site has been contemporaneously reclaimed (Vol. 3, Section 3.4). Map 4 v.4 of Volume 3, illustrates the status of reclaimed, active and topsoil salvage areas at the refuse site. Map 4 shows the first four cells reclaimed. Cell #3 of the waste rock site was seeded in November 1998 (email from Mike Davis 11/19/2009). Cell #4 was started in 1998 and completed in the fall of 2009. Cell #4 has been topsoiled and gouged and was seeded in the fall 2009 (see photographs in image folder 11182009). Vol. 3, Section 3.2.4 specifies a thirty inch cover depth over the waste rock site which was confirmed for cell #4 during a site inspection on 11/18/2009. Cell 5 or Lift #5 is the final remaining cell.

Map 2 shows final contours of the reclaimed cells or lifts # 1 through 5. Map 2v6 shows the cross section locations. Map 2A shows an additional cross-section through the expansion area.

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**Environmental Resource Information**

**Permit Area**

*Analysis:*

The waste rock disturbed area was enlarged from 7.223 acres to 8.733 acres with the West Lease amendment approved 2/1/2011. The waste rock area was enlarged from 8.733 to 10.76 acres with the west lease subsoil as-builts (Task 4395 Vol 1, p. 1-12 ). The current proposal increases the waste rock disturbed area by 0.5 acres to 11.29 acres (Vol 1, p. 1-12) and the permitted acreage by 0.62 acres to 12.22 acres.

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**Soils Resource Information**

*Analysis:*

Appendix V, Volume 3 contains the original soil survey completed in 1987. Additional soils information is provided in Appendix VI. These surveys document less than 6 inches in the surface A horizon and a buried A horizon that is 90 cm thick above a fluctuating water table found at 140 cm depth (or approximately 6 ft., App. VI, Vol 3). A discussion of the soil survey is included in Vol. 3, Section 2.12. (App. VI, Vol 3). A discussion of the soil survey is included in Vol. 3, Section

2.12.

Boring 1 is referenced for information on the soil depth in the vicinity of the expansion. The topsoil (A horizon) is less than 6 inches. The plan states a salvage depth of 12 inches based upon Boring B-1 (location shown on Map 4) as discussed in MRP Section 2.12. (Although not stated in this section, the boring logs can be found in Appendix II of Vol 3.)

Appendix 2-3 Water and Soil Analysis has been added to Vol. 2. This appendix contains lift #5 Gob analysis dated 7/8/2010 and subsoil analysis dated 12/20/2012. Evaluation of the use of fertilizer in final reclamation of the waste rock site is described on page WRDS 4-2, Section 4.5. Review of these analyses suggests that a potassium fertilizer will be necessary at reclamation of the waste rock site.

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## Operation Plan

### Topsoil and Subsoil

*Analysis:*

Vol. 3 p. 2-9 describes removal of 18 inches from the 0.54 acre expansion and either live haul to Lift #5 or stockpiling on Topsoil Storage site No. 2. The estimated volume of topsoil to be salvaged is 1,300 yd<sup>3</sup>s (Sec 2.12). The label "Topsoil" on Map 4 v 4 indicates the general location of topsoil stockpiled on Lift #4 .

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### Spoil Waste Refuse Piles

*Analysis:*

In response to deficiencies from the previous review, an amendment was submitted for the Sufco Mine MRP.

The slope stability calculation using the original configuration of the waste rock pile generated a slope safety factor of 2.62. The applicant commits to maintain the slope stability at the same safety factor throughout the expansion of lift #5 and with the reconfiguration of the waste rock pile as depicted on Map 2 of the application.

The tonnage placed at the site at the end of 2012 (199,700 tons) is less than the expected design capacity (200,000). The site is expected to exceed capacity tonnage in 2013, which is the reason for application for expansion. Though the site was expected to reach tonnage capacity in 2013, it has not reached its volume capacity based on visual inspection.

If there are any additional expansions beyond the proposed expansion for lift #5, the operator will be required to do a new geotechnical analysis, including stability analysis and capacity analysis. The expansion of lift #5 will allow the site to accommodate an additional 40,000 tons of waste rock.

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### Hydrologic Acid and Toxic forming Materials

*Analysis:*

The approved sampling plan in Section 3.1.5 requires four quarterly composite samples during periods of deposition. This plan was based upon an annual average of 10,000 tons hauled/year, with a density of 1.2 tons/yd<sup>3</sup>.

The amendment states that there is a remaining 30,000 tons capacity in Lift #5 and this amendment allows an additional 40,000 tons of waste rock capacity in Lift #5 (Sec 3.3), which is critically needed. A revision of the sampling plan must be resolved quickly so that 4 quarterly samples are not allowed to represent 70,000 tons (or 58,333 yd<sup>3</sup>) of waste rock by default.

A density of 1.2 tons/ yd<sup>3</sup> is implied by the statement, "The original fill volume was estimated at 10,000 tons or 8,200 cubic yards per year." (Vol 3, p. 3-12). The stability calculations in App. III refer to a density of 185 lbs/ft<sup>3</sup>. In the cover letter received 8/14/2013, the Permittee states a reluctance to rely on the existing density information provided in Vol 3, p. 3-12 of the MRP. In discussions with the Division, it was agreed that a current approximation for density of the SUFCO

waste rock will be made during the next expansion application, such that conversion between tonnage and volume can be made. (personal communication with James Owen, September 18, 2013).

The 2012 Annual Report contains a summary of all chemical analysis of the material stored in at the waste rock site since 2005. The earliest waste rock analyses are located in Vol 3, Exhibit. 5 .

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## Maps Facilities

### *Analysis:*

A cross section line L-L' was added to map 2. The cross section details are for the expansion area and are included in a new map, titled 2A. The cross section lines on Map 2 were returned as requested.

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