

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

April 5, 2010

TO: Internal File

THRU: ~~Dana~~ Dana Dean, P.E., Associate Director of Mining, Utah DOGM
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FROM: Peter Hess, Engineering / Bonding

RE: REQUIRED REMEDIAL ACTIONS / NOV# 10045, UtahAmerican Energy, Inc., Horse Canyon Mine / Permit Area "B" (Lila Canyon), C/007/0013, Task ID #3408

SUMMARY:

The Division issued a notice of violation NOV # 10045 to UtahAmerican Energy, Inc., on September 23, 2009 for:

- 1) Failure to dispose of underground development waste in excavated pits as described in the MRP;
- 2) Failure to salvage and store subsoil
- 3) Failure to protect undisturbed areas
- 4) Failure to treat runoff and contain sediment from the development waste storage area.

Remedial actions required to address the NOV were listed as follows:

- 1) Place sediment control at base of warehouse bench outslope
- 2) Salvage topsoil between warehouse bench and coal stockpile bench
- 3) Mark remaining undisturbed area islands with signs per MRP
- 4) Identify remaining subsoil salvage locations;
- 5) Establish a subsoil storage pile location.
- 6) Amend Appendix 5-5 safety factor analysis to represent the new waste disposal area design using geotech analysis of underground waste and the slope profile and cross-section from the new design.

- 7) The Permittee must amend the safety factor analysis in Appendix 5-5 to reflect the new design for the new waste disposal area.
- 8) The Permittee must revise Figures 1 and 2 contained in Appendix 5-7 to reflect the new design.

This technical analysis will address the adequacy of items 6, 7 and 8 listed above.

TECHNICAL ANALYSIS:

OPERATION PLAN

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Coal Mine Waste

Coal Mine Waste is defined as “coal processing waste” or “mine development waste”. The material being drilled and shot to drive the two tunnels needed to access the Lila Canyon coal reserves associated with the Horse Canyon Mine is underburden, or material which is located in a stratigraphic column below the coal seam which is to be extracted.

This material only partially meets the definition of underground development waste. It does not contain mixtures of coal or carbonaceous shales in with the other stratigraphic materials (shales, claystones, siltstones, sandstones, limestones). As stated in the MRP, (Appendix 5-7, Page 1) there is essentially no coal in the material being placed in the shop / warehouse pad and /or the ROM coal stockpile pad. The volume of material coming from the development of the rock tunnels has been determined to be 28,000 LCY. The balance of the material volumes contained within these pads is subsoil material collected from the excavation of the #1 pond , and from other areas located about the site.

The Permittee submitted a revised Page 16 to Appendix 5-5 with the Detailed Design Change application, Task ID # 3498 on March 2, 2010.

The Permittee submitted an updated slope stability analysis for section E-E', which is depicted on PLATE 5-7C, Surface Longitudinal Profile. E-E' is 75 feet below the mine portal pad and varies from elevation 6061.7 feet to 6025.7 feet. A horizontal to vertical exaggeration of 4 to 1 is used to depict the pre-mining, operational and post-mining reclamation profiles at Lila Canyon.

As determined from PLATE 5-7C, a 4.1 H to 1 V slope will be reclaimed post-mining in the E-E' section. This profile will approximate the original pre-mining contour, and thus meet approximate original contour requirements. The Permittee states that the maximum slope height will be 40 feet, at a vertical angle of 14.9 degrees. This is not considered a steep slope.

The vertical angle determined from PLATE 5-7C, using a 36 foot rise over a 148 foot run is 13 degrees 40 minutes, which is very close to the 14.9 degrees previously mentioned (page 16 of the revised Appendix 5-5).

Analysis of Appendix 5-5, Page 16 as contained in the approved mining and reclamation plan shows that for the reclaimed slope, a 3.25 H to 1 V slope exists between E and E'. This is depicted by the reclamation slope configuration on PLATE 5-7C. A vertical angle of 17 degrees four minutes is determined.

The currently approved reclamation slope configuration is 3 degrees steeper than the submitted reclamation slope in the Task ID # 3498 application.

R645-301-528.340 Underground Development Waste

"For the purposes of underground coal mining and reclamation activities the PAP must include a description of the proposed disposal methods for placing underground development waste" ... "

Analysis:

Appendix 5-7, Page 2 of the Task ID # 3498 application states the following; *"rock slope material will be dumped and compacted on the material supply pad (shop / warehouse pad / PHH). The material will be placed on the pad (and/PHH) compacted in 24" lifts using a front end loader."*

Thus, the compaction will be accomplished by the front end loader wheel print as it rolls over the material.

Findings:

The minimum regulatory requirement has been met. The slope stability analysis confirms that a minimum static safety factor will be achieved using this compaction method. There is not a public safety hazard from the pad facility should the western outslope of this pad fail.

R645-301-536.300 Coal Mine Waste

“Coal mine waste may be disposed of in excess spoil fills if approved by the Division.”

Analysis:

The mine development waste being produced from the development of the Lila Canyon access tunnels will be disposed of in the shop / warehouse pad.

By definition, in the R645 Coal Mining Rules, an excess spoil pile is a spoil pile which disposes of spoil material in a location other than the mined-out area (surface mine strip pit), provided that the spoil material used to achieve the approximate original contour or to blend the mined out area with the surrounding terrain in non-steep slope areas will not be considered excess spoil. A steep slope is defined as any slope, which is more than 20 degrees.

“Spoil” is defined as overburden that has been removed during coal mining and reclamation operations.

The rock tunnel material will not be used to re-grade a mined out area at Lila Canyon, as no coal seam is to be removed in the area of the surface facilities .

R645-301-553.250

The material volumes contained by the shop / warehouse pad and the ROM coal stockpile pad will be re-graded to the reclamation contour shown on PLATE 5-7C. The depths of material will range from eleven feet to 25 feet at the back of the bench cuts to 14 feet at the forward edge of the ROM pad.

According to Page 16 of revised Appendix 5-5, (Task ID # 3498) “*all slopes will have a maximum steepness of 1 H: 1V. All such slopes will have a safety factor of 1.3 or greater as shown above.*”

Analysis of section E-E' on PLATE 5-7C shows that the reclamation slope configuration has been designed at a 4.1 H / 1V slope, which correlates with Page 17 of the newly revised Appendix 5-5 (Task ID # 3498).

Page 17 of Appendix 5-5 shows a slope stability analysis for a 4H / 1V reclamation slope using rock slope material for construction. The material factors used in the analysis are as follows; 182 pounds per cubic foot (SG = 2.92); cohesion of 1.4; internal friction angle of 49 degrees.

The calculated Factor of Safety for the reclaimed slope configuration is 4.424 for saturated conditions. This exceeds the minimum regulatory requirement established at 1.3, (See 645-301-537.230).

The slope stability analysis on Page 17, "Rock Slope Material Slope Stability (Saturated)" is certified by Mr. R. Jay Marshall, P.E., Utah registered professional engineer.

As discussed elsewhere in this document, the approved Appendix 5-5, Page 16, slope stability analysis of E-E' depicts a reclaimed slope angle of 3.25 H / 1 V, (vertical angle of 17 degrees 4 minutes) (See approved PLATE 5-7C). As this is less than 20 degrees, the reclaimed slope will not be a steep slope area and the fills are therefore not considered excess spoil.

The Task ID # 3498 slope stability analysis, which was submitted as part of the NOV # 10045 remedial action requirements, contains a revised PLATE 5-7C, depicting a reclamation slope section designated as E-E'.

E-E' consists of 4 sections, each with a different vertical angle.

The toe of the E-E' section increases 4.3 feet in elevation over a 19 foot horizontal distance, which is a 4.4 H / 1 V slope.

The next section of reclamation slope rises a vertical distance of 15 feet over a horizontal distance of 25 feet, or a 1.67 H / 1 V slope. This is the steepest section of reclamation at Lila Canyon.

As is stated on Page 16, of the revised Appendix 5-5, Lila Canyon Mine, Safety Factor Analysis for Portal Access Road, Sediment Pond, and Reclaimed Slope, (revised submittal Task ID # 3498 received 3/2/2010), *"all slopes will have a maximum steepness of 1H:1V. All such slopes will have a safety factor of 1.3 or greater as shown above."*

Refuse Piles

Although the material being produced from the development of the rock tunnels is mine development waste, it does not meet the industry definition of "refuse". It does not contain coal or carbonaceous shales.

Stratigraphically, the material comes from the rock layers located under the Sunnyside coal seam. The material is under-burden.

The Utah coal rules require that refuse piles must be designed and located in special areas within a permit area (existing or newly permitted by DOGM) and meet specific design criteria. Maximum lift thickness, compaction and 2H / 1V outslope configuration are just a few of the existing requirements.

The materials from the rock slopes are siltstone, mudstones, limestone, sandstone, etc., with little or virtually no coal or carbonaceous material. Therefore the material characteristics of the rock slope material are dis-similar to most of the materials normally found in refuse piles such as the Sunnyside Mine refuse pile or the School House Canyon facility, located at Castle Gate.

The rock slope material at Lila Canyon is to be disposed of in an incised area with other material from the construction of the Mine facilities surrounding it, (See PLATES 5-2 and 5-7C). The rock slope material will be surrounded on three sides (incised per Appendix 5-7, Page 1) by this other native material. The fourth side, which is the west outslope of the shop and warehouse pad, has a 2.37 H / 1 V gradient at the western pad crest. This is not as steep as the 2H / 1V outslope configuration (27 degree vertical angle) required under 30 CFR 77.215 (h) / R645-301-513.400.

Excess Spoil

The requirements of this section are not applicable to the operational placement or reclamation design placement of the disposal of the rock tunnel development material within the Lila Canyon Mine surface facilities area.

Findings:

The amended Appendix 5-5, Safety Factor Analysis is adequate to meet the minimum regulatory requirements of the State of Utah R645 Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Affected Area Maps

Mining Facilities Maps

As part of the remedial action listed for the abatement of NOV # 10045, the Division required the following:

- 1) Amend Appendix 5-5, Safety Factor Analysis for the new waste disposal area design;
- 2) Amend Appendix 5-7, Figure #1 and Figure #2 for the new design.

The approved mining and reclamation plan contains the following:

- 1) Figure 1, Appendix 5-7, SURFACE AREA LILA CANYON MINE, (P.E. Certification Stamp Date 6/13/2005).
- 2) Figure 2, Appendix 5-7, CROSS SECTIONS LILA CANYON MINE, 18 cross sections depicted, (P.E. Certification Stamp Date 2/6/2004).

As part of the Task ID # 3498 submittal, the Permittee submitted three new plan views of the Lila Canyon Mine effected area. They are as follows:

- 1) PLATE 5-1A, PRE-MINING CONTOURS, Lila Canyon Mine
- 2) PLATE 5-2, SURFACE AREA, Official Disturbed Boundary Map
- 3) PLATE 5-6, POST-MINING TOPOGRAPHY

Also, the following PLATES depicting cross sections 0+00 through 18+00 on 100-foot increments have been submitted:

- 1) 5-7A-1 / 0+00, 1+00, 2+00 depicted
- 2) 5-7A-2 / 3+00, 4+00, 5+00 depicted
- 3) 5-7A-3 / 6+00, 7+00, 8+00 depicted
- 4) 5-7A-4 / 9+00, 10+00, 11+00 depicted
- 5) 5-7B-1 / 12+00, 13+00, 14+00 depicted
- 6) 5-7B-2 / 15+00, 16+00 depicted
- 7) 5-7B-3 / 17+00, 18+00 depicted.

These seven Plates adequately address the requirement to amend APPENDIX 5-7, Figure 1 and Figure 2.

All Plates show the pre-mining, operational and post-mining surface configurations of the Lila Canyon Mine surface facilities area.

All Plates are P.E. certified by a Utah registered professional engineer.

The ten revised Plates adequately address the two remedial actions required for amendment of the mining and reclamation plan.

Certification Requirements

All plates submitted with the Task ID # 3498 remedial action response which are required to be P.E. certified in accordance with the requirements of R645-301-512.100 through 512.260 are certified by a Utah registered professional engineer.

Findings:

The Permittee has adequately addressed the following remedial action requirements relative to Notice of Violation NOV # 10045;

Amend Appendix 5-5 safety factor analysis to represent the new waste disposal area design using geotech analysis of underground waste and the slope profile and cross-section from the new design.

The Permittee has amended the safety factor analysis in Appendix 5-5 to reflect the new design for the new waste disposal area.

The Permittee has submitted new Plates to address the revision of Figures 1 and 2 contained in Appendix 5-7. The new Plates reflect the new slope reclamation design.

RECOMMENDATION:

The Permittee has addressed the remedial action requirements necessary to abate NOV # 10045.

NOV # 10045 should be terminated.