

0033



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

November 13, 2001

TO: Internal File
THRU: Wayne H. Western, Sr. Reclamation Specialist, Project Team Lead *WHW*
FROM: *(Signature)* Priscilla W. Burton, Sr. Reclamation Specialist/Soils
RE: Midterm Review, Lodestar Energy Inc., Horizon Mine, C/007/020-MT99-5

SUMMARY:

The Division is required to review each active permit during its term, in accordance with R645-303-211. At the mid-point of the Horizon Mine permit term (April 1999), the Horizon Mining and Reclamation Plan (MRP) review was initiated.. The first Division Technical Analysis (TA) was dated April 23, 1999. The second TA was dated July 28, 2000. The third TA was dated March 13, 2001. The fourth TA was dated August 16, 2000. This review is the Division's fifth look at the mid-term amendment to the Mining and Reclamation Plan. In this technical memo, I have discussed only the operation and reclamation plan. Please refer to the technical analysis of August 14, 2001 for environmental resource soils information.

The Horizon mine includes 9.15 acres within the disturbed area boundary. Of those acres, 5.49 acres will received topsoil and other final reclamation treatments. The topsoil pile contains 2,458 cubic yards of soil. Final topsoil depth will be approximately ten inches.

TECHNICAL MEMO

TECHNICAL ANALYSIS:

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230

Analysis:

Removal

Soil plan for removal is given in Section 8.7 of the MRP. The island method of removal was used to salvage topsoil and substitute topsoil from locations identified on Figure 8-2, Growth Medium Removal Locations and the accompanying Table 8-3 Potential Topsoil/Growth Medium Available for Salvage. A target volume of 13, 670 cubic yards was set. That goal was superseded and approximately 15,000 cubic yards was salvaged and stored in the topsoil stockpile in November of 1996 (see the EarthFax Engineering Inc. report in Appendix 8-1 entitled "Horizon Mine Soil Salvage Practices, Fall, 1996, December 1996").

Plate 8-1, Soils, provides information on soil types for the mine site. Sections 8.3.1 and 8.3.2 provide a soil identification and descriptions. Table 8-3 presents the recommended depth of stripping and can be used for future reference. Although, Section 8.11 indicates that no additional surface disturbance involving soils will be required for the surface facilities.

Storage

Topsoil is stored in four locations for reclamation of 5.49 acres at the Horizon Mine, as listed below:

1. The topsoil pile (created in November of 1996);
2. In-place soils from areas 10 & 11 (beneath topsoil pile);
3. Areas D & E on Plate A, Appendix 8-1;
4. The slopes of Areas A, B, and C (as a last resort).

Topsoil Stockpile (2,458 cubic yards)

At its creation, the topsoil pile stored 10, 494 cubic yards (Appendix 8-1, Topsoil Stockpile Table). The topsoil stockpile was surveyed in May of 1997 and again in September/October of 1997. In 1998 replacement of a culvert beneath the pile resulted in the loss of over 8,000 cubic yards of topsoil material (as described in Section 8.8.1 of the MRP). Furthermore, the narrative on page 8-27 in Section 8.8.1 Resoiled Areas explains that,

“ During mine construction in 1996/1997 and after the removal of topsoil/growth media, Mr. Brad Derrick, P.E. determined that the Portal Canyon pad area was 6 to 8 feet higher in elevation than the portal openings. As a result of this discovery, the pad area was regraded in 1997 and the materials were distributed to various locations within the disturbed area boundary. Contours on Plate A (Topsoil Growth Medium Distribution) within Appendix 8-1 reflect the pad regrading and placement of the soils.”

This submittal confirms that loss with the information presented in Table 8-4 “1999 Topsoil Quantity Table (Pit Survey of Recovered Material).” The results of the soil survey conducted in November of 1999 suggest (by Division calculations) that 2,429 cubic yards of topsoil remain in the stockpile.

The volume of topsoil in the topsoil pile was also calculated using the difference between operating contours and proposed reclamation contours from Survcadd calculated volumes. Plate 3-7b Topsoil Storage Area shows the information generated. The calculated volume of topsoil is 2,458 cubic yards (which closely matches the Division calculations from the 1999 survey). The narrative states that this is a conservative estimate based upon a flat bottom, since no measurements were taken of the original stream channel. Cross-sections supporting Table 8-4 are provided as Plate 3-7b of this submittal.

Pre-mining contour maps were not used to develop an estimate of topsoil storage. Both Plate 3-6, Pre-Mining Topography, and Plate 3-2, PreMining and Operational Cross-Sections, were created in 1996 by EarthFax, Inc. These maps have been determined by Lodestar Energy, Inc. to be of little value, since the elevations reported do not match the ground conditions as surveyed in the year 2000, even for the undisturbed slopes of Portal Canyon. As a result, the topsoil stockpile elevation was higher than the portal elevation and so the difference between operational elevation and premining elevation was negative (no soil stored). In 1999, when Lodestar Energy, Inc. attempted to utilize the information on the maps and simply lower the elevations by a common amount, there were only a few points of correlation with the existing surveyed pad elevations. Lodestar Energy, Inc. prefers to utilize Plate 3-2, PreMining and Operational Cross-Sections, for its information about the shape of Portal Canyon prior to mining, rather than for precise elevation information.

In Place Soils (3,086 cubic yards)

The current MRP in Appendix 8-1, Topsoil Stockpile Table, indicates that 3,733 cubic yards of soil buried by the topsoil pile will be available for final reclamation. This submittal reduces that number down to 3,086.

TECHNICAL MEMO

Areas D & E (156 cubic yards)

The Division approved of the temporary distribution of topsoil materials to Areas D & E within the permit area to enhance the current use of those areas until needed for later reclamation. This layering of topsoil on the slopes was conducted under R645-301-234.300, under the conditions that such action would not permanently diminish the capability of the topsoil of the host site; and, that the material would be retained in a condition more suitable for redistribution than if stockpiled.

The current MRP in Appendix 8-1 Topsoil Stockpile indicates that Area D shown on Plate A of Appendix 8-1 received 499 cubic yards of topsoil.

The current MRP indicates Area E received 156 cubic yards of riparian soil and 124 cubic yards of other topsoil. For a total of 280 cubic yards.

This submittal indicates that only Area E will be redisturbed to supply 156 cubic yards of soil for reclamation. The remaining slopes will remain untouched during final grading.

Areas A, B, and C

Areas A, B, and C received 975 cubic yards of topsoil material during county road construction. The current MRP indicates that this material is available as needed upon reclamation. This submittal indicates that Areas A, B, and C will not be redisturbed during final reclamation, and topsoil from Areas A, B and C has not been included in the revised Appendix 8-1, Topsoil Stockpile Table.

Topsoil Storage Summary

In conclusion, Horizon mine has reduced its storage of topsoil available for mine site reclamation from 14,507 cubic yards down to 5,700 cubic yards (Appendix 8-1). Consequently, the depth of coverage has also been reduced from twenty inches down to ten inches of cover. The area to receive topsoil cover is 5.49 acres. The 5.49 acres includes the hillside west of the portals which has a layer of topsoil stored on the slope and which has received "interim" seeding. The figure of 4.04 acres has been noted in the revised Topsoil Stockpile Table in Appendix 8-1, because reclamation plans do not include regrading or removing the existing topsoil from the 1.5 acre hillside west of the portals.

Explanations of the drastic loss of stored topsoil are given in Section 8.8.1 of the submittal. The loss is attributed to several regrading and recontouring projects which were conducted without approval by the previous mine owner/operator. Among the projects listed are regrading of the old drill road on the southeast side of Portal Canyon and the old mine access

road and old portal area on the northwest side of Portal Canyon and the newly installed portals. (This assumption was confirmed by a personal communication on August 13, 2001, with Mr. Robert Davidson, former Division Soil Scientist, when he indicated that the most likely disposition of the topsoil was as backfill of the portals in 1999).

To generate more material for topsoil cover at final reclamation, Horizon mine could utilize an additional 623 cubic yards from Areas D & E and 975 cubic yards from areas A, B, and C to bring the total to 7,298 cubic yards of topsoil material available at final reclamation. However, utilizing this material would provide only 2 more inches of cover depth (13 inches rather than 11 inches as specified in the submittal) over the total area of 4.04 acres. Imposing the original reclamation plan (for Areas A - E) upon the site will not generate enough material to make a difference in the final reclamation.

Material excavated for concrete portal covers (as shown on Plate 3-7) may be useful as topsoil. Therefore, the following commitment has been placed in the plan on page 8-29 of section 8.8, "A qualified soil scientist will be employed at the time of reclamation to evaluate the excavated soil around the portals to determine if this material could be used as additional topsoil to improve vegetation habitat by making deeper microsities. This soil would be recovered prior to the demolition of the portal covers." This commitment is particularly important when one realizes the extent of effort that was made to gather all the best available material from within the disturbed area into the topsoil pile at the time of its creation. In other words, the material left in the pad is much less desirable than that which was stored in the topsoil pile and subsequently lost, perhaps as backfill against the concrete portal covers.

Slopes in the disturbed area which have been dressed with topsoil and seeded in accordance with R645-301-234.300 (Plate A, Appendix 8-1 and Plate 3-7) have been designated as "interim reclamation areas" on the Plate 3-7, Reclamation Topography. (Slopes which will not be redisturbed during final reclamation have been shown with a different shading.)

Interim reclamation/topsoil storage areas

On site, interim reclamation/topsoil storage areas will be designated with signs. As described in section 3.5.1, sediment control on these topsoiled slopes will consist of a mulch mat installed one foot above and below the cut bank.

Areas reported on Plate 3-7 as "topsoil storage on interim slopes" should also be shown on Plate 3-1, Surface Facilities.

As described in Section 3.5.1, topsoil in these interim reclamation areas will be protected by a mulch mat one foot above and below the grade break at the edge of the slope.

TECHNICAL MEMO

Findings

Information provided in the proposed amendment is considered adequate to meet minimum topsoil/subsoil operations requirements of the Regulations.

RECLAMATION PLAN

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-244, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

General

Table 3-1, Reclamation Cut and Fill Calculations, indicates that the average cut depth will be 1.71 feet and the volume of cut will be 11.753 cubic yards. The fill needed is 10,239 cubic yards. Table 3-1 was generated from Plate 3-7.

Coal Mine Waste

Section 3.3.2.5 of the MRP discusses the coal mine waste buried within the operations pad. The existing MRP indicates that approximately 2500 - 2700 CY of waste are buried 4 feet deep within the pad. Section 3.5.4 indicates that locations are shown on Plate A in Appendix 3-8. The plate in Appendix 3-8 is entitled Sweets Canyon, Pond Utilities. It did not have the information mentioned on coal mine waste burial locations.

Section 3.5.3.2, mentions that any toxic coal waste buried in the mine pad fill uncovered by reclamation grading work will be placed in the fill areas outside of drainages and covered with four feet of non-toxic fill. Locations will be mapped at the time of placement and submitted to the Division. As discussed above in this Technical Analysis under Environmental Soil Resource Information, previous sampling of this waste revealed some elevated boron levels. Refuse/coal waste material in pit #8 (location shown on Plate 8-1) revealed levels of Boron at 4.8 mg/kg (0 - 12 inches) and 5.19 mg/kg (10 - 11 feet deep). Boron is toxic to plants. Boron which exceeds 5 mg/kg is considered unsuitable growth medium and must be covered with a minimum of four feet of suitable growth medium. Additionally, the 1996 profile descriptions of the embankment southwest of the portals portray layered coal debris, coal waste, rock fragments and disturbed soils from previous mining operations. One pit sample showed an Acid/Base Potential (ABP) of -1.16 tons CaCO₃/1000 tons material. Therefore, the waste material buried on site is suspected as toxic for both boron content and acid generation.

Approximate burial locations of coal mine waste are indicated on Plate 3-7, Reclamation Topography. The map shows that coal mine waste may be buried very close to the proposed reclaimed channel of Portal Canyon, at cross-section F-F' on Plate 3-7. The Permittee must ensure that runoff from the design storm will not come in contact with the coal mine waste, which means that the buried waste must be removed to accommodate the channel width (including topsoil coverage) and flood plain protection (see Figure 7-12 Typical Cross Sections For Reclaimed Channels). This is a performance standard. The Permittee has committed to burying any waste encountered during reclamation at least four feet deep (see Section 3.5.3.2).

Findings:

Information provided in the proposed amendment is adequate to meet the requirements of this section.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

The disturbed area is 9.15 acres. Table 3-1 shows the cut and fill estimates for the disturbed area. An average cut of 1.71 feet over 4.271 acres will yield 11,753 CY. An average fill depth of 1.46 feet over 4.34 acres will require 10,239 CY. The MRP indicates in section 8.8, that topsoil will be spread 10 inches deep over 4.04 acres. (Previously the figure was 5.49 acres, the difference is due to the plan to leave undisturbed areas identified as "Interim Reclamation not redisturbed" on Plate 3-7.) Plate B, Appendix 8-1 illustrates the 4.04 acres of ground to receive the application of topsoil during reclamation.

The lower slopes in Areas B, D, and E (shown on Plate 3-7) will have topsoil removed from them during final reclamation. Section 3.5.3 indicates that a qualified person will be on site to ensure that the topsoil stored on these slopes is removed and placed on the topsoil stockpile for reclamation use. Section 8-8 further identifies methods to be used when salvaging topsoil.

Findings:

The information provided meets the minimum reclamation topsoil and subsoil information requirements of the Regulations.

TECHNICAL MEMO

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Section 3.5.1 indicates that all fill will be compacted using repeated passes of rubber-tired equipment and/or rollers. Section 3.5.4 indicates that reclaimed slopes will not exceed the angle of repose, which for a slightly cohesive granular soil would be 35 degrees (corresponding to a slope 1.5h:1v or 70% slope). Section 3.5.4 further indicates that slopes will be concave at the base.

As spelled out in Section 3.5.4 and Section 3.5.1, erosion and water pollution will be controlled by small depressions to retain moisture (refer to Plate 3-7 and Figure 3-6) and through silt fences at the bottom of fill slopes and along the top bank of the reclamation channel. Section 3.5.5.3 indicates that 2,000 pounds per acre mulch will be applied to the graded surface and incorporated into the surface with roughening before seeding. Erosion control matting will be used on all slopes that are 2.5h:1v or steeper.

Section 3.5.5.4 indicates that reclaimed and revegetated areas will be closely monitored, as described in Sections 3.5 and 9.8, for severe erosion, excessive weeds, bare patches and damage by wildlife. Section 3.5 indicates that the Permittee will stabilize and re-topsoil rills and gullies which form in the reclaimed landscape and which are disruptive to the postmining land use or which contribute to a violation of water quality standards.

Findings:

Information provided in the proposed amendment is considered adequate to meet the requirements of this section.

RECOMMENDATION:

This submittal outlines a loss of over 8,000 cubic yards of topsoil from the topsoil storage pile during the year 1998. The drastic loss was due to unauthorized backfilling activity by the previous Permittee as explained in the Mining and Reclamation Plan, section 8.8. The MRP indicates that upon final reclamation, a qualified soil scientist will be employed to ensure that the best available material is utilized as cover and to attempt to create cover depths greater than ten inches. The submittal is recommended for approval.