

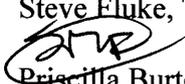
TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

February 14, 2007

TO: Internal File

THRU: Steve Fluke, Team Lead

FROM:  Priscilla Burton, Environmental Scientist, III/Soils 

RE: Pasture Pond Expansion Cogeneration Assoc., Sunnyside Refuse and Slurry, C/007/0035, Task ID #2644

SUMMARY:

The Division received an application from Sunnyside Cogeneration Associates on September 13, 2006 to revise the slopes of the excess spoil disposal area #2 and to expand the pasture pond, increasing the capacity of the disposal area from 130,000 yd³ to 217,000 yd³. The application also makes changes to Section 9.8. Topsoil Borrow Material Handling portion of the Mining and Reclamation Plan.

The annual reports dated 1999 through 2004, indicate that approximately 103,000 Tons of material has been placed in Spoil Disposal Area #2, which is approaching the original design capacity. This proposal would change the final configuration of the slopes of Disposal Area #2 from 5% (20h:1v) to 20% (5h:1v), thereby increasing the capacity of the storage site (Appendix 9-7, Revised Capacity Calculations). Since approximately 20,000 yd³ are placed in the disposal area each year, this design change will provide an additional five years of capacity for the disposal site. Plates 9-8A through 9-8D illustrate plans for Spoil Disposal Area #2.

Currently the **interim** reclamation plan calls for 150 lbs/ac of 16-16-8 fertilizer (Sec. 9.9.2) and the use of fertilizer at the time of **final** reclamation will be based on soil sampling.

The Division bonding calculations should include a line item for soil testing of the 135 acre regraded mine site and borrow areas, with a contingency for lime (flyash) or fertilizer application.

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TECHNICAL ANALYSIS:

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Acid- and Toxic-Forming Materials and Underground Development Waste

Appendix 9-7 and Chapter 6 Section state one grab sample will be taken from the surface of Excess Spoil Pile #2 at the completion of each 4 foot lift. Initial borings of the coarse refuse (Appendix 6-7) indicated that at depths of 60 – 130 ft the pile is acid forming. The borings also indicated that the neutralization potential of the underlying native soils (depths of 140 – 195) is between 6 and 17 Tons/1000 Tons of soil.

Annual reports on file with the Division contain the analytical reports for years 1999 through 2002 and 2004. (Spoil analysis was not included in the 2003 annual report.) After reviewing the annual reports, the Division understands that most of the material being placed in Excess Spoil Pile #2 is sand or loamy sand, with a pH between 6.2 and 8.7; an EC between 2 and 3 mmhos/cm; an SAR between 2 and 3; and with adequate buffering capacity [Acid Base Potential (ABP) of 25 to 90 CaCO₃Tons/1000 Tons spoil]. However, in 2001, spoil with a high SAR of 6 to 16 was placed in the disposal area and in 2004 spoil with acid forming potential was placed in the disposal area (ABP of -2.9). The material placed in Excess Spoil Pile #2 with high SAR (values of 10 and over) and with acid forming probability (ABP values less than zero) must be covered with four feet of cover.

As the mining progresses into the coarse refuse pile, the likelihood of encountering acid-forming material increases. The Permittee will continue to monitor the chemical characteristics of the spoil through grab samples of each four-foot lift (Appendix 9-7 and Chapter 6). The Excess Spoil Disposal Area is bonded for four feet of cover (pg 900-11). According to the information in Appendix 9-7, vegetation establishment on the non-toxic, non-acid forming spoil using less than four feet of cover will be demonstrated.

To suppress fires with the coarse refuse pile, part of the third and all of the fourth lift were reclaimed in the spring of 1994 with two feet of borrow material (MRP, Chap 9, pg. 900-18). The site was fertilized with 16-16-8 (150 lbs/ac) and treated with wood fiber mulch (1 T/acre). The interim seed mix was planted (Fig. 9-1). This mix has no woody species.

Final (contemporaneous) reclamation of 5.5 acres on the Old Coarse Refuse Road was completed in 1994 with four feet of borrow material over acid forming material and six to 18 inches on the road out slopes where no toxicity was noted.

Evaluation of the Sacco Flats site (MRP, Appendix 3-6 and Appendix 3-5) concluded that the depth of cover enhanced woody plant establishment with the optimum cover being 48 inches of borrow or 12 inches of topsoil.

The Permittee has not suggested that the above reclamation supports lesser cover. The bond held for the site must include four feet of cover over the entire site until such time as demonstrations of vegetation establishment with lesser cover can be documented.

Findings:

The information provided meets the requirements of the Regulations. The bond held for the site must include four feet of cover over the entire site until such time as demonstrations of vegetation establishment with lesser cover can be documented for the non-acid/non-toxic spoil.

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:

Excess Spoil:

Excess Spoil Pile #2 is described in Chapter 9 and Appendix 9-7. The 1999 through 2004 annual reports, indicate that approximately 103,000 Tons of material has been placed in Excess Spoil Pile #2.

Annual reports from 1999 through 2004 indicate that over 1 million Tons of refuse have been removed from the coarse refuse pile.

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Findings:

Information provided meets the requirements of the Regulations.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

Redistribution

A discrepancy exists between Plate 8-4 Permit Term Reclamation Plan Borrow Material Plan 9 and Plate 10-6 Final Reclamation Plan Borrow Material Plan, both were incorporated in February 2003.

- Plate 10-6 indicates that four feet of borrow material is required for 9.3 acres, rather than for 489,808 acres (as outlined in Plate 8-4).
- Plate 10-6 further indicates that two ft of borrow is required for 4.0 acres, rather than over 14.06 acres (as outlined in Plate 8-4).
- Plate 10-6 also indicates that 1.5 ft of borrow is required for 124.7 acres, rather than over 45.24 acres (as outlined in Plate 8-4).

Areas to receive borrow material are shown on Plates 8-4 Permit Term Reclamation Plan Borrow Material Plan. Plate 8-4, incorporated in February 2003, also indicates the following:

- four feet of borrow material is required for 75.9 acres
- two ft of borrow is required 14.06 acres.
- 1.5 ft of borrow is required for 45.24 acres.

For the above cover, the total borrow required is 644,656 yd³.

The three borrow areas are shown on Plate 5-1 Surface Facilities Map and Plate 2-1. Two of these borrow areas are previously disturbed industrial sites. The borrow soils are classified as Strych very stony or gravelly loam (Sec. 224 and Plate 2-1, App.2-8 Order One Soil

Survey of Proposed Disturbed Sites and Borrow Areas). The plan indicates that borrow materials will be retrieved from depths of 22 – 24 ft (App. 2-9 and Sec. 224).

The borrow soils were sampled and analyzed (Sec. 231). Analytical results are in Appendices 2-4 Reclamation Soil Borrow Area 1; 2-5 Borrow Area Sampling Results; and 2-9 Soil Borrow Material Report. App. 2-9 provides an indication of concentration of plant macronutrients (nitrogen, phosphorus, and potassium) that are likely to be found in the borrow soil. The surface layer of most cultivated soils has between 0.06 and 0.5% Total N (J.M. Bremner, "Total Nitrogen," Chap. 37. In. Soil Science Society of America. 1996. Series No. 5. Methods of Soil Analysis: Part 3 - Chemical Methods. (SSSA: Madison, Wisconsin). The average %Total N and P in mg/kg for the surface six inches and the 15 – 20 ft. deep subsoil is shown in the table below (derived from the information in App. 2-9).

	Ave. Total N %	Ave. P mg/kg
Surface 0 – 6 inch	0.2	10.1
Subsoil 15 – 20 ft.	0.01	4.3
East Slurry interim	0.07	NA
Coarse Ref. lifts 3 & 4	0.05	NA

By comparing these numbers in the first two rows of the table, one sees that the average measurement of % total N in the surface six inches falls within the norm for surface soils. Also note that surface six inches has 15 times the nitrogen and 4 times the phosphorus content of the 15 – 20 ft. subsoil strata.

Cover used for interim reclamation on the East Slurry Cell embankment was tested and found to be on average 0.07% Total Nitrogen (App. 2-11). The interim seed mix was planted (Fig 9-1). No fertilizer use was recorded in the interim reclamation that occurred in 1995.

But, to suppress fires with the coarse refuse pile, part of the third and all of the fourth lift were reclaimed in the spring of 1994 with two feet of borrow material (MRP, Chap 9, pg. 900-18). The excess spoil material that was used as cover was analyzed for %Total Nitrogen and found to be on average 0.07 %. The site was fertilized with 16-16-8 (150 lbs/ac) and treated with wood fiber mulch (1 T/acre). The interim seed mix was planted (Fig. 9-1). [This mix had no woody species.]

These two sites are not part of the annual reporting vegetation information, but would make for an interesting qualitative comparison of fertilizer vs. no fertilizer on cover material that had similar nitrogen content.

The requirement for fertilization during interim reclamation with 150 lbs/ac of 16-16-8 has been re-worded on page 900-17 of the MRP, to state that fertilizer will be applied, "if it is

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determined to be needed. Please specify how the necessity for fertilizer will be determined, by soil testing?

The requirement for testing the regraded mine site and borrow area soils must remain in the MRP, as it is likely that fertilization will be required at this site, based upon previous subsoil soil testing. Testing upon final reclamation is a requirement of the MRP and is currently stated in loose terms on page 900-15, Sec. 9.9. The current wording has been changed, however, to imply that

- 1) the Division does not ordinarily require testing and
- 2) that the site may not require fertilization.

These two statements are inaccurate for this site, as the Division will always require amendments and fertilization for the use of nutrient poor subsoils as a topsoil substitute. If there is to be any changes to this wording, the Division recommends that the MRP indicate the extent of sampling (for example 500 ft. centers) and the total number of samples, and the parameters to be analyzed (i.e. pH, EC, SAR, and macronutrients N, P, K). The bonding calculations must include this sampling and analysis cost.

In addition to some fertilization, the most likely amendment to be required at reclamation will be lime (or possibly flyash), especially if lesser cover is approved over the coarse refuse, which may be acid forming (see Operations Hydrology Acid-Toxic Forming Materials discussion above). In fact, revegetation test plots designed to confirm the suitability of borrow areas employed lime. These plots were monitored and a report is in App. 2-6.

Findings:

The information provided with this amendment to the MRP does not meet the requirements for Topsoil/Subsoil redistribution. The Permittee must include the following in the application, prior to approval, and in accordance with:

R645-301-243, The Permittee should not change the wording on page 900-15. The requirement for testing the regraded mine site and borrow area soils must remain in the MRP, as it is likely that fertilization will be required at this site, based upon previous subsoil soil testing. Testing upon final reclamation is a requirement of the MRP and is currently stated in loose terms on page 900-15, Sec. 9.9. The current wording has been changed, however, to imply that (1) the Division does not ordinarily require testing and (2) that the site may not require fertilization. These two statements are inaccurate for this site, as the Division will always require amendments and fertilization for the use of nutrient poor subsoils as a topsoil substitute. If there is to be any changes to this wording, the Division recommends that the MRP indicate the extent of sampling (for example 500 ft. centers) and the total number of samples, and the parameters to be analyzed (i.e. pH, EC, SAR, and macronutrients N, P, K). The bonding calculations must

include this sampling and analysis cost. •The requirement for fertilization during interim reclamation with 150 lbs/ac of 16-16-8 has been re-worded on page 900-17 of the MRP, to state that fertilizer will be applied, "if it is determined to be needed. Please specify how the necessity for fertilizer will be determined, by soil testing.

R645-301-553.252, The plan must indicate in Sec. 9.8.2 that the worst case scenario, requiring 644,656 yd³ to achieve a four foot cover depth is illustrated by Plate 8-4 and the best case scenario is illustrated by Plate 10-6, but the bond was calculated for four feet of cover as presented on Plate 8-4. [PWB]

STABILIZATION OF SURFACE AREAS

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

Analysis:

Plate 9-9D of Appendix 9-7 illustrates the west and east facing 15% slopes of Excess Disposal Area #2. These slopes run for a length of approximately 150 ft. The spoil is predominantly sand and has little water holding capacity. Stabilization will be accomplished through the use of gouging, wood fiber mulch, and hay. The seed mix to be applied over the Spoil Disposal Site #2 is the Pinyon/Juniper/Sagebrush mix given in Figure 10-3, which includes the small trees: serviceberry and mountain mahogany.

Final reclamation treatments will include 2Tons/ac mulch and wood fiber mulch as described in Section 9.9.4.

Findings:

The information provided meets the requirements of the Regulations.

RECOMMENDATIONS:

The amendment is not recommended for approval until the deficiencies are addressed.

Unlike most of our reclamation sites, the cover material for the Sunnyside Cogeneration site will be excavated from depths up to 23 ft. deep. This soil will invariably be poor in micro-organisms and lacking in the three major plant nutrients; N, P, K. The MRP existing requirement for testing of the regraded soil surface at the time reclamation must be retained in the MRP.

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The Division bonding calculations must include an estimated soil sampling and analysis cost for the 135 acre regraded site. As indicated in the MRP the frequency of testing will be decided at the time of reclamation. However for the purposes of bonding, the Division should make some assumptions as to the number of total samples and necessary parameters in order to derive a basis for bonding. The Division bonding specialist should work with the Division soil scientist to determine these figures.

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