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

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April 8, 1999

TO: File

THRU: Joe Helfrich, Permit Supervisor *JH*

THRU: Pam Grubaugh-Littig, Permit Supervisor *PGL*

FROM: Robert Davidson, Senior Reclamation Specialist *RAD*

RE: Phase I Bond Release Application for the Old Cottonwood/Wilberg Waste Rock Site, PacifiCorp, Cottonwood/ Wilberg Mine, ACT/015/019-BR98-1, File #2, Emery County, Utah

SUMMARY:

On December 17, 1998, Energy West requested Phase I bond release for the Old Cottonwood/Wilberg waste rock site. The site is located alongside Highway 57 and is 1.8 miles from the Cottonwood Mine (Township 17 S Range 7 E Section 34, NE1/4 SE1/4). The Division responded on February 9, 1999. The original submittal did not state the volumes or average depth of soil materials covering the waste rock. On March 9, 1999, Energy West responded with additional information to supplement the original Appendices A and B. This memorandum provides the Technical Analysis of the March 9, 1999 submittal in conjunction with the original Phase I bond submittal.

Analysis:

The Old Cottonwood/Wilberg waste rock site is located alongside Highway 57 and is 1.8 miles from the Cottonwood Mine (Township 17 S Range 7 E Section 34, NE1/4 SE1/4). The waste rock site consists of seven cells. Waste rock was placed in the first cell in 1983 and the last cell was reclaimed in 1993.

On October 14, 1998, Robert Davidson and Dennis Oakley visited the site. The site was observed from the northwest corner of the site, standing on top of the rock storage pile. The best vegetation was observed on the berms. Cells 1, 2, 6, and 3 appeared to have better vegetation establishment when compared to cells 5, 4 and 7. Cell 7 has the least amount of vegetation establishment. Discussion focused on soil quality for supporting vegetation in terms of salinity and SAR (Sodium Adsorption Ratio). Visual observation seem to indicate that in areas where salts were allowed to leach, vegetation establishment is the best (e.g., berms, upper drainage areas, etc.).

The Permittee seeks to have Phase I bond release on 15 acres at the Old Cottonwood/Wilberg waste rock site. PHASE I bond release may be considered only after the Division is satisfied that all the reclamation requirements for PHASE I have been met. The requirements for PHASE I reclamation are completion of backfilling and regrading (**which may include the replacement of topsoil**); and, completion of drainage control in accordance with the requirements of the approved reclamation plan.

General requirements for backfilling and grading, which may include topsoil replacement, include the following (**note: topsoil related issues are bolded text**):

- A map illustrating the "as-built" topography if different than the most recently approved plan.
- Pre- and Post-mining Contour Topographic Maps (no smaller than 1"=500') showing:
 - a. Permit Area
 - b. Areas Previously Released
 - c. Areas Proposed for Release
 - d. Post-mining Topography
 - e. Post-mining Hydrologic Features, including drainage, ponds, and monitoring sites
 - f. Cross-sections, including but not limited to, Approximate Original Contour (AOC), drainage systems, ponds, roads, etc.
 - g. Dates of Backfilling and Grading Activities
 - h. **Dates of Topsoil Replacement**
 - i. **Topsoil Replacement Depths**
- Results of overburden chemical analysis with discussion on how overburden will not adversely affect plant growth or water quality.
- Evaluation of **topsoil or substitute soil** including analyses and **replacement depths**.
- Evaluation of **subsoil** including analyses and **replacement depths**.
- Any field designs, modifications or changes to the mining and reclamation plan which occurred in conjunction with the reclamation activities.
- A brief history of mining and reclamation activities indicating when mining operations began and ended, when earthwork and topsoil distribution began and ended.

In the letter dated December 17, 1998 from Energy West, the Permittee has recorded the dates when each of the cells were reclaimed, and the number of monitoring years as follows:

1. Cell 1, seeded in 1983, monitored - 13 years
2. Cell 2, seeded in 1984, monitored - 12 years
3. Cell 3, seeded in 1985, monitored - 11 years
4. Cell 4, seeded in 1986, monitored - 10 years
5. Cell 5, seeded in 1989, reseeded in 1993, monitored - 4 years
6. Cell 6, seeded in 1989, reseeded in 1993, monitored -4 years
7. Cell 7, seeded in 1993, monitored - 4 years.

The letter explains that as the cells were filled to their capacity, they were backfilled and graded as outlined in the MRP. The letter states that sufficient subsoil material was used to cover the waste rock along with 12" of topsoil. Furthermore, the letter states that the depth of total soil cover varies throughout the waste rock site.

The March 9, 1999, submittal provides information and analysis concerning topsoil replacement depth and volumes. The December 17, 1998 submittal provides cross sections showing original, excavated and final surface configurations; the March 9, 1999 submittal supplements Appendix A showing cross sections areas and calculated volumes of soil between each cross section. The total excavated volume of soil was calculated at 106,907 cubic yards. The volume of soil remaining and stored in the berms is calculated at 27,056 cubic yards. Therefore, the total cover volume of soil is calculated by subtracting the calculated berm volume from the total excavated volume which equals 79,851 cubic yards. The average cover depth for the 15 acre Waste Rock Site equals 3.3 ft. An auger core was taken from Cell 7 to check on soil replacement depth. The depth of the core was approximately 3 ft., which is consistent with the average depth of the entire site. The location of the cored site is found in Appendix C, map drawing dated March 5, 1999. Since the application indicates that soil cover varies throughout the site, the above analysis allows the Division enough information to make a finding on soil replacement depths as they actually occur or currently exist.

The application includes discussion and information concerning soil sampling and analysis. Analyses include pH, EC, Ca, Mg, Na, SAR, Se, and B. An excellent summary for analyses is given both in the letter and application, with comparison charts for each cell comparing soil characteristics between 1986 and 1994 sampling periods. However, in order to correlate analyses with soil replacement quality, the depth of soil replacement was needed to help rectify if analyses are for topsoil, subsoil, substitute topsoil, overburden, or refuse.

A general statement in the December 17, 1998 letter is given for soil classification within the waste rock site. Soils range from a sandy loam type on the northern end of the site to sandy clay loam/loam type on the southern most end of the site. The March 5, 1999 submittal provides additional information on soil texture and depths where coal and/or refuse was encountered. Appendix B supplemental material provides the original soil sample reports from the 1989 sampling period and includes analysis from cells 2, 4, 5, and 6. In review of the 1989 data, the majority of the soils in the reclaimed waste rock area have a textural class rating of sandy loam from 0 to 3 feet in depth. The exception is site 6, where clay loam and sandy clay loam were

encountered between 2 and 5 feet in depth. The following table summarizing the 1989 data was provided in the March 5, 1999 submittal which lists the sample sites where coal was detected at the reported sampling depth:

Cell #	1989 Sample Location *	Depth (ft.)
2	I	2
2	I	3
2	J	4
4	A	2
4	B	3
4	C	3
5	B	4
6	A	2

*Reference Appendix A in the Dec. 17, 1998 submittal for sample locations.

Finding:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.