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ENERGY WEST Mining Co.
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ACT/015/019 #2
Pam, Daron

December 17, 1998

Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Re: Application for Phase I Bond Release of the Cottonwood Waste Rock Site, PacifiCorp, Cottonwood Mine, ACT/015/019, Emery County, Utah

Attn: Pam Grubaugh-Littig

PacifiCorp, by and through its wholly-owned subsidiary, Energy West Mining Company ("Energy West"), as mine operator, hereby submits an application for Phase I bond release of the Cottonwood/Wilberg Mine Waste Rock Site. The said area, located in Township 17 South, Range 7 East, Section 34, NE1/4 SE1/4 and Section 35, E1/2 SW1/4, has met the regulations of the R645 Utah Coal Rules in regards to Phase I bond release (R645-301-880.310).

Introduction

The (Old) Cottonwood/Wilberg Waste Rock Site is located approximately 1.8 miles from the Cottonwood Mine and alongside Highway 57. The site was initially planned and developed for containment of waste material from the Des-Bee-Dove and Wilberg mine sites. The waste containment area was started in 1983 by excavating the first of seven cells. Enough material was stock piled for the construction of a berm around the cell. The berm not only provided containment of storm runoff waters up to and including the 10 year/24 hour event, it also provided backfilling and cover for each cell as they were completed. Each cell was backfilled and graded according to the Mine Reclamation Plan, Append Part 1, Appendix VII, sections 817.17 (a) and 784.13 (b). At the completion of each cell, the area was seeded with an approved mixture as outlined in the Final Reclamation Plan, Volume II, Part 4, beginning on page 19. Final backfilling and grading was completed in 1992-93 as cell seven reached its capacity. The waste rock area, including the surrounding berms, consists of approximately 16 acres.

On September 10, 1998, Pam Grubaugh-Littig and Bill Malencik performed a pre-release inspection. Bob Willey and Dennis Oakley were present during this inspection. No suggestions or comments were made to Energy West Mining Company in regards to additional information needed to be included with this application.

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Requirements for Phase I Bond Release

Bond release for Phase I may be considered only after the Division is satisfied that all the reclamation requirements (taken from the Draft Policy for Bond Release Information) for Phase I have been met. The requirements are:

1. Completion of backfilling and regrading.

2. Completion of drainage control in accordance with the requirements of the approved reclamation plan.

Information included with item 1 above includes results and discussion of soil samples (overburden and topsoil) taken within the release area, dates of reclamation, supportive maps (areas to be released, pre- and post-mining cross-sections).

Item 2, includes a short discussion of drainage control structures devised to control runoff at and above the waste rock site. Maps are provided to illustrate the location of these structures. These draft requirements are discussed in the following sections below beginning with Reclamation of Cells. A discussion of soil suitability and vegetation monitoring of the site is provided which summarizes the condition of the soil and potential impacts to plant growth.

Reclamation of Cells

As the cells were filled to their capacity, they were backfilled and graded as outlined in the MRP. Sufficient subsoil material was used to cover the waste rock along with 12" of topsoil. Depth of total soil cover varies throughout the waste rock site. Dates of backfilling and grading coincide with final reclamation since it was completed simultaneously. Vegetation monitoring of the site has been performed by Dr. Patrick Collins of Mt. Nebo Scientific Inc. and has been ongoing since 1983. Each cell within the site is numbered and listed below. Duration of monitoring is also given. Refer to Drawing KS1650D in Appendix C for 1997 Vegetation Monitoring Map.

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.

Also included with this application are drawings KS1142E (Appendix C). These four drawings feature pre and post-mining cross-sections.

Initial soil sampling and analysis was performed in 1986. Additional sampling was conducted in 1989 and 1994. As discussed in the MRP (Append Part 1, Appendix VII, page 12), the analysis found possible concerns with Sodium Absorption Ratio (SAR), selenium and boron in cells 2, 4, and 5. Sampling of those problem cells has occurred every five years. Cells 1,3, and 6 were not resampled in 1994 since no quality problems were identified. The raw soil analysis data from 1986 and 1994 are found in Appendix B. These data have been converted from the original lab reports to an EXCEL spreadsheet.

In September of 1997, Dr. Collins was retained to sample the "problem " cells with concerns that soil problems could affect the establishment of vegetation. It was postulated that upward migration of certain constituents may even have a greater impact on plant growth over time. This report, *Comparison of Vegetation Data of Selective Reclaimed Cells at the Cottonwood Old Waste Rock Site, 1997,* is included as an attachment and found in Appendix F. This report is also summarized later in this document.

Charts comparing the soil characteristics in each of the problem cells for the sample years 1986 and 1994 are found in Appendix A. Suitability is determined using the criteria set forth in the *Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining* (Leatherman and Duce, 1988). The soil parameters compared from this document consist of pH, Electrical Conductivity (EC), Calcium (Ca), Magnesium (Mg), Sodium (Na), SAR, selenium and boron. The latter two parameters were only analyzed for in the 1994 sampling. The selenium values from these samples do not show up on the charts since the values are below detectable limits. Refer to the raw data in Appendix A.

On the charts in Appendix B, soil parameters are positioned on the x-axis with their corresponding values on the y-axis. The soil parameters have varying units and are, thus, not included on the chart. The units of the soil parameters are as follows; pH (SI), EC (mmhos/cm @ 25 °C), Ca (meq/l), Mg (meq/l), Na (meq/l), SAR (unitless), Se (mg/kg), and B (mg/kg). Soil depths are color coded and grouped according to the year the sample was taken. Depths of samples range from 0.0 feet to 3.0 feet. Refer to the keyed chart in Appendix A.

Discussion of Soil Analysis

Soil sampling at the waste rock site was performed in 1986, 1989, and 1994. Only the samples of the problem cells 2, 4, and 5 that were taken in '86 and '94 are discussed. At least three samples were taken at various depths at each sample location; 0-1 feet, 1-2 feet, and 2-3 feet. Classification of these 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 soil analysis from cells 1, 6, and 7 has been reviewed and were determined as suitable for vegetation growth. These data can be reviewed in the Cottonwood/Wilberg Mine Reclamation Plan, Append Part 1, Appendix VII.

Analysis of Cell 2

Eight sample locations were examined in Cell 2. Salinity of these soils ranged from non-saline (0-1') to moderately saline (1-3') in 1986. These values increased as depth of soil increased. Salinity was determined using Table 1 below. Na, Ca, and Mg levels were elevated in all sample sites that contributed to high salinity.

Class		Electrical Conductivity (mmhos/cm)
0	Non-Saline	0-2
1	Very Slightly Saline	2-4
2	Moderately Saline	4-8
3	Strongly Saline	8-16
4		>16

Table 1: Standard classification of the salinity of soils. Electrical conductivity is the standard measure of salinity.

In 1994, salinity was dramatically reduced but followed the same trend. Salinity increased as depth of soil increased. These soils ranged from non-saline (0-2') to very slightly saline (2-3') during this sampling period.

SAR values in 1986 were random where very little or no leaching occurred. Soil at all sample depths rated "poor" to "unacceptable" during this time period (Leatherman and Duce, 1988). This was probably due to the high Na content of these soils with respect to very moderate levels of Ca and Mg.

The 1994 samples found that the SAR values had decreased. These values increased as depth of the sample increased. The SAR values in the topsoil (0-1' in depth) of this cell fell below 5.0, which is considered "good" suitable soil.

The pH values in 1986 ranged from 7.01 to 8.24 and averaged about 7.6 throughout the depths of samples. These soils are neutral to moderately alkaline. The samples in 1994 show a slight increase in pH with an average of approximately 7.9. Soils with higher pH values are more alkaline but are still considered highly suitable for vegetative growth.

Selenium and Boron values in cell 2 were found not to be a problem. Most values of Selenium were at or below the detectable limit of 0.01 mg/kg. Boron values were well below 5.0 mg/kg. This value is considered the highest limit for the suitability of topsoil. Values greater than 5.0 mg/kg are considered unacceptable.

In general, the quality of soils in cell 2 have increased over time when analyzing the given parameters. Topsoil (0-1') of the area rates as "good" suitable soil for vegetative growth. Overall, subsoil quality is good but decreases in quality as soil depth increases.

Analysis of Cell 4

Four sample locations were examined in Cell 2. In 1986, salinity of these soils ranged from very slightly saline (0-1') to moderately saline (2-3'). Salinity was fairly consistent from depths 0 through 3 feet only varying at most 1.33 mmhos/cm. As in cell 2, Na, Ca, and Mg levels were elevated in all samples. These parameters contributed to the high salinity found.

In 1994, salinity declined in the topsoil and increased as depth increased. These soils ranged from non-saline (0-1') to moderately saline (2-3'). Highest values were observed at the deepest sampling points.

SAR values from samples taken at 0-1 foot ranged between 1.5 and 9.1 in 1986. These values are considered suitably "fair" to "good" when comparing them to the suitability criteria. Interestingly though, except for sample site 4D, SAR values decreased as soil depth increased. In 1994, however, these values showed an opposite trend. At 0-1 foot, SAR values ranged from 0.76 to 1.61 and increased at depth. This is probably due to the leaching that occurred during the eight-year period between 1986 and 1994.

The pH values of all samples were fairly consistent throughout both sampling periods. In 1986, the average pH was 7.7 at all depths, whereas, the pH rose slightly in 1994 to an average of 7.8 which indicate these soils as being slightly alkaline. These values generally reflect the presence of carbonates and exchangeable sodium in soils.

Selenium and boron samples were not taken in 1984. The 1994 values indicate that selenium was below the detectable limit and boron values were well below suitability criteria of 5.0 mg/kg.

The soil in cell 4 is considered "good" at depths up to one foot. These soils decrease slightly in quality as depth increases. Salinity affects the quality of the cell, but should improve as salts are continually leached out.

Analysis of Cell 5

Four sample locations were examined in cell 5. Salinity of the soils ranged from very slightly saline to off the chart (>16) in 1986. Salinity was not consistent throughout the depths sampled. This is probably due to mixing of the sub-soil during final reclamation activities. In 1994, however, salinity ranged from non-saline (0-1') to moderately saline (1-3'). As indicated, salinity increased as depth of soil increased.

SAR values in cell 5 were similar to the values observed in cell 2 from the 1986 data set. Soil at all sample depths rated "good" to "unacceptable" during this sampling period. In 1994, sample sites 5A and 5B indicated a dramatic reduction in SAR values. These values were below 2.0 at both sites, but slightly increased as soil depth increased. Sample site 5C was abnormally high at 19.0 (0-1') in '94, but decreased at increasing depths. Unusually large amounts of sodium were indicated throughout the sampling depths. Sample site 5D shown low values of SAR but increased as depth increased. This problem is indicative of the sample sites nearing the southern end of the waste rock site.

The pH values in cell 5 were consistent with the rest of the sampling sites. The soil is slightly alkaline as pH values averaged 7.7 in both 1986 and 1984.

Selenium was found to be below the detectable limit at all sample sites of cell 5. Boron values were found to lie in the acceptable range (<5.0 mg/kg). The only problem noted in this cell was at the 2-3 foot level at site 5C where boron was 6.54 mg/kg.

The soils in cell 5 were of good quality mostly in the northern end of the cell. Samples indicated decreasing quality towards the southern end of the cell. Further leaching and enhanced plant growth on the southern end will probably improve the quality of this soil over time.

Vegetation Monitoring

In September of 1997, Dr. Patrick Collins, Mt. Nebo Scientific, Inc., compared quantitative data between of cells 2, 4, and 5. He compared the total living cover, lifeform composition, and woody species density of each site between several sample years. Generally, his comparison found that all cells appear to have a positive trend that should lead to successful vegetative plant growth. The results in cell 2 found generous success in all categories compared. Grasses seemed to dominate in cell 4 but shrubs had increased significantly. Although numbers/acre are somewhat low, there is a positive trend in all categories. Cell 5 stayed fairly consistent throughout the period of comparison. Shrub density showed the largest increase in this cell. Refer to Collin's report in Appendix F.

The vegetation monitoring seemed to show a direct correlation against the soil analysis. This makes sense because the two are so closely related. There seems to be no upward migration of waste rock constituents in any of the cells at the site. Impacts to vegetative growth are minor and decreasing over time. It is Energy West's opinion, based on the data presented, that a positive trend of both soil quality and vegetative growth, especially in the southern most cells, will continue in the future.

Drainage Controls

A berm was constructed around the waste rock site to retain a 10 yr./24hr. precipitation event (see page 4 and figures 1 and 2 in Cottonwood MRP, Append Part 1, Appendix VII for calculated SCS curve numbers). The water is retained in the site until it evaporates or seeps into the subsurface. Also, a diversion ditch was constructed to direct runoff offsite, it occurs up-grade of the waste rock site and directs runoff around the east side of the site into the Grimes Wash. Drawing CM-10361-WB in Appendix C is provided which illustrates the berm and diversion ditch.

The information included with this bond release is a requirement of the *Draft Policy for Bond Release Information.* This draft policy was acquire from the Division of Oil, Gas, and Mining and used with the idea that the *draft* document would become a *final* document in the near future. The information submitted includes legal description of the site (Appendix D), notice letters (Appendix E), Drawing CM-10361-WB identifies drainage control devices and release information (Appendix C). A photo essay is included in Appendix G which depicts each cell within the waste rock site.

All information that is submitted with this application for Phase I Bond Release is accurate and complete to the best of our knowledge. Upon approval of Phase I Bond Release, Energy West intends to submit an amendment to the Cottonwood/Wilberg MRP reflecting changes that will occur due to this approval. Three (3) copies of this application is included with this submittal. If you have any questions or concerns regarding this application, please feel free to contact Dennis Oakley at (435) 687-4825.

Sincerely,

Chuck Semborski
Environmental/Geology Supervisor

Enclosures

DCO/dco/cas

Cc: Carl Pollastro, EWMC, w/o Appendices
Dennis Oakley, EWMC, w/Appendices
Blake Webster, IMC, w/o Appendices
Bill Malencik, DOGM – Price Office, w/Appendices