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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

May 26, 2009

TO: Internal File

THRU: James D. Smith, Lead JDS 05/26/09

FROM: Ingrid Wieser, Environmental Scientist II IW

RE: Phase II and Phase III Bond Release-Old Waste Rock Site, PacifiCorp/Energy West Mining Company, Cottonwood/Wilberg Mine, C/015/0019 Task ID # 3273.

SUMMARY:

The Cottonwood/ Wilberg "old" waste rock site is located by Highway 57 approximately 1.8 miles from the Cottonwood Mine. The waste site was developed in 1983, after the Bureau of Land Management Right of Way (UTU-37642) was granted in 1977. The site was primarily developed for use as an open storage and truck loadout but changed to use as an underground development waste storage site for Wilberg Mine and Des Bee Dove Mine.

Material excavated to form the waste disposal cells was used for the construction of a berm around the site in order to contain storm runoff and to provide backfilling and cover for each "cell" as reclamation was initiated. After each cell was backfilled and graded, the cells were seeded with a Division approved seed mixture. The reclamation of the seventh and final cell was completed in 1992-93.

In 1997, the Bureau of Land Management gave PacifiCorp approval to adjust the boundary of Lease UTU-37642 to relinquish 1.08 acres for a coal bed methane degasification project by Texaco Inc.

On July 22, 1999 the Division approved Phase I bond release for 13.81 acres of reclaimed area within the UTU-37642 lease area. Also in 1999, the Bureau of Land Management approved another boundary adjustment to the UTU-37642 lease. The adjustment involved relinquishment of an additional 12.98 acres for use by Texaco Inc.

No mining activities have occurred on the old waste rock site since final reclamation in 1994. Mt. Nebo scientific monitored the vegetation of the site nearly annually since reclamation and collected the final two consecutive years of data in order to apply for Phase III bond release in 2005 and 2006. The final remaining acreage in the UTU-37642 lease area is 34.56 acres, and

the phase II and Phase III bond release application applies to the 13.81 reclaimed acres on the southern parcel, which received Phase I bond release in 1999.

On January 27, 2009, the Division sent the Permittee the following deficiencies associated with the phase II and phase III bond release application.

R645-301-356.200: *Minimum woody species stocking densities needs to be specified on the basis of local and regional conditions in consultation with the DOGM and the Division of Wildlife Resources or other regulatory authority. The Applicant needs to demonstrate that minimum stocking densities have been achieved on the reclaimed area. And that no trees or shrubs that have been in place for less than two growing seasons are counted toward stocking adequacy as per R645-301-356.232.*

The Applicant must demonstrate that 80% of the woody species used to demonstrate stocking density have been in place for at least 60% of the responsibility period (or six years). In this demonstration, the Applicant must provide in the bond release application all data and analysis reports from the monitoring years used.

R645-301-356.110: *A signed statement by a regulatory authority needs to be included in the application describing the current range condition of the reference area and surrounding vegetation.*

The Applicant included the non-native invasive plant Bromus tectorum, (Cheatgrass), in all parameters of vegetation monitoring. The presence of Bromus tectorum does not affect bond release, but it should not be included in demonstration of achievement of success standards.

On April 30, 2009, the Permittee responded to these deficiencies. This memo will address the application and response to deficiencies for the Phase II and Phase III bond release of the Cottonwood/Wilberg old waste rock site.

The Permittee successfully responded to the deficiencies and provided the necessary information as discussed further below. This application is recommended for approval.

TECHNICAL ANALYSIS:

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

The Bond Release Application clearly identifies the area requested for Phase II and Phase III bond release on the *Phase III Bond Release* Map as well as in Attachment 2 *Draft Letters to Interested Parties.* In the letter, the Permittee identifies the area of the lease as located within Township 17 South, Range 7 East, Section 34, NE1/4 SE1/4 and Section 35, E1/2 SW1/4. The Permittee identifies the southern area within the lease boundary as 18.45 acres, of which 15.62 acres are disturbed. The Application for bond release applies to 13.81 acres of the disturbed area in the southern boundary.

The application for Phase II and Phase III bond release includes a description and a map of the entire 34.56 acres of the UTU-37642 lease area as well as the seven reclaimed cells within the 13.81 acres being considered for bond release. Cell one was reclaimed in 1983 and additional cells were reclaimed in the following years concluding the reclamation of cells, five, six and seven which occurred in 1993.

Findings:

The information provided in the Bond Release Application is adequate to meet the minimum regulatory requirements for this section.

POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

Analysis:

Land use information can be found in the Cottonwood/ Wilberg MRP in Volume 2, Part 2. In attachment 11 of the Phase II and III bond release for the Old Waste rock site, is a demonstration of the achievement of the post mining land use. Revegetation Success standards depend on the type of post mining land use, so it is therefore important that the Permittee describe the land use in the Application for bond release. The Permittee states that the land use for the Wilberg Mine was established in the early 1980's as grazing and wildlife.

The Permittee demonstrates that the post mining land use requirements have been met according to the combined cells and berm area production of 1,350 lbs./ acre estimated by Mt. Nebo Scientific. Using this production estimate, the reclaimed area can produce .51 AUM/ acre compared to the estimate by the BLM in 1982 of the pre-developed site of .022 AUM/ acre. This demonstrates that the reclaimed area has a higher production and better grazing land use capability than its pre-developed conditions.

Findings:

The information provided in the application is adequate to meet the minimum regulatory requirements for this section.

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Revegetation: General Requirements

Attachment five of the Application describes Reclamation Treatments Utilized at the Cottonwood/Wilberg "Old" Waste Rock Site. The Permittee states that the present environment conditions include existing vegetation consisting of pinyon-juniper, curlleaf mountain mahogany, Cutler ephedra, black sagebrush, Harriman yucca, Indian ricegrass and bottlebrush squirreltail. The Permittee also states that the present range condition is fair. As stated in the Vegetation Information Guidelines, *"Reference areas must be in fair or better condition at the time of bond release sampling. For reference areas not meeting this criteria, describe management practices that will be employed to improve range condition. Range condition should be determined according to Soil Conservation Service guidelines."* The Soil Conservation Service is now the Natural Resources Conservation Service (NRCS) and the NRCS or other regulatory authority would need to do an analysis of the reference site.

On January 29, 2009, the Division sent the Permittee the following deficiency related to the Phase II and Phase III bond release application.

R645-301-356.110: *A signed statement by a regulatory authority needs to be included in the application describing the current range condition of the reference area and surrounding vegetation.*

The Permittee contacted the Natural Resource Conservation Service (NRCS) to do a range site assessment of the reference area. The Vegetation Information Guidelines recommend that the reference site be assessed by the Soil Conservation Service (SCS) using the Soil Conservation Service Guidelines and that the site must be in "fair" or "better" condition at the time of bond release sampling. In a conversation with Dean Stacy of the NRCS in May 2009, Mr. Stacy explained that the NRCS now uses the guidelines titled, "Interpreting Indicators of Rangeland Health, Technical Reference 1734-6, Version 4-2005" to do site assessments (See email from Dean Stacy under task 3273). The Division's Vegetation Information Guidelines need to be updated to reflect this change in methodology and organization for site assessments. Both the SCS method and the new NRCS method are used to determine how far the assessment site has departed from the expected condition (i.e. the undisturbed reference site). However, the SCS method primarily used production as an indicator of range health whereas the NRCS method assesses many parameters including soil structure, erosion, vegetation composition and diversity, production, invasive species, etc.

Using the new method developed by the NRCS, Dean Stacy conducted a site assessment in April 2009. A letter from Dean Stacy describing his assessment is included on page 74 of the Addendum Phase II and Phase III bond release application submitted in April 2009. He concluded that the site was in "good" condition, with relatively stable soil and hydrological functions. Mr. Stacy noted that the biological integrity was lacking, however, because the herbaceous component and diversity was far lower than it should be. The Potential Natural Community (PNC) for the site is at 25% herbaceous cover and 30% shrub cover. Both cover values were lower than the PNC. Even though Mr. Stacy concluded that the site was vulnerable, the reference area meets the criteria and is acceptable for a revegetation success standard for the reclaimed waste rock area.

Revegetation: Timing

The Permittee describes the plant mixture used for revegetation in Attachment Five of the application. This plant mixture consists of native grasses, forbs and shrubs that are perennial and drought resistant. The Permittee planted the mixture after September 1 during favorable planting conditions.

Revegetation: Mulching and Other Soil Stabilizing Practices

After seeding, alfalfa hay was used to mulch the area at a rate of two tons per acre and was crimped into the soil.

Revegetation: Standards for Success

Reference area/ Baseline data

Found in the MRP and on plate 2-15 and 2-16, the pre-developed old waste rock site consisted of a Pinyon-Juniper plant community. A Pinyon-Juniper reference area of 1.2 acres was selected and is adjacent to the reclaimed area in the Northern Parcel of the UTU-37642 lease area. The report indicates that due to the proximity of the reference area to the reclaimed area, other environmental variables are comparable between the two sites including soil, elevation, exposure and precipitation. The Pinyon-Juniper plant community represents a habitat that provides cover for wildlife but very little forage. Ideally, a mix of adjacent shrub/grassland and pinyon/ juniper plant communities provides ideal habitat for wildlife because it provides forage and cover. The reclaimed area was obviously revegetated using plant species ideal for forage and not to imitate the adjacent pinyon/juniper reference area. Therefore, even though the reference area reflected the pre-development conditions of the site, it was probably not appropriate and a sagebrush/grass community should have been selected as a success standard. (Pinyon/juniper is a necessary habitat for wildlife, but due to its abundance in the site area, regulatory officials often prefer that a sagebrush/grassland community be planted in order to promote diversity and provide more forage for wildlife.) The Division only has authority in reference area similarity during site selection, not during bond release sampling.

Vegetation Monitoring

Pat Collins of Mt. Nebo Scientific conducted quantitative and qualitative vegetation monitoring annually from 1994 to 2006. The Permittee considers Years 2005 and 2006 the two consecutive year data to apply for Phase III bond release and these reports are found in Attachment 8 of the Bond Release Application.

2005 Monitoring

Seven cells, four berms and the Pinyon-Juniper reference area were sampled recording cover, frequency, composition, woody species density and production. A photograph of each cell, berm and reference area are also included in the report. Diversity was measured

by three indices including MacArthur's Diversity Index, average number of species and richness.

Cover, composition and frequency was calculated using ocular methods with meter square quadrants. The mean total living cover for the cells and berms combined was 51.89% with the dominant plant species by cover and frequency being fourwing saltbush *(Atriplex canescens),* needle and thread grass *(Stipa comata),* Cheatgrass *(Bromus tectorum),* Crested wheatgrass *(Agropyron cristatum),* and Broom snakeweed *(Gutierrezia sarothrae).* The mean total living cover for the reference area was 30.16% with the dominate plant species being Pinyon pine *(Pinus edulis)* and Utah juniper *(Juniperus osteosperma).*

The woody species density for the reclaimed area was estimated using the point-quarter method. The total woody species density for the combined cells and berms was estimated at 4382 individuals/ acre and for the reference area it was estimated at 799 individuals/ acre.

Productivity for the site was measured by double sampling. For the reclaimed area, production was estimated at 1,938.85-pounds/ acre and 355.47-pounds/ acre for the reference site.

Statistical analysis of the data indicated that total living cover; density and productivity of the reclaimed site were all significantly greater than that of the reference area. The R645 Coal regulation requirement for bond release states that for these measurements, the reclaimed area should be at least 90% of the success standard (reference area) using a 90-percent statistical confidence interval. For diversity indices, it is obviously beneficial for the reclaimed site to show significantly higher results than for the reference area.

Year two

Year two vegetation monitoring for bond release involved the same parameters as year one. The mean total living cover was 53.30% with the dominant plant species being Fourwing saltbush *(Atriplex canescens),* Indian ricegrass *(Stipa hymenoides),* Broom snakeweed *(Gutierrezia sarothrae)* and Crested wheatgrass *(Agropyron cristatum).* The mean total woody species density for the combined cells and berms was estimated at 5345 individuals/ acre.

The reference site had a total living cover of 34.67% consisting of dominant plant species Pinyon pine *(Pinus edulis)* and Utah juniper *(Juniperus osteosperma).* Woody species density for the reference site was estimated at 1360 plants/acre.

Statistical analysis of the data indicated that all parameters were again significantly greater for the reclaimed areas than for the reference site.

For both years, Cheat grass *(Bromus tectorum)* was present in the reclaimed site. Cheat grass is a non-native invasive species that degrades habitats, increases fire frequency and intensity on rangelands and can displace native grass species. The displacement of native species has not been found to be significant so the presence of the species will not affect bond release. However, it should not be included in vegetation success measurements as it detracts from the post mining land use of wildlife and grazing.

On January 29, 2009 the Division sent the Permittee the following deficiency: ***R645-301-356.110:*** *The Applicant included the non-native invasive plant Bromus tectorum, (Cheat grass), in all parameters of vegetation monitoring. The presence of Bromus tectorum does not affect bond release, but it should not be included in demonstration of achievement of success standards.*

The Permittee responded with the following:

Bromus tectorum is a well established invasive species throughout southeastern Utah. It is found throughout the range surrounding the waste rock site. Open range areas, similar to the waste rock site, are ideal habitats for Bromus tectorum to take hold. Most likely the source seed was imported by wildlife or wind.

Energy West talked with Patrick Collins (Mt. Nebo Scientific) who has historically monitored the site as well as gathered the data for the Phase II and III bond release application. As indicated in the Year 1 report, the total living cover for the reclaimed cells and berms was 51.89%. Bromus tectorum makes up 6.88% of this cover. In Year 2, the total living cover was 53.30%, with Bromus tectorum making up only 2.71% of the total living cover. Comparing the two years could indicate either the Bromus tectorum is declining or the sampling took place in a different proximity within the site. However, what the report correctly points out is that Bromus tectorum is a statistically insignificant cover source. If the species is excluded from monitoring (using the Year 1 data), it shows a mean cover of 45.01% compared to 30.16% reference area. Without having this information included in the data, this status of Bromus tectorum would have never been known.

The Division did not require a weed control program to eradicate all weeds within the site to achieve the standards of success for bond release. The presence or absence of this plant does not affect significantly or sway the outcome of the total living cover results. Bromus tectorum a is statistically insignificant plant that has been imported into the waste rock site area.

The Permittee demonstrated that the invasive species, Cheat grass, did not constitute a significant portion of the established vegetation on the site. Also, excluding the species from the analysis, the site would still meet all regulatory standards.

Additional Success Standards

An additional success standard for reclaimed areas with the post mining land use of wildlife habitat exists and states that the success of vegetation will be determined on the basis of tree and shrub stocking densities *(R645-301-356.230).* The minimum stocking amount is to be specified by the Division on the basis of local and regional conditions and after consultation with and approval by Utah agencies responsible for the administration of forestry and wildlife programs *(R645-301-356.231).* Furthermore, the regulations state that at the time of final bond release, the trees and shrubs should be healthy and at least 80 % are to have been in place for at least 60 % of the responsibility period, and *100%* have been in place for at least two years (the 60/80 rule) *(R645-301-356.232).* The Permittee successfully measured other parameters but needs to fulfill the requirements for health and stocking adequacy of trees and shrubs. So, in order to demonstrate that this standard has been achieved, the Permittee needs to show that a.) The minimum stocking density for trees and shrubs has been achieved (a density measurement selected by the regulatory agencies) and b.) That 80% of the final vegetation has been in place for at least six years, and all of the woody species used for the density calculation has been in place for at least two years. (The most obvious

example would be to use year four and ten monitoring data, but any range can be used including year one and year six.)

Year three and Year nine data

Quantitative monitoring did not take place in year four (2000) so, in order to demonstrate the 60/80 rule the Permittee will have to select an alternate range. The annual report for 1999 contains some quantitative data for the site, but the density data and analysis appears to be in a separate report submitted to Energy West by Mt. Nebo Scientific.

On January 29, 2009, the Division sent the Permittee the following deficiency:

R645-301-356.200: *Minimum woody species stocking densities needs to be specified on the basis of local and regional conditions in consultation with the DOGM and the Division of Wildlife Resources or other regulatory authority. The Applicant needs to demonstrate that minimum stocking densities have been achieved on the reclaimed area. And that no trees or shrubs that have been in place for less than two growing seasons are counted toward stocking adequacy as per R645-301-356.232.*

The Applicant must demonstrate that 80% of the woody species used to demonstrate stocking density have been in place for at least 60% of the responsibility period (or six years). In this demonstration, the Applicant must provide in the bond release application all data and analysis reports from the monitoring years used.

The Division contacted Leroy Mead of DWR on May 20, 2009 to discuss an adequate density standard for the Old Waste rock site. It was determined that the success standard for woody species density would be that of the reference area.

The Permittee responded by providing and analyzing the monitoring data for year 2001, seven years prior to bond release application. The Permittee stated that in 2001, the woody species density of the reclaimed area was 2219.51 and 917.22 for the reference area. The Permittee only used these two numbers to explain that 242 percent of the woody species in the reclaimed area were in place in 2001 or seven years prior to bond release (the 242% was obtained by 2001 density of reclaimed area/2001 density of reference area). Therefore, the Permittee apparently demonstrated that the reclaimed site was 242% of the requirements for density seven years prior to bond release. However, reference area standards should be those during bond release sampling not seven years prior. The Permittee also explains that the density standard was set in 1982 by Jerry Barker from Bio-resources. This number is only the density of the reference area in 1982, *not* the approved bond release success standard. The Permittee did not correctly explain the demonstration of density success, but included enough information that the Division could clearly see the standards were met. The analysis is as follows:

In order to demonstrate that 80% of the woody species used to demonstrate stocking density have been in place for at least 60% of the responsibility period, the comparison should be {.80 × density in 2001 sampling < current bond release sampling density). The density in 2001 was 2219.51-stems/ acre, and the density in 2006 was 5,345.26 stems/acre. .80 (2219.51) = 1775.26 which is less than 5345.26. The vegetation has clearly been established into a permanent, sustainable community. This only demonstrates five years before final bond release sampling of the site. However, the increase in plants indicates that the site is naturally regenerating and is not declining. The density during bond release sampling is well above the success standard, which is the density of the reference area at bond release.

Lastly, to demonstrate that all plants counted toward stocking adequacy have been in place for at least two growing seasons the Permittee should have provided more information. The Division is aware that the Permittee did not reseed the area after 1993, which was the year the reclamation was completed. During a site visit to the area after bond release sampling, the Division agreed that the site was well established and most of the vegetation was significant enough that it appeared it had been there for longer than two growing seasons.

Findings:

The information provided in the application is adequate to meet the minimum regulatory requirements of this section.

RECOMMENDATIONS:

The Application for Phase II and III bond release is recommended for approval.

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