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

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TO: Internal Files

THRU: Susan M. White, Sr. Reclamation Specialist/Biology, Team Lead SMW

FROM: Peter H. Hess, Sr. Reclamation Specialist/Engineering PHH by SMW
Wayne H. Western, Sr. Reclamation Specialist/Engineering WHW

RE: Upper Pad Reclamation Phase I, PacifiCorp, Des-Bee-Dove Mine, C/015/017-01A-1

SUMMARY

PacifiCorp submitted an amendment to reclaim the Little Dove and Beehive Mines on March 27, 2001. Appendix XIV was submitted as a separate reclamation plan in order to expedite the process such that the permittee could initiate the work during the fall of 2001. The historical use of the Phase 1 area predates the passage of SMCRA. The area consists of three access openings per mine to the Blind Canyon seam, the pad area used for material storage, a substation pad, and water tank pad and associated access roads. The Des-Bee-Dove Mines operated from the early 1900's until 1986 and were then sealed according to MSHA guidelines in 1987. From 1987 until 1999, the Mines remained in temporary cessation status. All surface facility structures were removed in 1999.

TECHNICAL ANALYSIS

OPERATION PLAN

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:

Disposal of Noncoal Waste

The reclamation of the Des-Bee-Dove site will generate asphalt material that was used for road surfacing and diversion construction along those roads. The permittee is proposing to dispose of the Phase I asphalt material at the Beehive Mine fan location highwall. Here it is to be buried under several feet of noncombustible earth material.

Analysis of drawings #CM-10368-BH, Beehive/Little Dove Mines (B.C. Seam) Mine Permit Area with Mine Workings and CE-10537-DS, Surface Ownership Map of the Des-Bee-Dove Mine Permit Area, as they currently exist within the approved mining and reclamation plan, reveals that the proposed disposal area exists on the surface of lands owned by PacifiCorp.

Numerous discussions between the Utah Department of Environmental Quality/Division of Solid and Hazardous Waste and the Utah DNR/DOGM have established a "permit by rule" criteria by which a permittee may dispose of asphalt material if the proper steps are followed. These include:

1) The permittee must apply for a "permit by rule" determination through the Utah DEQ/Division of Solid and Hazardous Waste (as permitted by Utah Administrative Code R315-318-1). Approval of this "permit by rule" criteria by the DEQ essentially grants the UDNR/OGM jurisdiction to control the disposal of the material within the Mines permit area, as regulated by the Division through the mining permit and the mining and reclamation plan for the site in question.
2) The owner of the solid waste disposal facility will change the record of title, within 60 days that the property is used as a solid waste disposal site.

Energy West Mining Company applied for and received a "permit by rule" consent from the Utah DEQ/Division of Solid and Hazardous Waste on March 22, 2001. That consent grants the permittee the right to pursue disposal of the Des-Bee-Dove asphalt disposal through that mine's mining and reclamation plan/permit, as regulated by the Division.

In a deficiency response relative to the Phase 1 reclamation plan, which was submitted by the permittee on September 17, 2001, the permittee committed to remove and dispose of asphalt curbing (which had been installed along the Little Dove Mine/Beehive Mine pad area) at the base of the backfill against the Beehive Mine fan highwall, (See page 8, Des-Bee-Dove Mine, Phase 1 Area, Section 553.100, Backfilling and Grading). This area is east, southeast of the main Beehive portals and is removed from any of the drainages that will have to be established as part of the reclamation.

Findings:

The information provided in the application meets the minimum Solid and Waste Materials requirements of the regulations.

RECLAMATION PLAN

APPROXIMATE ORIGINAL CONTOUR RESTORATION [smorriso15]

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

The permittee, at the request of the Division, provided information relative to the location of various highwalls in a survey conducted during the spring of 1997. Highwalls, as they relate to underground coal extraction, are defined by regulation (See page 14 of Appendix XIV) as areas whose purpose is to provide "entry to underground mining activities". Information included with the 1997 highwall survey included drawing # CS1660B, Des-Bee-Dove Mines, Surface Facilities Map Highwall Survey which depicts the six portal areas associated with the Little Dove and Beehive Mines.

Although the highwalls are depicted as the immediate area at the opening in the coal seam on drawing # CS1660B, large contour cuts were necessary to access the selected portal areas due to the extreme steepness of the terrain. These cuts were made prior to the passage of SMCRA; no consideration was given relative to the reclaim ability of the areas. Had the selected portal areas been accessible from a perpendicular or near perpendicular approach, the massive bank cuts could have been avoided. The steepness of the terrain prevented this.

Topsoil, as well as over burden, was side cast and from the edge of the area and used as pad material to gain access to the coal seam. Page 15 of the Engineering section of Appendix XIV indicates that it was determined during a site review on March 19, 2001 that sufficient fill existed to reclaim the access road and portal pad area to approximate original contour, however:

1) There are no surface configuration maps or photographs available to establish the pre-mining surface configuration in the Little Dove/Beehive portal area.
2) Without knowledge of the pre-mining surface configuration, even an engineering analysis using predicted cross sections is a "best guess" analysis. This is more accurate than merely looking at the site, as was done on March 19, 2001 by the various representatives of the USFS, and the UDNR/OGM.
3) Other fills at this site utilized large volumes of coal fines. This may or may not be the case in the Little Dove/Beehive terrace pad. In photo dated 1978 of the Little Dove portal pad area it appears that coal fines were not used in pad development.

Thus, it is impossible to know if sufficient fill will be available to reclaim the Little Dove/Beehive portal areas and access road until the contractor is actually well into the extraction/placement/compaction process of backfilling the area. The permittee anticipates that approximately 3,000 cubic yards of fill are required to accomplish the back filling requirements. Priscilla says 15,000 for the pad?

Any bank cuts, which remain above the portal areas, will exist due to the impossibility of trying to backfill nearly vertical areas with fine materials and have them remain stable. This remaining highwall will be more stable in an unfilled status than it would be if attempts were made to push material to the top of the cut. The Little Dove and Beehive Mine portals will not pose a hazard to public health or safety, or to the environment due to the remoteness of their location.

Photograph #'s 8, 9, 10, and 11 (Appendix A of Appendix XIV) show the upper limits of backfilled material in each photo. The photos provide verification that it is not the permittee's intent to fully backfill the highwalls, but rather to leave the upper portion unfilled. This constitutes a "remaining highwall". However, the reclaimed surface will meet AOC because:

1) The postmining topography will closely resemble the premining topography.
2) All spoil piles are eliminated.
3) All drainage channels are being restored.
4) The postmining land use is the same as the premining land use.

The requirements for achieving the approximate original contour requirements are coached in the backfilling and grading requirements. The Division's Technical Memo 002 contains guidelines to help evaluate compliance with AOC.

The term **"Approximate Original Contour"** means that surface configuration achieved by backfilling and grading of the mined areas so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain with all highwalls, spoil piles, and coal refuse piles having a design approved under the R645 Rules and prepared for abandonment.

The Division does not have any specific requirements how well a site blends into the surrounding terrain. The general requirements are that the slopes of the reclaimed area are of similar length and steepness of the surrounding area and that the reclaimed topography merges into the surrounding area. The Division's staff have looked at the proposed reclamation topography and cross-section and determined that the reclaimed site will blend into the surrounding area.

Although highwall retention under some circumstances may provide certain environmental benefits, both federal and state regulations require complete elimination of all highwalls. In Utah, the rules indicate that permittee's must eliminate all highwalls, except in previously or continuously mined areas and when cliffs existed in the highwall area before mining. Under the general requirements and within the meaning of the AOC directive, elimination of highwalls means backfilling, regrading and reshaping highwalls in a manner that meets AOC requirements and the requirements of the postmining land use.

All highwalls at the Des-Bee-Dove mine were developed prior to SMCRA and therefore do not have to be eliminated if the Permittee can demonstrate that 1) the highwall will be compatible with the postmining land use, 2) provide adequate drainage, 3) be stable (safety factor of 1.3), and 4) there is not enough spoil on site to completely reclaim the highwalls. The compatibility issues are discussed in the postmining land use section of the TA. The drainage issues are discussed in the hydrology section of the TA. The slopes in the area have been analyzed and determined that they meet (or will met provided the requirements of the RG&B specifications are followed during backfilling and grading to meet) the 1.3 safety factor (see Appendix C) of the submittal.

The main reason why the highwalls cannot be completely eliminated is the restricted site configuration. Reconstruction of the three drainages will dictate the actual extent to which fill can be placed (Section 553.110, page 15). The permittee could place enough spoil to cover the highwalls, however, the spoil would have to be placed at an angle that would cause the slope to have a safety factor of less than 1.3 and could potentially saturate the fill because of the drainages. This a major concern at the Division, especially in drainage #3 (Drawings CS1817C and CS1814D) where the dip of the sandstone ledge above the Beehive portals will naturally divert water towards the placed fill and the drop from the ledge will concentrate erosive power at the base of the ledge. No purpose will be served in covering the entire cut to the top if water erodes the fill or saturates the fill and causes it to slide.

The term highwall has been broadly interpreted to include cut slopes or cut features associated with highwalls, roads, pad facilities and other surface features related to underground coal mining. The permanent program rules have eliminated this broad interpretation of the term. The rules fail, however, to address what specialized grading techniques, if any, should be used to reclaim cut-slopes or roads and pads. In some cases, leaving cut-slopes or conducting other specialized grading practices may yield a superior reclamation plan when all performance standards and requirements for AOC are considered. The Division should consider other highwall elimination techniques in addition to backfilling in evaluating AOC compliance. Like what?

All spoil piles and coal refuse piles will be eliminated.

Findings:

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

BACKFILLING AND GRADING [smorriso16]

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

General

Appendix XIV makes the commitment to reclaim the portal areas and portal terrace and its associated access road to approximate original contour. However, the Des-Bee-Dove Mine meets the criteria of a "continuously mined area, (CMA)", as defined by the R645 coal rules. Thus, R645-301-553.610 gives the Division authorization to not require the permittee to completely eliminate the highwalls in the area, if insufficient spoil exists on site or the safety factor requirements cannot be met.

The permittee has submitted a slope stability analysis for the upper pad portals and their associated reclamation. The Phase ~~2~~-1 Reclamation Plan, as submitted on, September 24, 2001 contains a study performed by Rollins, Gunnell, and Brown at Profile B and longitudinal cross section 3+00, as depicted on drawing # CS1817C. The toe of Profile B intersects Profile A at cross section 3+00. Thus Profile B is for the upper pad area as it is situated between the Beehive portals and the Little Dove portals. The analysis contains two options for the backfilling of Profile B.

Option 1 (See Figure 2) assumes that a layer of foundation soil exists below the present surface elevation, and that these soils consist of loose to medium dense granular fill weighing 125 pounds /ft^3 with an inherent internal angle of friction of 32 degrees. A cohesion factor of 0 psf is assumed. A recommended vertical radius of seventy-two feet (concave slope surface) will provide a long-term static factor of safety of 1.33, which meets the minimum requirements of R645-301-553.130. The area to be backfilled may consist of either rock fill of earth fill, varying from 1.25H:1V to 2H:1V or flatter. The characteristics of the suggested rock fill are that the material be less than thirty inches in diameter, with less than 20% of the volume being minus one inch. Rock fill material should also have a total unit weight of 140 pcf with an internal friction angle of 45 degrees. Earth fill material should have a gradation of minus six-inches, with less than thirty percent consisting of minus 200 mesh material. Earth fill material should consist of material having a total unit weight of 125 pcf with an internal friction angle of 34 degrees.

Option 2 for Profile B, (Figure 5), consists of backfilling the slopes on bedrock material having a total unit weight of 140 pcf with an internal angle of friction of 45 degrees and a cohesive strength of 1000 psf. This option requires a much greater volume of material to reach the 2H:1V proposed slope than is required by Option 1. A minimum long-term static safety factor of 1.38 has been calculated for the vertical radius fill line of 103 feet. Other design criteria include the placement of ten feet of loose to medium dense granular fill (total unit weight of 125 pcf, internal friction angle of 32 degrees).

The slope stability analysis conducted by Rollins, Gunnell, and Brown contains specific design criteria that are recommended to ensure the long-term static safety factors calculated for the various backfill designs for Profile B. These include the following:

1) The RB&G report suggests that the material that currently exists at the site can be used as backfill material for the slope restoration. However, the stability analysis also recommends that this material be processed by separating the minus 4" to 8" material from the oversize material prior to placement. This will require additional hauling and handling costs.
2) The RB&G report recommends that all minus 4" to 8" granular material be placed in lifts not exceeding one foot in thickness. A compaction requirement of at least 90% of the maximum laboratory density as determined by ASTM D 1557-91 for the fill material has been recommended. The resulting granular fill will obtain a resulting friction angle equal to or greater than 34 degrees.
3) The RB&G report recommends that all rockfills utilizing +4" to 8" material be placed in lifts not exceeding three feet in thickness. Maximum material size must be limited to thirty inches with less than 20% smaller than one inch. The recommended compaction on this type of fill is to be accomplished by conducting "at least 4 passes of a D-9 (crawler compaction) or equivalent dozer. The friction angle of the rockfill after this is completed will be equal to or grater than 45 degrees.
4) The RB&G report recommends that all earth fills be constructed to be equal to or greater than 2H: 1V. Rockfill fills can be constructed at 1.25H: 1V.
5) The RB&G report indicates that the safety factors which have been calculated for greater than 1.3 assume that no pore pressures will develop within the fill. Thus it is recommended that all earth fill embankments be constructed with rock fill or drain fill beneath them.

Recommendation #5 is of particular importance where drainages must be constructed through areas that have been backfilled. Three drainages will require construction through the Phase 1 reclamation area of the Des-Be-Dove Mine.

In closing, the RB&G report states that conservative shear strength parameters were estimated to analyze the proposed finished slopes. The estimates were based upon visual classification of the surface materials. Thus, the RB&G report recommends that a geotechnical engineer observe the fill during construction, and that compaction testing be performed under that engineer's supervision. This is necessary to ensure that the design requirements previously mentioned are adhered to, such that the minimum long-term static safety factor of 1.3, as required by the R645 coal rules, can be met.

The addition of the Rollins, Gunnell, and Brown slope stability analysis to Appendix XIV, Phase 1 reclamation plan now makes that document adequate relative to the requirements of R645-301- 553. It is necessary, however, for the permittee to commit to meeting all of the design criteria and other recommendations made by the RB&G report.

Findings:

Information provided in the application is not considered adequate to meet the minimum Backfilling and Grading requirement of the regulations. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-553.500, the permittee must commit to adhering to the recommendations made within the slope stability report, as well as commit to making an experienced geotechnical engineer responsible for all field work, including the field verification methods necessary to ensure that all design criteria are being met. Construction methods found in the plan must not contradict with the RG&B report.

MINE OPENINGS [smorriso17]

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

Mining in the Des-Bee-Dove area predates SMCRA, going back to the late 19th century. It's not clear when the Beehive Mine was initially developed, but a shaft from the Deseret Mine up to the Beehive was constructed sometime in the 1950's to transport coal from the Beehive Mine to the surface by way of the Deseret Mine. The Little Dove Mine was constructed in the mid-1970's. The Beehive and Little Dove Mines each had three portals. The mines were temporarily sealed in 1987. In 1999 the portals were backfilled and the surface facilities removed. The planned reclamation will place additional fill and growth medium over the sealed portals. Water will not drain towards the sealed portals. The Little Dove portals and main entries are aligned almost directly down dip and no portion of the mine is at a higher elevation than the portals. The Beehive Mine portals and main entries are oriented close to strike of the coal seam but have a slight downward slope; most of the mine is at an elevation lower than the portals and there is no direct flow path from the higher areas to the portals.

On February 26, 1997, PacifiCorp filed a Notice of Intent with the Division to reclaim the Mines. The currently approved mining and reclamation plan for the Des-Bee-Dove Mine shows Figure 1, Des-Bee-Dove Coal Mines, Typical Portal Seal, drawing # CM-10319-WB, (See Volume 2, Part 4, Appendix 1) which depicts a keyed double course concrete block seal hitched into the coal ribs and mine floor, with twenty five feet of noncombustible backfill placed and compacted out by the seal. This method was approved as part of C/015/017-98BR, as approved for incorporation into the mining and reclamation plan on September 1, 1998.

As observed on the March 19, 2001 site visit by UDNR/OGM personnel, and as can be seen from Photos #9, #10, and #11 included in Appendix A, "Pre-Reclamation Site Photos", noncombustible fill does exist out to the surface contour of the highwall. In order to meet the

requirements of R645-301-551, Casing and Sealing of Underground Openings, and 30 CFR 75.1711-2, Sealing of Slope or Drift Openings, it was necessary for the permittee to provide adequate verification that the six mine openings associated with the Little Dove and Beehive Mines were permanently sealed. The permittee submitted a reclamation plan for the Phase 2 area for the lower pad areas associated with the Deseret Mine portals, and the tipple and bathhouse facilities. That submittal, which has been designated as C/015/017-AM01-D, includes drawing # CS1660B, "Des-Bee-Dove Mines", Surface Facilities Map Highwall Survey, which shows that the three portals associated with the Little Dove Mine and the three portals associated with the Beehive Mine were sealed with double block wall seals and backfilled at least twenty-five feet. The drawing also contains a note that "all seals were backfilled and constructed to MSHA regulations at least 25' in by opening". The drawing is P.E. certified by Mr. John Christensen, who is Utah registered professional engineer. Drawing #CS1660B adequately addresses the requirements of R645-301-551.

Findings:

Information provided as part as part of the Phase 1 Reclamation Plan for the Des-Bee-Dove Mines (C/015/017-AM01D) is considered adequate to meet the requirement of this section for the Little Dove and Beehive Mine portal areas.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS [smorriso22]

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Final surface configuration maps

Appendix XIV includes several maps that show the permittee's intent relative to the reclamation of the Beehive/Little Dove portals, the terrace pad, and the associated access road, (Phase 1). Drawing # CS1814D, Des-Bee-Dove Coal Mines 2001 Reclamation Phase 1, shows the operational topography as well as the final reclamation topography for the Blind Canyon seam. The map is P.E. certified by Mr. John Christensen, who is the applicant's resident professional engineer.

Reclamation backfilling and grading maps

Drawing #CS1817C, Des-Bee-Dove Mine's Phase 1 Reclamation, Plan View and Cross Sections also shows the existing topography and final reclamation topography. Reclamation profiles and cross sections are also depicted, which show the depth of cut/fill being made at each section location to achieve the desired reclamation effect. Most of the fill areas approximate a maximum ten-foot depth. Reclaimed slopes will average twenty to twenty-five degrees from

horizontal in the cut areas. Based on the two drawings, a large volume of fill material should be left over to be utilized in the reclamation of the access road. The permittee has not provided mass balance calculations to determine the volume of excess material.

Findings:

The information provided meets the minimum regulatory requirements of this section.

BONDING AND INSURANCE REQUIREMENTS [smorriso23]

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:

Determination of bond amount

The Des-Bee-Dove Mine site is currently bonded in the amount of $1, 837,712.00 with the State of Utah through surety bond # 400 JN 6139. This amount was last reviewed prior to the August 2000 permit renewal, and is determined to be adequate.

Appendix XIV briefly discusses bonding on the last page included with the submittal. Included text indicates "upon completion of the reclamation project, PacifiCorp will revise the bond estimation by eliminating items related to the Beehive/Little Dove Mines. Bond reduction will not be requested until Phase 2 is complete (scheduled for the Fall of 2001)." This appears to be adequate.

Findings:

The information provided meets the minimum regulatory requirements of this section.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT [smorriso24]

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

A CHIA for the East Mountain area was updated in 1994. This modification of the Reclamation plan does not require modification or updating of the CHIA.