

**PacifiCorp**  
**Energy West Mining**  
**Company**

**Deer Creek Mine**

**Volume 11: Response to Deficiencies, Task  
ID #2195**

**R645-301-200 Soils Section**

**Replace Entire Text Section**

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Appendix B	Report: Soil Survey Report of the New North Rilda Canyon Portal Facilities Area, Mt. Nebo Scientific, July 2004. Soil Storage Addendum March 2005.
Appendix C	Prime Farmland Determination: NRCS, October 2004.

**LIST OF MAPS**

200-1	Soils Classification Map
200-2	Soils Stripping and Storage Location Map

**R645-301-210 INTRODUCTION**

Mining in the Rilda Canyon area has been conducted since the 1940's. Four historic mines (Helco Mine, Leroy Mine, Jeppson Mine, and Rominger Mine) are located in Rilda Canyon that were reclaimed by Abandoned Mined Lands in 1988. In 1995, PacifiCorp expanded its Deer Creek Mining operations into the North Rilda area. Approximately 23 million tons of minable coal is anticipated to be mined from the this area during life-of-mine production. Surface ventilation facilities were constructed in the Left Fork of Rilda Canyon to provide for ventilation to the North Fork area. Because of the need to expand the mining operations farther to the northeast (Mill Fork State Lease #48258), surface facilities are required in Rilda Canyon. This includes all support facilities for underground mining operations with the exclusion of coal transportation.

Five soil survey's or investigations have been conducted in the Rilda Canyon area: Gainer, 1983, Furst 10/90, Furst, 12/91, EIS Environmental and Engineering Consulting, 5/04, and Nyenhuis, 7/04. The soils investigation provided by Furst can be found in Volume1, Part 2 (Environmental Resources), pages 2-181.1 through 2-181.39. These reports discuss soil resources of the Left Fork of Rilda Canyon. The EIS report discusses soil resources in the area of the historic Leroy, Jeppson, and Rominger mines, refer to Volume 11 Appendix Volume - Soils: Appendix A. This area was initially proposed for surface facilities. However, because of concerns of culverting approximately 1500 feet of the Rilda Creek, the site location was moved approximately ½ mile up canyon. The Nyenhuis report discusses soil resources of the proposed Rilda Canyon Portal Facilities, refer to Volume 11 Appendix Volume - Soils: Appendix B.

Soil segregation locations have been established in the Left Fork Rilda Canyon Fan Facilities area (refer Volume 4 Map 2-17A) and the Rilda Canyon Portal Facilities area (refer to Map 200-1, Soils Stripping and Storage Location Map). These areas store topsoil and subsoil salvage from each of these disturbed areas.

The following sections detail investigations of the soil environment in Rilda Canyon. Through these investigations, detailed procedures are designed for the removal and storage, sampling, analysis, and replacement of soil during reclamation of the disturbed sites.

**R645-301-220 ENVIRONMENTAL DESCRIPTION**

The proposed Rilda Canyon Portal Facilities is located on the north side of Rilda Canyon, a tributary of Huntington Creek. The surface facilities will be located in an east-west trending canyon below the intersection of the right and left forks of Rilda Canyon. The elevation differences in the area of the mine site range from approximately 7,300 feet above mean sea level near the sediment storage area to 7,725 feet near the forks of Rilda Canyon.

***R645-301-221 Prime Farmland Investigation***

As stated in the regulations, all permit applications, whether or not Prime Farmland is present, will include the results of a reconnaissance inspection of the proposed permit area to indicate whether Prime Farmland exists as given under R645-302-313.

PacifiCorp has consulted with the National Resources Conservation Service (formally the Soil Conservation Service) on three separate occasions for Prime Farmland Determination related to the Deer Creek Mine permit boundary;

- + November 10, 1983 (refer to Volume 1, pages 2-215 through 2-2118)
- + March 27, 1991 (refer to Volume 1, pages 2-218.1 through 2-218.2)
- + October 14, 2004 (refer to Volume 11 Appendix Volume Soils: Appendix C)

Based on the NRCS investigations of all of the lands within the Deer Creek Mine (including the proposed Rilda Canyon Portal Facilities) it has been determined that these lands do not qualify as "Prime Farmland" for the following reasons:

- + Soils contain more than 10% percent surface rock fragments, or
- + Percent slope multiplied by K (erodibility factor) exceeds 2
- + Area is above all existing irrigation systems

***R645-301-222 Soil Survey***

Previous Studies

The soils in the area have been included in previous baseline studies of the general permit area. Furthermore, the soils of the area have been mapped previously by the operator in anticipation to include the area for future mining (see Volume 4, Map 2-16, "Future Permit Area"). A field survey of the soils of the permit area was conducted by T.H. Furst in 1990. Field work and

laboratory analyses of Soil Pedon 3 in the study described and classified the soils mapped in the North Rilda Area. The soils have been classified as mixed Typic Cryoborolls, loamy-skeletal, 25-40% slopes. The pedon contained >0.6% organic carbon throughout the soil solum, and the percent base saturation was most likely >50% throughout the soil solum (inferred from the pH). Soil textures ranged from sandy loam in the A and Bw1 horizons to loam in the Bw2 horizon. Electrical conductivity ranged from 0.4-0.5 mmhos/cm and the sodium adsorption ratio for all horizons was less than 3.4. Soil reaction (pH) ranged from 8.0 to 8.1. SAR values were also low enough to be rated as "good" by DOGM guidelines. Alkalinity (HCO<sub>3</sub>) was less than 4 meq/L, whereas, the saturation percentages of all horizons ranged from 44.6% to 52.6%. Available water capacity ranged from 0.10 to 0.15 inches of water per inch (depth) of soil. Calculations of the total available water revealed that about 3.6 inches of water would be available on a whole pedon basis when the displacement of soil material by coarse fragments was taken into account.

The soils were generally described "as a dark grayish brown loamy surface layer about 40 cm thick, underlain by a pale brown clay subsoil 40 cm thick, over a light gray calcareous substratum with up to 50% sandstone fragments". A general soil map for the permit area which includes the North Rilda Area has been provided as Volume 4, Map 2-16 in the Deer Creek MRP. For additional information about the soils in the area refer to Volume 1, Part 2 of the MRP.

#### 2003-2004 Studies

PacifiCorp retained Environmental Industrial Services (Soil Scientist: Dan Larsen) to conduct a soil inventory to aid in the development and reclamation associated with the proposed expansion of the Deer Creek Mine in Rilda Canyon. The EIS report discusses the inventory and assessment of soil resources of the historic mining areas of the Leroy and Rominger mines. This report is included since an area below the Leroy Mine portal area is proposed for disturbance. PacifiCorp plans to construct a sedimentation pond within this area. The EIS report lists this area as soil map unit D "disturbed". This soil consists of mixed soil materials and waste coal. The area below the Leroy Mine had been previously reclaimed. Two soil pits revealed a layer of about one to two feet of cobbly sandy loam soil over waste coal materials in most areas. Coal deposits are up to eight feet in depth.

As stated earlier, PacifiCorp's original proposal was to construct the facilities in the area of the historic Leroy, Jeppson, and Rominger mines. However, because of concerns of culverting approximately 1500 feet of the Rilda Creek, the site location was moved approximately ½ mile up canyon. As a result, PacifiCorp retained Mr. Jim Nyenhuis, Certified Professional Soil Scientist/Soil Classifier (ARCPACS 2753), to map the revised location at the Order 1 level of intensity for the proposed area, refer to Volume 11 Appendix Volume - Soils: Appendix B. The study area was approximately 16 acres in size and was composed of the proposed surface facility

area, intersection of the right and left forks, and the alluvial bottom to the south of the facilities. Field work including soil sampling was completed in July 2004. Pacificorp contracted Mr. Jim Nyenhuis to supplement the initial study of the proposed facilities near the intersection of the right and left forks to include an in-depth analysis of the topsoil and subsoil storage areas. Topsoil/subsoil material will be stockpiled at separate locations approximately 0.5 miles down canyon from the mine site. The topsoil site is located away from any drainages in a fairly flat previously disturbed area directly below the reclaimed Helco Mine portal site. The subsoil/construction fill site is located in Rominger Canyon. The canyon was previously disturbed to access the Rominger and Jeppson coal mines. Appendix B has been amended in to include soil descriptions and sampling analysis of the soil storage locations.

**R645-301-222.100    Map Delineating Soils**

A site specific, Order 1 soil survey for the proposed mine site area was performed by Mr. Jim Nyenhuis and Dan Larsen during 2003 and 2004. Detailed reports of the on-site field work and laboratory analyses along with soil maps are presented in Volume 11 Appendix Volume - Soils: Appendix A & B.

**R645-301-222.200-300    Soil Identification and Descriptions**

Soil types of the proposed disturbed area are identified on maps located in Volume 11 Appendix Volume - Soils: Appendix A 2003-4 EIS report: Sediment Pond Area and Appendix B, 2004 Mt. Nebo Report: Mine Facility and Soil Storage areas. During 2003 and 2004, Mr. Dan Larsen, Soil Scientist from EIS and Mr. Jim Nyenhuis from MT. NEBO conducted field mapping of the proposed mine facility, sediment pond and soil storage areas. Soil profiles were exposed either by hand tools or a backhoe to examine the full soil sequence at various locations around the proposed disturbed area. Soil sampling and subsequent analyses were used to determine suitability for reclamation purposes. Soils data from previous investigations conducted in the 1990's, as well as aerial photography, and detailed site investigations were used to define the boundaries of each map unit. This information was then used to prepare a detailed map unit description for each of the mapping units delineated during the Order 1 Survey at the mine site sediment pond and soil storage areas (refer to Map 200-1).

Five map units were within the study area:

- \* Map Unit A Alluvium Bottomland Soils
- \* Map Unit B Steep Rocky Slopes, Haplustepts, Ustorthents
- \* Map Unit E Colluvial Toeslopes, Bench (referred to Map Unit C by EIS: Appendix A)
- \* Map Unit F Steep Facing Slopes; Cryoborolls
- \* Map Unit D
  - D Disturbed Land, Soil, Coal, Stones, Fill Material
  - DR Disturbed Land (Old Mine Access Road)
  - DF Disturbed Fan Site (Leroy Portal Area)
  - RD Rilda Canyon Road (Emery County #306)

### **Pedon Descriptions**

#### **Map Unit A: Alluvial Bottom Land Soils**

Alluvial bottomland (Map Unit A) is located along Rilda Creek and in the confluence area of the Left and Right Forks of Rilda Creek. Alluvial bottomland is south of the Rilda Canyon Road and will not be disturbed by mining activities. An area within the bottomland along the Right Fork of the Rilda Creek, near the confluence with the Left Fork of Rilda Creek, includes the proposed relocation of the Spring Collection Study Area for the North Emery Water Users Association. Slope range of the map unit is 0 to 15 percent. Vegetation within the alluvial bottomland is a mixture of Douglas fir, aspen, and spruce with an understory of grasses and grape holly. Elevation ranges from about 7,600 to 7,750' MSL. The map unit is considered to be in a "frigid" soil temperature regime.

Soils within Map Unit A are very deep (>60" to bedrock), well to somewhat poorly drained, and are developing primarily in streamlain alluvium with some slopewash colluvial material. Soil textures are primarily sandy loam or sandy clay loam. Coarse fragment content is generally less than 15% in the surface layer, and increases to about 20% or more in the subsoil and substratum. Stones and boulders are scattered on the soil surface. Brycan bouldery very fine sandy loam is the dominant soil within the alluvial bottomland, and is described below. Schupert gravelly very fine sandy loam occupies the narrow channel

bottom of Rilda Creek within the study area, and was described in the previous survey for the fan installation project (Furst, 1991).

Schupert is a very deep, well drained, slowly permeable soil forming in streamlain alluvium. It is classified as a "Fine-loamy, mixed, superactive, calcareous, frigid Typic Ustifluent." The most recent official NRCS soil series description for Schupert, dated March 2003, is on file.

Soils within the Alluvial Bottomland have been described and/or sampled at four locations (S1, S4, S7, and RC2). Evaluation of the field and laboratory data indicates the soil most closely correlates to the Brycan soil series.

Brycan bouldery very fine sandy loam is a very deep, well drained, moderately permeable soil with slow runoff forming primarily in streamlain alluvium. It is moderately to strongly calcareous. The surface layer meets criteria for a mollic epipedon. Brycan is classified as a "Fine-loamy, mixed, superactive, frigid Cumulic Haplustoll". The most recent official NRCS soil series description for Brycan, dated June 2000, is on file.

Sample site RC2 was located in the Proposed Spring Collection Study Area in the west extension of the study area. At typical sample site RC2, Brycan has a very dark grayish brown (10YR 3/2, dry) sandy loam surface layer about 6 inches thick. The subsoil is a brown (10YR 4/3, dry) sandy clay loam about 12 inches thick. The underlying "BC" transition layer is a brown (10YR 5/3, dry) sandy loam to a depth of about 30 inches. The "C" horizon substratum is a brown (10YR 5/3, dry) sandy loam to a sampled depth of 66 inches. Coarse fragment content ranges from about 10 to 20 percent throughout the soil profile. Scattered stones and boulders are on the soil surface.

#### **Map Unit B: Steep Rocky Slopes; Haplustepts, Ustorthents**

Map Unit B was mapped in the northwest corner of the west extension of the facility area and the canyon side slopes of the subsoil/construction storage area. The area west of the facilities will not be disturbed by mining activities nor is it in the spring collection area. PacifiCorp is proposing to store and protect topsoil in-place in the subsoil/construction fill storage area (refer to R645-302-212 for details related to the experimental practice). Soils within Unit B have been described and/or sampled at three locations (S5, S6, and RC6). Map Unit B consists of steep to very steep, well drained, rocky slopes. Stones and boulders are commonly scattered on the surface. Sandstone rock outcrop is nearby. Vegetation is dominantly pinyon and juniper. Soil depth ranges from shallow to very deep in stony colluvium. Soils have little profile development, and are high in carbonates. The surface

layer is less than 5 inches thick, and can be dark colored in certain areas. The subsoil and substratum layers are often very cobbly to very stony sandy loam to loam with 20 to 35% carbonates.

### **Map Unit E: Colluvial Toeslopes; Bench**

Map Unit E (Colluvial Toeslopes; Bench) is the dominant map unit on the current study area. It is the site for all of the proposed mining and related facilities. Map Unit E occupies a gently sloping alluvial fan toeslope-bench situated between the Star Point Sandstone outcrop located near the base of the steep mountain sideslope and the alluvial bottomland of Rilda Creek to the south. As such, it is a south-facing slope with mixed, diverse vegetation including Ponderosa pine, Juniper, Douglas fir, some spruce, mountain mahogany, sagebrush, and mixed grasses. Elevation ranges from about 7,600 to 7,730' MSL. The map unit is considered to be in a "frigid" soil temperature regime, and an "ustic" soil moisture regime.

Three representative sites were fully described and sampled within Map Unit E (RC1, RC3, and RC4). All three sites were located midway across the unit, and indicated very deep, well drained soils. Results from seismic testing across this bench indicate an approximate depth of unconsolidated materials (soil above unweathered materials) of 5' on the north end nearby to the Star Point Sandstone outcrop, increasing to a total depth of 50 to 75' on the south end of the bench which ends just north of Rilda Creek alluvial bottomland. Three seismic lines were run across the bench, and the methods and results are contained in a separate report (AMEC Consultants, 2004).

Evaluation of the field and laboratory data for Map Unit E indicates that the soil most closely correlates to the Osote soil series. Osote is an established soil series of small extent mapped in south-central Utah. The most recent official NRCS soil series description for Osote, dated February 1999, is on file. Osote is a very deep, well drained, slowly permeable soil forming in colluvium and slopewash alluvium from sandstone and shale materials. Osote is slightly to strongly calcareous. The surface layer meets criteria for a mollic epipedon. Osote is classified as a "Fine-loamy, mixed, superactive, frigid Typic Calciustoll".

Based on a review of all three sample pedons (RC1, RC3, and RC4), Osote typically has a brown (10YR 4/3, dry) sandy loam to loam surface layer about 9 to 16 inches thick. The lower part of this layer is a "Bw" cambic horizon. The subsoil "Bk" calcic horizon is a brown to light yellowish brown (10YR 5/3 to 10YR 6/4, dry) strongly calcareous sandy loam, sandy clay loam, or loam to a depth of about 20 to 38 inches. The underlying "C" horizon substratum is a yellowish brown to light yellowish brown (10YR 5/4 to 10YR 6/4, dry) sandy

loam, sandy clay loam, or loam to a depth of 60 inches (5') on the north side of Map Unit E, and exceeding 84 inches (7') on the south side of the map unit. Slightly weathered, unconsolidated colluvial material extends to a depth of 50 to 75' on the south side of the unit (AMEC Consultants, 2004). For a full description of the map units, laboratory results, evaluation of soil suitability and topsoil volume refer to Volume 11 Appendix Volume - Soils: Appendix B.

#### **Map Unit F: Steep North Facing Slopes; Cryoborolls**

One delineation of Map Unit F (Steep North Facing Slopes; Cryoborolls) was mapped on a north-facing slope above the south side of the Right Fork of Rilda Creek in the western extension area. This area will not be disturbed by mining activities nor is it in the proposed Spring Collection Study Area. It was not sampled for laboratory analysis. Soils on this steep, north-facing slope are best classified as "loamy or loamy-skeletal, mixed, Typic Cryoborolls" with typical slopes of 25 to 60% or more. This map unit dominantly has Douglas Fir and spruce vegetation, with some aspen.

In a typical profile, Typic Cryoborolls have a stony to bouldery sandy loam to loam, dark-colored, surface layer ranging from 10 to 18 inches thick. The surface layer meets criteria for a mollic epipedon. The subsoil is a brown stony to very stony sandy loam or loam. Typic Cryoborolls are well drained.

#### **Map Unit D: Disturbed Land Including Subcategories**

##### **Disturbed Land**

The soils in this map unit have been disturbed by previously mining activities and road construction. They consist of mixed soil materials and waste coal. In the area that had been reclaimed below the Leroy Mine, three soils pits (S2, S3 and RC8) along with four geotechnical trenches (pits 7, 8, 10 and 11) revealed a layer of about one to two feet of cobby sandy loam soil over coal waste materials. The coal deposits are up to eight feet in depth (refer to Geotechnical Pit Photos in Volume 11 Appendix Volume: Soils - Appendix A). In addition to the area below the Leroy Mine, geotechnical trenches were excavated in the disturbed lands along Emery County Road #306 (pits 4, 6, and 9) and in the Rominger Mine area (pits 13 and 14).

**Disturbed Land - DR: Old Mine Access Road**

This unit designates the narrow access road leading to reclaimed Leroy Mine. This single track road cuts through Soil Unit B on a steep, rocky, south facing slope. The surface of the old road consists of gravely to stony soil materials derived mostly from sloughing and erosion of the cut slope and subsoil in the road base. Soil textures are mostly sandy loam with intrusions of loam. The materials in the upper 8 to 24 inches show good rooting potential. Underlying materials are very stony. Soils within this unit have been described and/or sampled at one location (S6). Geotechnical trenches were excavated along the access road, refer to Volume 11 Appendix Volume: Soils - Appendix A.

**Disturbed Land - DF: Leroy Mine Site**

This is bench and cut slope at the location of the Leroy Mine portals. It includes a relatively flat area which has very little soil material over sandstone bedrock and a cut slope having poor quality soil materials. Soil sample, RIL1303, site S-5 was collected from the cutslope to characterize the soil materials at this location. A single geotechnical trench was excavated across the portal area (pit 1), refer to Volume 11 Appendix Volume: Soils - Appendix A.

**Disturbed Land - RD: Emery County Road #306**

Map Unit RD consists of the present road corridor in Rilda Canyon. It was not evaluated as a soil map unit although there are suitable soil materials beneath the road.

In addition to the survey conducted related to the portal facility area, PacifiCorp consulted with Mr. Jim Nyenhuis in preparing a soil classification map for the proposed soil storage sites located near the portal facilities area (refer to Volume 11 Appendix Volume - Soils: Appendix B). The topsoil storage site is located on a gentle alluvial/colluvial fan slope directly below the reclaimed Helco Mine portals on what was the coal storage area for the mine. This site was reclaimed in the late 70's by the lease holder and again by AML in 1988. The primary plant community in this area is disturbed Sagebrush/Grass community (refer to Volume 11 Appendix Volume - Biology: Appendix A for a complete description of the area). Approximately 60% of the area is mapped as Unit D (Disturbed Land; soil, coal, stones, fill material), with remaining area mapped as Unit A.

The subsoil/construction fill storage site is located in a narrow canyon used as access/coal storage for the reclaimed Rominger and Jeppson mines. Access to the canyon is directly from Emery County Road #306. The primary plant communities in this area is native,

Douglas Fir/White Fir, Pinyon-Juniper/Curl Leaf Mountain Mahogany/Ponderosa Pine, Pinyon-Juniper/Curl Leaf Mountain Mahogany and Previously Disturbed AML (refer to Volume 11 Appendix Volume - Biology: Appendix A for a complete description of the area). Soil units mapped include; Disturbed - valley area and access road on the west side of the canyon, Colluvial toeslopes - collouvial fan (Unit E) located of the west side of the canyon and steep rocky slopes; haplustepts, ustorthents (Unit B) - steep slopes located on the east and west side of the canyon reclamation project (refer to Volume 11 Appendix Volume - Soils: Appendix A and B for soil descriptions of the site).

The following table list the acrage of each soil unit within the extent of the disturbance:

<b>SOIL MAP UNIT</b>	<b>ACREAGE WITHIN DISTURBED AREA (acres)</b>
Map Unit A: Alluvium Bottomland Soils	0.41
Map Unit B: Steep Rocky Slopes, Haplustepts, Ustorthents	1.29
Map Unit D: Previously Disturbed Area, Reclaimed by AML	3.53
Map Unit E: Colluvial Toeslopes, Bench	6.96
Map Unit RD: Rilda Canyon Road	0.91
	Total 13.1

**R645-301-222.400 Potential Productivity of Soils**

Present and potential productivity of the existing soils was conducted by the Natural Resources Conservation Service and is presented in Volume 11 Appendix Volume - Biology: Appendix B.

***R645-301-223 Soil Characterization***

The results of the Order 1 Soil Surveys are presented in Volume 11 Appendix Volume - Soils: Appendix A & B. Each distinct soil is presented as a soil map unit with accompanying description, laboratory analyses, and spatial extent clearly defined. Excavation test pits used to conducted the detailed examination, description and sampling of each mapping unit are also displayed on Map 200-1.

**R645-301-230 OPERATION PLAN**

The following sections describe the methods for the removal and storage of topsoil and subsoil/construction fill from the Rilda Canyon portal facilities. The main facilities area covers approximately 9.0 acres of disturbance that require the removal of topsoil and or subsoil.

***R645-301-231 General Requirements***

**R645-301-231.100 Methods for Removing and Storing Topsoil, Subsoil**

All areas to be disturbed at any time during the construction, operation, or reclamation of the mine and its surface facilities will have the available topsoil (i.e. plant growth medium) separately removed and segregated from other colluvial material. The topsoil will be stockpiled in separate pile in the topsoil storage area for use during reclamation (refer to Map 200-1, 200-2 and Engineering Section Maps 500-3 and 500-4 sheet 3 of 4). Based on the survey conducted Mr. Jim Nyenhuis (refer to Volume 11 Appendix Volume - Soils: Appendix B) both the A and portions of the B horizon will be removed and stockpiled. At a minimum, twenty-four inches of topsoil materials will be salvaged from all areas, except the sediment pond area which was previously disturbed by historic coal mining and later reclaimed by AML. Soil removal from the AML area will be segregated and stored as recommended by the qualified soil scientist monitoring the soil removal process. Soil and geophysical surveys conducted at the mine facility and sediment pond areas revealed that the colluvial soil material extends to a depth greater than projected cuts to develop the post construction topography. Based on this analysis, cut material in excess of the upper twenty-four inches of the topsoil will be segregated and stored in the subsoil/construction fill storage area as reclamation fill (refer to Maps 200-1, 200-2 and Engineering Section Maps 500-3 and 500-4 sheet 4 of 4).

The soils will be removed with one or more of the following types of equipment: bulldozer, scraper, front-end loader, and/or trackhoe. A qualified soil scientist will provide on-site consultation during the topsoil removal process to maximize removal of quality topsoil and minimize inclusion and dilution.

Topsoil/subsoil material will be stockpiled at separate locations approximately 0.5 miles down canyon from the mine site. These locations will allow the soil materials to be managed and minimize the potential impacts from the active mining operation.

The topsoil storage site is located away from the main Rilda Canyon drainage in a fairly flat previously disturbed area. As depicted on Maps 200-1, 200-2 and Engineering Section Maps 500-3, 500-4 sheets 3 of 5, the dimension of the storage pile will be approximately 300 feet in length by 200 feet in width, occupying approximately 1.1 acres. Location of the topsoil storage pile minimizes disturbance by utilizing previously disturbed areas associated with the Helco Mine. During the operations of the Helco Mine, this area was used as coal storage and handling area. Water monitoring well (P4, refer to map 500-3 in the Engineering Section) installed near the proposed pile indicates that the depth of the saturated alluvium is approximately twenty feet below the existing ground surface. As discussed above, this area was used as a coal storage and handling site. To prevent additional compaction of the existing soils, the pile will be constructed over a broad area with track mounted equipment. End dump trucks will haul the soil from facility area to the soil storage site. Trucks will not travel on the storage site, but will dump loads adjacent to Forest Development Road 024. Track mounted equipment will distributed the soil across the site. Construction of the topsoil storage slopes will not exceed 2:1. Maximum heights of the constructed slopes is projected at 40 feet, with average of approximately 20 feet. A conceptual topsoil pile is designed with a capacity of 25,000 yards<sup>3</sup> of soil material. Grubbed vegetation material will be placed on the final surface of the topsoil stockpile in a layer not to exceed 6 inches. Upon completion of the soil storage pile, PacifiCorp will conduct as-built survey of the site to accurately compute the volume of soil retrieved during development of the surface facilities. All appropriate maps and text will be revised to reflect as-built conditions.

The subsoil/construction fill site is located in Rominger Canyon. The canyon was previously disturbed to access the Rominger and Jeppson coal mines. Undisturbed drainage from the area will bypass directly below the pile (refer to Volume 11 Appendix Volume: Hydrology - Appendix B for complete discussion related to hydrologic design). Installation of the bypass culvert will be accomplished by trackhoe(s), moving only the material necessary to install the culvert. As depicted on Maps 200-1, 200-2 and Engineering Section Maps 500-3, 500-4 sheets 4 of 5, the dimension of the storage will be approximately 550 feet in length by 250 feet in width, occupying approximately 3.0 acres. To prevent additional compaction of the

existing soils, the pile will be constructed over a broad area with track mounted equipment. End dump trucks will haul the soil from facility area to the subsoil storage site. Trucks will travel on Emery County #306 to the storage site and access the area using a temporary road adjacent to the undisturbed culvert. Trucks will dump loads adjacent to culvert. Track mounted equipment will be distributed across the site. Construction of the soil storage slopes will not exceed 2:1. Maximum heights of the constructed slopes is projected at 70 feet, with an average height of approximately 40 feet. A conceptual subsoil pile is designed with a capacity of 107,000 yards<sup>3</sup> of soil material. The conceptual configuration exceeds the estimated soil requirements (refer to R645-301-500 Engineering Section for mass balance analysis). Excess area will be needed to store large boulders encountered during construction activities and grubbed vegetation. Stored boulders will consist of sandstone and used during final reclamation for development of riprap or placed on the final reclaimed slopes to blend in with surrounding terrain. Grubbed vegetation material will be placed on the final surface of the subsoil stockpile in a layer not exceeding 6 inches. Upon completion of the subsoil storage pile, PacifiCorp will conduct an as-built survey of the site to accurately compute the volume of soil retrieved during development of the surface facilities. All appropriate maps and text will be revised to reflect as-built conditions.

The stockpiled material surface will be pocked to help retain runoff from precipitation events and to reduce erosion. Diversion ditches and culverts will be installed around the perimeter of the piles to divert runoff around the pile and reduce erosion due to runoff from the surrounding area. Silt fencing will be placed along the base of the stockpiles to treat any runoff from the piles and to prevent the loss of soil from the site. The roughened surface of the stockpiles will prevent rapid runoff and help to control erosion until vegetation becomes reestablished.

The stockpile seeding is planned during the fall period with the sagebrush/grass seed mix outlined R645-300 Biology Section Table 300-8. Vegetative cover will protect the soil from wind and water erosion. If supplemental seeding is needed, it will be completed the following year. Sideslopes will be monitored for erosion as well and will be repaired if erosion appears to be excessive.

**R645-301-231.200 Demonstration of Suitability**

Analyses from the soil samples taken in the proposed disturbed area are listed in Volume 11 Appendix Volume - Soils: Appendix A and B. The suitability of this material for reclamation is discussed in Appendix A and B. Material proposed as a supplement to topsoil has also been tested and mapped. The suitability of this material for vegetative growth has been demonstrated through past reclamation activities in Rilda Canyon (AML reclaimed

mines: Helco, Leroy and Rominger/Jeppson). Approximately 10.7 acres has been disturbed during past mining activities, refer to Engineering Section Map 500-1. Approximately 4.4 acres of the Rilda Canyon Portal Facilities (included soil storage areas) has been previously disturbed by coal mining activities. Vegetation has become re-established quite successfully on the previously disturbed areas even in areas without the benefit of topsoil replacement, reseeded or supplemental irrigation.

During coal mining activities, cuts and fills were made on both north and south facing sides of the canyon. Areas were leveled for staging areas, coal seam exposures, coal handling and drilling pads. The cuts were left in place. In several areas, no reclamation was conducted on the disturbed lands. Natural vegetation has moved in and become established on the previously disturbed areas even without the replacement of topsoil materials and seeding.

**R645-301-231.300 Test Plan for Evaluation the Results of Topsoil Handling and Reclamation Procedures**

At the time of final reclamation and after the subsoil material has been regraded, the soil material will be sampled on 500 foot intervals to a depth of 48 inches. A soil auger will be used to collect samples by 1.0 foot increments. A field instrument will be used to sample the regraded material for pH and EC parameters. Field sampling will allow immediate identification of salinity, acidity or sodicity problems. Should problem areas be located, sampling will be intensified to a 100 foot square grid described below. Four augered holes will be randomly placed in the regraded area of the mine facility. The randomly selected sites will be sampled along the survey baseline established for the mine facility area. The subsoil material will be sampled at 1.0 foot intervals. Samples will be sent to a certified laboratory to be analyzed for the parameters outlined in Table 6 of the Utah "*Guidelines for Topsoil and Overburden Handling*". If any potential problems are identified, additional sampling will be conducted in the vicinity of the suspect sample to better define the extent of the area affected. Should a problem be identified, the area would be resampled on a grid of 100 foot centers to define the nature and extent of the problem. The problem area would then be evaluated in consultation with the Division with the most appropriate remedial action implemented.

If testing finds the field parameters are within an acceptable range, redistribution of the topsoil will then be initiated. Topsoil will be sampled as it is hauled from the storage pile for comparison to the baseline data. Amendments would be added to the regraded areas at rates based on their comparison to the baseline soil data. Fertilizer would be added as needed by using a spreader then mixing the fertilizer into the soil, along the contour.

**R645-301-231.400 Construction and Maintenance of Topsoil Handling and Storage**

Construction of the topsoil storage site will begin by removing any large, existing vegetation and developing a diversion ditch to channel natural undisturbed drainage away from the stockpile location. Existing soil from the storage area will not be removed. A colorful marker fabric, 1.0 foot in width, will be installed on 10.0 foot centers to identify the predisturbed surface. Topsoil will be hauled from the mine facility and sediment pond areas with end dump trucks to develop the storage pile. Once a topsoil stockpile has been developed from materials removed during construction of the proposed mine site, it will remain in place until final reclamation occurs. A field fence will be constructed to surround the topsoil pile to protect it from grazing. In addition to the perimeter fence, a silt fence will be installed at the toe of the pile to prevent loss of soil due to erosion. Maintenance of the topsoil pile throughout the life of the mining operation will consist of; 1) seeding new material added to the stockpile, 2) reseeding where erosion or other elements have caused a loss of vegetation, and 3) maintenance of the ditches, culverts and silt fences.

After the removal of the topsoil, subsoil/construction fill will be hauled from the mine and sediment pond areas and segregated in a separate area (Rominger Mine area) to develop the subsoil storage pile. Construction of the subsoil/construction storage site will begin by removing any large, existing vegetation and installing a culvert to channel natural undisturbed drainage away from the stockpile location. Installation of the bypass culvert will be accomplished by trackhoe(s), moving only the material necessary to install the culvert. Existing soil from the storage area will not be removed (refer to R645-302-200 Special Categories of Mining - Experimental Practice). A colorful marker fabric will be installed over the entire site to identify the predisturbed surface. Once a subsoil/construction stockpile has been developed from material removed during construction of the proposed mine site, it will remain in place until final reclamation occurs. A field fence will be constructed at the toe of the slope of the storage pile to protect it from grazing. In addition to the perimeter fence, a silt fence will be installed at the toe of the pile to prevent loss of soil due to erosion. Maintenance of the soil pile throughout the life of the mining operation, will consist of; 1) seeding new material added to the stockpile, 2) reseeding where erosion or other elements have caused a loss of vegetation, and 3) maintenance of the ditches, culverts and silt fence.

***R645-301-232 Topsoil and Subsoil Removal***

Prior to the removal of the topsoil, all trees and brush will be cleared and removed from the site. Soil will be stripped to various depths up to 2.0 feet depending on soil type and/or topsoil depth. Where thick deposits of topsoil or material from reclaimed AML sites are found, as much soil material as possible will be removed. The coal waste will be removed from the area and disposed of at the existing Deer Creek waste rock site or utilized in the generation of electrical power. Topsoil and subsoil storage is illustrated on Maps 200-1, 200-2, Engineering Section 500-3 and 500-4 sheets 3 of 4 and 4 of 4.

Prior to any surface disturbance of the portal area soil test pits were dug. Soil test pits/trenches were established in the proposed disturbed areas (refer to refer to Volume 11 Appendix Volume - Soils: Appendix A and B). These areas included the pinon/juniper habitat areas, riparian habitat areas, sage/brush grass, mountain brush habitat areas, and AML reclaimed sites. Refer to Map 200-1 for test pit/trench site locations. Samples were taken at various depth intervals and analyzed according to the *Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining* (Leatherwood and Duce, 1988). Analyses of these pre-construction samples are found in Volume 11 Appendix Volume - Soils: Appendix A and B.

As documented during the soil survey (refer to Volume 11 Appendix Volume - Soils: Appendix A) and geotechnical investigation (refer to Volume 11 Appendix Volume - Engineering: Appendix F - 2004 AMEC/LGS Geophysics) an area of buried coal was encountered covering approximately 0.7 acres with an average depth of 4.0 feet. The buried coal is located directly below the reclaimed Leroy Mine portals. During development of the drainage control and sediment pond, the buried coal will be removed and transported either to the Deer Creek Waste Rock Storage Site or utilized for power generation if coal quality allows (refer to Volume 11 Appendix Volume - Soils: Appendix A for analysis of the coal waste material). A portion of the buried coal is located outside the proposed disturbed area as shown of Map 200-2. Energy West will cooperate with AML to enhance this area during site development.

Based on soil, geophysical and geotechnical surveys and knowledge of the site, it is estimated that at least 19,700 cubic yards of suitable topsoil material can be recovered and stockpiled during construction activities. The upper 24 inches of recommended topsoil salvage will include portions of the A and B horizons (refer to Volume 11 Appendix Volume - Soils: Appendix A & B). This volume was estimated utilizing digitized based maps where the area is multiplied by the salvage depth of 24 inches. In addition to the topsoil,

approximately 97,300 cubic yards of subsoil/construction fill will be salvaged consisting of a combination of B and C soil horizons, see following table:

<b>TOPSOIL SALVAGE VOLUMES</b>			
<b>SOIL SALVAGE AREA</b>	<b>Acres</b>	<b>Salvage Depth (inches)</b>	<b>Estimated Volume (cubic yards)</b>
Mine Facility: North of Emery County Road #306	4.5	24 (1)	14,500
Mine Facility: South of Emery County Road #306	1.6	24 (1)	5,200
Sediment Pond Area	1.0	(2)	3,200 (2)
<b>SUBSOIL SALVAGE VOLUME</b>			
Mine Facility: North of Emery County Road #306	4.5	Refer to Engineering Section Table 1 and Map 500-4 sheet 2 of 4	97,300

(1) Based on recommendations from the Order 1 survey conducted by Mr. Jim Nyenhuis (refer to Volume 11 Appendix Volume - Soils: Appendix B)

(2) Sediment Pond Area: Soil salvaged from this area will be used to enhance the previously AML reclaimed area, excess soil material will be segregated and stored as recommended by the qualified soil scientist monitoring the soil removal process. Re-exposed A & B horizons located below the coal waste will be sampled to determine final placement as topsoil for the AML reclaimed area or for storage in either the topsoil or subsoil/construction storage piles. The estimate on soil resource is based on the existence of 24 inches of native soil horizons below the buried coal waste. Disturbed soil with coal in the profile will not be salvaged. Coal waste encountered during soil salvaging and construction of the sediment pond will be segregated separately and transported to the Deer Creek Waste Rock Site for disposal or utilized power generation if coal quality allows.

A volume of approximately 19,700 cubic yards would be needed to cover the regraded mine site (at the time of final reclamation) with twenty-four inches of topsoil material. Actual soil depth at the time of reclamation will be dependent upon the soil salvaged during construction of the facilities. Upon completion of the construction activities and development of the soil storage site, the topsoil and subsoil piles will be surveyed to document the actual amounts salvaged.

**R645-301-232.500   Subsoil Segregation**

After removing and storing the topsoil, the underlying strata of soil will be removed, segregated, and stockpiled separately. There is an estimated 97,300 cubic yards of subsoil that will be utilized for reclamation (refer to Engineering chapter, R645-301-553: Backfilling and Grading for cut/fill construction estimates). Subsoil storage is located approximately 0.5 miles below the portal facilities in Rominger Canyon. Refer to Maps 200-1, 200-2, Engineering Section 500-3, 500-4 sheets 3 fo 4 and 4 of 4, to review the soil storage locations. Approximately 3.0 acres will be disturbed for subsoil storage including access to the site. A portion (approximately 1.4 acres) of this location was previously disturbed by historic coal mining activities and reclaimed by AML during reclamation of the Rominger and Leroy mines in 1988. Portals were not backfilled during the AML project. Concrete block stoppings were installed to prevent access to the mines. As discussed above, brush and boulders will be cleared from the site before storing soil. Boulders larger than 1.0 foot in diameter will be segregated and stockpiled and utilized for reclamation. A colorful marker fabric 1.0 foot in width will be installed on 10 foot centers to identify the predisturbed surface.

**R645-301-232.600   Timing**

All soil resource material to be removed and stockpiled will be salvaged prior to significant surface disturbance. Vegetation and boulders that might interfere with topsoil salvage will be removed prior to salvaging the soil. Boulders encountered during site development will be stored within the salvage soil or in boulder piles and randomly scattered upon final reclamation to restore the natural appearance of the area and provide habitat for wildlife and microclimate for plants.

***R645-301-233   Topsoil Substitutes and Supplements***

Inspections of the disturbed areas of Rilda Canyon related to the historic coal mining activites have shown that the regraded colluvium materials have provided a suitable growth medium for sustaining native vegetation on previously disturbed surfaces. Even without replacement of the topsoil material, existing revegetation at the sites indicate that excavated, regraded materials are capable of successfully supporting vegetation that existed prior to disturbance with minimal surface preparation. The revegetation has occurred without the addition of mulch, seed, nutrients or supplements and without the installation of erosion protection. Based on the soil surveys conducted for the Rilda Canyon Portal Facilities, substitute topsoil will not be required for final reclamation of the mine site.

### ***R645-301-234 Topsoil Storage***

As required under R645-301-234, permanent stockpiles of topsoil and subsoil, for use during final reclamation, will be placed on a stable surface within the permit area where it will not be subject to significant disturbance, wind erosion, or compaction during life of mine. The stockpile locations are considered ASCA areas where BTCA technique's will be used for the treatment of runoff water from the area. Refer to R645-301-700 for details concerning ASCA areas. The stockpile locations are presented on Maps 200-1, 200-2, Engineering Section Maps 500-3, 500-4 sheets 3 of 4. The topsoil storage pile site will occupy approximately 1.1 acres. Stockpile slopes will not exceed 2:1. The soil depth within the topsoil stockpile will range from 0 to 40.0 feet, however, the average depth will be 20.0 feet. Depths in the subsoil/construction fill pile will range from 0 to 70.0 feet with an average depth of 40.0 feet. The conceptual piles are designed with a capacity as follows; 1) topsoil - 25,000 cubic yards and 2) subsoil/construction fill - 107,000 cubic yards of soil material. Slopes will be irregular, pocked, mulched and covered with approximately 6.0 inches of grubbed vegetation to help retain precipitation and minimize runoff.

Revegetation of the topsoil storage pile will be with an effective cover sagebrush/grass (refer to R645-301-300: Biology Table 300-8 for seed mix). The stockpile will not be disturbed prior to final topsoil redistribution without prior approval by the Division. According to Neinhaus, 2004, the quality of the subsoil (below 2 feet depth) varies little from the top 2 feet of material. Revegetation of the subsoil storage piles will be identical to the topsoil pile.

The stockpiles will be a BCTA area, with runoff being treated by a combination of irregular surface, pocking, mulch, grubbed vegetation material, vegetation, and silt fencing. Diversion ditches/culverts will be placed above the stockpiles to divert undisturbed drainage to culverts or away from and past the stockpile area. The pile surfaces will be roughened and pocked to minimize surface runoff. A silt fence will be placed along the base of the stockpiles to treat any runoff from the pile surface and to retain material within the stockpile area. A perimeter fence will be installed to control grazing.

## **R645-301-240 RECLAMATION PLAN**

As mining activities at the Deer Creek Mine ceases and the utilization of the surface facilities is no longer needed, land reclamation processes will commence. Reclamation of all disturbed areas will follow the requirements of R645-301. The Soils Reclamation plan for the Rilda Canyon Portal Facilities is detailed below.

***R645-301-242 Soil Redistribution***

At the time of reclamation of the Rilda Canyon Portal Facilities, PacifiCorp will reduce the footprint of the Portal Facility Area disturbed area by redistributing soil material to be consistent with the postmining land use of the area. This will be accomplished by cutting and/or filling the areas disturbed by mining activities. Prior to initiating regrading process at the facility area, the entire area will be ripped with a dozer to a depth of approximately two feet to reduce soil compaction.

Soil will be removed from the soil storage sites until excavation encounters the indicator fabric placed during development of the site. Topsoil materials that were previously stockpiled will be redistributed in a uniform thickness on the scarified, postmining regraded subsoil surface. The material will be hauled to the regraded area by dump truck. Track-mounted equipment will be used to recontour the disturbed area. Refer to R645-301-500: Engineering where a detailed plan for recontouring the area is presented. Travel over redistributed soil material will be minimized to the extent possible. This will be accomplished by reclaiming the mine in specific sequences, utilizing existing roads and travelways to live haul soil material. It is important to understand that while reclamation will be specifically sequenced, various stages will be occurring simultaneously throughout the site. The regraded surface will be staked to indicate the depth of topsoil to be applied. After the topsoil has been spread and leveled, it will be poked/scarified along contour, unless prohibited by slope configuration or grade. At this time other additives would be incorporated into the soil if deemed necessary by soil sampling. Seeding and mulching will be completed soon after redistribution of the topsoil to minimize wind and water erosion. A volume of approximately 19,700 cubic yards would be needed to cover the regraded mine site (6.1 acres, excludes Emery County Road #306 and the sediment pond area) with 24.0 inches of topsoil material. Actual soil depth at the time of reclamation will be dependent upon the soil salvaged during construction of the facilities. The sediment pond area, approximately 1.0 acre, will be regraded and covered with available soil salvaged from this area. As discussed in R645-301-553: Backfilling and Grading, there is approximately 6,000 cubic yards of excess soil material for reclamation. If additional soil is available, it will be used to create mounds, extrusions, etc. to provide a natural aesthetic appearance to the reclaimed slopes.

The soil storage sites will be reclaimed by first removing the indicator fabric, then on slopes greater than 2H:1V, the entire surface will be treated with anionic polyacrylamide (PAM). On slopes less than 2H:1V, post pile bulk density data will be compared to baseline data, if the density values exceed the baseline by ten percent the entire surface will be ripped with a dozer to a depth of at least 1.0 foot or poked with a backhoe. Boulders will be randomly placed on the surface similar to pre-existing conditions, estimated at approximately five percent coverage.

Revegetation of the soil storage piles will be with an effective vegetative cover (refer to R645-301-300: Biology Tables 300-7 and 300-8 for seed mixtures).

### ***R645-301-243    Soil Nutrients and Amendments***

Nutrients and soil amendments will be applied to the redistributed material when deemed necessary by assessment of the laboratory analyses. Laboratory analyses for the redistributed topsoil will be compared to soil samples collected from the baseline studies. Nutrients and amendments will be added, to make the redistributed soil similar to the undisturbed soils and aid in establishment of the vegetative cover. The nutrients can be added by hydroseeding, by broadcasting or by drilling. If the nutrients and amendments are broadcast to the ground surface they will be intermixed with the soil during placement.

The topsoil will be sampled as it is being put in place as described in R645-301-231.300. Random grab samples will be collected from the regraded surface during redistribution of the topsoil. Three composite samples will be collected for each of the areas to be topsoiled: mine facility and sediment pond areas. Soil nutrients and amendments will be added as dictated by the results of the tests in comparison with baseline sampling results.

To increase the fertility of the topsoil during reclamation, PacifiCorp will enhance the establishment of locally adapted microrhizomes by mixing 1 cubic foot of undisturbed topsoil from areas adjacent to the disturbed area to the hydroseeder prior to application. The supernatant from this slurry mixture will be applied to regraded topsoil during the reclamation process.

### ***R645-301-244    Soil Stabilization***

Various sized rocks and boulders (litter) will be randomly placed on slopes of reclaimed areas to control slope slippage, promote microhabitats, and provide a natural aesthetic appearance. Where it is deemed necessary, especially on slopes greater than 20%, a soil tackifier (refer to R645-301-300: Biology, Seeding Techniques) will be incorporated into the reclamation process to stabilize soil material.

Rills and gullies, which develop in areas that have been regraded and topsoiled and which either; 1) disrupts the approved postmining land use or the reestablishment of the vegetative cover, or 2) causes or contributes to the violation of water quality standards for receiving streams will be filled, regraded, or otherwise stabilized.

## **R645-301-250 PERFORMANCE STANDARDS**

All topsoil and subsoil will be removed , maintained and redistributed according to the plan given under R645-301-230 and R645-301-240.

All stockpiled topsoil and subsoil will be located, maintained and redistributed according to plans given under R645-301-230 and R645-301-240.

## **R645-302-200 SPECIAL CATEGORIES OF MINING**

PacifiCorp is proposing a new mine site facility in Rilda Canyon located approximately 8 miles west of Huntington, Utah. Construction of the mine site would involve salvage and protection of topsoil resources prior to construction of the mine pads and site facilities. Most of the site would have topsoil salvaged and stockpiled with traditional methodologies. However, PacifiCorp proposing to use an experimental practice to protect the existing topsoil resources with the use of colorful marker fabric to identify the predisturbed topography. This experimental practice would be used on approximately 3.0 acres of the 13.1 acres proposed disturbed area. Approximately 1.4 acres of the 3.0 acre site was previously disturbed by historic coal mining activities (refer to Maps 200-1 and 200-2). Details of the proposed experimental practice are provided as the Plan For Experimental Practice : In-Place Topsoil Storage, which follows the specific regulations regarding experimental practices addressed below.

## **R645-302-210 EXPERIMENTAL PRACTICES MINING**

**Experimental practices provide a variance from environmental protection performance standards of the Act, of R645-301, and the State Program for experimental or research purposes, or to allow an alternative postmining land use, and may be undertaken if they are approved by the Division and the Office and if they are incorporated in a permit or permit change issued in accordance with the requirements of R645-200, R645-300, R645-301, R645-302-100 through R645-302-280, R645-302-310, R645-320, or R645-303.**

**R645-302-212** An application for an experimental practice will contain descriptions, maps, plans and data which show:

**R645-302-212.100** The nature of the experimental practice, including a description of the performance standards for which variances are requested, the duration of the experimental practice, and any special monitoring which will be conducted;

A variance for the performance standard of the Utah Regs (R645-301-251) is being applied for under this experimental practice proposal. This regulation involves topsoil removal, maintenance and redistribution. PacifiCorp is proposing to store and protect topsoil in-place in the subsoil/construction fill storage area. This would involve placing a colorful fabric marker over the intact soil horizons and then filling over the fabric marker to create a soil storage pile. The fill material would contain no toxic or hazardous material. The fill

material has been tested for suitability guidelines (refer to Volume 11 Appendix Volume: Soils - Appendix A & B).

The fill material would remain in-place for the duration of the mining operation, about 17 years, until final reclamation of the mine facility area. During final reclamation, the soil material will be removed and hauled off-site until the marker fabric layer has been exposed. Next, the marker fabric will be removed to expose the original soil surface. The surface would be treated and then revegetated (refer to R645-301-240 Reclamation Plan for more detail on the reclaiming the Experimental Practice areas).

**R645-302-212.200** How use of the experimental practice encourages advances in mining and reclamation technology or allows a postmining land use for industrial, commercial, residential, or public use (including recreation facilities) on an experimental basis;

This experimental practice is being proposed to test the feasibility of storage of existing topsoil materials in areas where, 1) original, pre-existing soil structure was disturbed by historical coal mining, 2) slope configuration may be difficult and 3) stability of the reclaimed slopes would be greatly enhanced by retaining the original soil characteristics intact. The area being proposed for the soil storage without removal of existing topsoil is limited in areal extent, approximately 3.0 acres (total area for the subsoil/construction fill). Of the 3.0 acres proposed for the experimental practice, 1.4 acres has been previously disturbed by coal mining activities. In Rominger Mine area, the side slopes are rough, steep, irregular with limited soil resources. Soil recovery from the side slopes would be difficult due to the topography and formational outcrops. Based on visual observations, it was determined that the materials support a variety of vegetation and are relatively stable in the present configuration. Leaving the soil material intact and in place appears to be the most suitable means of protecting the material and providing the best storage for achieving successful revegetation and the ultimate stability of the slopes in this area. Refer to Plan for Experimental Practice : In-Place Topsoil Storage, Mine Facility Construction Plan - Topsoil Salvage and Storage for a description of the in-place topsoil protection measures.

**R645-302-212.300** That the experimental practice:

**R645-302-212.310** Is potentially more, or at least as, environmentally protective, during and after coal mining and reclamation operations, as would otherwise be required by standards promulgated under R645-301 and R645-302, and

The soil would be protected by the layer of indicator fabric and soil material overlying it. It would be similar to burial within the middle of a large soil stockpile, which it would have been placed in otherwise. By leaving the soil in place, the environment will be better protected at the time of final reclamation because of the increased stability of the soil material resulting from the rocks, roots and natural soil cementation existing in the original soil horizons. Refer to Plan for Experimental Practice : In-Place Topsoil Storage, Mine Facility Construction Plan - Topsoil Salvage and Storage for a description of the in-place topsoil protection measures.

**R645-302-212.320** Will not reduce the protection afforded public health and safety below that provided by the requirements of R645-301 and R645-302, and

There will be no diminishment of public health and safety based on the proposed experimental practice.

**R645-302-212.400** That the applicant will conduct monitoring of the effects of the experimental practice. The monitoring program will ensure the collection, analysis, and reporting of reliable data that are sufficient to enable the Division and the Office to:

**R645-302-212.410** Evaluate the effectiveness of the experimental practice; and

PacifiCorp has demonstrated the success of the experimental practice in previously completed reclamation projects. Buried soil horizons were reclaimed successfully at the Cottonwood Canyon Fan Portal and the Des-Bee-Dove mines under less desirable conditions than the proposed project in Rominger Mine area.

Example of Similar Practice: During the development of the Cottonwood Fan Portal (refer to Cottonwood Permit Volume 11), prior to the State Program, topsoil and subsoil excavated from the site were placed in storage piles on slopes 2H:1V or greater without removing the existing resources. PacifiCorp reclaimed this site in 1998. Soil resources were reclaimed from the storage sites back to approximate original contour. Vegetation has re-established successfully even with area receiving less than normal precipitation (personal communication with Patrick Collins, March 2005).

**R645-302-212.420** Identify, at the earliest possible time, potential risk to the environment and public health and safety which may be caused by the experimental practice during and after coal mining and reclamation operations.

After the subsoil/construction fill is removed and the buried soils reclaimed, vegetation monitoring will be utilized to determine the success of the experimental practice (refer to PLAN FOR EXPERIMENTAL PRACTICE: IN-PLACE TOPSOIL STORAGE - 6) Experimental Practice Monitoring for complete details related to monitoring the effectiveness of the experimental practice). It is important to note that only 1.6 acres of the experimental practice area has not been previously disturbed. Potential risk of the experimental practice is minimal due to the limited area and the type of soils involved.

***R645-302-213*** Applications for experimental practices will comply with the public notice requirements of R645-300-120.

PacifiCorp will included, in the administrative completeness public notice, a statement indicating that an experimental practice is being requested and identification of the regulation for which a variance is being sought.

***R645-302-214*** No application for an experimental practice under R645-302-210 will be approved until the Division first finds in writing and the Office of Surface Mining then concurs that:

**R645-302-214.100** The experimental practice encourages advances in coal mining and reclamation technology or allows a postmining land use for industrial, commercial, residential, or public use (including recreational facilities) on an experimental basis;

PacifiCorp, with the use of the experimental practice plans to demonstrate that in certain situations, soil storage in-place offers the same degree of protection for the topsoil materials, reduces the amount of disturbed area, increases slope stability and decreases sediment production while providing a natural looking land surface.

**R645-302-214.200** The experimental practice is potentially more, or at least as, environmentally protective, during and after coal mining and reclamation operations, as would otherwise be required by standards promulgated under R645-301 and R645-302;

Storage of the topsoil in place under the fill material would be similar to storage of the topsoil in the lower portion of a large topsoil stockpile. The environmental benefit derived from this proposed experimental practice would be that the soil structure and integrity would remain intact and will be present when reclamation starts. Having the rocks, roots and soil cohesiveness present as vegetation is initially being re-established should substantially reduce the potential for erosion and slope failure plus reduce the time it takes to re-establish vegetative cover.

**R645-302-214.300** The coal mining and reclamation operations approved for a particular land use or other purpose are not larger or more numerous than necessary to determine the effectiveness and economic feasibility of the experimental practice; and

The experimental practice is being proposed on approximately 3.0 acres. This is only that area which lies in and adjacent to the Rilda Canyon Facilities which would be filled in during construction activities. The majority of the area containing topsoil would have the topsoil removed and stockpiled prior to construction of the proposed mine site. The topsoil pile is located below the reclaimed Helco Mine portals. The stockpiled topsoil would be stored until final reclamation when, after final slope regrading to approximate original contour, it would be placed back over the regraded surface areas from which it was removed.

The experimental practice is being proposed primarily for that area that was previously disturbed historical mining activities and where topsoil is limited and removal, storage and replacement would be impractical. See Plan for Experimental Practice : In-Place Topsoil Storage, Mine Facility Construction Plan - Topsoil Salvage and Storage for details concerning the mine facility area.

**R645-302-214.400** The experimental practice does not reduce the protection afforded public health and safety below that provided by standards promulgated under R645-301 and R645-302.

The proposed experimental practice should have no negative effect on public health and safety. It should, if anything, increase the stability of the reclaimed slopes thus assisting in providing safe and stable slopes.

***R645-302-215*** Experimental practices granting variances from the special environmental protection performance standards of Sections 515 and 516 of the Federal

Act applicable to prime farmlands will be approved only after consultation with the SCS.

No prime farmlands have been identified in the Rilda Canyon drainage system (refer to Volume 11 Appendix Volume: Soils - Appendix C).

**R645-302-216** Each person undertaking an experimental practice will conduct the periodic monitoring, recording and reporting program set forth in the application, and will satisfy such additional requirements as the Division or the Office may impose to ensure protection of the public health and safety and the environment.

PacifiCorp has demonstrated the success of the experimental practice in previously completed reclamation projects. Buried soil horizons were reclaimed successfully at the Cottonwood Canyon Fan Portal and the Des-Bee-Dove mines under less desirable conditions than the proposed project in Rominger Mine area.

**R645-302-217** Each experimental practice will be reviewed by the Division at a frequency set forth in the approved permit, but no less frequently than every two and one-half years. After review, the Division may require such reasonable modifications of the experimental practice as are necessary to ensure that the activities fully protect the environment and the public health and safety. Copies of the decision of the Division will be sent to the permittee and will be subject to the provisions for administrative and judicial review of R645-300-200.

PacifiCorp will comply with the directions or revisions required as a result of the Division reviews.

**R645-302-218** Revisions or amendments to an experimental practice will be processed in accordance with the requirements of R645-303-220 and approved by the Division. Any revisions which propose significant alterations in the experimental practice will, at a minimum, be subject to notice, hearing, and public participation requirements of R645-300-120 and concurrence by the Office. Revisions that do not propose significant alterations in the experimental practice will not require concurrence by the Office.

Revisions and amendments submitted to the Division by PacifiCorp would be processed in the appropriate manner.

**PLAN FOR EXPERIMENTAL PRACTICE:  
IN-PLACE TOPSOIL STORAGE**

The following is the descriptive plan for the proposed experimental practice of in-place topsoil storage in a portion of the Rilda Canyon Portal Facilities. It is organized as follows:

- 1) General Description of the Rilda Canyon Portal Facility Area and Surface Facilities
- 2) General Description of the Topsoil Resources in the Minesite Area
- 3) Mine Facility Construction Plan - Topsoil Salvage and Storage
- 4) Rilda Canyon Portal Facility Reclamation Plan
- 5) Reclamation of the Experimental Practice Area
- 6) Experimental Practice Monitoring

**1) General Description of the Rilda Canyon Portal Facility Area and Surface Facilities**

The Rilda Canyon Portal Facility will be located in Rilda Canyon below the intersection of the right and left forks where the Hiawatha coal seam outcrops to the surface. The elevation of the minesite ranges from 7725' at the west end to 7600' at the upper (east) end of the mine yard. Because of the narrowness of the canyon in this area, surface facilities will be confined to a narrow strip along the bottom of the canyon north of Rilda Creek. Suitable surface area for the minesite will be created by constructing a series of earthen pads adjacent to the canyon bottom. This will be accomplished by excavating cuts and by leveling out the areas adjacent to the bottom of the canyon drainage. The average gradient of the minesite area is approximately 7%. Therefore, the mine pads will be constructed up through the canyon in a stair step manner. Each individual pad level will be dedicated to a specific function as part of the overall minesite operation. An access road will connect the various pad levels with one another. The entire mine yard area would be approximately 9.0 acres. The proposed minesite is located below where the main canyon branches into two forks.

Located within the main canyon will be the mine office, parking lot, and mine portals. The Emery County public road #306, which provides access to the minesite, will terminate at the east end of the mineyard.

## **2) General Description of the Topsoil Resources in the Minesite Area**

Detailed soil surveys were conducted at the minesite area by Dan Larsen and Jim Nyenhuis, during the 2003-04. These surveys were conducted in close consultation with DOGM's technical staff. As a result of these surveys, the topsoil resources in this area have been extensively defined in terms of soil types, depth and areal extents. The results of these site specific surveys are in close agreement with the regional surveys conducted by the National Resource Conservation Service and previous surveys completed in Rilda Canyon.

Soil types of the proposed disturbed area are identified on maps located in Volume 11 Appendix Volume - Soils: Appendix A 2003-4 EIS report: Sediment Pond Area and Appendix B 2004 MT. NEBO Report: Mine Facility and Soil Storage areas). During 2003 and 2004, Mr. Dan Larsen, Soil Scientist from EIS and Mr. Jim Nyenhuis from MT. NEBO conducted field mapping of the proposed mine facility, sediment pond and soil storage areas. Soil profiles were exposed either by hand tools or a backhoe to examine the full soil sequence at various locations around the proposed disturbed area. Soil sampling and subsequent analyses were used to determine suitability for reclamation purposes. Soils data from previous investigations conducted in the 1990's, as well as aerial photography, and detailed site investigations were used to define the boundaries of each map unit. This information was then used to prepare a detailed map unit description for each of the mapping units delineated during the Order One Survey at the mine site sediment pond and soil storage areas (refer to Map 200-1).

Five map units were within the study area:

- \* Map Unit A Alluvium Bottomland Soils
- \* Map Unit B Steep Rocky Slopes, Haplustepts, Ustorthents
- \* Map Unit E Colluvial Toeslopes, Bench (referred to Map Unit C by EIS: Appendix A)
- \* Map Unit F Steep Facing Slopes; Cryoborolls
- \* Map Unit D D Disturbed Land, Soil, Coal, Stones, Fill Material

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DR	Disturbed Land (Old Mine Access Road)
DF	Disturbed Fan Site (Leroy Portal Area)
RD	Rilda Canyon Road (Emery County #306)

Map Unit E (Colluvial Toeslopes, Bench) is the dominant map unit within the proposed disturbed area related to the facilities. As stated in Volume 11 Appendix Volume - Soils: Appendix B, Map Unit E occupies a gently sloping alluvial fan toeslope-bench situated between the Star Point Sandstone outcrop located near the base of the steep mountain sideslope and the alluvial bottomland of Rilda Creek to the south. Map Unit E most closely correlates to the Osote soil series. Osote is a very deep, well drained, slowly permeable soil forming in colluvium and slope wash alluvium from sandstone and shale materials. Osote is slightly to strongly calcareous. The surface layer meets criteria for a millic epipedon. Osote is classified as a "Fine-loamy, mixed, superactive, frigid Typic Calciustoll". Osote typically has a brown (10YR 4/3, dry) sandy loam to loam surface layer about 9 to 16 inches thick, followed by a subsoil "Bk" calcic horizon, brown to light yellow brown (10YR 5/3 to 10YR 6/4, dry) strongly calcareous sandy loam, sandy clay loam, or loam to a depth of 20 to 38 inches. The underlying "C" horizon substratum is a yellowish brown to light brown (10YR 5/4 to 10YR 6/4) sandy loam, sandy clay loam, or loam to a depth of 60 inches on the north side of Map Unit E, and exceeding 84 inches on the south side of the map unit. For a full description of the map units, laboratory results, evaluation of soil suitability and topsoil volume refer to Volume 11 Appendix Volume - Soils: Appendix B.

### **3) Mine Facility Construction Plan - Topsoil Salvage and Storage**

A detailed discussion of the reclamation plan for the Rilda Canyon Portal Facility is presented in the Engineering Section. The following is a summary of the detailed discussion in the Engineering Section. It is also important to remember that although the reclamation tasks are listed below in a consecutive sequence, it is likely that various stages of these events may be occurring simultaneously in different parts of the mine yard during reclamation.

As stated earlier, the Rilda Canyon mine site will be constructed as a series of level pads located adjacent to Rilda Creek. In some places within the facilities, the level surface areas of the pads will be constructed by excavating the existing topography. In other areas, the pads will be constructed by filling the lower parts of the canyon using existing cut material. As detailed previously, all areas to be disturbed at any time during the construction, operation, or reclamation of the mine and its surface facilities will have the available topsoil (i.e. plant growth medium) separately removed and segregated from other colluvial material. The topsoil will be stockpiled in separate pile in the topsoil storage area for use during reclamation. It should be noted that the proposed experimental practice of protecting the topsoil in place with indicator fabric would only apply to the subsoil/construction fill area of about 3.0 acres.

A topsoil protection plan has been designed for the Rilda Canyon Portal Facilities minesite which incorporates protection of soil resources both by salvaging/stockpiling and by the experimental practice of protecting the in-place soil with a layer of indicator fabric. Various techniques will be utilized depending on the specific area of the mine yard. There are four different scenarios for topsoil salvage.

They include:

**Mine Facility Area:**

In areas that contain topsoil and are proposed to be excavated during construction of the mine yard, the existing topsoil will first be salvaged and stockpiled. This topsoil material will be excavated with a backhoe, then trucked to the topsoil storage pile where it will be stockpiled and protected during the life of the mine. Based on soil, geophysical and geotechnical surveys and knowledge of the site, it is estimated that at least 19,700 cubic yards of suitable topsoil material can be recovered and stockpiled during construction activities. The upper 24 inches of recommended topsoil salvage will include portions of the A and B horizons (refer to Volume 11 Appendix Volume - Soils: Appendix A & B). This volume was estimated utilizing digitized based maps where the area is multiplied by the salvage depth of 24 inches. In addition to the topsoil, approximately 97,300 cubic yards of subsoil/construction fill will be salvaged consisting of a combination of B and C soil horizons. Salvaging of topsoil in these areas would be accomplished under the on-site direction of a qualified soil scientist.

**Sediment Pond Area:**

Soil salvaged from this area will be used to enhance the previously AML reclaimed area, excess soil material will be lived hauled to the AML sites or segregated and stored as recommended by the qualified soil scientist monitoring the soil removal process. Re-exposed A & B horizons located below the coal waste will be sampled to determine final placement as topsoil for the AML reclaimed area or for storage in either the topsoil or subsoil/construction storage piles. Estimates on soil resources are based on the existence of 24 inches of native soil horizons below the buried coal waste. Disturbed soil with coal in the profile will not be salvaged. Coal waste encountered during soil salvaging and construction of the sediment pond will be segregated separately and transported to the Deer Creek Waste Rock Site for disposal or utilized for power generation if coal quality allows.

**Topsoil Storage Area:**

Construction of the topsoil storage site will begin by removing any large, existing vegetation and developing a diversion ditch to channel natural undisturbed drainage away from the stockpile

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location. Existing soil from the storage will not be removed. A colorful marker fabric one foot in width will be installed on ten foot centers to identify the predisturbed surface. Topsoil will be hauled from the mine facility and sediment pond areas with end dump trucks to develop the storage pile. Once a topsoil stockpile has been developed from material removed during construction of the proposed mine site, it will remain in place until final reclamation occurs. A field fence will be constructed around the topsoil pile to protect it from grazing. In addition to the perimeter fence, silt fencing will be installed at the toe of the pile to prevent loss of soil due to erosion. Maintenance of the topsoil pile, during the life of the mining operation, will consist of; seeding new material added to the stockpile, reseeding where erosion or other elements have caused a loss of vegetation, and maintenance of the ditches, culverts and silt fence.

**Subsoil/construction Fill - Experimental Practice :**

Prior to development of the subsoil storage site, PacifiCorp will collect baseline compaction data (lbs/sq ft) at one foot intervals down to four feet or bedrock in the undisturbed and disturbed soils of Rominger Canyon. PacifiCorp will collect the samples as described in the bulk density section of "Methods of Soil Analysis, Part 4 - Physical Methods, Soil Science Society of America". This data will be compared to post reclamation information to reveal the level of compaction which has occurred, and indicate the type of remediation that will be implemented. Remediation methods will be approved by the Division and Forest Service prior to implementation.

After the removal of the topsoil, subsoil/construction fill will be excavated and hauled from the mine and sediment pond areas and segregated in separate area (Rominger Mine area) to develop the subsoil storage pile. Construction of the subsoil/construction storage site will begin by removing any large, existing vegetation and installing a culvert to channel natural undisturbed drainage away from the stockpile location. Installation of the bypass culvert will be accomplished by trackhoe(s), moving only the material necessary to install the culvert. Existing soil from the storage area will not be removed. A soil tackifier will be applied to the existing surface at a rate recommended by the supplier. Next, a colorful marker fabric will be installed over the entire surface to identify the predisturbed surface. Once a subsoil/construction stockpile has been developed from material removed during construction of the proposed mine site, it will remain in place until final reclamation occurs. A field fence will be constructed at the toe of the slope of the storage pile to protect it from grazing. In addition to the perimeter fence, silt fencing will be installed at the toe of the pile to prevent loss of soil due to erosion. Maintenance of the soil pile, during the life of the mining operation, will consist of; 1) seeding new material added to the stockpile, 2) reseeding where erosion or other elements have caused a loss of vegetation, and 3) maintenance of the ditches, culverts and silt fences will comply to R645-301-742-300.

The regulation for which PacifiCorp is proposing to use an experimental practice is R645-301-232 Topsoil and Subsoil Removal. Rather than removing the topsoil from the subsoil/construction fill area, PacifiCorp proposes to protect the soil resource in-place by covering the soil surface with a indicator fabric, then placing fill material over the fabric. At the time of reclamation, the fill material will be removed. The fabric will then be removed, exposing the original, intact soil surface.

In areas where topsoil is to be protected in-place (about 3.0 acres of the 13.1 acre site), fabric will be used to provide a protective barrier between the existing soil and the fill material which will be used to construct the subsoil storage area. The fill material which will be placed on top of the fabric will be hauled in by trucks from the facility area. The fill material itself is a suitable substitute topsoil medium. It does not contain any toxic or unsuitable material and meets the soil suitability recommended by the DOGM guidelines.

#### **4) Rilda Canyon Portal Facility Reclamation Plan**

Reclamation of the minesite will begin once all surface facilities and structures have been demolished and removed. The cut areas will be backfilled and regraded using fill material taken from the subsoil storage area. During construction, material available from the cut slopes was used as fill and was placed into the adjacent pad areas or stored in the subsoil storage pile. During reclamation, the process will be reversed. Fill will be placed in the cuts in 18"-24" lifts and compacted sufficiently to achieve adequate structural stability. After the cut slopes have been re-contoured and re-topsoiled they will be revegetated.

Reclamation of the mine facility area will proceed as outlined below:

In areas where topsoil previously existed but was removed prior to construction the following method will be used.

- 1) The entire area will be ripped with a dozer to a depth of approximately two feet to reduce soil compaction.
- 2) Fill will be removed or cut slopes backfilled until approximate original contour is achieved.
- 3) Topsoil will be replaced in each area where it previously existed.
- 4) A weed-free alfalfa hay mulch will be blown over the topsoiled surface at a rate of 2,000 pounds per acre. Fertilizer, if determined necessary by soil testing, would also be applied at this time.

- 5) The surface will be gouged with irregularly shaped depressions approximately 18" deep x 24" diameter.
- 6) The appropriate seed mix will be either broadcast or hydroseeded on the area at the rate specified in the Biology section (refer to Biology Section R645-301-341 Revegetation: Description of Revegetation Operations. The topsoil storage area will be seeded with the White Fir/Aspen seedmix (Biology Section: Table 300-10) and subsoil storage area will be seeded with the Pinyon-Juniper/Mountain Brush seedmix (Biology Section Table 300-8).
- 7) A wood fiber mulch will be applied to the surface at a rate of 1500 pounds per acre. A tackifier will be used in areas where the slope exceeds 2 horizontal and 1 vertical.
- 8) If root stock is listed in the seed mix, the containerized plants will be planted at the rate specified in the seed list table, one year after seeding.

Revegetative efforts (including regrading, topsoiling, fertilizing and mulching) will be conducted in the fall (late September - October).

Reseeding will be accomplished by hydroseeding or broadcast seeding the large areas during final reclamation. Hydroseeding will be completed by applying a small amount of mulch with the seed mix to mark the area of coverage during application. Steeper areas of the mine yard, such as the experimental practice area, will be tackified to provide erosion protection.

Rills and gullies of an excessive nature, which form on regraded and retopsoiled areas and disrupt the approved postmining land use or cause or contribute to a violation of water quality standards for receiving streams, will be filled, regraded or stabilized. The area will then be reseeded.

Pesticides and herbicides will be used only if a problem is identified and spraying is deemed necessary to control damage to reclamation. Using weed-free straw/hay will reduce the potential for noxious weeds to become a problem. Pest control measures to be utilized would depend on what type of problem exists.

Revegetation success will be judged on the effectiveness of the vegetation for the approved postmining land use. The sampling techniques for measuring success and methods identified in DOGM's "Vegetation Information and Monitoring Guidelines" will be referenced during the post revegetation evaluation. Annual monitoring will be included as part of the annual report submitted to DOGM.

Based on the information available from the vegetation survey on-site, it appears that reclamation at this site is feasible. Native species have re-established themselves successfully on previous disturbances without seed or mulch application or surface preparation. Also, successful reclamation has been completed on the Helco, Leroy and Rominger mine sites.

### **5) Reclamation of the Experimental Practice Area**

A reclamation plan has been formulated for the experimental practice area below the Rominger Mine based on conversations with DOGM technical specialists and consultants that specialize in specific fields. Because of the experimental practice being proposed, reclamation techniques differ from conventional practices. In the Rominger Mine area, PacifiCorp is proposing to use a indicator fabric to protect topsoil resources in-place along the bottom of the canyon and the adjacent side slopes. During reclamation of the mine yard, the subsoil will be back hauled from the subsoil storage area until the indicator fabric is located. The fabric will then be removed and the approximate original contour restored.

Removal of fill material will be conducted very carefully in order not to disturb the in-place soil resources located under the indicator fabric or the bypass culvert. Fill material will be removed in lifts exposing the approximate original contour. Once the remaining fill is been removed, the indicator fabric will be carefully peeled away from the soil and the condition of the underlying soil materials observed at this time.

Reclamation of the experimental practice/geotextile area, where topsoil was protected in-place, will proceed as outlined below:

- 1) After the fill has been removed, the indicator fabric covering the original ground surface will be removed.
- 2) A weed-free alfalfa hay mulch will be applied over the re-exposed surface at a rate of 2,000 pounds per acre. Fertilizer, if determined necessary by soil testing, would also be applied at this time.
- 3) Steep Slopes (greater than 2H:1V): soil surface will be treated with an anionic polyacrylamide (PAM) to increase cohesion and infiltration of the water during revegetation. The PAM product will be applied contemporaneously with the seed mixture. PacifiCorp will review details concerning the application type/rate with the Division prior to implementation.

Moderate Slopes (2H:1V or less): The surface will be gouged with irregularly shaped depressions with the depth based upon available soil resource. This will also mix the hay and fertilizer into the upper portion of the soil surface.

- 4) The appropriate seed mix (determined by pre-existing vegetation type) will be either broadcast or hydroseeded on the area at the rate specified in the Biology Section.
- 5) A wood fiber mulch and tackifier will be applied to the surface at a rate of 1500 pounds per acre.
- 6) Root stock (treated with PAM) will be planted at the rate specified in the seed list table (refer to Biologic Section).

#### **6) Experimental Practice Monitoring**

PacifiCorp will conduct monitoring to analyze the effectiveness of the experimental practice. The monitoring program will ensure the collection, analysis, and reporting of reliable data that are sufficient to enable the Division to evaluate the performance experimental practice procedures. Monitoring to be conducted on annual basis by a qualified specialist during revegetation reconnaissance and include;

Location:

Date:

Name of Specialist:

% Slope:

Exposure:

Area (acres):

Animal Use/Disturbance

Erosion:

Cover: (refer to Biology Section R645-301-340 Table 300-7, qualitative on years 1, 2, 3, 5, 6, 7 and quantitative on years 4, 8, 9 and 10)

Dominant Plant Species Observed

Notes:

Photographs

Reporting: Data will be reported in the Annual Reports.

In addition to reviewing the experimental practice area, the qualified specialist will compare the practice area to undisturbed areas adjacent to the sites.

**PacifiCorp**  
**Energy West Mining**  
**Company**

**Deer Creek Mine**

**Volume 11: Response to Deficiencies, Task  
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- Appendix B. VEGETATION PRODUCTIVITY ESTIMATES LETTER, 10/26/04, NATURAL RESOURCES CONSERVATION SERVICE.
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- Appendix D. PRELIMINARY REPORT ON SURVEYS CONDUCTED TO DETERMINE POTENTIAL IMPACTS OF RILDA SURFACE FACILITY DEVELOPMENT IN RILDA CANYON DURING 2004, JULY 2004, BY THE UTAH DEPARTMENT OF NATURAL RESOURCES.
- FISH AND MACROINVERTEBRATE SURVEY AT RILDA CREEK, EMERY, UTAH, FALL 2004, PRELIMINARY REPORT, CIRRUS ECOLOGICAL SOLUTIONS, L.C., NOVEMBER 4, 2004.
- Appendix E. 2004 VENTILATION FAN SOUND SURVEY.
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- Appendix H. GUIDELINES FOR MANAGING BIRDS ON POWERLINES, PACIFICORP, EFFECTIVE DATE: 2/15/99.

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## **R645-301-310 INTRODUCTION**

A portion of the following vegetative, fish, and wildlife resource information has been taken from the Data Adequacy document (Data Adequacy L.B.A No. 11, December 1996) and the Environmental Assessment (Mill Fork Federal Coal Lease Tract UTU-71307, Environmental Assesment document, Lease By Application, No. 11) reported by the Manti LaSal National Forest in June, 1997.

## **R645-301-320 ENVIRONMENTAL DESCRIPTIONS**

The following sections of this applications contain descriptions, information, and plans to protect the biological, aquatic, and wildlife resources within and in the vicinity of Rilda Canyon.

### ***R645-301-321 Vegetation Information***

The North Rilda area is located within an east-west trending canyon that is very steep and narrow with rounded narrow ridge tops. Contour elevations range from approximately 7,400 feet to over 9,600 feet. Vegetative cover and species composition within this elevation range is very diversified. Ecosystems within this portion of East Mountain contain various habitats that are mostly influenced by the steep and broken slopes and their orientations. Distinguishable plant communities within the area are: Pinyon/Juniper, Mountain Brush, Mixed Conifer (upper elevations), Sagebrush/Grass and Riparian. A very narrow band of Riparian community is considered to follow along the stream to the Rilda Canyon Springs. Refer to Map 300-1 of this section for the diverse vegetative communities. Note that Map 300-1 is a vast area map. For more vegetative community details related to the Rilda Canyon Portal Facilities refer to Volume 11 Appendix Volume - Biology: Appendix A.

Vegetation studies have been conducted within the Deer Creek Mine permit area. The vegetation mapping that was previously conducted for the mine area includes the North Rilda Area, (formerly called the "Future Permit Area" [Volume 4, Map 2-14]). Vegetation studies were conducted for the North Rilda permit area by Mt. Nebo Scientific, 2003 and 2004 (refer to Volume 11 Appendix Volume - Biology: Appendix A), and J.R. Barker in 1982 (refer to Volume 3, Appendix II of the MRP). Quantitative and qualitative data of the major plant communities provided in the 1982 study are also relevant to the North Rilda Area.

Mr. Rick Collins, Mt. Nebo Scientific, identified different vegetation communities in the Rilda Canyon Portal Facilities area and designated reference areas for each community. Of the identified reference areas, only the Sagebrush/Grass (undisturbed), Pinyon Juniper/Mountain

Brush (undisturbed), and White Fir/Aspen reference areas will be established. A reference area for the pre-disturbed area (AMR/AML) was identified by Mt. Nebo Scientific, this area will be used for topsoil storage to minimize the footprint and to keep all disturbance within the permit boundary. The pre-disturbed areas (AMR/AML) will be seeded with Pinyon-Juniper/Mountain Brush seedmix at final reclamation and be held to the undisturbed reference area standards for reclamation. Map 300-2 of this section, depicts the location of each reference area.

The most dominant plant community in the facilities area is the Pinyon /Juniper/Mountain Brush Transition. The prominent species identified in this area are: Utah Juniper (*Juniperus osteosperma*), Rocky Mountain Juniper (*Juniperus scopulorum*), Pinyon Pine (*Pinus edulis*), Curleaf Mountain Mahogany (*Cercocarpus ledifolius*), Ponderosa Pine (*Pinus ponderosa*), Big Sage (*Artemisia tridentata*), Salina Wildrye (*Elymus salina*), Indian Rice Grass (*Oryzopsis hymenoides*), Cutler ephedra (*Ephedra cutleri*), corymbd eriogonum (*Eriogonum corymbosum*), and bluebunch wheatgrass (*Elymus spicatus*).

The Mixed Conifer community, identified in Collin's report (refer to Volume 11 Appendix Volume - Biology: Appendix A) as Douglas Fir/White Fir and White Fir/Aspen communities, are found in the upper elevations of the canyon. The most common plant species of the Mixed Conifer community are: White Fir (*Abies concolor*), Quaking Aspen (*Populus tremulodes*), Douglas fir (*Pseudotsuga menziesii*), Saskatoon serviceberry (*Amalanchier alnifolia*), corymbd eriogonum (*Eriogonum corymbosum*) and bluebunch wheatgrass (*Elymus spicatus*).

Plant communities that would be impacted by proposed new construction of the portal facilities in North Rilda Canyon were quantitatively sampled. Additionally, similar communities chosen outside the areas that would be disturbed were also sampled to determine appropriate reference areas for the disturbed communities (refer to Volume 11 Appendix Volume - Biology: Appendix B). The Similarity Index (SI) of the proposed disturbed vegetation compared to the reference areas were determined using the Motyka's version of the Sorensen's index (Chambers, Jeanne C., Brown, Ray W., Methods for Vegetation Sampling and Analysis on Revegetated Mined Lands, Report INT-151, United States Department of Agriculture, Forest Service, October 1983):

$$SI = \frac{2 MW}{MA + MB}$$

Where:

MW = Sum of the smaller importance values of the species or life-forms common to both areas.

MA = The sum of the importance values of all species or life-forms in one area.

MB = The sum of the importance values of all species or life-forms in the other area.

The SI results for the three plant communities are:

White fir/Aspen:	93.5
Pinyon-Juniper/Mountain Brush:	70.3
Sagebrush/Grass:	83.9

UDOGM recommends an SI of at least 70 to show an acceptable comparison between the proposed disturbed and reference area vegetation.

Threatened, Endangered and Sensitive Plant Species

Threatened, endangered, and sensitive plant species of interest in Emery County include *Astragalus monti* (Heliotrope milkvetch), *Hedysarum occidentale* var. *canone* (Western sweetvetch), *Silene petersonii* (Plateau catchfly), and *Aquilegia flavescens* (Yellow columbine). Populations of these species have been found to inhabit the upper areas near the Rilda Canyon Portal Facilities area. Other listed species of concern include *Cycladenia humilis* var. *jonesii* (Jones Cycladenia), *Erigeron maguirei* (Maguire Daisy), *Townsendia aprica* Last Chance Townsendia), *Schoenocrambe barnebyi* (Barneby Reed-mustard), *Pediocactus dispainii* (San Rafael Cactus), *Pediocactus winkleri* Winkler Pincushion Cactus), and *Sclerocactus wrightiae* (Wright Fishhook Cactus). Mr. Rick Collins (Mt. Nebo Scientific) conducted an in-depth vegetation analysis of the area related to the proposed Rilda Canyon Facilities, As stated in his report, "There was a potential of the following plants to be present in the study areas: canyon sweetvetch (*Hedysarum occidentale* var. *canone*) and Link Canyon Trail columbine (*Aquilegia flavescens* var. *rubicunda*). These plants have been listed as "sensitive" in the Manti-La Sal National Forest by the USDA Forest Service. These plants, nor their ideal habitats, were not found during the plant surveys". In the 2003 study Collins states, "No threatened, endangered, rare or otherwise sensitive plants were observed within the study areas during the course of the field sampling and surveys" (refer to Volume 11 Appendix Volume - Biology: Appendix A.).

Vegetation productivity analysis was conducted by M. Dean Stacy and Jim Brown of the Natural Resources Conservation Service (NRCS) in October 2004 (refer to Volume 11 Appendix Volume - Biology: Appendix B). The NRCS condition rating is 3 levels (Good, Fair, Poor), with sub-ratings of high and low. Though precipitation totals for the year were slightly below normal (85% of normal, based on East Mountain Weather Station data), the conditions of the reference areas were in the mid range (fair) condition. Productivity values for the communities to be impacted by the facilities are in the report.

**R645-301-322 Fish and Wildlife Information**

The Rilda Canyon Portal Facilities are all inclusive in the Rilda Canyon drainage, a tributary to Huntington Creek. Water resources within Rilda Canyon provide habitat for a variety of big and small game animals, non-game animals and birds. A complete listing of all threatened and endangered wildlife species that have the potential to be present near and/or within the North Rilda Canyon can be found in the County lists of Utah's Federally Listed Species (UDWR, 8/14/02, at <http://www.dwrcdc.nr.utah.gov/ucdc/>). Refer to Volume 11 Appendix Volume - Biology: Appendix C for the 5/21/2004 list, by county. A complete listing of all wildlife species that have the potential to be present near and/or within the Rilda Canyon can be found at this same internet address.

The following wildlife information tables includes Threatened and Endangered Species, Sensitive Species, Management Indicator Species, and Priority Migratory Bird Species, listed in Emery County, Utah, and may be present in the Rilda Canyon facilities area. Most data from these tables came from "Wildlife Resources Report for the SITLA - Access on East Mountain Project", Re-re-revised July 2004, by the Ferron/Price Ranger District, Manti La-Sal National Forest.

<b>Table 300-1: Emery County, Utah Threatened and Endangered Species (Wildlife and Fish)</b>			
<b>Species</b>	<b>Species Status</b>	<b>Species Habitat Association</b>	<b>Rilda Habitat Information</b>
Bald Eagle <i>Haliaeetus</i>	Threatened	Habitat not considered in this area.	May occur incidentally but no nesting is known in the area.
Mexican Spotted Owl <i>Strix occidentalis lucida</i>	Threatened	In Utah, the Mexican spotted owl nests in steep-walled, complex rock canyons at relatively low elevations with mixed conifer stands. Canyons are generally at least 2 kilometers long and less than 2 kilometers wide.	This habitat is in Rilda Canyon, but the elevation is marginal and the canyon does not meet the 2 X 2 rule. The steep-walled outcrops are south facing with conifer habitat generally on the north facing slopes.
Black-footed Ferret <i>Mustela negripes</i>	Endangered	Depends of prairie dog colonies for food. Grass vegetation is normally associated with this habitat.	Prairie dog colonies have not been observed in the facilities area. Sagebrush/Grass vegetation communities are minimal and mostly at lower elevations.
Canada Lynx <i>Lynx canadensis</i>	Threatened	Coniferous forests that have cold, snowy winters. Generally not sufficient large tracts of suitable habit	This habitat does exist in Rilda Canyon, but the large suitable habitat is generally not sufficient.

Table 300-1: Emery County, Utah Threatened and Endangered Species (Wildlife and Fish)

Species	Species Status	Species Habitat Association	Rilda Habitat Information
Southwestern Willow Flycatcher <i>Empidonax trailii extimus</i>	Endangered	Riparian habitat, nesting in area with high shrub densities interspersed with openings or meadows.	Riparian habitat is present in the canyon, but this vegetation community is down canyon of the facilities and very narrow.
Bonytail <i>Gila elagans</i>	Endangered	Warm water reaches of larger rivers in the Colorado River Basin.	Prime habitat not found. The Rilda Canyon stream is feed by cold springs that originate near the joining of the Left and Right Forks. The stream has great differences in flow during the Spring and Fall flows.
Humpbacked Chub <i>Gila cypha</i>	Endangered	Deep, swift mainstream and large tributaries in relatively inaccessible canyons of the Colorado River Basin.	Prime habitat not found. The stream in the Rilda Canyon is not considered a large tributary, is not deep or swift.
Razerback Sucker <i>Xyrauchen texanus</i>	Endangered	Mainly along the mainstreams of the Colorado, Greenand San Juan Rivers.	Prime habitat not found. The nearest known population occurs approximately 50 miles from the project area, in the lower San Rafael River and green River.
Colorado Pikeminnow <i>Ptychocheilus lucius</i>	Endangered	Species exists only in the upper Colorado River system. Adults prefer medium to large rivers. Young prefer slow moving backwaters. Food source is usually other fish.	Prime habitat not found. Rilda Canyon's stream is small and adult feed is limited.
Whooping Crane <i>Grus americana</i>	Endangered	Primarily found in wetlands, but pastures and cultivated fields are also habitats.	Prime habitat not found. Some riparian vegetation is found down stream of the mine site, but it is not the wet, open area preferred.

**Table 300-2: Sensitive Species (Utah Conservation Data Center and Manti-LaSal Forest)**

Species	Species Habitat Association	Rilda Habitat Information
Spotted Bat <i>Euderma maculatum</i>	Habitat consists of a variety of vegetation types in elevations ranging from 2,500 to 9,500', including riparian, desert shrub, spruce/fir, ponderosa pine, montane forests and meadows.	Habitat in Rilda. Small areas of several of the vegetation communities are present. A bat survey in Rilda Canyon was conducted in October 2004. (Refer to Appendix G)
Townsend's Big-eared Bat <i>Plecotus townsendii pallescens</i>	Hibernates in caves and mines. The mixed conifer vegetation communities in the canyon provides suitable habitat for foraging.	Habitat in Rilda. Caves are not found in the area in the area, but the south facing escarpments could be considered habitat. A bat survey in Rilda Canyon was conducted in 2004. (Refer to Appendix G)
Northern Goshawk <i>Accipiter gentilis</i>	Mixed Conifer vegetation stands in this elevation.	Habitat in Rilda. Mixed Conifer communities are present in Rilda Canyon, but the stands are on the north facing slopes and away from the facilities' activities.
Three-toed Woodpecker <i>Picoides tridactylus</i>	Forests containing spruce, fir, ponderosa pine, tamarack, and lodgepole pine.	Habitat in Rilda. Small, mixed stands of spruce/fir communities are on the north facing slopes. A few ponderosa pines are on the south facing PJ/Mountain Brush communities.
Colorado Cutthroat Trout <i>Oncorhynchus clarki pleuriticus</i>	Require cool, clear water in streams with well vegetated banks, which provides cover and bank stability. Deep pools and structures such as boulders and logs provide instream cover.	Habitat in Rilda Canyon. Two fish and invertebrate surveys were conducted during 2004. Flows vary in the stream during the spring and fall. Turbidity increases during spring runoff and summer storm events. (Refer to Appendix D)
Bonneville Cutthroat <i>Oncorhynchus clarki utah</i>	Requires a functional stream riparian zone, which provides structure, cover, shade, and bank stability. Found in this habitat ranging from high elevation mountain streams and lakes to low elevation grassland streams.	Habitat in Rilda Canyon. Two fish and invertebrate surveys were conducted during 2004. Species was not identified. (Refer to Appendix D)

Table 300-2: Sensitive Species (Utah Conservation Data Center and Manti-LaSal Forest)

Species	Species Habitat Association	Rilda Habitat Information
Spotted Frog <i>Rana luteiventris</i>	Habitat preference is isolated springs and seeps that have a permanent water source. Isolated populations exist in the West Desert and along the Wasatch Front.	Habitat in Rilda Canyon
Greater Sage-grouse <i>Centrocercus urophasianus</i>	Also known as the Sage-hen and the Sage-chicken. Habitat is sagebrush plains, foothills and mountain valleys. Sagebrush is the predominant plant of quality habitat.	Small sagebrush communities are in Rilda Canyon.
Peregrine Falcon <i>Falco peregrinus</i>	The species is distributed very widely, breeding in a variety of habitats.	Rilda Canyon cliffs could be habitat for Peregrine falcon nesting. Annual raptor surveys are conducted in Rilda Canyon.
Flammulated Owl <i>Otus flammeolus</i>	Prime habitat is Montane forests, especially ponderosa pine forests. Species is considered widespread in Utah, but breeding occurs primarily in the southwestern and north-central parts of the state.	Habitat in Rilda Canyon. The north facing slopes is mixed conifer community. Some individual Ponderosa pines are present in the bottom of the canyon.

**Table 300-3: Other Wildlife Species of Consideration**

<b>Species</b>	<b>Species Habitat Association</b>	<b>Rilda Habitat Information</b>
Mule Deer <i>Odocoileus hemionus</i>	Mixed conifer forest, Pinyon/Juniper/Mountain Brush and sagebrush communities are suitable habitat.	High value winter and critical summer habitat are in Rilda Canyon. Mule Deer are found in the canyon.
Rocky Mountain Elk <i>Cervus canadensis</i>	Tend to occupy higher elevation aspen and mixed conifer communities in spring through fall, and move to lower Pinyon/Juniper and sagebrush communities during the winter months.	High value winter, critical summer, and critical winter habitat are in Rilda Canyon. Elk are known to use the area in late spring, summer and fall.
Moose <i>Alces alces</i>	Marshy, riparian type communities.	High value winter and critical summer habitat are in Rilda Canyon. Moose transplants have been seen in canyons near the Rilda Canyon.
Mountain Lion or Cougar <i>Felis concolor</i>	Species is fairly common throughout Utah's mountainous areas. Diet is composed of deer, rabbits, rodents and other animals.	Habitat in Rilda Canyon.
Black Bear <i>Ursus americanus</i>	Species is common in Utah's large forested areas. Diet is composed of fruits, insects, grubs, some small vertebrates, and carrion.	Habitat in Rilda Canyon.
Wolverine <i>Gulo gulo</i>	Prefer alpine tundra and mountain forest habitats. Eats a variety of food, including eggs, roots, carrion and many types of animals.	Habitat in Rilda Canyon.
Golden Eagle <i>Aquila chrysaetos</i>	High cliffs are used for nesting. Search for prey in high mountain brush, perennial forb, and high elevations perennial grassland habitat.	One golden eagle nest is known in the canyon. Annual raptor surveys are conducted in the canyon and other areas of East Mountain.
Macroinvertebrates (Aquatic Species)	Stream and riparian habitat	This habitat exists in Rilda Canyon. Two fish and invertebrate studies were conducted in 2004.

Table 300-4: Migratory Birds		
Species	Species Habitat Association	Rilda Habitat Information
Virginia's Warbler <i>Vermivora virginiae</i>	Preferred breeding habitat includes chaparral and open stands of pinyon/juniper, ponderosa pine and scrub oak, mountain mahogany thickets on dry mountainsides.	The preferred scrub hillsides, scrub oak, is not present in Rilda Canyon, but small stands of pinyon/juniper and mountain mahogany occur. There have been no known confirmed nesting sites found on the Manti-La Sal National Forest.
Black Rosy-Finch <i>Leucosticte atrata</i>	Breeding populations occur as high as 11,000' in Utah. Habitat is crevices or holes in inaccessible vertical cliffs.	High cliff habitats are present in the area. Generally, could only be considered in the area during slight shifts southward, moving south out of Montana and northern Wyoming.
Broad-tailed Hummingbird <i>Selasphorus platycercus</i>	Primary breeding habitat is lowland riparian communities, but have also been recorded in aspen, mountain riparian, ponderosa pine, Engelmann spruce, subalpine fir, and Douglas fir. Nesting typically occurs at elevations ranging from 6,000 to 8,000'.	Primary habitat not present in Rilda Canyon. Upper nesting elevation is at the facilities elevation.
Black-throated Gray Warbler <i>Dendroica nigrescens</i>	Preferred breeding habitat includes dry oak slopes, pinyon/Juniper, open mixed woods and dry coniferous and mixed conifer habitats, with grassy understories. Elevation is up to 5,400'.	Habitat found in Rilda Canyon, but the canyon elevation is above the upper elevation limit
Gray Vireo <i>Vireo vicinior</i>	Species breeds on arid slopes dominated by mature pinyon-juniper and juniper woodlands in southwestern Utah, north to Sevier County.	Habitat found in Rilda Canyon.
Brewer's Sparrow <i>Spizella breweri</i>	Primary habitat in Utah is the shrub steppe habitat. However, Brewer's sparrows may also be found in high desert scrub (greasewood) habitats. They may also breed in large sagebrush openings in pinyon-juniper or coniferous forest habitats.	Habitat found in Rilda Canyon.
Sage Sparrow <i>Amphispiza belli</i>	Species occurs throughout Utah during the spring and summer months, but primarily in the southwestern portion of the state during the winter. Prefers shrubland, grassland and desert habitats.	Habitat exists in small stands of sagebrush/grass communities in the canyon.

Aquatics within the Rilda Canyon Creek corridor will be protected during construction and operation activities by placing silt fence along the southern edge disturbance. The silt fence will be removed when the UDOGM determines that vegetation is sufficiently established. The surface yard will be constructed to slope towards the north. In addition, the topsoil and subsoil piles have silt fence around the slopes that can drain to the stream. Wildlife will be protected by conducting construction during months that would minimize impacts to breeding and birthing months.

A rat midden site is located near the facilities area. There will be no actual disturbance in this area. It is protected by placing a 6 foot chainlink fence around the base..

**I. Aquatic Species** - The Utah Division of Wildlife Resources (UDWR) has conducted aquatic surveys of the perennial and intermittent streams in the area. The following information, summarizes the representative game species in the Right Fork Rilda Creek.

**Benthic Invertebrates** - The USGS in cooperation with the UDWR and Utah Division of Oil, Gas, and Mining (UDOGM) conducted a comprehensive hydrologic study (from July 1977 through September 1980) of the upper drainages of the Huntington and Cottonwood Creeks ("Hydrology of the Coal-Resource Areas in the Upper Drainages of Huntington and Cottonwood Creeks"). Data on benthic invertebrates were collected from 16 sites in October 1977, July and October 1978, and October 1979. This data will be cited and used as a reference source in comparison baseline evaluation conducted during 2004 and 2005 for the North Rilda Canyon area. (Refer to United States Geological Survey, Water-Resource Investigations, Open-File Report 81-539, Salt Lake City, Utah, 1981)

As written from the report, "...data indicate that there were significant seasonal differences in the benthic invertebrate population at a given site in addition to areal differences...These organisms appeared in their maximum numbers in the July samples collected at sites in the higher altitudes of the study area, but they were not present in any of the October samples. The large numbers found in July, reflected a seasonal cycle rather than an unnatural condition that allowed one species to dominate." The average diversity (Shannon-Weiner diversity index) found between 1977 and 1979 in Rilda Canyon was 2.84.

In addition to the previous studies of Rilda Creek drainage, UDWR conducted biological organism and habitat studies of Rilda Creek in the spring of 2004(refer to Volume 11 Appendix Volume - Biology: Appendix D). As stated in the report entitled "*Preliminary Report on Surveys Conducted to Determine Potential Impacts of Rilda Surface Facility Development in Rilda Canyon During 2004*", representatives of the UDWR, Southeastern Region were asked by the UDOGM to participate in an on-site meeting, discuss the impacts of this project on the biota within Rilda Canyon, and aid in the development of a

comprehensive EA. During this and subsequent meetings it was decided that UDWR would conduct pre and post-disturbance evaluations of macroinvertebrate populations and identify resident fish populations in Rilda Creek. This preliminary report, plus the reports that will be generated from the spring and fall 2005 surveys, marks the completion of the pre-disturbance baseline data sampling effort. Details on the methodology employed during macroinvertebrate and fish sampling and a limited results section are included in this report. Refer to Volume 11 Appendix Volume - Biology: Appendix D for a copy of the preliminary report. A copy of the final report will be included upon completion by UDWR. The Preliminary Report, indicates the presents of fish in the Rilda Canyon stream. Brown trout (*Salmo trutta*), and cutthroat trout (*Oncorhynchus clarki*), two salmonid species were found. No fish were found above the stream crossing. As suggested, the stream along the disturbed facilities area will be protected to minimize the impacts of sedimentation and reduction of water quality below the side drainage undisturbed bypass culvert installations. Disturbed runoff will be treated as outlined in the Hydrology Section.

An additional study of the area was conducted by Cirrus Ecological Solutions in the fall of 2004. Spring and fall surveys will be conducted in 2005. The results in this Preliminary Report are similar to previous (Walker) survey. Brown trout and cutthroat trout were observed. Refer to Volume 11 Appendix Volume - Biology: Appendix D, for this report. The 2004 -2005 surveys will serve as baseline aquatic data for Rilda Creek.

**II. Terrestrial Species** - Wildlife studies have been conducted within the Deer Creek Mine permit areas and those areas adjacent to it. The wildlife habitats of the North Rilda Area include Mixed Conifer, Pinyon-Juniper/Mountain Brush, and Sagebrush/Grass communities. Descriptions of these and other habitats that exist within the permit boundaries have been given in previous wildlife sections of the MRP. "Species of Special Significance", threatened, endangered, and "Special Status Species" have been described previously. Table 1 of Volume 1, Part 2 of the MRP lists Vertebrate Species of the Wasatch Plateau of which the Deer Creek Mine permit area and the North Rilda Area are part. The tables include the species status (common, rare, threatened, etc.), the habitats in which they occur, and the likelihood of their occurrence within the boundaries of the lease area.

Mule Deer, Elk, and Moose habitats have been mapped for the permit and adjacent areas. Refer to Maps 300-3, 300-4, and 300-5 of this section to view the areas. "Critical Summer Range", "Critical Winter Range", and "High Value Winter Range" are shown on the maps. The Utah Division of Wildlife Resources indicate that the entire Rilda Canyon area is habitat for Mountain Lion and Black Bear. UDWR also have records of occurrence for wolverine eight miles northwest and thirteen miles southwest of Rilda Canyon. Habitat for the Canadian Lynx is also found in the Rilda Canyon area. The wolverine and lynx habitat

maps, found on the UDWR web site (<http://dwrcdc.nr.utah.gov/ucdc/default.asp>) are shown as “predicted habitat” and not “known habitat” maps.

Raptor nesting studies and nest mapping have been conducted in the North Rilda Area. Much of the area is raptor nesting habitat. Specific nests have been numbered and mapped in the area (this report has been submitted to the Division of Oil, Gas and Mining only and is found in PacifiCorp’s Confidential Files, located at the UDOGM office) The status of the two nests in Rilda Canyon have also been submitted and are part of the Confidential Files. Nest information and locations are based on results from the 2004 annual raptor survey conducted by Energy West Mining Co. , in conjunction with the Utah Department of Wildlife Resources. Energy West Mining Co. will conduct annual raptor surveys in the area. The results of those surveys will be available upon request.

A Ventilation Fan Sound Survey was conducted in November 2004, see Volume 11 Appendix Volume - Biology: Appendix E. Results indicate that the sound frequency and volume of the fans in Rilda Canyon will be near background levels at the perennial stream origination point.

**R645-301-322.210    Threatened and Endangered Species**

The Environmental Assessment (Mill Fork Federal Coal Lease Tract UTU-71307, Environmental Assessment, LBA Application #11. June, 1997), MRP Volume 12 reports “No threatened or endangered wildlife species are known to inhabit the proposed lease area. A Bald Eagle (*Haliaeetus leucocephalus*) nest near the Hunter Power Plant is approximately 26 miles southeast of the coal lease. The coal lease area is outside of the foraging area for the Bald Eagles. No roost sites have been found in the lease area ...”

Other TES information applicable to the North Rilda Canyon Portal Facilities:

Mexican Spotted Owls (MSO) have recently become a species of interest since the U.S. Fish and Wildlife Service (USFWS) designated (in January, 2001) 4.6 million acres on federal lands in Arizona, Colorado, New Mexico, and Utah as critical habitat. The designation includes 3.2 million acres in Utah. More specifically, the designation includes areas west of the Colorado River within the West Tavaputs Plateau in Carbon County and the northeast corner of Emery County east of US Highway 6. Other areas in Utah have been designated as critical habitat, however, these areas exist in the southern portion of the state. Typical MSO, habitat according to the 2001 Environment Assessment (Environmental Assessment, Designation of Critical Habitat for the Mexican Sotted Owl, January 2001, U.S. Fish and Wildlife Service, New Mexico Ecological

Services Field Office, Albuquerque, New Mexico), consists of “a diverse array of biotic communities. Nesting habitat is typically in areas with a complex forest structure or rocky canyons, and contains uneven-aged, multi-storied mature or old growth stands that have high canopy closure (Ganey and Balda 1989, USDI 1991). In the northern portion of the range (southern Utah and Colorado), most nests are in caves or on cliff ledges in steep-walled canyons...typically characterized by the cooler conditions...frequently contain small clumps or stringers of ponderosa pine, Douglas fir, white fir, and/or pinyon-juniper”.

Dr. Dave Willey from Montana State University, known Mexican Spotted Owl expert, modeled representative habitat using the 2000 Willey-Spotskey Mexican Spotted Owl Habitat Model. The model included the Manti-LaSal area. Figure 300-1 includes the North Rilda Canyon area, with the Mill Fork Lease area outlined. Areas identified in black, are areas of potential nesting habitat. The green's are identified as potential

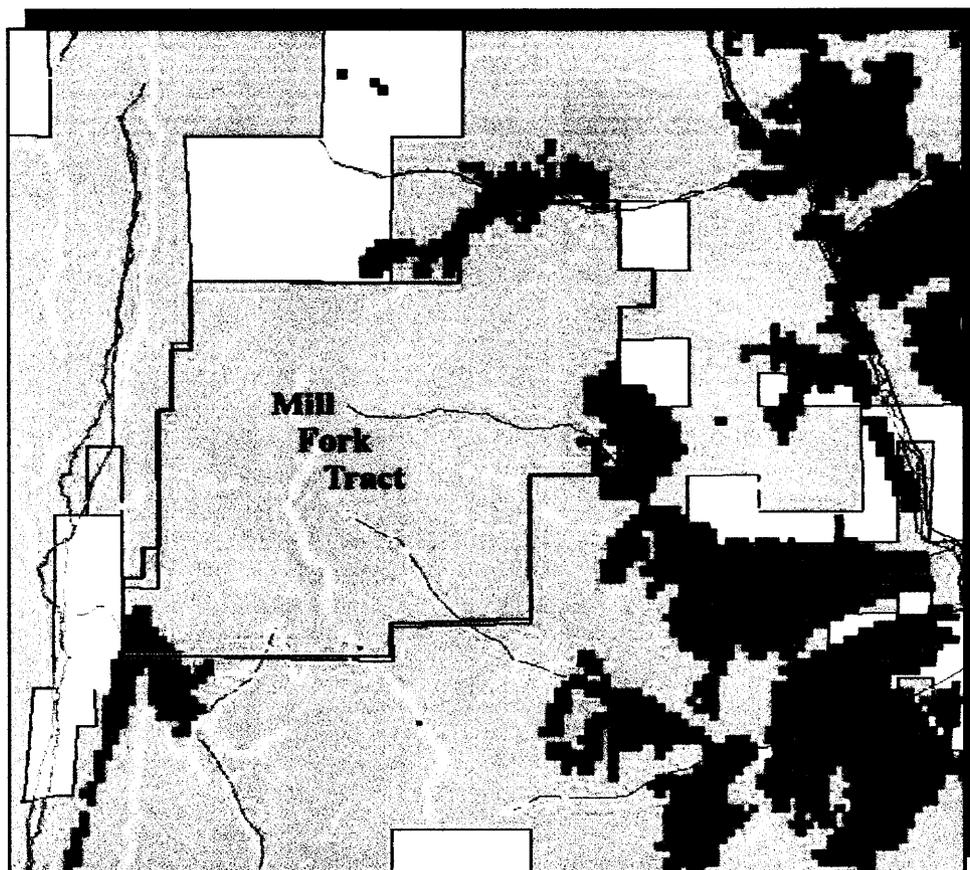


Figure 300-1: Mexican Spotted Owl nesting and foraging areas (Dr. Dave Willey, Montana State University, 2000).

foraging areas of steep sloped mixed conifers. However, it is reported in the UDWR's *Inventory of Sensitive Species and Ecosystems in Utah, 1997* that foraging, nesting and roosting habitats are "dominated by Douglas-fir and/or white fir...In the northern portion of the range (southern Utah and Colorado), most nests are in caves or on cliff ledges in steep-walled canyons." Potential steep sloped, mixed conifer foraging habitats of this type are found on the extreme northeastern border, extreme western border, and a small area in the southwest corner of the Mill Fork lease area as illustrated in Figure 300-1. Large ponderosa pines are typically found in lower elevations in the rocky canyons. The Rilda Canyon drainage is depicted in the lower right corner of Figure 300-1. The Rilda Canyon supports both aspen and Douglas fir stands, and has cliff ledges or steep walled canyons recognized as typical foraging habitats.

On October 5, 2004, a habitat suitability determination study was conducted by EIS Environmental & Engineering Consulting. Refer to Volume 11 Appendix Volume - Biology: Appendix F for the report. The summary of this report states that MSO habitat constituents are in Rilda Canyon.

The Spotted bat (*Euderma maculatum*) depends on cliffs for roost/hibernation areas. These areas exist in isolated locations in the south facing slopes of Rilda Canyon. Energy West Mining Company and Genwal Resources in 1997, contracted Richard Sherwin, Dr. Duke Rogers, and Carl Johansson to conduct a bat survey in the areas of Huntington Canyon, Straight Canyon, and Cottonwood Canyon. The purpose of this surveys was to assess the distribution, abundance, and habitat requirements of the Townsend big-eared and Spotted bats. These parameters were investigated for the following: 1) areas under consideration as potential lease sites for mining (North Rilda Area, Cottonwood Canyon LBA and the Mill Fork lease); 2) sites where subsurface coal mining is ongoing, and 3) sites (both on and off the Manti-La Sal National Forest) that serve as controls (no mining activities). The results of this surveys (Refer to Volume 12 Appendix A: *Assessment of Spotted Bat (Euderma maculatum) and Townsend's Big-eared Bat (Corynorhinus townsendii) in the Proposed Cottonwood Canyon, North Rilda Area and Mill Fork Lease areas, Manti La Sal National Forest, Emery County, Utah.*) are as follows:

**Use assessment for Townsend's big-eared bats in specified areas**

No Townsend's big bats were located within the survey areas during the project.

**Use assessment for Spotted bats in specified areas**

No Spotted bats were mist netted during these studies, refer to Volume 12 Appendix A Table 1 for a summary of results. There is some indication that water source(s) may not be as critical for the Spotted bat as for other species of bats with which it co-occurs. In a study of urine concentrating ability among selected species of bats, the spotted bat

could concentrate its urine more effectively than any species of bats evaluated, with the exception of two typically “desert species”, the pallid bat (*Antrozous pallidus*) and the Western pipistrelle (*Pipistrellus hesperus* - Geluso, 1978). It is likely that the Spotted bats were using water sites specifically to forage rather than drink, making netting extremely difficult.

Spotted bats were observed throughout the eastern (lower elevation) portions of the study areas. The highest concentration of calls were recorded in Rilda and Huntington Canyons. These canyons seem to best represent “classic” Spotted bat habitat with an abundance of fractured sandstone cliffs, and large areas of suitable foraging habitat. From three studies, it appears that Spotted bats are using the cliffs as roosting areas and the canyons as flyways to reach the lower elevation foraging areas. The principal Spotted bat foraging areas are located over the lower elevation riparian habitat located near the mouth of Huntington Canyon. Spotted bats concentrated foraging efforts above the upper canopy of intact riparian vegetation, particularly cottonwood trees (*Populus ssp.*).

Spotted bats were not restricted to the study areas, but rather are widely distributed in low densities throughout the entire area. In fact, Spotted bats were detected in suitable habitat throughout the area (including utilizing the parking lots of the Village Inn Motels in Huntington and Castledale).

There also is evidence that the Spotted bats tolerate at least moderate human disturbance while foraging. Surveys were conducted at several sites near roads with light to moderate vehicular traffic (Crandall Canyon, Huntington Canyon), including tandem trucks used for hauling coal from the Genwal Mine portal located in Crandall Canyon. Spotted bats were observed foraging at low elevations sites off the lease areas, sometimes within 30 meters of the right of way.

Spotted bats are common throughout the Huntington Canyon area. They were identified utilizing the lease areas (North Rilda and Mill Fork), the active mine permit areas and the control sites (refer to Volume 12 Appendix A, Table 2). Based on the number of individuals observed and their habitat use patterns, it does not appear that current mining practices represent a long term threat to the viability of this population. The bat communities in all areas sampled consist of the same suit of species among all areas of similar habitat and complexity (this includes sites in actively mined areas, control sites, and proposed lease areas (North Rilda and Mill Fork).

The fact that Spotted bats are relatively common in active and previously mined areas implies that past cliff failures have not dramatically impacted resident populations. As a cliff roosting species, it is likely that they have adapted to tolerate natural rock falls and

subsidence. Mine related cliff failures do not generally result in a net loss of habitat (ie. cliffs), but rather provide replacement habitat which may later be colonized by members of the local population. The results of the study indicate that Spotted bats are “common” enough throughout the area that the localized failure of cliffs (as a result of coal mining within the proposed lease areas [North Rilda Area and Mill Fork]) does not pose a serious threat to the population as a whole.

An additional bat habitat study was conducted in October 2004 by Joel and Gabrielle Diamond, Refer to Volume 11 Appendix Volume - Biology: Appendix G. This study was specific to the Rilda Canyon area. Findings is the 2004 study were similar to the 1997 study.

### ***R645-301-323 Maps and Aerial Photographs***

The map for vegetation diversity is located in the Maps Section of R645-301-300: Biology of this volume (Map 300-1). Deer, elk, and moose habitat are located on Maps 300-3, 300-4 and 300-5. The Raptor nest map has been transmitted to the Division of Oil, Gas and Mining, and is part of PacifiCorp’s confidential files, located in the UDOGM office. In addition to biologic base maps provided in this section, PacifiCorp conducts annual reconnaissance surveys, including subsidence monitoring (annual aerial photogrammetric surveys), infrared photography (5 year intervals), and hydrologic monitoring.

## **R645-301-330 OPERATION PLAN**

### **Protection and Enhancement:**

Methods, devices, and procedures to protect fish, wildlife and stream degradation during construction, operation and reclamation activities are:

1. Reduced disturbed footprint.

As depicted in Volume 11 - Engineering, Maps Section, Map 500-1, the Rilda Canyon Portal Facilities are located in an area disturbed by historical coal mining. This disturbed land is part of the historic coal developments known as the Helco, Leroy, Rominger, and Jeppson mines. All of the mines were reclaimed by AML in 1988. The historic mine sites disturbed a total of 10.67 acres. . Of the 13.1 total proposed disturbed acres, 4.4 acres are on land pre-disturbed by the historical mine sites. The pre-disturbed land is 33.6 % of the total disturbed at the Rilda Canyon Portal Facilities. PacifiCorp commits to enhancing the previously disturbed area to revegetation standards relative to the non-disturbed reference areas. In addition to the designing the facilities utilizing the previously disturbed area, PacifiCorp negotiated with Andalex Resources to acquire a right-of-way within the existing Genwal Mine disturbed area for a future breakout

- associated the Deer Creek Mine. Originally, PacifiCorp included a potential breakout for the Deer Creek Mine within the Mill Fork Lease ML-48258 located in Crandall Canyon upstream from the existing Genwal Mine. The ventilation breakout in Crandall Canyon would have required access road and pad disturbing approximately 1.0 acre near Crandall Creek. As a result of the right-of-way acquisition, overall the disturbance associated with the Deer Creek Mine will be reduced.
2. The surface yard will be constructed such that all surface runoff flows to the north, away from the stream, to a disturbed ditch. (Refer to Engineering and Hydrology Sections for plan to treat disturbed runoff).
  3. Barrier berm will be installed along the surface yard's southern disturbed boundary (closest disturbance near the stream).
  4. Interim vegetation on slopes and topsoil/subsoil piles.
  5. Buffer Zones markers placed along the south disturbed border to make construction workers aware of the location of the stream.
  6. Reduced speed limit on the mine access road (Emery County Road #306).
  7. Compliance with a Spill, Prevention, Control and Countermeasures (SPCC) Plan for the mine facility. The SPCC Plan is required under 40 CFR 112. It's primary use is prevention, reporting and clean-up of spills.
  8. Compliance with and Air Quality Approval Order for the mine facility.
  9. Compliance with an ISO 14001 Environmental Management Plan. ISO 14001 is a voluntary, international standard to reduce environmental impacts at the operation.
  10. Annual raptor survey
  11. To limit the impact on wildlife, the facility disturbance is located below the stream crossing at the forks of Rilda Canyon. Wildlife can continue to use the area for access from one fork to the other.
  12. Material haulage to the existing Rilda Canyon fan in the Left Fork will be discontinued. Materials will be hauled underground via the facility's portal.
  13. Raptor safe power poles will be installed in the facilities following PacifiCorp's "Guidelines For Managing Birds on Powerlines", refer to Volume 11 Appendix Volume - Biology: Appendix H.
  14. Reclamation/construction activities will not take place between December 1<sup>st</sup> and April 15<sup>th</sup>, an exclusionary time for wintering and calving periods.
  15. A warning sign (Stay Out - Buffer Zone) will be installed at the western end of subsoil pile to inform mining personnel/public of the large cavern (Leroy Mine Portals). Awareness will protect this potential bat habitat area.

In addition to the protection and enhancement methods, devices and procedures listed above, PacifiCorp in cooperation with the regulatory agencies has developed a series of mitigation commitments to enhance and mitigate potential impacts associated with the Rilda Canyon

development related to big game species, raptors, riparian habitat (aquatic species, bats and migratory birds) and noxious weed control. The list details the mitigation commitments:

**Wildlife Mitigation Commitments:**

<b>Table 300-5: Rilda Canyon Wildlife Mitigation</b>						
<b>Wildlife</b>	<b>Project</b>	<b>Project Summary</b>	<b>Overseeing Agency(s)</b>	<b>General Objective</b>	<b>Date of Implementation</b>	<b>Required Reporting</b>
Big Game Species	Leroy Mine Area; Buried Coal Removal and Landscape Enhancement	Leroy Coal Mine operated during the 1940's through the 1950's. Development included a narrow access road, two portals and coal storage and haulage area. Soil/geotechnical surveys delineated an area containing approximately 4,000 tons of buried coal. In addition, these surveys also documented that the depth of soil was limited in this area and ultimately affected the success and diversity of the revegetation. PacifiCorp proposes as part of the development of Rilda Canyon to remove the buried coal within the proposed disturbed area. During final reclamation, PacifiCorp commits to reclaiming this area to the same standards as areas previously not disturbed, including committing the revegetation standards to non-disturbed reference areas.	DOGM	To achieve reclamation of the Leroy Mine buried coal area with vegetation success similar to the non-disturbed reference area.	Project will initiated and be completed during the development of the facilities, approximately two years.	Certified as-built drawings after the construction of the Rilda Canyon facilities.

**Table 300-5: Rilda Canyon Wildlife Mitigation**

<b>Wildlife</b>	<b>Project</b>	<b>Project Summary</b>	<b>Overseeing Agency(s)</b>	<b>General Objective</b>	<b>Date of Implementation</b>	<b>Required Reporting</b>
Big Game Species	Abandoned Mine Areas Outside of the Proposed Disturbance	Cooperate with Abandon Mine Lands (AML), United States Forest Service (USFS) to reclaim and enhance the Leroy Mine access road and portal site, including access road, buried coal, historic coal spills and portal highwalls.	DOGM, USFS	To achieve reclamation success of the Leroy Mine disturbed area outside the proposed Rilda Canyon facilities boundaries with vegetation success similar to the non-disturbed reference area. PacifiCorp will utilize available soil resources to backfill the portal bench and access road. The entire area will be recontoured to approximate original contour to the extent possible. After completion of the backfill and grading process, the entire area will be pocked and seeded as outlined in the Biology and Engineering Sections for areas within the proposed disturbed area.	Project will be initiated and completed during the development of the facilities, approximately two years.	Upon completion of the project, PacifiCorp will develop a report documenting the restoration project.

**Table 300-5: Rilda Canyon Wildlife Mitigation**

<b>Wildlife</b>	<b>Project</b>	<b>Project Summary</b>	<b>Overseeing Agency(s)</b>	<b>General Objective</b>	<b>Date of Implementation</b>	<b>Required Reporting</b>
Big Game Species Small Game Species Migratory Birds	Meetinghouse Canyon (Elk Springs Area) Wildlife Enhancement/ Aspen Regeneration	Cooperate with the Utah Division of Wildlife Resources (UDWR) in a select timber harvest and aspen regeneration of 200 acres of private land holding on East Mountain located in portions of Sections 4,5,6,8,9 T17S R7E.	UDWR  DOGM and the USFS will be notified of the date of implementation and progress of the project.	PacifiCorp will a conduct timber harvest program to remove beetle infested timber, reduce conifer encroachment, reclaim old access roads and cabin sites, improve drainage crossings and re-develop/improve spring areas. During the timber harvesting program, PacifiCorp will utilize technologies/equipment to reduce associated impacts. All roads/access will be reclaimed upon completion of the project. Aspen regeneration will be a natural process, supplemental planting is not anticiapated.	Upon issuance of the Rilda Canyon permit, PacifiCorp will initiate and complete the project within two year period	DOGM annual reports

**Table 300-5: Rilda Canyon Wildlife Mitigation**

<b>Wildlife</b>	<b>Project</b>	<b>Project Summary</b>	<b>Overseeing Agency(s)</b>	<b>General Objective</b>	<b>Date of Implementation</b>	<b>Required Reporting</b>
Big Game Species Small Game Species Migratory Birds	Habitat Protection on East Mountain Private Land	"PacifiCorp owns and controls approximately 4,440 acres of private lands on East Mountain within the Manti-LaSal National Forest boundary in Emery County, Utah. These private fee lands are located amongst federal lands and have unrestricted open range access to the southern and eastern portions of East Mountain together with open range on 440 acres of fee lands in the northern area in Rilda Canyon. PacifiCorp manages these private lands for multiple use and has no plans for development which would impair wildlife habitat, seasonal livestock grazing or recreation."	NA	Maintain ownership and control of East Mountain properties throughout the life of the Rilda Canyon facilities. These lands will be managed for multiple use. Use which would impair wildlife habitat, such as seasonal livestock grazing or recreation will be limited.	NA	NA

<b>Table 300-5: Rilda Canyon Wildlife Mitigation</b>						
<b>Wildlife</b>	<b>Project</b>	<b>Project Summary</b>	<b>Overseeing Agency(s)</b>	<b>General Objective</b>	<b>Date of Implementation</b>	<b>Required Reporting</b>
Raptor Species	Historic Raptor Database Development and Evaluation	Develop comprehensive raptor database utilizing data from over the past twenty-five years related to energy development and conduct statistical analysis comparing annual trends versus potential impact factors	DWR, DOGM	PacifiCorp will provide funding to the DWR to develop and analyze raptor data collected during the past twenty-five years. Funding by PacifiCorp will be provided to compensate graduate level student (or person[s] with equivalent experience and background) stipend for a two year period. DWR will administer the funding and direct the program to meet the objectives.	Upon issuance of the Rilda Canyon permit, PacifiCorp provide funding to DWR initiate and complete the project within two year period (project completion dependent upon DWR).	DWR will issue status and final report
Raptor Species	Company News Letter	Periodically include in the company newsletter awareness of highway deer kill and the impacts to raptors.	NA	Increase awareness of the potential impacts associated with traffic and raptors. PacifiCorp will periodically make available to employees special newsletters outlining the potential impacts of raptor mortality and corrective measures to reduce these impacts. Coordinate with Emery County Road Department to install warning signs along Emery County road #306.	Upon issuance of the Rilda Canyon permit, PacifiCorp will initiate the educational newsletters to mine employees and contact Emery County Road Department.	NA

*North Rilda  
Rilda Canyon Portal Facilities*

*Biology*

*PacifiCorp*

**Table 300-5: Rilda Canyon Wildlife Mitigation**

<b>Wildlife</b>	<b>Project</b>	<b>Project Summary</b>	<b>Overseeing Agency(s)</b>	<b>General Objective</b>	<b>Date of Implementation</b>	<b>Required Reporting</b>
Riparian Habitat Big/Small Game Species Migratory Birds Aquatic Habitat	Rilda Creek Riparian Habitat Restoration	Rehabilitate the perennial portion of Rilda Creek, from Rilda Canyon Springs to the mouth of the canyon. Coordinate with government agencies and private property land owners to facilitate the project. Project would involve approximately two miles of stream corridor.	DWR, USFS, DOGM and Private Land Owners: CW Mining Intermountain Power PacifiCorp	Conduct a stream restoration project of Rilda Canyon Creek throughout the perennial reach (approximately two miles). Project goals and objectives will follow the established guidelines developed by the Federal Interagency Stream Restoration Working Group (for a complete guide refer to <a href="http://www.usds.gov/stream_restoration">http://www.usds.gov/stream_restoration</a> ). Stream restoration will involve an systematic approach: identify the problems and opportunities, develop project goals and objectives, select and design restoration alternatives, implement selected designs, monitor results and modify designs if necessary.	Upon issuance of the Rilda Canyon permit, PacifiCorp will coordinate initial meeting with governmental agencies and private land owners within 180 days. PacifiCorp will provide funding to DWR to initiate and complete the project within a two year period (project completion dependent upon DWR).	DOGM Annual Reports
General	Mitigation Database Development	Cooperate with regulatory agencies including USFWS, USFS DWR, and the DOGM to develop a comprehensive database to track mitigation commitments and success in the Huntington Canyon Drainage.	USFWS, USFS, DWR, and DOGM	At the request of the USFWS, PacifiCorp will provide a monetary contribution to the sum of \$5,000 dollars to USFWS or the Utah Natural Heritage Program to develop a database to track mitigation projects in Huntington Canyon Drainage.	Upon issuance of the Rilda Canyon permit, PacifiCorp will provide funding to USFWS to initiate and complete the project (project completion dependant upon USFWS).	NA

<b>Table 300-5: Rilda Canyon Wildlife Mitigation</b>						
<b>Wildlife</b>	<b>Project</b>	<b>Project Summary</b>	<b>Overseeing Agency(s)</b>	<b>General Objective</b>	<b>Date of Implementation</b>	<b>Required Reporting</b>
General	Noxious weed program	PacifiCorp will monitor Rilda and Mill Fork Canyons annually for noxious weeds. Manually/chemically treating methods will be used to control noxious weeds.	DOGM and USFS	Control noxious weeds in Rilda and Mill Fork canyons. PacifiCorp will use manual methods and if necessary institute chemical treatment program to eradicate noxious weeds. If chemical treatment is necessary, PacifiCorp will follow a DOGM/USFS approved application plan and apply for necessary permits and approvals from the USFS.		DOGM Annual Reports

A brief summary of the facilities are: side drainage undisturbed by-pass ditches and culverts, disturbed ditches and culverts, bathhouse/office/warehouse building, parking lot, underground vehicle parking garage, fueling area, trash bunker, rock dust silo, septic tanks and sewer pump station, non-coal waste storage, sediment pond, fan, generator, and some designated storage areas. Steep slopes (retaining walls), created during construction of the facilities will be supported using geotechnical design criteria.

Buffer zones along the stream will be established and marked with "Buffer Zone" signs to minimize potential impacts to the stream.

To protect the vegetative growth media, the topsoil will be removed prior to construction of the facilities (Refer to the Soils Section of this permit). The top soil storage area is designated on Map 200-1 in R645-301-200: Soils. Erosion protection includes deep pocking, interim vegetation and silt fence until the vegetation is established. "Topsoil" and "Subsoil" signs will be placed at the foot of each pile for location awareness.

Erosion control is discussed in the Engineering and Hydrology sections of the this volume.

Baseline data for aquatic species will include two spring and fall surveys prior to facilities construction. Post construction surveys will be conducted in the spring and fall, followed by a spring survey once every 3 years, using the same protocol and sampling sites as the 2004 surveys.

Second mining (ie. longwall extraction) of the North Rilda area will be limited to the ridge separating Rilda and Mill Fork canyons. Second-full extraction will not occur beneath the stream channels of these canyons. First mining (i.e. mainline, gate road development) will occur below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence" design of the 4th North Mains development within the Right Fork of Rilda and the long-term stability analysis refer to the Volume 11, Appendix Volume - Engineering: Appendix A.

To protect the alluvial/colluvial system of the Right Fork of Rilda Canyon a stream buffer zone was established based on the extent of the stream corridor and the angle of draw from the Hiawatha Seam, the lowest seam to be mined. The stream corridor within the Right Fork of Rilda Canyon was delineated by field observation, aerial photography, and map contour analysis. The extent of the identified zone is based on the contact of the alluvial/colluvial fill with the canyon's side slopes. The angle of draw was calculated from the Hiawatha Seam horizon/elevation @ 15 degrees to the point of intersection on the surface. The stream buffer zone delineates the area restricted to full extraction mining. The referenced 15 degree angle of draw is an industry/agency accepted standard used for delineation of surface influence

protection from mining areas considered for full extraction mining. Mining experience at PacifiCorp's Deer Creek, Cottonwood, and Trail Mountain mines has provided a sound, scientific basis for using the 15° angle of draw mentioned above (refer to Annual Subsidence Reports of the Deer Creek MPR).

## **R645-301-340 RECLAMATION PLAN**

The following sections contain plans for final reclamation and revegetation of the Rilda Canyon Portal Facilities. All disturbed lands will be reclaimed as part of the post mining land use stipulations for grazing, wildlife and recreation. The plan complies with the biological protection performance standards of the State Program. The reclamation plan for the left fork facilities is found in Volume 2, Part 4, of the Deer Creek Mine permit.

### ***R645-301-341 Revegetation***

Table 300-6 discloses the timetable in which reclamation will be conducted on the North Rilda Canyon portal facilities. Much of the operations will be conducted simultaneously. The main emphasis of reclamation will work from the top of the canyon to the bottom.

Table 300-7 establishes a monitoring program that extends through the responsibility period of the bond.

<b>Table 300-6: Rilda Canyon Portal Facilities Reclamation Schedule: Initial Reclamation for mine facilities</b>											
#	Project	Estimated Scheduling *									
1	Soil Sampling	Sampling conducted between the months of June - October.									
2	Structure Removal	[Bar chart showing activity from approximately month 2 to month 6]									
3	Closures - Portals & Ventilation	[Bar chart showing activity from approximately month 2 to month 3]									
4	Hauling, Backfilling, Compaction & Grading	[Bar chart showing activity from approximately month 3 to month 7]									
5	Seed Bed Preparation	[Bar chart showing activity from approximately month 5 to month 7]									
6	Fertilization & Mulching	[Bar chart showing activity from approximately month 5 to month 7]									
7	Seeding & Planting	[Bar chart showing activity from approximately month 5 to month 7]									
8	Sediment Control Structure Removal *	[Bar chart showing activity from approximately month 8 to month 9]									

\* The sediment pond will be removed at the completion of all other reclamation activities above the pond.

Notice in the table above that backfill and grading activities and seeding activities are occurring simultaneously. This will occur as work progresses down canyon. Seeding is planned for the fall season. Seeding will occur contemporaneously with backfilling and grading. Mulching, hydromulching, and tackfing will occur as successive processes. Access with mulching equipment will be achieved by the use of the reconstructed Emery County road #306.

<b>Table 300-7: Rilda Canyon Portal Facilities Reclamation Schedule: 1<sup>st</sup> thru 10<sup>th</sup> Year</b>											
#	10 Year Revegetation & Monitoring	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year	6 <sup>th</sup> Year	7 <sup>th</sup> Year	8 <sup>th</sup> Year	9 <sup>th</sup> Year	10 <sup>th</sup> Year
1	Plant Monitoring Disease & Pest Control *		✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Soil Stabilization Rills & Gullies		✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Contingent Seeding		✓			✓					
4	Revegetation Inventory for Bond Release				✓				✓	✓	✓

\* Monitoring is conducted twice per year during the spring and fall.

Description of Revegetation Operations

Tables 300-8 through 300-10 are the vegetation seedmixes to be used during interim and final reclamation. Supplemental tublings or bare root plants, as indicated in seedmix, will not be planted as part of the interim seeding. Pinyon Juniper/Mountain brush habitats are those areas that have a high exposure to sunlight. These areas are typically drier and need grass growth early on for moisture retention and soil stabilization.

**Table 300-8: Seed Mixture (Pinyon-Juniper/Mountain Brush)**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Lbs/Acre Equivalent PLS*</b>
<b>Grasses</b>		
Bluebunch Wheatgrass	<i>Agropyron spicatum</i>	2.0
Sandberg Bluegrass	<i>Poa secunda</i>	1.0
Great Basin Wild Rye	<i>Leymus cinereus</i>	2.0
Indian Ricegrass	<i>Oryzopsis hymenoides</i> var. Paloma	1.0
Western Wheatgrass	<i>Agropyron smithii</i> var. Rosanna	3.0
<b>Forbes</b>		
Blueleaf Aster	<i>Aster glaucodes</i>	0.25
Blue Flax	<i>Linum lewisii</i>	0.25
Louisiana Sage	<i>Artemisia ludoviciana</i>	0.2
Northern Sweetvetch	<i>Hedysarum boreale</i>	1.0
Palmer Penstemon	<i>Penstemon palmeri</i>	0.5
<b>Shrubs</b>		
Snowberry	<i>Symphoricarpus oreophilus</i>	0.5
Curleaf Mahogany	<i>Cercocarpus ledifolius</i>	1.0
Fourwing Saltbush	<i>Atriplex canescens</i>	2.0
Saskatoon Serviceberry	<i>Amelanchier alnifolia</i>	1.0
True Mountain Mahogany	<i>Cercocarpus montanus</i>	1.0

\* Pure Live Seed

<b>Table 300-9: Seed Mixture (Sagebrush/Grass)</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Lbs/Acre Equivalent PLS*</b>
<b>Grasses</b>		
Salina Wildrye	<i>Elymus salinus</i>	2.0
Needle and Thread Grass	<i>Stipa comata</i>	3.0
Sandberg Bluegrass	<i>Poa secunda</i>	2.0
Indian Ricegrass	<i>Oryzopsis hymenoides</i> var. Paloma	3.0
Western Wheatgrass	<i>Agropyron smithii</i> var. Rosanna	2.0
<b>Forbes</b>		
Blueleaf Aster	<i>Aster glaucodes</i>	0.5
Blue Flax	<i>Linum lewisii</i>	1.0
Louisiana Sage	<i>Artemisia ludoviciana</i>	0.2
Northern Sweetvetch	<i>Hedysarum boreale</i>	1.0
Palmer Penstemon	<i>Penstemon palmeri</i>	0.5
<b>Shrubs</b>		
Bitterbrush	<i>Purshia tridentate</i>	1.0
Fourwing Saltbush	<i>Atriplex canescens</i>	2.0
Snowberry	<i>Symphoricarpos oreophilus</i>	1.2

\* Pure Live Seed

Table 300-10: Seed Mixture (White Fir/Aspen)		
Common Name	Scientific Name	Lbs/Acre Equivalent PLS*
<b>Grasses</b>		
Bluebunch Wheatgrass	Agropyron spicatum	1.0
Indian Ricegrass	Oryzopisi hymenoides var. Paloma	2.0
Western Wheatgrass	Agropyron smithii var. Rosanna	3.0
Kentucky Bluegrass	Poa pretenses	1.0
Mountain Brome	Bromus marginatus	2.0
Slender Wheatgrass	Elymus trachycaulus ssp. trachycaulus	2.0
<b>Forbs</b>		
Louisiana Sage	Artemisia ludoviciana	0.2
Northern Sweetvetch	Hedysarum boreale	1.0
Pacific Aster	Aster chilensis	0.2
Rocky Mountain Penstemon	Penstemon strictus	1.0
Silky Lupine	Lupinus sericeus	1.0
<b>Shrubs</b>		
Snowberry	Symphoricarpos oreophilus	1.0
Saskatoon Serviceberry	Amelanchier alnifolia	0.5
Skunkbush Sumac	Rhus trilobata	0.5
<b>Trees</b>		
White Fir	Abies concolor	200/acre
Quaking Aspen	Populus tremuloides	200/acre
Blue Spruce	Picea pungens	200/acre

\* Pure Live Seed

Though several reference areas were designated and sampled, (see Volume 11 Appendix Volume - Biology: Appendix A), the disturbed area will only impact four vegetation communities. As indicated in the vegetation map, of this appendix, the sagebrush/grass seedmix will be used in the upper part of the disturbance. The topsoil storage area will be seeded with the White Fir/Aspen seedmix (Table 300-10) and subsoil storage area will be seeded with the Pinyon-Juniper/Mountain Brush seedmix (Table 300-8) for interim and final vegetation. Disturbances to the White Fir/Aspen Community, near the Rilda Canyon stream, will be seeded with the White Fir/Aspen seedmix. All other areas will be seeded with the Pinyon-Juniper/Mountain Brush seedmix. Within the disturbed area is a small community of Douglas Fir/White Fir, approximately 0.25 acres. Because of the small size, this area will be seeded with the Pinyon-Juniper/Mountain Brush seedmix. This seedmix will be used for both the previously undisturbed (AMR/AML) and previously disturbed Pinyon Juniper (AML) areas.

No Riparian vegetation areas will be disturbed.

Seeding Techniques

Seeding will take place as contemporaneously as practical following soil placement and contouring/pocking of the area being reclaimed. Certified noxious weed free alfalfa hay will be incorporated into the soil following contouring at a rate of 2000 lbs/acre. The mulch will be applied using a tub grinder or similar blower. Pocking techniques will mix the alfalfa hay into the upper portion of the soil.

The seed mixture will be broadcast using a "hurricane spreader" or applied using a hydroseeder. If the seed mixture is hydroseeded, a small amount of wood fiber mulch will be added to mark the area of coverage during application.

After the seed is applied, the entire area will be hydromulched with a wood fiber or other acceptable mulch and applied at a rate of at least 1500 lbs./acre for cover and protection. A tackifier (plantago or other similar tackifier) will be added to the mulch and applied at a rate recommended by the manufacturer. Tackifier will only be used on slopes greater than 2:1. Mulch and tackifier will be applied simultaneously.

As indicated in Table 300-10, supplemental tublings or bare root plants will be planted after final reclamation. Tublings or bare root plants will be planted at the stated number per acre.

Measures to determine success of revegetation are those included in R645-301-350 of the Utah Coal Rules and as detailed later in this section.

***R645-301-342 Fish and Wildlife***

To minimize impact of the stream area and to make the operator aware of the presents of the stream, "Buffer Zone" signs will be placed along the stream side of the disturbed area.

To limit the impact on wildlife, the facility disturbance is located below the stream crossing at the forks of Rilda Canyon. Wildlife can continue to use the area for access from one fork to the other. In addition, material haulage to the existing Rilda Canyon fan in the Left Fork will be discontinued. Materials will be hauled underground via the facility's portal.

Measures taken during reclamation and liability period to reduce impact to environment and wildlife:

1. Rock piles will be formed to create habitat for small mammals.
2. Supplemental container planting to enhance the reseeded areas.

3. Supplemental container planting will be arranged in groupings or clusters to promote wildlife cover.
4. Weekly water monitoring of the stream, during construction and reclamation, if there are flows, will be taken upstream and downstream of the site. Field parameters measured include pH, turbidity, and conductivity.
5. Vegetation pocking to create micro-niches for vegetation to control and limit erosion.
6. Mulch and tackifier will be used to promote vegetation and control and limit erosion.
7. Reclamation activities will not take place between December 1<sup>st</sup> and April 15<sup>th</sup>, an exclusionary time for wintering and calving periods.

## **R645-301-350 PERFORMANCE STANDARDS**

Construction/reclamation activities will not take place between December 1<sup>st</sup> and April 15<sup>th</sup>.

Signs will be placed around the planted slopes for their protection. The area will be entered only to provide maintenance (as needed) and/or monitoring duties.

Standard for successful revegetation includes weed species not more than 10% and no noxious weeds. Weed control will not be undertaken unless it is determined necessary due to weed dominance and delayed rate of succession. All noxious weeds will be eradicated either chemically or physically if they become established on the site. Chemical applications will be approved by UDOGM in consultation with the Forest Service.

Rodent damage on revegetated areas will be assessed during monitoring periods. Species specific control measures will be implemented as necessary. Control measures must be approved by the Division in consultation with the Utah Division of Wildlife Resources prior to application.

Annual monitoring will also include inspection for rills and gullies. Should these be present, they will be filled and the soil reseeded. Rill and gully repair will follow the regulations set forth in the Coal Rules R645-301-357.360 through R645-301-357.365. As repairs are recognized, the Division will be notified and the affected area will be reported in the annual vegetation report.

All vegetation sampling will be undertaken in the late summer for maximum plant growth. The line intercept or ocular estimation methods will be used to measure cover and species composition. The point-center quarter method will be used to measure shrub and tree density.

Productivity measurements will be a double sampling procedure of clipped plots and ocular estimates. Rectangular plots (6.27 in. x 100 in.) will be randomly located in reference areas and revegetation sites. Sampling will be at the 90% confidence level.

The reference area will be checked to detect any change from natural or man-induced activities and to verify they are in fair or better condition. Sampling of the reference sites at the time of bond release will be conducted concurrently with final reclamation sampling, using the same methodology used to sample the reclaimed areas.

The standards for success to be applied for ground cover and production of living plants on the reclaimed areas at the Rilda Canyon Portal Facilities will be at least equal to 90% (with a 90% confidence level) to that of the corresponding reference area at the time of bond release. Cover in the reclaimed areas will not be less than that required to achieve the approved post-mining land use outlined in R645-301-400: Land Use and Air Quality.

At the time of bond release, or after the 10 year responsibility period has passed, similarity between the reclaimed area and corresponding reference area will compare life forms and/or species present in each community by the use of similarity indices. Indices of similarity provide the means of mathematically comparing the plant communities in the two areas. One of, or a combination of the three indices found in the Vegetation Guidelines, February 1992, will be used to determine the similarity between the reclaimed and reference area. If another index (or combination thereof) is used, Division approval will be required. Similarity will be considered successful when the index value is at least 70% of the reference area.

All vegetation monitoring data will be reported annually. This report will contain a narrative of the actual monitoring methods used, results, and a discussion of the overall success or failure of each area. Raw data sheets will also be included in the annual reports. Standards attained at the time of bond release will be approved by the Utah Division of Oil, Gas and Mining (UDOGM).

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**PacifiCorp**  
**Energy West Mining**  
**Company**

**Deer Creek Mine**

**Volume 11: Response to Deficiencies, Task  
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**R645-301-500 Engineering Section**

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**R645-301-510**

**INTRODUCTION**

The Engineering Section provided within this permit application contains general descriptions, information, and design criteria for both operation and reclamation of the facilities associated with the North Rilda Area and Mill Fork Area mining operations. Most plans, maps and designs for the North Rilda Area operations (Left Fork Fan Facilities) can be found in Volume 2 of the Deer Creek Mining and Reclamation Plan (MRP). A portion of these facilities are detailed below. All plans, maps and designs associated with the Mill Fork Area operations (Rilda Canyon Portal Facilities) are detailed in the following sections. In general, the Left Fork Fan Facilities will be discussed first follow by the Rilda Canyon Portal Facilities.

Coal mining has occurred since 1946 in Deer Creek Canyon, a tributary of Huntington Canyon in Emery County, Utah. Utah Power & Light Company (now PacifiCorp) purchased the operations and coal leases from Peabody Coal Company in 1977. The Deer Creek Mine portal, mine personnel, and its coal handling facilities are located in Deer Creek Canyon.

Mining in the North Rilda Area produced coal from both the Blind Canyon and Hiawatha coal seams. Approximately 23 million tons of minable coal was mined from the North Rilda Area during the past few years. A portion of the North Rilda Area is planned to be used to provide access from the proposed Rilda portals to the Mill Fork Lease area. Refer to Volume 5, Plates 3-6, Life of Mine Plan / 5 Year Increments - Blind Canyon Seam, and 3-7, Life of Mine Plan / 5 Year Increments - Hiawatha Seam.

Because of the need to expand the mining operations to the northwest (Mill Fork State Lease #48258), surface facilities are required in Rilda Canyon. This includes all support facilities for underground mining operations with the exception of coal processing and coal transportation facilities. All mined coal from the extended Deer Creek Mine will continue to be transported through the Deer Creek Canyon portals and processed at these facilities. The processed coal will then be transported via beltline to the Huntington Power Plant. The Huntington Power Plant is owned and operated by PacifiCorp.

A variety of engineering principles and techniques are applied in the Deer Creek Mine operation. Principles of engineering employed are those associated with standard prudent mine engineering practices. More detail about the methodologies used to plan the coal mining activities for long-range goals at the Deer Creek Mine and the use of computer assisted models can be found in Volume 2, Part 3 of the MRP.

### ***R645-301-511 General Requirements***

This document will include the general requirements to meet the State of Utah's regulatory requirements to mine coal in the North Rilda Area and operate surface facilities in Rilda Canyon as part of the Deer Creek Mine. The proposed surface facility operation plan will include new information or reference the existing mine plan when appropriate. The potential impact to the environment will also be addressed. As reflected by its format, much of the current Deer Creek MRP was written prior to the State's R645- Rules. This plan attempts to follow the Rules general format, yet allow it to also be consistent with the existing MRP.

**Rilda Canyon Portal Facilities and Operations:** Early mining operations, prior to PacifiCorp's presence in the canyon, occurred near the proposed surface facilities (see Map 400-1). These operations include the Rominger (Ferrell) Mine, Jeppson Mine, Leroy (Comfort) Mine, and Helco Mine (refer to site photos A through C in Volume 11 Appendix Volume - Engineering: Appendix G). These mines were active during the 1940's and early 1950's. Abandoned Mine Lands (AML) reclaimed these mines in 1988. Much of the proposed disturbed surface area of the Rilda Canyon facilities will occur west of the Leroy, Rominger, and Jeppson mines disturbed area. However, a portion of the disturbance, namely the sediment pond (Leroy mine site) and soil storage (Rominger/Jeppson mine site) will occur in previously disturbed areas.

Surface facilities in Rilda Canyon include the existing mine fan, substation and water supply in the Left Fork of the canyon, and surface related facilities associated with the proposed Rilda Canyon Portal Facilities including (but not limited to): bathhouse/office/warehouse, underground vehicle parking garage, fuel dock, water and sewer stations, rock dust tank, employee parking area, fan, sediment pond, covered and open storage area, etc. Refer to Section R645-301-521 for a detailed description of all proposed surface facilities planned for Rilda Canyon. Also refer to Volume 12 of the Deer Creek MRP for detailed information of the mining plan, mining production, and mining methods that will be utilized within the Mill Fork Lease.

### ***R645-301-512 Certification***

Applicable cross sections and maps have been included or referenced within this document. They have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer, geologist, or land surveyor, with assistance from experts in related fields such as hydrology, geology and biology.

***R645-301-513 Compliance with MSHA Regulations and MSHA Approvals***

All structures that are proposed for mining in the North Rilda Area and the Mill Fork Lease will comply with all regulations, whether at the local, State, or Federal level.

There are no impoundments or sedimentation ponds that meet size or other qualifying criteria of MSHA, 30 CFR Part 77. All impoundments or sedimentation ponds utilized by operations in Rilda Canyon will meet the requirements outlined in the Utah Coal Regulations.

Underground development waste, coal processing waste and excess spoil will continue to be disposed of in accordance with plans approved by DOGM and MSHA. There are no plans to return coal processing wastes to the underground workings at Deer Creek Mine. All coal will be shipped via beltline through the Deer Creek Canyon portals.

There are no plans to construct refuse piles within the facilities area in Rilda Canyon. All refuse that is transported through the Rilda Canyon portals will be temporarily stored in a refuse bunker. As the bunker fills to capacity, the refuse will be transported by truck to the Deer Creek waste rock site in Huntington Canyon for permanent storage.

Each shaft, drift, adit, tunnel, exploratory hole, entryway or other opening to the surface from underground will be capped, sealed, backfilled or otherwise properly managed consistent with MSHA, 30 CFR 75.1771. Refer to Section R645-301-550 Reclamation Design Criteria and Plans below.

PacifiCorp proposes to collect storm water runoff and grey water from the mine facilities area (refer to R645-301-521-180 Support Facilities for details). Collected waste water will be pumped from the collection tank to a sealed area of the mine. Since it is not a degasification hole [75.371(dd)] and it is not being drilled in advance of mining [75.388], these regulations do not apply. Upon completion of the drill hole, the ventilation and map will be revised.

***R645-301-514 Inspections***

All appropriate engineering inspections and reports will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer during the construction, operation, and reclamation activities of mining.

***R645-301-515 Reporting and Emergency Procedures***

In the event any potential hazard exists, develops, or occurs in association with slides and/or impoundment structures which may have an adverse effect on the health and safety of the public, property, or the environment, DOGM will be promptly notified. The operator commits to comply with any remedial measures required to protect and ensure the health and safety of the public.

The Deer Creek Mine facility conducts routine inspections on a weekly basis. Should a hazard exist or occur, personnel have been instructed to notify the Mine Manager, who will coordinate and implement any emergency procedures and remedial measures to be taken.

Where temporary cessation of operations is necessary for a period beyond 30 days, the applicant will submit the proper notification and information required of R645-301-515.300 to DOGM.

**R645-301-520      OPERATION PLAN**

***R645-301-521 Introduction***

The plan for the mining in the North Rilda Area includes or references maps, cross sections, narratives, descriptions, and calculations indicating how the relevant requirements are met. The plan describes and identifies the lands subject to coal mining and reclamation activities over the estimated life of the operations and describes the size, sequence, and timing of the sub-areas for which it is anticipated that individual permits for mining will be sought. For review of the mining plan of the Mill Fork Lease area, refer to Volume 12, Mill Fork Lease, ML-48258.

**R645-301-521.110      Previously Mined Areas**

Areas previously mined in the Rilda Area are presented on Map 500-1, Pre-Disturbance Topography, in the Maps Section. These areas include the Leroy Mine, Rominger Mine, Jeppson Mine, and Helco Mine. Mining occurred in these mines in the 1940's and 1950's. Abandoned Mine Lands reclaimed these sites in 1988. Extent of mine workings of the said mines are included on Map 500-1. Photos of all previously mined areas in Rilda Canyon area illustrated in Volume 11 Appendix Volume - Engineering: Appendix G. All openings have been backfilled by AML during reclamation activities.

**R645-301-521.122    Man Made Features**

Utah Power owns and operates a 25 KV electrical power transmission line that supplies electrical power to the Left Fork fan facilities. This line (refer to Map 500-3) currently runs through the proposed Rilda Canyon Portal Facilities. This transmission will need to be permanently moved to by-pass the proposed facilities area. Energy West will coordinate with Utah Power to conduct this activity.

Two wells exist in Rilda Canyon within the proposed disturbed area; P6 and P7. These wells were developed in 1989 to evaluate the hydrologic characteristics of the alluvium for the North Emery Water Users Special Service District's spring collection system. The wells were drilled through the alluvium to bedrock. Monthly monitoring (level only) is conducted on the wells. Refer to Map 500-3 for location. Refer to Volume 9 for complete discussion. Refer to photo's D through F in Volume 11 Appendix Volume - Engineering: Appendix G.

**R645-301-521.123    Public Road**

Emery County Road #306 runs approximately 3.0 miles from the Huntington Canyon road, Highway 31, to the turn around area in the Left Fork of Rilda Canyon. A portion of this road is located within the proposed disturbed area of the Rilda Canyon Portal Facilities (refer to maps 500-1, 500-3, and Figure R645-301-500c). Energy West has worked with Emery County Special Services District #1 (ECSSD#1) and the Emery County Commission to develop an agreement to suspend public use of that portion of EC#306 that runs through the proposed facilities area. This agreement is located in Volume 11 Appendix Volume - Engineering: Appendix B. Refer to Volume 11 Appendix Volume - Engineering: Appendix G for photos of the proposed suspended portion of the road.

**R645-301-521.124    Location of Existing Coal Waste**

As mentioned above, previous mining occurred in Rilda Canyon at the Leroy Mine, Rominger Mine, Jeppson Mine, and Helco Mine. Map 500-1 shows predisturbed areas associated with these mines. At reclamation of these mines, coal waste material was buried on-site. It is not known to what extent or volume waste coal is buried throughout the area.

**R645-301-521.130    Landowners and Right of Entry and Public Interest Maps**

Refer to Supplemental Volume (Legal and Financial Information) for description of lands containing surface and subsurface ownership. Refer to Volume 4 Maps 1-1 and 1-2 for locations of ownership.

**R645-301-521.140    Mine Maps and Permit Area Maps**

The boundaries of the North Rilda Area proposed to be affected for the life of coal mining and reclamation activities are found on Map DU1688 in Volume 11 Appendix Volume - Engineering: Appendix A. Refer to Volume 12, Mill Fork Lease ML-48258 to review all proposed affected areas and discussion of subsidence in the Mill Fork Lease. Subsidence for the North Rilda Area is discussed below in R645-301-525.

**R645-301-521.150    Land Surface Configuration Maps**

Map 500-1 illustrates the existing topography prior to construction of the proposed Rilda Canyon Portal Facilities. Contours extend at least 100 feet beyond the area of each disturbance.

**R645-301-521.160    Maps and Cross Sections for the Proposed Features**

Typical construction sequencing is presented on Map 500-2 in the Maps Section. This map show the construction sequences that will be used to construct the planned facilities. Plan views for existing and proposed land surface configuration for the coal mining and reclamation operations in the North Rilda Area are found on maps 500-3. Map 500-3 shows a plan view for the proposed disturbance for the 9.0 acre mine facility site as well as the location of the topsoil and subsoil storage areas. The conceptual design for the topsoil pile shows an area of 1.0 acres with a capacity of approximately 25,194 cubic yards. The design for the subsoil pile shows an area of 3.0 acres with a capacity of 107,225 cubic yards. Refer to Table 500-3 below for soil pile capacity.

The facilities pad will be developed by cutting and/or filling the surface to create a earthen structure that supports the proposed buildings and storage areas. The facilities pad will be cut to the bedrock on the north side of the pad. This bedrock stretches the entire length of the proposed disturbed area and is nearly vertical. The mass balance in tables 500-1 and 500-2 below illustrates the cuts and fills needed at each cross-section throughout the proposed disturbed area. Maps 500-4, 1 of 5 and 2 of 5 show the cross-sections through the facilities area. Maps 500-4, 3 of 5 and 4 of 5 show the cross-sections through the topsoil and subsoil piles respectively. Cross-sections are spaced on 50 foot centers and are identified by interval and distance from the starting point (i.e. 15+00, 15+50, etc.). Total cut is 119,278.15 cubic yards, whereas total fill is only 2,286.20 cubic yards. It is estimated that 117,000 cubic yards will be hauled to the soil storage areas. Of this 117,000 cubic yards of soil material, approximately 19,700 cubic yards is topsoil. Topsoil and subsoil will be segregated as detailed in the Soils Section.

**Table 500-1: Mass Balance Table for Facilities Pad Construction.**

Sta.	Cut	Fill	Sta.	Cut	Fill	Sta.	Cut	Fill
0+00	33.33	29.26	7+00	2,613.89	61.11	14+00	5,588.89	
0+50	94.44	140.74	7+50	1,503.70	58.33	14+50	3,224.07	
1+00	866.67	83.33	8+00	1,557.41	6.48	15+00	2,282.41	
1+50	1,862.96	20.37	8+50	1,889.81	0.00	15+50	4,798.15	
2+00	2,537.96	0.93	9+00	1,995.37	0.00	16+00	6,212.04	
2+50	2,825.00	0.00	9+50	1,743.52	91.20	16+50	6,063.89	
3+00	3,183.33	19.90	10+00	2,060.19	312.04	17+00	5,881.48	
3+50	3,725.00	154.63	10+50	2,589.81	162.04	17+50	3,811.11	
4+00	3,487.96	385.19	11+00	2,912.96	16.20	18+00	1,744.44	
4+50	2,934.26	321.30	11+50	3,383.33	0.00	18+50	1,487.04	
5+00	2,476.85	105.56	12+00	4,089.81	0.00	19+00	815.74	
5+50	3,503.70	88.89	12+50	3,642.59	0.00	End	241.11	
6+00	5,875.00	118.52	13+00	3,407.41	12.96	End	5.60	
6+50	5,319.44	97.22	13+50	5,006.48	0.00			
<b>Total</b>							<b>119,278.15</b>	<b>2,286.20</b>

Cross-sections associated with the stations in Table 500-1 are shown on Map 500-4, 1 of 5 and 2 of 5. These cross-sections illustrate pre-existing contours, post-construction contours, and reclamation contours. Reclamation of the facilities is discussed later in this chapter. Table 500-2 show exceedingly large volume cuts. This table does not consider the removal of the buried coal waste nor the removal of topsoil. Since volume of coal waste is unknown, the volumes in this area will not be considered in the mass balance calculations. Refer to Map 500-4, 5 of 5 for a cross-sectional view of the pond construction and reclamation.

**Table 500-2: Mass Balance Table for Sediment Pond Construction.**

Sta.	Cut	Fill
End	3,563.00	2.50
0+00	11,255.56	564.81
0+50	7,641.67	1,837.04
End	1,611.50	689.50

Cross-sections for the soil storage pile is illustrated on Maps 500-4, 3 of 5 and 4 of 5. Note that the pre-existing contours also represent the final reclamation contours since no excavation is planned in this area. All soil will be transported back to the facilities area at final reclamation. Table 500-3 illustrates volumetric calculations for the conceptual piles.

<b>Table 500-3: Volumetric Calculation Table for Soil Placement*.</b>			
Sta.	Volume	Sta.	Volume
Topsoil Volume		Subsoil Volume	
End	952.13	End	792.03
0+00	5,576.85	0+00	5,246.30
0+50	7,446.30	0+50	10,000.00
1+00	5,811.11	1+00	14,343.52
1+50	3,994.44	1+50	18,412.04
End	1,412.96	2+00	17,923.15
<b>Total</b>	<b>25,193.79</b>	2+50	13,770.37
		3+00	11,125.00
		3+50	8,835.19
		4+00	4,924.07
		4+50	1,991.67
		End	405.09
		<b>Total</b>	<b>107,768.43</b>

\*Refer to Map 500-4 Sheets 3 of 5 and 4 of 5.

Upon completion of the soil placement and pile construction, an as-built survey will be conducted and the results will be published in the above tables and specified maps.

Proposed buildings and facilities are shown on Map 500-3. These facilities will be included in the performance bond calculations. Refer to R645-301-800: Bonding, for detailed information.

**R645-301-521.170    Transportation Facilities**

Primary and secondary roads are described in detail in Section R645-301-527.

**R645-301-521.180 Support Facilities**

Surface facilities in Rilda Canyon are located at two locations; 1) Left Fork of Rilda Canyon and 2) Rilda Canyon Portal Facilities:

**Left Fork of Rilda Canyon:** This facility includes an access road and a pad area which supports two portals, a substation, power line, fan, water storage tank, and pumphouse. Topsoil removed prior to construction of the site is also stored within the permit area of the Left Fork Rilda Canyon fan facilities. Additional information about this facility is provided in Volume 2, Part 3 and Volume 5, Map 3-9A and Map 3-9B.

**Rilda Canyon Portal Facilities:** This facility includes, but not limited to the following: Sediment pond, runoff collection tank, parking lot, underground vehicle parking garage, office/bathroom/warehouse building, materials storage area, mine ventilation fan, power supply, water treatment system, water storage tank, sewer treatment system, and drainage system (see Map 500-3 in this chapter). A short discussion of each facility is presented below:

**Sediment Pond** - Preliminary plans for the Rilda Canyon Facilities include construction of a single sedimentation pond located at the eastern extent of the disturbed area. Analysis utilized to determine the size and hydraulics related to the construction and operation of the sedimentation pond and all supporting drainage structures are included in the Drainage and Sediment Control Plan (refer to Volume 11 Appendix Volume - Hydrology: Appendix B). Note that prior to any construction, temporary sediment control will be established to protect the Rilda Canyon creek from additional contributions of sediment. These plans are outlined in the above referenced material.

**Runoff Collection Tank** - Discharge water from boot wash, showers, floor drains, etc. (gray water) is collected in a temporary storage tank east of the parking lot. The tank is divided into two separate compartments; 1) Tank #1, a 7,540 gallon tank for gray water, and 2) Tank #2, an 18,500 gallon runoff tank. Tank #1 will be pumped directly into an abandoned area of the underground mine workings (See MSHA approvals in Volume 11 Appendix Volume - Engineering: Appendix B). The abandoned workings dip to the east away from any potential public water source in Rilda Canyon. Tank #2 will overflow into Tank #1 and be pumped into the mine. If a storm event is larger than the containment of Tank #2, then Tank #2 will overflow into the emergency spillway and piped to the sediment pond at the east end

of the disturbed area. For simplicity, Tank #1 will not be able to flow into Tank #2, but Tank #2 will flow into Tank #1.

The containment tanks will be housed in 30'x60' pre-engineered building which will contain two 30 hp pumps and piping that will pump the contents from Tank #1 into the mine. A complete discussion and plans of this system will be incorporated in Volume 11 Appendix Volume - Hydrology: Appendix B as engineering design is completed.

**Parking Lot** - One general parking area is proposed for the Rilda Canyon Portal Facilities. Construction consists of an average 6" road base with 4" of asphalt surface. The main parking lot is designed for 168 designated parking spaces.

The parking lot will be cleared of snow and debris and resurfaced as needed. When snow removal from the mine site is necessary due to heavy snowfall and accumulation, it will be stored in designated locations or transported and stored at the Waste Rock Site in a controlled manner so that snowmelt will drain into the sediment basin.

**Retaining Structures** - The retaining structures are a vertical wall that allows elevation changes in the parking lot and yard area. There are four of these structures in the parking lot that span the length of the parking stalls which measure approximately 100 feet.. The structures are constructed of 12 inch thick concrete. Two other retaining structures are located in the yard area. Final design of these structures will be incorporated into this section when available.

**Underground Vehicle Parking Garage** - A 120' x 70' steel frame structure with a concrete floor, metal siding and roofing will be located adjacent to the bathhouse. This structure will be used as a staging area and provide parking for underground vehicles.

**Office/Bathhouse/Warehouse Building** - The proposed mine offices, bathhouse, and warehouse facilities are planned to be housed in a 120' x 72' three story, pre-fab concrete building or metal building. Offices for mine management, administrative, warehouse, clerical, safety and engineering personnel will be included in this building with conference rooms and bathroom facilities. Locker rooms, showers, bathrooms, and lamp room for 250 miners and supervisors occupy the bulk of the building. Warehouse facilities will be located at ground level. Standard building maintenance procedures will be followed to maintain the office/bathhouse/warehouse.

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**Materials and Snow Storage Areas** - Mine support materials and equipment will be stored in graveled or asphalted surface areas on the cut or embankment fills. Primary material storage is located west of the parking garage and includes a non-coal waste storage, coal waste storage, oil storage, fuel facilities and bulk rock dust. Snow storage is located through the disturbed area as indicated on map 500-3. Materials stored in open areas include crib blocks, roof bolts, conveyor hardware, conveyor belting, beams, etc.

On the south side of the mine yard are two 40' x 160' steel frame storage sheds. These covered storage sheds will provide shelter for bagged rockdust, ready-mix concrete, and other dry products.

The oil shed and fueling dock are located either side of the underground vehicle parking garage. Cans of oil and lubricant are housed in a steel storage shed. Diesel fuel is stored in a 4,000 gallon above ground tank and accessed with an electric pump. Description of this facility will be expanded when engineering designs have been completed.

A 140 ton capacity steel rock dust silo is located near the oil shed. The silo will be mounted on a concrete foundation. Rock dust will be pumped into specially equipped cars or into a pneumatic pipeline for distribution in the mine.

A non-coal waste/sand/ waste rock storage area (85'x24') will be located on the north side of the mine yard between the fan and access portal. The facility is covered and temporarily stores non-coal and waste rock materials in three separated compartments. Waste rock and non-coal wastes will be hauled away as necessary. Traction materials for winter road maintenance are also stored in this facility.

**Lift Station** - The lift station is a devise that allows longwall shields to loaded and unloaded from flat-bed trailers.

**Mine Ventilation Fan** - The fan installation at the Rilda Canyon portal facility is a dual, parallel fan arrangement. The fans are located side-by-side on concrete foundation. The fans are planned to be installed in a blowing configuration, taking in outside air and forcing it into the mine. Only one fan will operate at a time. Both fans are driven by an electrical motor. Back-up power is supplied by a diesel generator north of the fan. The motors are housed in steel frame buildings. Fuel for the back-up fan is stored in an above ground storage containment system (500 gallon capacity) inside a bermed area near the fan.

**Power Supply** - A 25kV power line provides electrical power to the substation at the Left Fork Portal Facility. The power line was installed by a contractor in accordance to the Forest Service Special Use Permit issued to Utah Power (refer to Volume 5 Map 3-9A). A transformer will provide power to the Rilda Canyon portal facility and will be designed and constructed with poles and cross-member structures that are consistent with the raptor protection design criteria.

**Water Treatment Building** - Culinary water treatment and distribution system is incorporated into the office/bathhouse/warehouse facility. The design and construction of the water treatment facility will meet the specifications of the State of Utah Division of Drinking Water.

**Water Tank** - A 10,000 gallon steel water storage tank will be located on the facility pad area west of the office/bathhouse/warehouse to provide storage of treated culinary water.

**Septic Tank**- Office/Bathhouse/Warehouse sewage is separated depending on sewage type. Sewage from toilets (black water) will be carried by a pipeline to a storage/transfer system consisting of one twenty thousand (20,000) gallon tank for temporary storage. The temporary storage tank will be pumped as needed and transported by truck to an approved facility. The sewer treatment system is required to be designed to fulfill local, state and county health codes.

**Drainage System** - Two separate drainage systems are provided at the Rilda Canyon portal facility site and is classified as "undisturbed" and "disturbed" collection systems. The "undisturbed" system collects overland runoff water above the portal site and from side slopes adjacent to the site and conveys it past the disturbed area into the natural channel of Rilda Canyon Creek. The "disturbed" collection system collects runoff from the portal area, parking lots, storage areas and bathhouse area and conveys it to the runoff collection tank for discharge into the mine. Any overflow of this tank is directed by culvert to the sedimentation pond. For complete details pertaining to the drainage, refer to Volume 11 Appendix Volume - Hydrology: Appendix B.

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**R645-301-521.200    Signs and Markers Specifications**

Permit area identification signs will be placed and maintained at each point of access from public roads. Signs identify the business name, address, telephone number, and DOGM identification number of the Deer Creek Mine.

Perimeter markers will be placed around all disturbed areas of the Rilda Canyon portal facilities and Left Fork Rilda Canyon fan facilities. Perimeter signs are placed at a reasonable sight distance from one another.

Areas along the Rilda Canyon perennial stream (within 100 feet of the disturbed area of the Rilda Canyon Portal Facilities) are considered a buffer zone and will be appropriately posted as such.

The topsoil and subsoil storage area will be appropriately posted to identify these piles. A silt fence, ditch or other appropriate control structure will be used to prevent topsoil and subsoil erosion from the site. Refer to Volume 11 Appendix Volume - Hydrology: Appendix B for a complete description of the Alternative Sediment Control Areas (ASCA's).

***R645-301-522 Coal Recovery***

This section includes a description of the mine plan and measures to be used to maximize the use and conservation of the coal resource. The description attempts to show that coal mining and reclamation operations are conducted to maximize the utilization and conservation of the coal, while utilizing the best technology currently available to maintain environmental integrity. This decreases the likelihood of re-affecting the land in the future through coal mining and reclamation operations. Coal Recovery in the Mill Fork area is included in Volume 12, Mill Fork Lease, ML-48258 of the Deer Creek MRP.

**Mine Plan:** Access to the North Rilda reserves was achieved with the use of 5-entry set of mains referred to as 4<sup>th</sup> North Mains. The 4<sup>th</sup> North Mains are developed northwest (approximately 4000 feet) from the 4<sup>th</sup> North / 10th West Mains intersection. Mainline development, designated as 5<sup>th</sup> North, then changed course to a northeast bearing, with development proceeding under the Right Fork area of Rilda Canyon. Selection of the Right Fork stream crossing area was based on the results of an extensive surface exploration program conducted in the Right Fork of Rilda Canyon (refer to Volume 9 maps HM-9, HM-10 and HM-12). A series of six drill holes were completed in 1997 to document coal seam characteristics, structural geology and hydrologic conditions. Drilling was conducted on approximately 250 foot centers across the projected Mill Fork Graben from previously completed drill holes EM-158 and EM-56. No structural discontinuities were identified during drilling. Groundwater encountered

during drilling was restricted to minor quantities from the alluvium/colluvial fill (estimated at 2 - 5 GPM) near the bedrock interface. Based upon the results of the surface exploration program, mining below the Right Fork of Rilda Canyon was re-located approximately 800 feet to the west of the original projection. Re-location of the mains to the west increased the overburden from approximately 120 to 200 feet.

Based on the information gained from the surface exploration program , a detailed plan was developed to position the 4<sup>th</sup> North/5<sup>th</sup> North intersection to optimize the "no-subsidence" design of the 5<sup>th</sup> North / Rilda Canyon Right Fork crossing route and rock slope access into the lower Hiawatha Seam as well as maximizing overall reserve recovery within the area.

From the 4<sup>th</sup> North/5<sup>th</sup> North intersection, mainline development proceeded to the northern boundary of Federal Coal Lease U-024317. Longwall gateroad development sections will were driven due east from the 5<sup>th</sup> North Mains to the extent of mineable reserves. Six longwall panels were completed in the Blind Canyon Seam, and six longwall panels were completed in the Hiawatha Seam. Sequence of longwall panels extracted in the Blind Canyon Seam were as follows:

Blind Canyon Seam:

<u>Longwall Panel</u>	<u>Coal Lease</u>
11 <sup>th</sup> East	Federal Leases U-06039 U-024317 PacifiCorp patent fee claims
12 <sup>th</sup> East	Federal Leases U-06039 U-024317 PacifiCorp patent fee claims
14 <sup>th</sup> East	Federal Leases U-06039 U-024317 PacifiCorp patent fee claims
15 <sup>th</sup> East	Federal Leases U-024317
9 <sup>th</sup> East	Federal Leases U-06039 U-024317 SL-051221 U-2810 PacifiCorp patent fee claims
8 <sup>th</sup> East	Federal Lease U-06039 Federal Lease SL-051221

**Hiawatha Seam Access:** Access to the North Rilda Hiawatha seam reserves was achieved with development of rock slopes and vertical raises from the Blind Canyon seam to the Hiawatha seam. From the bottom of the slopes, a 5-entry set of mains referred to as 6<sup>th</sup> North Mains were developed to the northeast for access to gateroad development in the Hiawatha seam. Main line development was reduced to three entries above 6<sup>th</sup> Right. The sequence of longwall extracted in the Hiawatha Seam were as follows:

Hiawatha Seam:

<u>Longwall Panel</u>	<u>Coal Lease</u>	
5 <sup>th</sup> Right	Federal Leases	U-06039
		U-024317
4 <sup>th</sup> Right	PacifiCorp patent fee claims	
	Federal Leases	U-06039
		U-024317
	PacifiCorp patent fee claims	
3 <sup>rd</sup> Right	Federal Leases	U-06039
		U-024317
		SL-051221
		U-2810
	PacifiCorp patent fee claims	
2 <sup>nd</sup> Right	Federal Leases	U-06039
		SL-051221
7 <sup>th</sup> Right	Federal Leases	U-06039
		U-024317
8 <sup>th</sup> Right	Federal Lease	U-06039
	Federal Lease	U-024317

Longwall mining on North Ridge was completed during August 2004. As indicated above, a total of six panels were extracted in each seam.

**Mill Fork State Lease ML-48258 Access:** Based on data acquired through surface coal exploration programs, Energy West developed a mine plan to access the Mill Fork State Lease with a set of 6-entry mains driven on a northwest bearing from the 6<sup>th</sup> North Mains. Mining within the Mill Fork Access corridor will be restricted to mainline development. To ensure long term stability, pillars will not be removed (refer to Volume 5 Map 3-7).

**Rilda Canyon Portal Facility Access:** Based on data acquired through in-mine directional drilling program, Energy West developed a mine plan to access the Rilda Canyon Portal Facility area by extending the 1<sup>st</sup> Right submains with a set of four entry submains driven southeast toward the Hiawatha coal outcrop near the fork of the Rilda Canyon. Near the Hiawatha outcrop, however, the in-mine directional drilling located a burn area that affects approximately 250 feet of outcrop coal. The intake and travelway access to the mine will be accomplished by constructing a portal and driving a rock slope from inside the mine below the burned coal area of the seam. The slope will be constructed at the elevation of the mine facilities pad and sloped upward at approximately 8% for approximately 500 feet to intersect the Hiawatha coal seam. The dimensions of the portals will be approximately 20' x 9' rectangular opening. Mine equipment and men will use the access portal to access the northwestern reserves of the Deer Creek Mine.

Two northern and two southern panels of each seam extended below the Castlegate Sandstone escarpment. As specified in the lease stipulations, "except at specifically approved locations, the Castlegate escarpment must be protected from mining induced failure". Due to the limited surface exposure of the Castlegate Escarpment, no special monitoring of environmental assessment was deemed necessary for the northern panels. An environmental analysis for full extraction longwall mining beneath the Castlegate Sandstone escarpment has been completed for the two southern panels with an accompanying Decision Notice/FONSI signed (Volume 11 Appendix Volume - Engineering: Appendix C and D). The environmental analysis assessed the following:

- a. How much escarpment could fail based on analytical methods, observation of similar areas, geologic/topographic conditions, and panel orientation.
- b. What resources would be affected by escarpment failure and description of the nature and magnitude of these effects, ie: vegetation; wildlife and habitat; threatened / endangered and sensitive species; cultural and paleontological resources; hazards; visual quality; etc.

The Castlegate Sandstone escarpment within the North Rilda Permit Application area has been defined in the permit application in two (2) distinct portions:

- NORTH CASTLEGATE ESCARPMENT - NORTH RILDA AREA
- SOUTH CASTLEGATE ESCARPMENT - NORTH RILDA AREA

**North Castlegate Escarpment:** The Castlegate Sandstone escarpment within the northern portion of the North Rilda Area (north face of the ridge) has very limited surface exposure due to the presence of talus slopes and forest vegetation which cover most of the escarpment in this area. Due to the limited surface exposure of the Castlegate escarpment, no special

monitoring or mine layout protection is planned for the escarpment in this area, i.e.; the four (4) northernmost longwall panels in the Blind Canyon and Hiawatha Seams - North Rilda Area, refer to Volume 11 Appendix Volume - Engineering: Appendix A for complete description and comparison of the North Castlegate Escarpment to previously mined areas.

**South Castlegate Escarpment:** The Castlegate Sandstone escarpment within the southern portion of the North Rilda Area (south face of ridge) has a prominent surface exposure. Based on an on-going geotechnical study evaluating the potential effects of longwall (full-extraction) mining on the stability of the Castlegate escarpment, i.e.; Cottonwood Newberry Canyon/Corncob Wash and Trail Mountain 5<sup>th</sup> East/Cottonwood Canyon Test Areas, on going development of a predictive escarpment/mining model is in progress. The current model developed from these studies was used to forecast anticipated effects of proposed mining under the escarpment within the southern portion of the North Rilda Area, ie: The two (2) most southern longwall panels proposed in the Blind Canyon and Hiawatha Seams - North Rilda Area, refer to R645-301-500: Appendix A for complete description of the Geotechnical Study.

**Coal Recovery:** The maximum amount of economically recoverable coal will be extracted from the North Rilda Area of the Deer Creek Mine with the exception of protective coal barriers which must be left in place to ensure the integrity of the mine entries associated with the active underground workings and to protect environmentally sensitive surface resources within the Rilda Canyon Fork Area (See R<sub>2</sub>P<sub>2</sub> Mine Plan Map [Volume 5, Map 3-6 & 3-7]). These protective coal barriers can be broken into five (5) separate categories:

- (1) **Property Boundary Barriers:** All external property boundary lines are protected by a 50 foot (minimum) solid coal "buffer" barrier.
- (2) **Protective Main Entry Barriers:** Protective main entry barriers are designed to protect long term mine entries from excessive abutment pressures of the retreating longwall. Design of these barriers are based on (I) intended duration of use, (ii) depth of cover in the area, (iii) geologic conditions present, and (iv) historical performance of similar sized barriers in similar conditions.
- (3) **Bleeder Entry Barriers:** Bleeder entry barriers are designed to insure the long term stability of the longwall panel bleeder system. Design of these barriers is based on (I) intended duration of use, (ii) depth of cover in the area, (iii) geologic conditions present, and (iv) historical performance of similar sized barriers in similar conditions. Evaluation of localized conditions at the time of development, in conjunction with the

preceding design parameters, will be on-going to determine final barrier sizing so that bleeder entry stability and coal recovery may be optimized.

**(4) Surface and Sub-Surface Resource Protective Barriers:**

- (a) In-place coal will be left within the Rilda Canyon fork area to insure the long-term stability and integrity of environmentally sensitive surface and sub-surface resources.
- (b) In-place coal will be left within the Mill Fork Access area to ensure the long-term stability and integrity.

**(5) Mining Below the Right Fork of Rilda Canyon:** A portion of the right fork of Rilda Canyon lies within the proposed North Rilda Area Permit Application of the Deer Creek Mine. Due to the environmental sensitivity of the Right Fork area (specifically the sub-surface hydrologic alluvial system and associated surface riparian vegetation zone), a complete analysis of a proposed "no-subsidence" design of the 5<sup>th</sup> North Mains development within the area of the right fork of Rilda Canyon has been prepared addressing the long term ground stability and subsidence protection of the area with regards to proposed mining. All pre-mining and post-mining conditions have been evaluated based on the best geologic and engineering information currently available (refer to R645-301-500 Engineering Section: Appendix A).

The 4<sup>th</sup> North Mains consist of a 5-entry development section, bearing northwest from the Deer Creek 10<sup>th</sup> West Mains. Initial location of the 10<sup>th</sup> West/4<sup>th</sup> North intersection was based on the following:

- (a) Existing Blind Canyon seam conditions encountered in 10<sup>th</sup> West Mains development.
- (b) Proximity to the projection of the Mill Fork Fault Graben.
- © Most practical access route to the North Rilda - Blind Canyon and Hiawatha coal reserves, across the North Rilda Canyon Forks area.

A complete analysis of the location and long term ground stability of the 4<sup>th</sup> North / 10<sup>th</sup> West Mains and the Left Fork of Rilda Canyon was prepared and submitted by PacifiCorp to the BLM on November 15, 1996. Approval to proceed with relocation and development of the 4<sup>th</sup> North Mains was given by the BLM (per letter) February 13, 1997.

With regard to PacifiCorp's North Rilda Area Permit Application, the 4<sup>th</sup> North Mains were originally projected to be developed northwest (approximately 3000 feet), from the 4<sup>th</sup> North / 10<sup>th</sup> West Mains intersection. Based on the results of the 1997 surface

exploration conducted in the Right Fork of Rilda Canyon, a meeting was held in October 1997 with DOGM, USFS, and BLM to discuss the re-location of the 4/5<sup>th</sup> intersection to maximize the overburden in the Right Fork stream crossing. The 5<sup>th</sup> North Mains were re-located approximately 800 feet west of the original projection, increasing the overburden from 120 to approximately 200 feet. Based on the information gained from the surface exploration program, a detailed plan was developed to position the 4<sup>th</sup> North/5<sup>th</sup> North intersection to optimize the "no-subsidence" design of long term entry stability for the 5<sup>th</sup> North / Rilda Canyon Right Fork crossing route and rock slope access into the lower Hiawatha Seam as well as maximizing overall reserve recovery within the area.

It is expected that recovery rates of 85% can be obtained within the proposed longwall panel areas. The overall minable reserve recovery for the North Rilda Canyon area of the Deer Creek Mine is estimated at approximately 65%. In addition to the protective barriers listed above, Energy West has no plans on recovering coal pillars for remaining gateroad and mainline development entries.

The Deer Creek mining plan is based on the geologic information of the area obtained from outcrops, drilling, and previous mining by the operator. For geologic information of this area, refer to R645-301-600 and Volume 8 of the MRP.

### ***R645-301-523 Mining Methods***

The following is a description of the mining operation proposed to be conducted during the life of the mine within the North Rilda Canyon Area, including the methods of coal mining, engineering techniques, and anticipated annual and total production of coal.

#### **Continuous Mining Units (Main Entry and Longwall Section Gateroad Development):**

The principal purpose of the continuous mining units within the North Rilda Area of the Deer Creek Mine is underground mine development (i.e. section development of mainline entries, longwall section gateroad development, and longwall section setup/bleeder entry development; along with development of mine water holding sumps, rock storage rooms, etc.).

Figure R645-301-500a (Figure Tab) illustrates the basic configuration of a typical five-entry mains, consisting of (nominal) 20 feet wide entries and crosscuts driven on standard 80 feet x 100 feet entry centers. The pillars created measure a (nominal) 60 feet wide x 80 feet long; a size which has been developed for sufficient support of the main entries and overlying strata.

A variation to this typical configuration was utilized for the development of main entries underlying the crossing of the Rilda Canyon Right Fork Area. These five-entry mains consist of (nominal) 20 feet wide entries and crosscuts driven on 80 feet x 130 feet entry centers. To eliminate multiple intersections in the stream crossing area, crosscut locations were staggered. The pillars created measure a (nominal) 60 feet wide x 110 feet long; a size which improves long term main entry stability and overlying strata stability through an area of hydrologic and surface resource concern.

Figure R645-301-500a also illustrates the basic configuration of a typical two-entry longwall panel development, consisting of (nominal) 20 feet wide entries and crosscuts driven on (nominal) 50 feet x 100 feet entry centers. With the retreating longwall mining system, all panel development work is accomplished by continuous mining units prior to longwall installation.

**Longwall Mining System:** The predominant mining method to be used in the North Rilda Area of the Deer Creek Mine was *Longwall Retreat Mining*. This method, as practiced by PacifiCorp, presents the safest and most efficient underground resource recovery mining method available.

As referenced above, the two-entry gateroad system is developed with (nominal) 20 feet wide entries and crosscuts driven on (nominal) 50 feet x 100 feet entry centers. This type of "yield pillar" configuration is designed so that the gateroad pillar will gradually yield as longwall retreat proceeds from panel to panel. The purpose of this design is to prevent the buildup of unrelieved stresses within the pillar.

Figure R645-301-500b (Figure Tab) illustrates the basic configuration of a retreating longwall system. After gateroad entries are driven to the extent of the longwall panel length, on both sides of the longwall panel, setup and bleeder entries are driven to connect the gateroads. A solid coal barrier is left between the setup and bleeder entries, size based on; (1) intended duration of use, (2) depth of cover in the area, (3) geologic conditions present, and (4) historical performance of similar sized barriers in similar conditions.

Longwall face width, depending on the geologic parameters of the coal deposit, varies from 500 feet to 1000 feet wide. Standard face width is 750 feet center to center (from center-line of head-gate belt entry to center-line of tailgate entry), or 730 feet coal block width. Once installed in the setup entry, the longwall begins retreat mining (from the setup entry "outby" toward the main line entries). A protective barrier is left between the mined out longwall panel (extraction face) and the main line entries that is sized to insure long term main line entry stability.

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Panels are designed within the mining area, bounded by natural and imposed limits, with varying degrees of confidence as to final location and extent. Faults may vary somewhat from currently assumed locations. Geologic limitations such as seam splits, channel scours, spars, stratigraphic thinning, burned coal areas, etc. may affect resource recovery by varying the mining limits by hundreds of feet as information becomes available and as mining recovery economics and practicality are further refined. Regulatory mining restrictions, such as escarpment protection barriers and perennial stream buffer zones further confine mining extent.

The anticipated production will be obtained by utilizing two to three continuous mining units and one longwall mining system. The Deer Creek Mine normally operates two continuous mining units and one longwall mining system.

The North Rilda Area of the Deer Creek Mine was developed with mains and sub-mains which supported a series of longwall mining panels. This system is very effective in extracting and maximizing coal recovery. Approximately 75% of the Deer Creek minable coal reserve will be extracted by longwall mining systems, 25% will be extracted by continuous miner development.

The extracted coal is transported by underground conveyor belt to the Deer Creek portals, sized in the Deer Creek coal handling facility and conveyed to the PacifiCorp - Huntington Power Plant, approximately two miles away. A portion of the coal was also transferred to the Cottonwood Mine loading facilities via underground conveyor belts and transfer shaft.

The interburden in the minable area where the two seams overlap averages about 80 feet. Multi-seam mining will be evaluated where in interburden thickness of less than 30 feet exist between the two seams.

The mine layout of the Deer Creek mine is illustrated in Volume 5, Maps 3-6 and 3-7. The drawings show an arrangement of longwall panels and development sections interconnected by systems of main and sub-main entries. This arrangement is predicated on geographical dedication of reserves, regulatory mining restrictions, available coal quality, and geologic information.

The planned mine development sequence accommodates longwall panels as the primary means of efficiently extracting the reserves. This will ensure the best possible means of maximizing reserve recovery while maintaining consistent coal quality and ground control. Volume 5, Map 3-6 and Map 3-7 shows the North Rilda Area. Table 3 (Volume 2, Part 3) provides the approximate number of acres affected by mining in five-year increments for the Deer Creek Mine.

**Mine Production:** Average Production rates for the North Rilda Area were approximately 1,150 tons/machine shift for continuous miners and 9,000 tons/machine shift for the longwall. Table 4 (Volume 2, Part 3) of the MRP lists the anticipated annual and total production of coal at the Deer Creek Mine.

All in-mine coal haulage is by belt conveyor. Of the total entries in the main entry system, at least one entry is dedicated specifically to the belt conveyor. All mine personnel and materials are transported underground by diesel equipment. Table 5 (Volume 2, Part 3) lists the major ancillary equipment used in Deer Creek Mine.

### ***R645-301-524 Blasting and Explosives***

The Deer Creek Mine is a developed and producing underground mine and there is no anticipated need for any surface blasting activities incident to the underground mining activities. However, if circumstances develop that require surface blasting activities, a plan will be initiated in accordance with DOGM regulations in R645-301-524.

#### **R645-301-524.100 Blaster Certification**

All surface blasting incident to underground mining operations will be conducted under the direction of a certified blaster. Blaster certifications will be kept at the blasting site during blasting activities.

A certified blaster and at least one other person will be present at the firing of a blast. The blaster will be familiar with the blasting plan and site specific performance standards (refer to Volume 3 Appendix VI for the approved plan)

#### **R645-301-524.200 Blast Design**

Submittal of blast designs for shots will be made to the Division for approval prior to conducting surface blasting at the mine site. A schedule will be presented to the Division prior to conducting blasting activities. The blast design will be prepared and signed by a certified blaster.

#### **R645-301-524.300 Blast Survey**

A pre-blasting survey will be conducted as needed.

**R645-301-524.400    Blast Schedule**

Blasting may be performed during the construction of the mine site pads. If conducted the blaster will use audible signals to notify those in the vicinity immediately before the blast. No residents live within one-half mile of the proposed blasting site. All blasting will be conducted between sunrise and sunset.

***R645-301-525    Subsidence Control Plan***

This section describes in detail the operator's plan to ensure minimal environmental impacts from mine-induced subsidence. The Operation Plan (Volume 2, Part 3) plus the Geology Section (Volume 8) present the detailed data on which the analytical approach for the subsidence control plan is based. The following subsections describe the principal factors involved in controlling subsidence impacts resulting from the proposed mining operations.

For subsidence control and monitoring information specific to the Mill Fork Lease, please refer to Volume 12, Mill Fork Lease, ML-48258 in the Deer Creek MRP.

**R645-301-525.100    Subsidence Damage Probability Survey**

A survey has been conducted on that portion of East Mountain surface which could possibly be affected by the mining of coal from the North Rilda Area. It has been determined that there are renewable resources present in the area in the forms of springs, water seeps, grazing land, timber, and wildlife. There are no springs and seeps located above the projected mining activities in the North Rilda Area. The occurrence of the springs is discussed in the hydrology section of this document (Section 700). Only two springs are located within the North Rilda permit area, 80-50 located in Section 29 and the Rilda Canyon Springs located in Section 28 (refer to Volume 9 HM-9 for the location of the springs and Volume 9 - Hydrologic Section of the Deer Creek MRP: Appendix A for sampling sites and monitoring schedule). Most of the streams within the permit area are ephemeral and/or intermittent. Only the lower portion of Rilda Canyon Creek below the Rilda Springs is considered perennial. The streams are fed by springs that emanate primarily in the North Horn Formation west of the permit boundary. Second mining, i.e. longwall extraction, room & pillar, of the North Rilda area will be limited to the ridge separating Rilda and Mill Fork canyons and subsidence will not occur beneath the stream channels of these canyons. First mining, i.e. mainline, gateroad development, did occur below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence / long term stability" design of the 5<sup>th</sup> North Mains development within the Right Fork of Rilda Canyon and the long-term stability analysis refer to the Engineering Section R645-301-500 A. To protect the

alluvial/colluvial system of the Right Fork of Rilda Canyon a stream buffer zone was established based on the extent of the riparian zone and the angle of draw from the Hiawatha Seam, the lowest seam to be mined. The riparian zone within the Right Fork of Rilda Canyon was delineated by field observation, aerial photography, and map contour analysis. The extent of the identified zone is based on the contact of the alluvial/colluvial fill with the canyon's side slopes. The angle of draw was calculated from the Hiawatha Seam horizon/elevation @ 15 degrees to the point of intersection on the surface. The stream buffer zone delineates the area restricted to full extraction mining. The referenced 15 degree angle of draw is an industry/agency accepted standard used for delineation of surface influence protection from mining areas considered for full extraction mining. Mining experience at Energy West's Deer Creek, Cottonwood, and Trail Mountain mines has provided a sound, scientific basis for using the 15° angle of draw mentioned above (refer to Annual Subsidence Reports of the Deer Creek MPR).

The angle of draw of subsidence produced by full-extraction mining can be influenced by many factors. These include the size of the area mined, number of seams mined, fractures or faults in the overburden, adjacent mine workings, and adjacent areas of burned coal and clinker. If mine workings extend to an area of burned coal, experience has shown that the overburden stresses above the mined area can be transferred to the adjacent burned coal and clinkers which can cause the clinkered areas to fail. In this case, the angle of draw may appear to be very shallow, when the crushing of the clinkered areas are the source of subsidence outside the normal area of influence.

Faults can also influence the angle of draw. If mining occurs adjacent to an existing fault, the area of subsidence will follow the natural plane of weakness formed by the fault. In this case, the angle of draw will be the same as the dip of the fault.

Based on data collected by the U.S. Bureau of Mines and eighteen years of subsidence data collection on East and Trail mountains, the angle of draw is found to be between 0 and 15 degrees from vertical. In some limited areas, the angle of draw is greater than 15 degrees, but in every case, the angle is greater due to the influence of one of the other factors mentioned above.

For planning purposes, any barrier of protection left in the mine to protect surface features should use a 15 degree angle of draw unless one of the factors mentioned above is known to exist in the immediate area.

No structures such as cabins, fencing, water troughs, and stock ponds currently exist within the boundaries of the North Rilda Area. Moreover, there are no oil, gas or water wells located within the East Mountain property, nor are there any gas or oil pipelines.

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**R645-301-525.200    Protected Areas**

The operator will conduct the underground mining operations so as to prevent subsidence from causing material damage to the surface and to maintain the value and reasonable foreseeable use of that surface in accordance with the preceding subsidence control plan.

As mentioned in the PROBABLE HYDROLOGIC CONSEQUENCES DETERMINATION section, (728: Hydrologic Balance - Surface Water System), the drainages conveying runoff away from the permit areas are streams in Rilda, and Mill Fork canyons. Second mining, i.e. longwall extraction, room & pillar, of the North Rilda area will be limited to the ridge separating Rilda and Mill Fork canyons and subsidence will not occur beneath the stream channels of these canyons. First mining, i.e. mainline, gateroad development, will occur below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence / long term stability" design of the 4/5<sup>th</sup> North Mains development within the Right Fork of Rilda and long-term stability analysis, refer to Volume 11 Appendix Volume - Engineering: Appendix A. To protect the alluvial/colluvial system of the Right Fork of Rilda Canyon, a stream buffer zone was established based on the extent of the riparian zone and the angle of draw from the Hiawatha Seam, the lowest seam to be mined.

The riparian zone within the Right Fork of Rilda Canyon was delineated by field observation, aerial photography, and map contour analysis. The extent of the identified zone is based on the contact of the alluvial/colluvial fill with the canyon's side slopes. The angle of draw was calculated from the Hiawatha Seam horizon/elevation @ 15 degrees to the point of intersection on the surface. The stream buffer zone delineates the area restricted to full extraction mining. The referenced 15 degree angle of draw is an industry/agency accepted standard used for delineation of surface influence protection from mining areas considered for full extraction mining. Mining experience at Energy West's Deer Creek, Cottonwood, and Trail Mountain mines has provided a sound, scientific basis for using the 15° angle of draw mentioned above (refer to Annual Subsidence Reports of the Deer Creek MPR).

**R645-301-525.300    Subsidence Control**

The operator intends to minimize surface effects of subsidence by adopting, wherever practical, the longwall mining method and mining the coal deposits as completely as possible. The areas within the mine limits not mined by the longwall method will be mined by continuous miner in development for the longwall system. Approximately seventy-five percent (75%) of the recoverable coal reserve will be mined by the longwall method, the remaining area will be mined by continuous miner units.

The longwall mining method allows almost total extraction of the mineral and induces caving of the immediate and upper roof strata. As the coal seam is extracted, the overlying

strata caves rapidly. The caving process has been shown to propagate to within 100 feet of the surface in less than two weeks after mining. This was determined by a cooperative study conducted by the U.S. Bureau of Mines using Time Domain Reflectometry (TDR). In this study, a coaxial cable was cemented within a drill hole positioned near the center of the 14th West longwall panel in the Cottonwood Mine. As the caving of the strata occurred, the cable would shear or be stretched. The depth of the shears or stretches could be identified with instruments on the surface. The data collected from this study is contained in Volume 3, Appendix IV of the MRP. Surface subsidence has been observed within two months of the coal extraction. In most areas, the subsidence will stabilize within 2 years of mining.

It is the operator's intent to mine areas as wide and long as present mining technology or equipment allows in order to minimize the area which would be on the sloping edge of the subsidence trough. The pillars of support for the longwall gate roads have been designed on the yielding pillar principle so that they will yield to destruction. This has been proven in practice in the mines and therefore will not affect the subsidence trough.

The size of the support coal pillars used in mine planning for both the Blind Canyon and Hiawatha seams to ensure long term stability has been determined by basic calculation for the deepest expected cover (from prior mining practice in the area) and USBM study. Experience has also shown that, in multi-seam mining circumstance, columnizing main entry development pillars in both seams is essential for long term main entry stability.

Full extraction areas, by definition, are planned and can control subsidence in areas. It is anticipated that the planned subsidence will minimize impacts and result in a generally uniform lowering of the surface lands in broad areas, thereby limiting the extent of material damage to those lands and causing no appreciable change to present land uses and renewable resources. Subsidence prediction work has shown that the expected maximum planned and controlled subsidence will vary from zero to fifteen (0-15) feet, assuming that the total cumulative extraction from the two minable seams will not exceed twenty (20) feet.

*First Mining, "No Subsidence Restricted" Areas*

1) Right Fork of Rilda Canyon

First mining, (i.e. mainline development), has occurred below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence / long term stability" design of the 5<sup>th</sup> North Mains development within the Right Fork of Rilda Canyon and the long-term stability analysis refer to the Engineering Section R645-301-500 Appendix A.

2) Mill Fork State Lease ML-48258 Access (Hiawatha Seam)

Access to the to North Rilda Hiawatha seam reserves was achieved with the development of rock slopes and vertical raises from the Blind Canyon seam to the lower seam. From the bottom of the slopes, a 5-entry set of mains (referred to as 6<sup>th</sup> North Mains) were developed to the northeast for access to gateroad development in the Hiawatha seam. Main line development was reduced to three entries above 6<sup>th</sup> Right.

Based on data acquired through surface coal exploration programs, Energy West developed a mine plan to access the Mill Fork State Lease with a set of 6-entry mains driven on a northwest bearing from the 6<sup>th</sup> North Mains. Mining within the Mill Fork Access corridor will be restricted to mainline development. To ensure long term stability, pillars will not be removed (refer to Volume 5 Map 3-7).

**R645-301-525.400    Subsidence Monitoring Plan**

The operator initially adopted a twofold approach to subsidence monitoring:

- 1)     aerial photogrammetry,
- 2)     on-the-ground monumentation.

After seven years of comparing the two types of surveys it was determined that both methods effectively document the amount of subsidence which has occurred; however, the aerial photogrammetry method has the advantage of showing more detail because more data points can be monitored with less effort. Therefore in 1987, with the concurrence of the State of Utah, Division of Oil, Gas & Mining (DOGM), the operator discontinued on-the-ground monumentation and now collects subsidence data solely by aerial photogrammetry.

The subsidence monitoring program, conducted since 1980, has produced data which not only document the amount of subsidence that has occurred but also allows the operator to predict the amount of subsidence that is likely to occur when mining in new areas. The detail of the data collected in years past is not included herein. If the reader desires to investigate past data, it can be found in the annual subsidence reports available in the offices of DOGM.

**Aerial Photogrammetry:** PacifiCorp's subsidence monitoring program is primarily based on aerial photogrammetry. A baseline photogrammetric survey was conducted in 1980 which includes over 12,000 elevations measured on a 200-foot spacing grid. These elevations are then compared to elevations measured from the photographs taken annually in August. This method has proven to be the best way to collect subsidence data on East Mountain. In flat areas, with limited vegetation, the elevations can be read from the photographs with a precision of one-half foot. In steeper areas, where cliffs are present, the resolution becomes less reliable, and inaccuracies of greater than ten feet can occur. In steeper areas, photogrammetric monitoring can, and has been, augmented by

conventional survey data. The applicant will maintain survey control aerial targets within the permit boundary necessary to allow the interpretation of coordinates on photos within  $\pm 1$  foot. Following this procedure the operator shall conduct annually an aerial photo survey of all areas which have been undermined. The operator shall continue monitoring all areas undermined until it is mutually agreed by the operator and DOGM that the subsidence in a given area has become stable and no further monitoring is necessary. The findings of the survey shall be reported to DOGM annually in a summary report.

Special Monitoring - Castlegate Cliff Escarpment

*North Castlegate Escarpment - North Rilda Area*

The Castlegate Sandstone escarpment, within the northern portion of the North Rilda Area, has very limited surface exposure due to presence of talus slopes and vegetation that cover the formation in this area. Due to the limited surface exposure of the Castlegate escarpment, no special monitoring or mine layout protection measures was planned for the escarpment in this area (refer to Volume 11 Appendix Volume - Engineering: Appendix A for a comparison of the North Castlegate Escarpment to previously mined areas).

*South Castlegate Escarpment - North Rilda Area*

The Castlegate escarpment, within the southern portion of the North Rilda Area, has well established surface exposure. Based on an on-going geotechnical study of evaluating the potential effects of longwall (full-extraction) mining on the stability of the Castlegate Sandstone escarpment, i.e. Cottonwood Newberry Canyon/Corncob Wash and Trail Mountain 5th East Cottonwood Canyon Test Areas, development of a predictive escarpment/mining model was developed and presented to DOGM, USFS and BLM. The model developed from these studies was used to forecast anticipated effects of proposed mining under the escarpment within the southern portion of the North Rilda Canyon Area, i.e. two (2) southern-most longwall panels proposed in the Blind Canyon and Hiawatha Seams - North Rilda Area (See R<sub>2</sub>P<sub>2</sub> Mine Plan Maps Volume 5, Maps 3-6 & 3-7). Based on the predictive escarpment/mining model, areas of potential cliff escarpment failure will be monitored with photogrammetric methods, augmented by conventional survey data.

To comply with the special monitoring stipulation referenced in the environmental assessment, "Deer Creek Mine will also monitor subsidence through their mine plan requirements and as proposed, provide higher resolution monitoring data for the North slope of Rilda Canyon by installing prisms for accurate surveying on the top of the escarpment", PacifiCorp installed a series of prisms in 1999 to document

subsidence features of Castlegate escarpment (Refer to Map DU1688E in Volume 11 Appendix Volume - Engineering: Appendix A).

Prisms PR-1, PR-2, and PR-3 were installed in February 1999 prior to full extraction mining. Prisms PR-4, PR-5, and PR-6 were installed in June 1999.

All prisms will be monitored prior to mining to establish baseline values and percent error variations. During the mining process, prisms will be monitored daily until the movement stabilizes. Data from the prism monitoring will be reported in the Annual Subsidence report.

In addition to the prism monitoring, PacifiCorp will install warning signs in Rilda Canyon prior to undermining the two southern panels.

PacifiCorp did cooperate with the surface land management agency (U.S.D.A. Forest Service) in an environmental analysis of the potential impacts. Final mining approval of the referenced southern longwall panels was granted based on the objective evaluation of the predictive model and assessment of potential surface impact from full-extraction mining within the affected area. The environmental analysis is complete with the associated Decision Notice/FONSI signed on 11/1/99 (see Volume 11 Appendix Volume - Engineering: Appendix C and D in this section) and DOGM consent dated November 10, 1999 (Volume 11 Appendix Volume - Engineering: Appendix E).

**R645-301-525.500    Repair of Damage**

Should significant subsidence impacts occur, the applicant will restore, to the extent technologically and economically feasible, those surface lands that were reduced in reasonably foreseeable use as a result of such subsidence to a condition capable of supporting presubsidence reasonably foreseeable uses.

In order to restore any land affected by operations to a condition capable of supporting the current and postmining land uses stated herein, the operator will replace water determined to have been lost or adversely affected as a result of operator's mining operations if such loss or adverse impact occurs prior to final bond release. The water will be replaced from an alternate source in sufficient quantity and quality to maintain the current and postmining land uses as stated herein.

During the course of regular monitoring activities required by the permit, or as the operator otherwise acquires knowledge, the operator will advise DOGM and the surface land

management agency of the loss or adverse occurrence discussed above, within ten working days of having determined that it has occurred. Within ten working days after DOGM notifies operator in writing that it has determined that the water loss is the result of the operator's mining operation, the operator will meet with DOGM to determine if a plan for replacement is necessary and, if so, establish a schedule for submittal of a plan to replace the affected water. Upon acceptance of the plan by DOGM, the plan shall be implemented. The operator reserves the right to appeal DOGM's water loss determinations as well as the proposed plan and schedule for water replacement as provided by Utah Code Ann. 40-10-22(3)(a).

As outlined earlier, there are no springs or seeps located above the projected mining activities in the North Rilda Area. Most of the streams within the permit area are ephemeral and/or intermittent. Only the lower portion of Rilda Canyon Creek below the forks is considered perennial. The streams are fed by springs that emanate primarily in the North Horn Formation west of the permit boundary. Second mining, i.e. longwall extraction, room & pillar, of the North Rilda area will be limited to the ridge separating Rilda and Mill Fork canyons and subsidence will not occur beneath the stream channels of these canyons. First mining, i.e. mainline, gate road development, will occur below the Right Fork of Rilda Canyon. For a complete analysis of the proposed "no subsidence / long term stability" design of the 5<sup>th</sup> North Mains development within the Right Fork of Rilda Canyon and long-term stability analysis refer to the Engineering Section Volume 11 Appendix Volume - Engineering: Appendix A. To protect the alluvial/colluvial system of the Right Fork of Rilda Canyon a stream buffer zone was established based on the extent of the riparian zone and the angle of draw from the Hiawatha Seam, the lowest seam to be mined. The riparian zone within the Right Fork of Rilda Canyon was delineated by field observation, aerial photography, and map contour analysis. The extent of the identified zone is based on the contact of the alluvial/colluvial fill with the canyon's side slopes. The angle of draw was calculated from the Hiawatha Seam horizon/elevation @ 15 degrees to the point of intersection on the surface. The stream buffer zone delineates the area restricted to full extraction mining. The referenced 15 degree angle of draw is an industry/agency accepted standard used for delineation of surface influence protection from mining areas considered for full extraction mining. Mining experience at Energy West's Deer Creek, Cottonwood, and Trail Mountain mines has provided a sound, scientific basis for using the 15° angle of draw mentioned above (refer to Annual Subsidence Reports of the Deer Creek MPR).

**R645-301-525.700    Public Notice**

The operator will not mine in any areas that would allow potential subsidence effects (as indicated by the angle of draw) to affect any area outside of the lease and permit boundary until this constraint on coal recovery is resolved by OSM and BLM or permission is granted

by the adjacent surface agencies. A mining schedule which details the area in which mining is to take place and the planned date of the mining activity has been submitted to the affected surface owners.

***R645-301-526 Mine Facilities***

Support facilities exist and are proposed in Rilda Canyon, a tributary of Huntington Canyon; Left Fork Fan Facilities, and Rilda Canyon Portal Facilities. The Left Fork Fan Facilities pad and access road of this area occupy approximately 2.01 acres of Manti-La Sal National Forest land in the NW1/4, NW1/4, SE1/4 of Section 29, T16S, R7E, SLM. These facilities include an access road and a pad area which supports two portals, a substation, power line, fan, water storage tank, and pumphouse. Topsoil removed prior to construction of the site is stored within the permit area of the Left Fork Rilda Canyon facilities.

Vehicular access has been limited to the public turn-around area below the portal facilities. However, the Left Fork road continues to serve as a Forest Development Trail, allowing access by horseback and foot travel up the Left Fork of Rilda Canyon and beyond the fan facility area. Access to the facility pad is controlled with fencing and a locked gate at the point where the road enters the pad. The existing trail continues beyond this point.

Vehicular use of the road within the Left Fork Fan Facilities will only occur in emergency situations, for environmental maintenance, and for maintenance to the substation. Environmental maintenance will include transportation of men, materials, and equipment required to maintain, install, or remove structures that are necessary to comply with environmental laws and regulations. Surface environmental compliance inspections will be conducted on foot from the turn-around area. Maintenance to the substation is usually conducted by an independent contractor. Surface access will need to be maintained for these purposes.

In 1997, vehicular use of the road within Rilda Canyon was revised through proper permitting action via USFS, UDWR, and UDOGM approvals to allow the permittee to transport a limited number of truckloads (tractor/trailer combinations utilizing forty foot trailers or ten wheel end dump trucks) per day of solid, bulk materials for usage in the North Rilda area of the Mine. Special travel stipulations were imposed to limit this access. As material storage is no longer needed at the Left Fork facility, access will only be used for the three situations mentioned above.

Snow removal will only occur in emergency situations. Should snow removal be necessary prior to December 1 or post April 15, snow removal will be accomplished by push, pickup, load and haul techniques. Snow volumes will be hauled to the Deer Creek Mine active waste rock site

via ten wheel dump trucks and placed for proper treatment of the snow melt runoff. Side casting of snow into the Left Fork Rilda Creek drainage or the adjacent road ditch will not be practiced.

Specific locations and other information regarding the access road and facility pad in Left Fork Rilda Canyon are shown in Volume 4, Maps 2-15A and 2-17A; Volume 5, Maps 3-9A and 3-9B; and Volume 6, Maps 4-1A and 4-4A (Sheets 1, 2 and 3). More specific information about each of the structures and facilities is provided in the MRP. [Volume 2, Part 3 entitled "MINE FACILITIES (Rilda Canyon)"].

Rilda Canyon Portal Facility is located on a 13.1 (including soil storage areas) acre site approximately 2.0 miles from the mouth of Rilda Canyon. Of the 13.1 acres of proposed disturbance, approximately 4.4 acres were previously disturbed by earlier mining which leaves only 8.7 acres of additional disturbance needed for the proposed surface facilities. The site is characterized by moderate vegetation and rugged, steep terrain. Surface facilities as described in R645-301-521.180, include the following: sediment pond, runoff collection tank, parking lot, underground vehicle parking garage, office/bathhouse/warehouse building, materials storage area, mine ventilation fan, power supply, water treatment system, water storage tank, sewer treatment system, and drainage system. A pre-disturbance topography map is constructed to show the contour of the canyon prior to any construction activities. This map is found in the Maps Section as Map 500-1. Construction cross-sections are found on Map 500-4. All construction cut slopes and fills will conform to the recommendations outlined in the Geotechnical Study found in Volume 11, Appendix Volume - Engineering: Appendix F.

#### **R645-301-526.110    Mine Structures and Facilities**

As illustrated on Map 500-1, three abandoned mines exist on the north side of Rilda Canyon: Leroy, Rominger, and Jeppson mines (also refer to photos A through C in Volume 11 Appendix Volume - Engineering: Appendix G, Previously Disturbed Areas). These areas were reclaimed by AML in 1988. No structure presently exists in connection with these mines except for their respective reclaimed footprints. The lower portion of the Leroy Mine will be utilized for the location of the sediment pond. Approximately 1.5 acres of predisturbance exists at this site where coal was buried during reclamation activities conducted by AML. The soil covering this coal will be stripped off and stored. The coal will be hauled off to the existing Deer Creek waste rock site or utilized if the quality proves acceptable. Topsoil stripped from the facilities area will be stored at the topsoil storage area which is located next to the NEWUSSD spring collection facility. Topsoil (approximately 19,700 cubic yards) will be stored at this location until reclamation activities commence.

A portion of the Rominger/Jeppson mines will be utilized for subsoil storage. Approximately 3.0 acres of undisturbed (1.6 acres) and predisturbed (1.4 acres) land exists

that will be covered with approximately 97,300 cubic yards of subsoil. Photo A in Volume 11 Appendix Volume - Engineering: Appendix G (Previously Disturbed Areas) illustrates the appearance of the area prior to soil placement. The pile will be stored until reclamation activities commence.

The North Emery Water Users Special Service District (NEWUSSD) spring system (refer to photos D through F in Volume 11 Appendix Volume - Engineering: Appendix G (Previously Disturbed Areas) consists of a series of collection lines extending westward up Rilda Canyon and southward up a small side drainage as shown on Map HM-8 (refer to Volume 9 - Hydrologic Section of the Deer Creek MRP). The NEWUSSD spring system is metered at four locations. Meter 1 (Side Canyon Spring) is located at the downstream end of a collection line which enters Rilda Canyon from the South. Meter 2 (Side Canyon Spring plus South Spring) is located near the bottom of the main east-west trending collection line which lies to the south of Rilda Canyon Creek at a point just upstream (west) of the main spring collection box. Meter 3 (North Spring) records flows for the east-west central collection line which was constructed through the central portions of the valley near Rilda Canyon Creek. Meter 4 (North Spring) collects data from the north collection line located on the north side of Rilda Canyon Creek. Meter 3 and Meter 4 were combined in 1995 during the Rilda Canyon road improvement project.

In addition to the main spring collection lines, there are two flumes in the vicinity which monitor flow rates within Rilda Canyon Creek. The upper flume, RCF-2, is located adjacent to the extreme west end of the spring collection system monitored by Meter 4. Flume RCF-3 is located in Rilda Canyon Creek adjacent to spring collection Meter 2.

Initially five shallow wells were located in the area surrounding the spring collection system to monitor groundwater level fluctuations through time. The locations of the wells are shown on Volume 9 Map HM-9. Wells 1 through 5 are relatively shallow wells which were constructed prior to 1989 by West Appa Coal Company. In 1990, two additional large diameter wells were developed, (Wells 6 and 7) adjacent to wells P-2 and P-3, respectively, in order to obtain more complete groundwater data through aquifer testing. Wells P-2 and P-3 were abandoned and sealed in 1995.

#### **R645-301-526.116.1 Mining Within 100 Feet of Public Road**

PacifiCorp intends to conduct coal mining and reclamation activities within 100 feet of Emery County Road #306. PacifiCorp has entered into two separate agreements with Emery County Special Services District No. 1 to encroach upon their right of way in Rilda Canyon. Agreement #1 is made to reconstruct, realign, widen, and surface County Road #306 to allow for increase speed and increased traffic. Agreement #2 is made to allow a portion of this

road to be temporarily restricted for public use. The restricted use area will start approximately 1/4 mile west of the cattle guard and extend approximately 2,300 feet to the mine gate in the left fork of Rilda Canyon (refer to Figure R645-301-500c). A copy of Agreements #1 and #2 are found in Volume 11 Appendix Volume - Engineering: Appendix B. Access will be given to Emery County Road Department officials and North Emery Water Users Special Services District for periodic inspection and maintenance of their facilities and also to regulatory and other governmental agencies so they may access their jurisdictional areas. Photos of the proposed suspended portion of the road is found in Volume 11 Appendix Volume - Engineering: Appendix G (Existing Road).

**R645-301-526.116.2 Relocating a Public Road**

Emery County Road #306 exists in the location of the North Rilda Canyon portal facilities. This road runs approximately 3.0 miles from the Huntington Canyon road, Highway 31, to the turn around area in the Left Fork of Rilda Canyon. It is owned and maintained by Emery County Special Service District No. 1. As mentioned above, an agreement has been constructed between PacifiCorp and Emery County to suspend the public use of a portion of EC #306. Approximately 2,300 feet of the road would be eliminated through the proposed facilities throughout the life of the mine. At time of reclamation, the suspended portion of the road would be reconstructed in its original location and to its original design. The design and construction plans are the property of Emery County Road District and are better known as Rilda Canyon Road Change Order #1. PacifiCorp has retained a copy of these plans and formatted them onto a CD. These plans can be reviewed in Volume 11 Appendix Volume - Engineering: Appendix G. Reclamation and replacement of the road will be completed to the standards found in these original road designs. Figure R645-301-500c in the Figures Section shows the location of the road and typical road section .

As this restricted use area eliminates public access to the existing Forest Service trail system in the canyon, PacifiCorp's Agreement #1 with ECSSD#1 includes the construction of a new trailhead and parking area on the east end of the mine facilities and the reconstruction of the county road (see detailed design in Figure R645-301-500c in the Figures Section and discussion in the Reclamation Plan below). PacifiCorp will also establish a trail on the south side of Rilda Creek that by-passes the mining facilities. The trail will cross the Rilda Canyon creek and travel parallel to the creek to a point where it reconnects to the existing trail as shown in Figure R645-301-500c. The trail will be constructed to comply with USFS design parameters. Upon reclamation, the trail will be eradicated and the road will be relocated to its original location.

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**R645-301-526.200    Utility Installation and Support Facilities**

As described above, North Emery Water Users Special Services District (NEWUSSD) possesses a spring collection system in Rilda Canyon near the proposed mine facilities location (refer to Map 500-1). This collection system is planned to be reconstructed to the west of the surface facility in the mouth of the Right Fork. This will be completed to insure that the springs will not be impacted by the mining operations. A feasibility study will be completed in accordance with an agreement with NEWUSSD.

Water transmission lines associated with the spring collection system will be located to protect against damage from mining operations in the areas in which they pass through the disturbed area. When the feasibility study and designs are completed, the information will be incorporated in the Hydrologic Section.

As Emery County Road #306 is reconstructed, PacifiCorp will cooperate with NEWUSSD to insure protection of water transmission lines. Location and design of EC#306 is within the jurisdiction of the Emery County Road Department. Plans for the road can be reviewed in Volume 11 Appendix Volume - Engineering: Appendix G. Support facilities were previously discussed in R645-301-521.180. Construction and operation of these facilities will be in accordance to applicable Emery County Building Codes. Drawings and specifications will be submitted to the Emery County building inspector for their review.

***R645-301-527    Transportation Facilities***

The Rilda Canyon operations utilizes roads in association with the facilities described in the above sections. The Left Fork Rilda Canyon Fan Facilities are described in Volume 2, Part 3. A description of the transportation facilities is detailed below.

**Roads**

The Deer Creek Mine Rilda Canyon operations utilizes two roads as follows:

- (a) Left Fork Rilda Canyon Access Road
- (b) Emery County Road #306  
(Rilda Canyon Portal Facility)

**Left Fork Rilda Canyon Access Road:** The Left Fork Rilda Canyon Facility Access Road is approximately 1150 feet in length (see Map 3-9A and 3-9B in Volume 5). It follows the north side of the Left Fork of Rilda Canyon from the end of the county road to the facility pad. The existing road/trail was upgraded to a gravel surfaced road with an average width

of 11 feet and an average grade of approximately 8%. The road was designed in accordance with recommendations from the surface management agency (Manit-LaSal National Forest). See R645-301-534 below and Volume 2, Part 3 for additional information.

**Emery County Road #306 (Rilda Canyon Portal Facility):** PacifiCorp has entered into an agreement with Emery County Special Services District #1 to reconstruct/realign county road #306 (Agreement #1 in Volume 11 Appendix Volume - Engineering: Appendix B). This road will be utilized by traffic related to the mine as well for recreational and grazing purposes. The road will be completely asphalted with a trailhead and parking area constructed at the east boundary of the Rilda Canyon Portal Facility.

This portion of the road is owned and operated by ECSSD #1. However, during winter months snow removal will be required along the entire length of this road. As this is the responsibility of the Emery County Road Department, PacifiCorp may find the need to assist the road department by clearing snow from EC#306 with its own equipment. PacifiCorp will use a deicing product as specified by Emery County on the county portion of the road to make the road safe for mine personnel and other local traffic. The deicing product will not be stored on-site but will be acquired at the Deer Creek portal facilities. No salt will be used within the disturbed areas of the Rilda Canyon Portal Facilities.

**R645-301-527.100 Road Classification**

Only one primary road exists within the disturbed area of the Rilda Canyon portal facility area. This road begins at the mine gate (19+50, refer to map 500-3 in the Maps Section) at the end of the County road and ends at the bathhouse (10+00). This road will be utilized daily by mine personnel and supply truck deliveries. The length of the primary is approximately 950 feet and coated with asphalt. The foundation of the road is identical to the parking lot area. The main components of the foundation are the subgrade, subbase, base course, and surface cover. There are no embankments associated with this road.

The subgrade is the native underlying soil that serves as the primary foundation for the road and parking area. Placement of the subgrade is completed in specific lifts not to exceed 8 inches. Compaction should be over the full depth of the fill to at least 95% of the maximum dry density as determined by the AASTHO T-180 test procedures. Refer to the Geotechnical Study provided by AMEC Earth and Environmental Inc. in Volume 11, Appendix Volume - Engineering: Appendix F.

The subbase is a compacted granular material between the subgrade and the base course. The specifications of the subbase will be determined by the contract engineering firm that will design the surface facility. Typically, the subbase thickness is between 12 inches and 18

inches for the loads that are expected at the mine site. Aggregate and gradation specifications are less stringent than the specifications for the base course.

The base course is the surface layer directly beneath the surface cover. The material has strict specifications for strength, stability, hardness, aggregate type and gradation. Typical thickness of the base course is 6 inches which should provide a stable base for the surface covering material.

The surface covering material consists of bituminous material and mineral aggregates that are well graded. The cover is typically 4 inches thick. As with all foundation layers for the primary road construction, the specifications for the material and construction will be detailed by the contracting engineer that is responsible for the design of the surface facilities. This information will be included with the permit application when the information becomes available. A typical illustration for road base design and location of primary is found on Map 500-3 in the Maps Section.

***R645-301-528      Handling and Disposal of Coal, Overburden, Excess Spoil  
and Coal Mine Waste***

As discussed earlier, approximately 4.4 acres of the proposed facility was disturbed as a result of previous coal mining and other activities. Geotechnical investigations conducted during April 2004 delineated an area of approximately 0.7 acres of buried coal directly below the Leroy Mine.

It is estimated at 3,600 tons, based on the following: 1) average depth of 4.0 feet, 2) in-place weight of 60 lbs/ft<sup>3</sup>, area: 30,302 ft<sup>2</sup>. Coal waste encountered during soil salvaging and construction of the sediment pond will be segregated separately and transported to the Deer Creek Waste Rock Site for disposal or utilized if coal quality allows. Quality data is found in Volume 11 Appendix Volume - Soils: Appendix A, EIS Report, Appendix 6.2, Soil Testing Data, Sample ID RIL1003.

During operations in Rilda Canyon, very limited amounts of coal mine waste (waste rock) may be transported through the Rilda Canyon portals. Most waste rock will be removed through the Deer Creek portals. The Deer Creek MRP includes a narrative explaining the construction, modification, use, maintenance, and removal of coal, overburden, excess spoil, and coal mine waste through the Deer Creek portals. Up to approximately 125 cubic yards of waste rock may be temporarily stored in a controlled manner in the designated area as shown on Map 500-3. The waste rock will be transported to the Deer Creek waste rock site when the temporary storage area becomes full (Refer to the surface facilities Map 500-3 and facility description in R645-301-521.180).

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**R645-301-528.330    Non-Coal Waste**

All non-coal wastes generated during mining activities and removed from the mine through the Rilda Canyon portals will be placed and stored in a controlled manner in a designated portion of the disturbed area as shown on Map 500-3. The materials will be removed from the site and disposed of in an approved disposal facility.

***R645-301-529    Management of Mine Openings***

Two (2) portals are located in the Left Fork of Rilda Canyon which support intake and return ventilation entries for the operation of the mine. Underground access to the Rilda Canyon Portal Facilities will be achieved by the continuation of a set of three entry 1<sup>st</sup> Right Submains and development of two rock slopes to the portal facility area near the intersection of the Right and Left Forks. All of the development will occur in the Hiawatha coal seam or in the Starpoint Sandstone immediately beneath the coal seam. During the development of the Rilda Canyon Portal Facilities two separate surface breakouts will be constructed; 1) Mine Fan, and 2) Intake Access. Both portals will be developed [from underground] as rock slopes through the upper member of the Star Point Sandstone (Spring Canyon Member) from the portal facility area to an interception point in the Hiawatha Coal Seam. Methods used to construct this portal and tunneled slope may utilize conventional drill and shoot methods. The dimensions of the portal will be approximately 20' x 9' rectangular opening. The fan will be constructed at the west portal. Mine equipment and men will use the east portal to access the northwestern part of the Deer Creek Mine.

Sealing of the portals in the Left Fork Rilda Canyon is detailed in Volume 2, Part 4, Reclamation Plan. Sealing of the portals in the Rilda Canyon portal facility is detailed in the reclamation plan in Section R645-301-540.

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## **R645-301-530 OPERATIONAL DESIGN CRITERIA AND PLANS**

### ***R645-301-531 General***

This section includes a general plan for precipitation runoff/wastewater management, sediment control, impoundment design, road design, and coal mine waste handling plans.

### ***R645-301-532 Sediment Control***

The Rilda Canyon portal facilities (not including sediment storage areas) covers approximately 9.0 acres of disturbed area. All water within this area will be conveyed to drop drains, ditches, and/or culvert systems into a sediment collection tank located on the east side of the parking lot area. Two types of water will be collected in this collection tank: gray water, and washdown/precipitation runoff. The collection tank is divided into two separate compartments; 1) Tank #1, a 7,540 gallon basin for gray water (boot wash, showers, floor drains, etc.) , and 2) Tank #2, an 18,500 gallon basin for washdown/precipitation runoff.

Tank #1 will be pumped directly into an abandoned area of the underground mine workings. The abandoned workings dip to the east away from any potential public water source in Rilda Canyon. Tank #2 will overflow into Tank #1 and be pumped into the mine. If a storm event is larger than the containment of Tank #2, then it will overflow into the emergency spillway and piped through an 18" CMP culvert to the sediment pond at the east end of the disturbed area. The pond is sized for a 10yr/24 hr storm event. The sediment pond design is described in R645-301-533: Impoundments. A detailed design is found in Volume 11 Appendix Volume - Hydrology: Appendix B.

The collection tanks will be housed in 30'x60' pre-engineered building which will contain two 30 hp pumps and piping that will pump the contents from Tank #1 into the mine via water transfer line. Waterline access into the mine will be achieved by drilling through the Starpoint Sandstone for approximately 800' to the abandon mine workings of the 2<sup>nd</sup> Right longwall panel. The drill hole will be cased with steel or HDPE pipe.

There are seven (7) terraced areas within the disturbed area of the Rilda Canyon Portal Facilities. The terraces are graded to positively drain runoff toward the disturbed water ditch. Water runoff will be collected in ditches on each terrace and transferred to the sediment collection tank through ditches and a buried culvert system. The water collection system design is found in Volume 11 Appendix Volume - Hydrology: Appendix B.

**R645-301-532.200    Stabilization**

Sediment control on cut and fill slopes and soil piles will be accomplished primarily by revegetation. Prior to the establishment of vegetation, the slopes will be protected by the application of a surface tackifier, rock mulch, erosion control fabric, and/or other means approved by the Division. An undisturbed drainage ditch will be constructed at the toe of the cut slopes to divert all undisturbed drainage away from the disturbed area. Diversion ditches will be protected using protective barrier to physically separate the disturbed from the undisturbed areas.

Other sediment control measures are discussed in detail in the Hydrology Section.

***R645-301-533    Impoundments***

As described previously, a sediment pond will be utilized to collect storm water runoff from the disturbed area of the surface facility area that exceeds the design capacity of the pump system and collection tank volume. The design of the pond is found in Volume 11 Appendix Volume - Hydrology: Appendix B. Pond design encompasses 8.4 acres of disturbed land.

**R645-301-533.200    Foundations**

The pond is designed as an incised structure. Foundations for embankments and impounding structures will be constructed as outlined in the Geotechnical Study conducted by AMEC (refer to Volume 11 Appendix Volume - Engineering: Appendix F). A construction summary is given below.

Foundations will be constructed by first stripping the area of vegetation and topsoil. Large boulders must be removed to a depth of at least one foot below the base of the impounding structure. The natural exposed subgrade must be proof-rolled. Proof-rolling must consist of at least three passes of moderate weight compaction equipment over the natural soils.

Embankment fills will be placed in horizontal lifts not to 12 inches in loose thickness. Moderate to large sized boulders must be removed prior to placement. Fill will be compacted throughout by the double passing of construction, spreading, or hauling equipment over the embankment surface. Side slopes will be constructed to not exceed 2 horizontal and 1 vertical.

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**R645-301-533.300    Side Slope Protection**

To protect against infiltration, the pond will be over-excavated two (2) feet, compacted, and lined with clay on the bottom and sides. Areas where embankment fills are necessary (south and east sides), vegetation will be planted on the side slope to protect against erosion. Refer to R645-301-300: Biology for seed mix.

**R645-301-533.700    Plans**

A complete plan and design for the pond is found in Volume 11 Appendix Volume - Hydrology: Appendix B. Total volume of the sediment pond is estimated at 1.63 ac. ft., of which approximately 0.042 ac. ft. of the containment is for sediment. The pond will be cleaned of sediment when the sediment volume reaches 60% of the total sediment containment volume capacity.

There are no underground operations below this pond that could potentially impact the structure. The pond will be utilized during the life of the mining operations and will be removed at reclamation.

***R645-301-534    Roads***

**Left Fork Rilda Canyon:** The Left Fork Rilda Canyon Fan Access Road is approximately 1,150 feet in length. It follows the north side of the Left Fork of Rilda Canyon from the end of the county road to the facility pad. The existing road/trail was upgraded to a gravel surfaced road with an average travel width of 11 feet an average grade of approximately 8%. The road was designed in accordance with recommendations from the surface management agency (Manti-LaSal National Forest).

Drainage control is provide by a ditch along the north side of the road. The ditch is armored with type L, D50 = 9" riprap at stations 3+36 to 6+55, 7+69 to 9+89 and 11+82 to 13+96 to comply with DOGM and Forest Service Stipulations (refer to Map 3-9B in Volume 5). Additionally, Map 3-9B, illustrates the typical rip rapped ditch installation. Flows in the ditch are controlled by rip rap. An 18" diameter CMP culverts carries the flow beneath the road and into the natural drainage system. Further information regarding drainage controls along the access road is found in Volume 3: Appendix VII, Surface Runoff Control Plan, prepared by Hansen, Allen & Luce.

The road and culverts will be removed during final reclamation from the site and the Forest Development Trail will be re-established. Refer to the Reclamation Plan for the Left Fork Rilda Canyon fan facilities in Volume 2, Part 4.

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**Rilda Canyon Portal Facilities:** Emery County Road #306 exists in the location of the Rilda Canyon Portal Facilities. This road runs approximately 3.0 miles from the Huntington Canyon road, Highway 31, to the turn around area in the Left Fork of Rilda Canyon. It is owned and maintained by Emery County Special Service District No. 1. A portion of this road is proposed to be temporarily restricted for public use in order to allow PacifiCorp to conduct mining and reclamation operations. The proposed restricted use area starts approximately 1/4 mile west of the cattle guard and extends approximately 2,300 feet to the mine gate in the left fork of Rilda Canyon (refer to Figure R645-301-500c).

As this restricted use area cuts off public access to the Forest Service trail system in the canyon, PacifiCorp has entered into an agreement with Emery County (Agreement #1) to construct a new trailhead and parking area on the east end of the mine facilities at the end of the reconstructed county road. PacifiCorp will also establish a trail that by-passes the mining facilities and connects into the existing trail system. Upon reclamation, the trail will be eradicated and the road will be relocated to its original location. (Refer to original design of road in Volume 11 Appendix Volume - Engineering: Appendix G

All roads associated with the Rilda Canyon Portal Facilities will be designed to ensure environmental protection and safety appropriate for their planned duration and use, including consideration of the type and size of equipment used. The design and construction or reconstruction of roads will incorporate appropriate limits for surface drainage control, culvert placement, culvert size, and any necessary design criteria established by the Division.

Facility parking and facility pads will be designed, constructed and maintained to have adequate drainage control, using structures such as specified in R645-301-534. The drainage control system will be designed to pass the peak runoff safely from a 10-year, 6-hour precipitation event, or an alternative event of greater size as demonstrated to be needed by the Division.

Since the primary road associated with the Rilda Canyon Portal facilities will be located on the facility pad, there will be no road embankments. Therefore, a static safety factor of 1.3 can be disregarded in this situation.

### ***R645-301-535      Spoil***

For a discussion on spoil of the Deer Creek Mine, refer to Vol. 2, Part 3 of the MRP.

### ***R645-301-536      Coal Mine Waste***

Underground development waste, coal processing waste, and excess spoil will continue to be disposed of in accordance with plans approved by DOGM and MSHA. There are no plans to

return coal processing wastes to the underground workings at the Deer Creek Mine. All coal mine wastes (waste rock) will be removed from the mine through either the Deer Creek portals or the Rilda Canyon portals and disposed of at the Deer Creek waste rock site in Huntington Canyon. Refer to Volume 10 of the Deer Creek MRP for a full discussion of the design, construction, and maintenance of the waste rock site.

A temporary waste rock storage facility is located on the surface at the Rilda Canyon portal facility in Rilda Canyon and noted on Map 500-3 as "Waste Rock". The capacity of the waste rock bunker is approximately 125 cu. yds. The waste rock will be hauled to the Deer Creek Waste Rock Site as the bunker reaches its capacity.

***R645-301-537      Regraded Slopes***

There will be no spoil or underground development waste use to regrade slopes to achieve approximate original contour. Slopes for the Rilda Canyon Portal facilities will be constructed using the subsoil and topsoil material.

**R645-301-540    RECLAMATION PLANS**

Reclamation of the Left Fork Fan Facility is detailed in Volume 2, Part 4 of the Deer Creek MRP. The reclamation of the Rilda Canyon Portal Facilities are detailed in the following sections.

***R645-301-541      General***

As required by R645-301-540, the applicant intends to conduct final reclamation as follows:

1. Remove existing structures.
2. Remove buried diversion systems, where necessary, and provide 100yr/6hr storm event channels.
3. Re-contour the disturbed area to blend in with the existing surroundings.
4. Stabilize all fill structures.
5. Reconstruct Emery County Road #306
6. Reduce sediment loading to receiving streams by incorporating Best Management Practices (BMP's).
7. Vegetate all disturbed areas to meet minimum requirements of plant cover, diversity and production as compared to the reference areas.
8. Meet the stated post-mining land use.
9. Achieve bond release.

**R645-301-541.300**      **Structure Removal**

Following the completion of mining, work will begin on the demolition of surface facilities. All structural steel, metal siding and other building materials except concrete will be dismantled and disposed of off the permit area. These structures include, but are not limited to:

- ▶ Fan and fan housing
- ▶ Water tanks
- ▶ Fuel storage tanks
- ▶ Substations
- ▶ Oil storage facilities
- ▶ Fences
- ▶ Bathhouse/Office/Warehouse

All foundations and structures built of concrete will be broken up and buried on-site or taken to the waste rock site. There is approximately 5000 yds<sup>3</sup> of in-place concrete at the Rilda Canyon Portal Facility. It is estimated that the density for in-place concrete is approximately 150 lbs/ft<sup>3</sup>. For crushed concrete, the estimated density is approximately 110 lbs/ft<sup>3</sup>. The volume needed to backfill crushed concrete increases the volume of in-place concrete about 27%. Using these density estimates, the volume of concrete to dispose at the Rilda Canyon Portal Facility is approximately 6350 yds<sup>3</sup>. Any excess demolition material will be used to backfill the portals or taken to the waste rock site for disposal. All asphalt material from the disturbed area will be excavated and taken to a permitted class IV landfill. For cut and fill quantities, refer to R645-301-553 and Map 500-4 for cross-sections.

***R645-301-542 Narratives, Maps, and Plans***

A detailed timetable for the completion of each major step in reclamation is outlined in R645-301-300: Biology, Table 300-5. Pre-reclamation surface configurations for the Rilda Canyon Portal Facility are located on Maps 500-3 and 500-4. These drawings show the location and extent of surface disturbances due to coal mining and reclamation activities at the portal facility.

A detailed plan for backfilling, soil stabilization, compacting and grading is outlined below in R645-301-553, Backfilling and Grading. Certified contour maps, cross-sections, and soil placement maps can be found in the map sections of this volume.

**R645-301-542.600**      **Roads**

Emery County road #306 will be reconstructed as part of the post mining land use. The road will be replaced in the approximate original location that it existed prior to the construction

of the facilities area. The road will be reconstructed as per the designs of Emery County Special Service District #1, Change Order No. 1, November 1994. These designs are the property of Emery County. A copy can be reviewed in Volume 11 Appendix Volume - Engineering: Appendix G. All drainage structures will be replaced. Sediment control will be that control stated in R645-301-552, Permanent Features and R645-301-553.100, Disturbed Areas.

## **R645-301-550 RECLAMATION DESIGN CRITERIA AND PLANS**

Reclamation activities at the Rilda Canyon Portal Facility will include plans and designs for 1) Casing and sealing of portals, 2) Permanent features, and 3) Backfilling and grading. These plans and designs are outlined below.

### ***R645-301-551 Casing and Sealing Underground Openings***

The Rilda Canyon Portal Facility has a total of two (2) portals of which one (1) is a blowing fan installation. These portals are located on the surface facility map, Map 500-3. The plan for sealing these portals consists of permanent double solid-block seals with at least 25 feet of non-combustible material compacted, to the extent possible, to form an earthen plug (see Figure R645-301-500d in the Figures Section). The earthen plug will extend out the portal and graded to match the topography that existed prior to mining and reclamation activities in this area. Since the portals have been developed post-SMCRA, the associated highwalls will be completely eliminated by the reclamation activities. Backfilling and grading of the portals and mine site is detailed below.

The proposed surface facility includes a drill hole that allows transferring of gray water and washdown/runoff water to the abandoned workings of the mine. The depth of this drill hole will be approximately 800 feet in length and an approximate diameter of 6". Reclamation would consist of installing a plug at the terminal end of the hole and filling the entire length with cement. It will require approximately 6 yd<sup>3</sup> of cement to complete the task. Sealing will be completed according to BLM specifications.

### ***R645-301-552 Permanent Features***

Small depressions (pocks) will be constructed to retain moisture, minimize erosion, create and enhance wildlife habitat, and assist revegetation. The pocks will be constructed with a track-hoe or similar machinery and placed in random order. The pocks will measure approximately 1.5

feet deep by 2.0 feet in diameter. Pocking techniques and sediment loss is explained in detail in the Soil and Hydrology sections.

**R645-301-553 Backfilling and Grading**

Once the structures have been removed and the portals sealed as outlined in Figure R645-301-500d, backfilling and grading will commence. Reclamation will be accomplished by systematically reclaiming the Rilda Canyon Portal Facility starting at the uppermost part of the disturbed area, working down. Prior to initiating backfilling and grading process at the facility area, the entire area will ripped with a dozer to a depth of approximately two feet to reduce soil compaction. Various stages of the reclamation process may be occurring simultaneously in different parts of the site. Working from top to bottom will minimize handling and compaction of the material in the reclaimed areas and allow the sedimentation structures below the reclamation work to remain in place. Backfilling and grading the disturbed area of the mine site will be conducted to achieve approximate original contour (AOC) of the entire site. At completion of backfilling and grading, the sediment pond will be removed. The clay liner will be disposed of on-site by burying at least four (4) feet below the final surface configuration. Recontouring will be completed as detailed on Map 500-4. Fill quantities are balanced as outlined in Table 500-4 below. Map 500-5 shows final reclamation topography of the entire mine site.

**Table 500-2: Reclamation Mass Balance Table**

Sta.	Cut	Fill	Sta.	Cut	Fill	Sta.	Cut	Fill
1+00	0.00	869.44	8+00	0.00	1,262.96	15+00	0.00	1,978.70
1+50	0.00	1,600.93	8+50	0.00	1,549.07	15+50	0.00	3,970.37
2+00	0.00	2,075.93	9+00	0.00	1,721.30	16+00	0.00	5,084.26
2+50	0.00	2,452.78	9+50	0.00	1,552.78	16+50	0.00	4,951.85
3+00	0.00	2,942.59	10+00	0.00	1,850.93	17+00	0.00	5,107.41
3+50	0.00	3,650.93	10+50	0.00	2,370.37	17+50	0.00	3,404.63
4+00	0.00	3,738.89	11+00	0.00	2,822.22	18+00	0.00	1,309.26
4+50	0.00	3,484.26	11+50	0.00	3,373.15	18+50	0.00	1,102.78
5+00	0.00	2,987.04	12+00	0.00	3,996.30	19+00	0.00	569.44
5+50	0.00	3,743.52	12+50	0.00	3,594.44	End	0.00	60.65
6+00	0.00	5,821.30	13+00	0.00	2,994.44	End	0.00	143.33
6+50	0.00	5,450.93	13+50	0.00	4,419.44			
7+00	0.00	3,022.22	14+00	0.00	5,354.63			
7+50	0.00	1,547.22	14+50	0.00	3,049.07	<b>Total</b>	<b>0.00</b>	<b>110,981.76</b>

As shown on Table 500-2, There is approximately 110,981.76 cubic yards of total fill material needed to construct final contours over the entire reclamation area. Of this total, approximately 19,700.00 cubic yards of topsoil will be transported from the topsoil storage pile. Topsoil coverage will cover the entire site to a depth of 2.0 feet. The mass balance shows a difference of 6,010.19 cubic yards of excess material when compared to the stored material ( $116,991.95 - 110,981.76 = 6,010.19$ ). Refer to Section R645-301-521.150. Excess soil material will be used to create mounds, extrusions, etc. on the reclaimed surface.

Upon completion of subsoil and topsoil placement the entire area will be pocked to minimize (or eliminate) erosion and sediment transport from the reclamation site. Pocks will be constructed using the bucket of a track-hoe or similar machinery to an approximately size of 2.0' diameter x 1.5' deep. Reclamation of the soil placement area will be conducted as outlined in R645-301-200.

**R645-301-553.100**      **Disturbed Areas**

Generally, all slopes are on a 2:1 or less grade. All slopes will be constructed to achieve a minimum long-term safety factor of 1.3 and will prevent unstable slopes. The two highwalls created by the initial portal development will be completely eliminated to meet approximate original contour provisions. All slopes will be compatible with the postmining land use of the area and will provide adequate drainage.

Since the subdrainage areas in the reclaimed area are ephemeral and rarely receive flow, the drainage systems through the site will be armored with rock but not designed as a riprapped channel. Final surface configuration (Map 500-5) will channel any drainage that may occur from the undisturbed area through the reclaimed armored channels. Drainage will then be conveyed to road culverts (refer to Figure R645-301-500c for location) to direct flow beneath the EC#306 (see R645-301-542.600, Roads). Culvert outlets will extend beyond the south side of EC#306. Runoff will then flow overland through the buffer area for an average of approximately 50 feet before contacting Rilda Creek. Silt fences or straw bales will be placed so that the disturbed runoff will be treated prior to entering the Rilda Creek. After two years of vegetation growth, these structures will be removed.

**R645-301-553.130**      **Slope Stability Analysis**

With the soil conditions, slope, and aspect being similar to that of the Des Bee Dove Mine site, the recommendations made by RB&G Engineering (refer to Des Bee Dove Mine, Appendix XIV, Phase 1 Reclamation, Engineering Section, Appendix C) for slope stability will be used for the Rilda Canyon Portal Facility reclamation. Their analysis assumed strength parameters for foundation fills and embankment fills. It was assumed that the foundation soils consisted of loose to medium dense granular fill extending to a depth of at

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least 10 feet below the existing level surface. A friction angle of 32° with zero cohesion was conservatively assumed for this material. All reclaimed slopes should be equal to or less than 2 horizontal and 1 vertical.

Based upon the results of their analysis and experience in the compaction of similar material in the Phase 1 and Phase 2 Des Bee Dove Mine reclamation project, slope stability can achieve at least a 1.3 safety factor by compacting lifts not exceeding 1 foot in thickness a minimum of four passes with a rubber-tired dozer or sheepsfoot. The Geotechnical Study by AMEC Earth and Environmental Inc. (Volume 11 Appendix Volume - Engineering: Appendix F) concurs with RB&G recommendations. However, their recommendations use only two passes of construction, spreading, or hauling equipment.

No slope failures have occurred at the Des Bee Dove reclaimed site since completion in 2003.

The forest trail which was constructed in association to the mine facilities will be reclaimed using hand tools. The area will be reseeded as outlined in the Biology Section.

As a final step in reclamation of the Rilda Canyon portal facilities, the entire reclaimed area will be seeded and hydromulched as outlined in the Biology Section.

## **R645-301-560      PERFORMANCE STANDARDS**

Coal mining and reclamation operations will be conducted in accordance with the approved permit and requirements of R645-301-510 through R645-301-553.

# **PacifiCorp**

## **Energy West Mining Company**

### **Deer Creek Mine**

#### **Volume 11: Response to Deficiencies, Task ID #2195**

##### **Replace Maps** **Revised to Reflect FRD 024**

<b>Volume 11</b>	<b>Appendix Volume</b>	<b>Map 200-1</b>	
<b>Volume 11</b>	<b>Appendix Volume</b>	<b>Map 200-2</b>	
<b>Volume 11</b>		<b>Map 300-2</b>	
<b>Volume 11</b>		<b>Map 400-1</b>	
<b>Volume 11</b>	<b>Engineering Figures</b>	<b>Figure 500c</b>	
<b>Volume 11</b>		<b>Map 500-1</b>	<b>1 of 3</b>
<b>Volume 11</b>			<b>3 of 3</b>
<b>Volume 11</b>		<b>Map 500-3</b>	
<b>Volume 11</b>		<b>Map 500-5</b>	
<b>Volume 11</b>		<b>Map 600-1</b>	
<b>Volume 11</b>	<b>Appendix Volume</b>	<b>Map 700-1</b>	
<b>Volume 11</b>	<b>Appendix Volume</b>	<b>Map 700-2</b>	
<b>Volume 11</b>	<b>Appendix Volume</b>	<b>Map 700-4</b>	
<b>Volume 11</b>	<b>Appendix Volume</b>	<b>Map 700-5</b>	

**Six Copies Included**

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**Energy West Mining**  
**Company**

**Deer Creek Mine**

**Volume 11 Appendix Volume: Response to  
Deficiencies, Task ID #2195**

**Soils Section**

**Appendix B:**  
Soil Survey Report of the New North Rilda Canyon Portal  
Facilities Area Addendum Soil Storage Survey

Insert Additional Soil Analysis

Six Copies Included

May 14, 2005

To: Mr. Patrick Collins  
Mt. Nebo Scientific  
330 East 400 South, Suite 6  
P.O. Box 337  
Springville, Utah 84663

RECEIVED  
JUN 02 2005  
DIV. OF OIL, GAS & MINING

From: James Nyenhuis  
Certified Professional Soil Scientist  
ARCPACS# 2753  
600 Ramah Drive  
Fort Collins, CO 80525

RE: **Letter Report Attachment** to "Addendum 1, Soil Survey Report for Former Rominger Mine and Helco Mine Areas of Proposed Rilda Canyon Portal and Facilities Area, Deer Creek Mine, March 2005".

Subsequent to completion of soils field work and report preparation for Addendum 1 to the Rilda Canyon soils assessment (Mt. Nebo Scientific, 2004), additional laboratory analyzes were requested. The additional parameters included: Boron and Selenium (mg/kg, hot water soluble), acid-base potential (A:B Potential), and Total Organic Carbon (%TOC). A:B Potential required determination of percent calcium carbonate equivalent and total sulfur percent. Eleven soil samples from four soil profiles were delivered to CSU's Soil Testing Laboratory in Fort Collins, Colorado, for analysis. The sample sites and depths were: RC5 (0-3", 3-12", and 12-18"), RC6 (0-4", 4-14", and 14-34"), RC7 (0-8", 8-18", 18-42", and 42-72"), and RC8 (0-12"). The laboratory results, dated May 13, 2005, are attached to this letter.

Results indicate all parameters are entirely suitable (acceptable) and present no limitations for reclamation potential subsequent to mining activities. Boron values range from 1.2 to 3.8 (ppm), with an average of 2.8 ppm, and are thereby less than the commonly accepted unsuitable threshold value of >5.0 ppm. Selenium values are all less than 0.01 and are entirely suitable. Calcium carbonate values range from 12.4 (good) to 30.1 (poor), and average 20.4 percent (fair). Only one sample (RC6, 14-34", 30.1%) rated poor, just exceeding the poor threshold of 30 percent. Total Organic Carbon (TOC) values range from 1.01 to 7.35 percent with an average of 3.8 percent and are all acceptable with values less than 10 percent. Likewise, Acid-Base Potential values are all acceptable with values >-5 (tons CaCO<sub>3</sub> equivalent/1000 tons). Values range from positive 114 to positive 278 with an average of positive 179. In summary, all parameter values are suitable (acceptable) with no limitations for reclamation potential.

Energy West Mining Co.

Jim Nyenhuis/Certified Soil Scientist

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DATE RECEIVED: 12-13-2004

DATE REPORTED: 03-02-2005

DATE ADDITIONAL REQUESTED: 04-01-2005

DATE REPORTED: 05-13-2005

RILDA CANYON PROJECT

## RESEARCH SOIL ANALYSIS

BILLING:

Lab #	Sample ID #	Hot Water		% CaCO <sub>3</sub> equiv	Total % S	A:B potential	% TOC
		mg/kg B	mg/kg Se				
R2407	RC5 0-3"	3.6	<0.01	19.0	0.736	167	5.81
R2408	RC5 3-12"	3.4	<0.01	19.8	0.915	169	7.35
R2409	RC5 12-18"	3.5	<0.01	21.6	1.15	180	7.20
R2410	RC6 0-4"	2.9	<0.01	24.3	2.78	156	4.71
R2411	RC6 4-14"	2.7	<0.01	28.0	0.914	251	1.29
R2412	RC6 14-34"	2.7	<0.01	30.1	0.721	278	1.01
R2413	RC7 0-8"	3.2	<0.01	12.4	0.320	114	2.85
R2414	RC7 8-18"	3.8	<0.01	16.6	0.308	156	3.92
R2415	RC7 18-42"	1.7	<0.01	18.9	0.315	179	1.96
R2416	RC7 42-72"	1.2	<0.01	13.3	0.218	126	1.35
R2417	RC8 0-12"	1.5	<0.01	20.9	0.493	194	4.87

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JUN 02 2005

DIV. OF OIL, GAS &amp; MINING

APPROVED



Ph.D.

TITLE Manager, Soil, Water & Plant Testing Lab

**PacifiCorp**  
**Energy West Mining**  
**Company**

**Deer Creek Mine**

**Volume 11 Appendix Volume: Response to  
Deficiencies, Task ID #2195**

**Engineering Section**

**Appendix G:**

Rilda Canyon Road - Change Order #1

(Emery County Road Design)

Rilda Canyon Facilities Site Photos

Insert CD Entitled "Emery County Special  
Service District No.1 Rilda Canyon Road  
Improvement Project Emery County Road 306

Six Copies Included