

April 8, 2004

Chuck Semborski, Environmental Supervisor  
Energy West Mining Company  
P.O. Box 310  
Huntington, Utah 84528

Re: Update Appendix XIV, Energy West Mining Company, Des Bee Dove Mine, C/015/0017, Task ID # 1786, Outgoing File

Dear Mr. Semborski:

The above-referenced amendment has been reviewed. There are deficiencies that must be adequately addressed prior to approval. A copy of our Technical Analysis is enclosed for your information. In order for us to continue to process your application, please respond to these deficiencies by July 8, 2004.

If you have any questions, please call me at (801) 538-5268 or Jim Smith at (801) 538-5262.

Sincerely,

Pamela Grubaugh-Littig  
Permit Supervisor

an  
Enclosure  
cc: Price Field Office  
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# State of Utah



## Utah Oil Gas and Mining

### Coal Regulatory Program

Des-Bee-Dove  
Update Appendix XIV  
C/015/0017, Task # 1786  
Technical Analysis  
April 8, 2004



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## TECHNICAL ANALYSIS

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# TECHNICAL ANALYSIS

The Division ensures compliance with the Surface Mining Control and Reclamation Act of 1977(SMCRA). When mines submit a Permit Application Package or an amendment to their Mining and Reclamation Plan, the Division reviews the proposal for conformance to the R645-Coal Mining Rules. This Technical Analysis is such a review. Regardless of these analyses, the permittee must comply with the minimum regulatory requirements as established by SMCRA.

Readers of this document must be aware that the regulatory requirements are included by reference. A complete and current copy of these regulations and a copy of the Technical Analysis and Findings Review Guide can be found at <http://ogm.utah.gov/coal>

This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings which comprise the necessary components of an application. Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.

Often the first technical review of an application finds that the application contains some deficiencies. The deficiencies are discussed in the body of the TA and are identified by a regulatory reference which describes the minimum requirements. In this Technical Analysis we have summarized the deficiencies at the beginning of the document to aid in responding to them. Once all of the deficiencies have been adequately addressed, the TA will be considered final for the permitting action.

It may be that not every topic or regulatory requirement is discussed in this version of the TA. Generally only those sections are analyzed that pertain to a particular permitting action. TA's may have been completed previously and the revised information has not altered the original findings. Those sections that are not discussed in this document are generally considered to be in compliance.

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**TECHNICAL ANALYSIS**

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## INTRODUCTION

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## INTRODUCTION

PacifiCorp, through their subsidiary Energy West Mining Company, is reclaiming the Des-Bee-Dove mine site. Regrading and contouring were completed in June 2003. The reclamation plan originally included leaving a strip of vegetation between the reclaimed bathhouse pad and the canyon bottom. Prior to beginning reclamation excavation and regrading, estimates of erosion and sediment yield for the reclaimed areas had been done using RUSLE 1-06.

However, after reclamation construction began, the Permittee, the Division, and the contractor agreed that the entire slope below the bathhouse should be excavated and recontoured, working from the top of the slope to the canyon bottom and eliminating the strip of vegetation. This was Change Order #2 to Phase II of the Des Bee Dove reclamation plan (Tech Memo dated March 28, 2003 in M: files/coal/2003/internal/0023.pdf).

Change Order #2 added 0.6 acres to the disturbed area between stations 3+00 and 7+00 (Plate 500-3, Appendix XV) at the bathhouse pad outslope. The slope from the pad to the drainage was reshaped to recover fill, rip rap, and substitute topsoil from the outslope. According to the information submitted in the Change Order, the length of the cut would be 125 to 150 ft with a slope angle of 1.9H:1V. The Division required the Permittee to randomly sample the slope between Station 5+00 and 7+00 for pH, EC and SAR before using any of the material as substitute topsoil.

Because the RUSLE calculations are very responsive to the slope length parameter, the change in the configuration of the slope below the bathhouse required a recalculation for that area. Energy West's submittal contains a 3.5-inch floppy disk with new RUSLE 1.6 calculations for profile A3-2D on the slope beneath the bathhouse pad, a revised Table 2 (page 3) of Appendix B, and a revised Drawing CS1854D that shows the location of profile A3-2D. The recalculated values have been entered into Table 2 incorrectly and this needs to be corrected before the amendment can be approved for insertion into the MRP.

This review raises some questions about the derivation of the sediment yield value (SY) from the RUSLE equation. The Permittee is asked to provide a rationale for the choices made in developing the Cover and Management (C) factor. The Permittee is asked to base the Soil Erodibility (K) factor on an average annual precipitation of approximately 13 inches as reported for the Hiawatha weather station in the 1988 Carbon County Soil Survey (p 151).

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## **INTRODUCTION**

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**SUMMARY OF DEFICIENCIES**

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**SUMMARY OF DEFICIENCIES**

The Technical analysis of the proposed permit changes cannot be completed at this time. Additional information is requested of the permittee to address deficiencies in the proposal. A summary of deficiencies is provided below. Additional comments and concerns may also be found within the analysis and findings made in this Draft Technical Analysis. Upon finalization of this review, any deficiencies will be evaluated for compliance with the regulatory requirements. Such deficiencies may be conditioned to the requirements of the permit issued by the division, result in denial of the proposed permit changes, or may result in other executive or enforcement action and deemed necessary by the Division at that time to achieve compliance with the Utah Coal Regulatory Program.

Accordingly, the permittee must address those deficiencies as found within this Draft Technical Analysis and provide the following, prior to approval, in accordance with the requirements of:

***Regulations***

**R645-301-121.200, 742**, The recalculated values for A and SY need to be placed in the correct cells in Table 2 of Appendix B. .... 9

**R645-301-244, (1)** The RUSLE calculation for the disturbed area slopes should be based on a 13 inch average annual rainfall for Hiawatha; and provide a rationale for the choices made concerning development of the C factor. **(2)** An As-Built of Dwg 300-1 should reflect the actual acreage seeded. .... 12

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**SUMMARY OF DEFICIENCIES**

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## RECLAMATION PLAN

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# RECLAMATION PLAN

## TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

### Analysis:

#### Redistribution

The Permittee randomly sampled the bathhouse pad outslope on April 9, 2003, between Station 5+00 and 7+00 for pH, EC and SAR before using any of the material as substitute topsoil (see April 15, 2003 field visit report in M: files/coal/2003/internal/0033.pdf). Intermountain Laboratories/Sheridan analyzed the samples for pH, Electrical Conductivity, and Sodium Adsorption Ratio. The analytical report is included in Change Order #2 of Appendix XV. The SAR values reported for the soil are between 3.42 and 5.68 units. These SAR values are within reason for the permeability class used in developing the K factor for the bathhouse disturbed area soils (see discussion of the Revised Universal Soil Loss Equation in Reclamation Plan – Stabilization of Surface Areas).

### Findings:

The information provided meets the requirements of Reclamation Plan, Topsoil and Subsoil.

## HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

### Analysis:

#### Hydrologic Reclamation Plan

##### *Sediment control measures*

Contouring, pocking, and vegetation are the methods that have been used to keep sediment in place on reclaimed surfaces. Weed-free alfalfa hay was incorporated into the soil at a rate of 2,000 lbs/acre (R645-301-341). Surfaces were roughened by pocking or deep gouging

## RECLAMATION PLAN

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to retain sediment and moisture and to mix the straw mulch into the upper portion of the soil. Hydroseeded areas received wood-fiber mulch. A soil tackifier was applied to protect against erosion until vegetation becomes established (R645-301-244). Rock litter on the surface will also aid in sediment control, enhance vegetation establishment, create microhabitats, and help provide a natural aesthetic appearance (R645-301-244). If erosion is identified during routine monitoring or monitoring after precipitation events, silt fence will be installed and, if needed, the surface will be enhanced and reseeded (R645-301-728).

The reclamation plan originally left a strip of vegetation between the reclaimed bathhouse pad and the canyon bottom. However, after reclamation construction began, the Permittee, the Division, and the contractor agreed that the entire slope below the bathhouse should be excavated and recontoured, working from the top of the slope to the canyon bottom (Change Order #2). This change increased the surface disturbance by 0.6 acre, but:

- Reduced the slope from 1.3:1 to 1.9:1;
- Increased slope stability;
- Increased substitute topsoil was made available for cover;
- Improved safety and efficiency of the work environment; and
- Improved reclamation techniques could be used.

In the approved reclamation plan, estimates of A (annual soil loss) and SY (sediment yield) for the reclaimed areas had been done using RUSLE 1.06. Because the RUSLE calculations are very responsive to LS, the slope length parameter, the change in the configuration of the slope below the bathhouse required a recalculation for profile A3-2D.

Energy West's submittal contains a 3.5-inch floppy disk with the new calculations, and Table 2 (page 3) of Appendix B has been updated. A revised Drawing CS1854D shows the location of profile A3-2D. Elevation contours on Drawing CS1854D are pre-construction estimates (this map should be updated with as-built elevation contours if a new aerial survey is flown over this area.)

A slope length of 502 feet - measured horizontally - and a gradient of 98% were used by Energy West to recalculate A and Y for profile A3-2D: other parameters remained the same as in the previous calculation. (See the TA C/015/017-AM01D-2 dated December 19, 2002 for a discussion of the soil erodibility factor, K.)

**RECLAMATION PLAN**

Energy West	Gradient (%)	Horizontal slope length (ft)	Ground cover (%)	A (tons/acre/year)	SY (tons/acre/year)
A3-2D - old	45	165	64	0.05	0
A3-2D - new	98	502	64	0.23	0.02
Undisturbed areas	57 to 92	70 to 260	55	0.05	0.05

The contours and profile length shown on Drawing CS1854D indicate a gradient of approximately 50%, the reclamation plan calls for a maximum slope of 1.9H:1V (Change Order #2), or 50% for this slope, and a gradient of 45% was used in the original calculation. The Division ran RUSLE using a 50% slope for A3-2D, and again with a 50% slope and ground cover reduced from 64% to 55%, the value used in RUSLE calculations for the undisturbed slopes. Energy West's calculation of A = 0.23 tons/acre/year and SY = 0.02 tons/acre/year seems to be a conservative approximation of soil loss and sediment yield.

Division	Gradient (%)	Horizontal slope length (ft)	Ground cover (%)	A (tons/acre/year)	SY (tons/acre/year)
A3-2D	50	502	64	0.14	0.01
A3-2D	50	502	55	0.17	0.01

Energy West's recalculated A value for A3-2D in Table 2 (Appendix B) has been placed incorrectly in the cell for A1-1D and the new SY value has not been entered in the table. This must be corrected before the submittal can be approved for insertion into the MRP.

**Findings:**

Hydrologic information in the submittal does not meet the requirements of the Coal Mining Rules. Prior to approval, the Permittee must address the following:

**R645-301-121.200, 742**, The recalculated values for A and SY need to be placed in the correct cells in Table 2 of Appendix B.

**STABILIZATION OF SURFACE AREAS**

**Analysis:**

As a result of Change Order #2 (Tab in Appendix XV), the areas seeded varied from the Proposed Seeded Area shown on Dwg 300-1.

Between stations 3+00 and 7+00, the final slope configuration was reduced from 1.3H:1V to 1.9H:1V over a slope length of 125 to 150 feet (Tab 2, Change Order 2, App XV).

The Revised Universal Soil Loss Equation (RUSLE) was used to calculate the average annual soil loss from the disturbed area. The parameters entered into the program are described in Table 2 Annual predicted soil loss from the disturbed area (page 3, App B of App XIV and electronically on a disc). Slope Profiles are illustrated on Dwg CS1854D. This application changes the length of slope for profile A11D from 19.58 to 52.3 feet and the annual soil loss from this disturbed profile is now reported to be 0.23 Tons/year/acre. This profile falls on Station 12+00 of Dwg 500-3 in Appendix XV and does not fall within Stations 3+00 to 7+00 where the bathhouse pad reclamation was changed.

Slope Profile A3-2D, illustrated on Dwg CS1854D, is drawn across stations 4+00 and 5+00 shown on Dwg 500-3. This profile represents the reclamation work that resulted from Change Order #2 (see technical memo dated March 28, 2003 in M: files/coal/2003/internal/0023.pdf). Conditions given for profile A3-2D should have changed with this application.

The site soil survey conducted by Dr. A.R. Southard in 1989 reports a taxonomic classification for the soil as loamy-skeletal, mixed, mesic, Lithic Ustorthents (an Entisol). Dr. Southard reported that the "C" horizon of this soil (below 4 inches) was strongly calcareous and alkaline (pH 8.8) and that bedrock was found at 14 inches. However, the 1970 Carbon/Emery Soil Survey indicates the Rock Land-Shaly Colluvial Land –Castle Valley- Kenilworth Association would be dominant in the Des Bee Dove canyon. Therefore, the Permittee used the Kenilworth Series soil (KeE2) soil was used as a comparison for the undisturbed soil.

The Kenilworth Series is classified in the 1970 Carbon-Emery Area Soil Survey as loamy-skeletal, mixed, mesic Xerollic Calciorthids (an Aridisol). The Kenilworth very stony sandy loam, 0 – 20% slopes, eroded is the typical soil profile of this series. The soil has active sheet erosion with gullies two to three feet deep common in some places. Coatings of lime on the surface rock are common and indicate erosion has removed the supporting soil from around the rock. Table 3 of the 1970 Survey states the following for the KeE2 soil: 50 – 75% gravels and 20 - 50% rock fragments larger than 3 inches; and Hydrologic Group B (having a moderate infiltration rate when thoroughly wet). Table 9 of the 1970 Carbon-Emery Area Soil Survey provides the physical and chemical characteristics of the Kenilworth very stony sandy loam, 0 – 20% slopes, surface horizon (0 – 7 inches): pH 7.7, 15% clay, 62.6% sand (with 17.9% very fine

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RECLAMATION PLAN

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sand), 21.8% silt, 2.6% organic matter, 4% Exchangeable Sodium, and 37.6% CaCO<sub>3</sub> equivalent.

The undisturbed soil samples SS1 and SS5 (taken in 2001) had similar amounts of clay and sand in the profile, as did the soil sampled from trenches in the disturbed area in 2002. The average SAR value of SS1 and SS5 was 0.58 units. The average SAR value of the bathhouse trench soil samples was 6.02 units (Exhibit B of Appendix C of Section 200 in Appendix XIV). Soil samples were taken between stations 3+00 and 7+00 in April 2003 and SAR values ranged from 3.42 to 5.68 units (see Change Order #2 Appendix XV for analytical results).

To calculate the annual soil loss from the reclaimed site, the Permittee used the following parameters in the RUSLE equation: a K value of 0.36, permeability class 3 (moderately permeable). The K value for the Kenilworth Soil was not provided by the 1970 Carbon/Emery soil survey, but the upper limit of 0.37 for the K factor value was suggested by Mr. Dan Larsen (Substitute Topsoil Assessment, January 2002 *in* Appendix C of Section 200 of Appendix XIV). The gouging technique was taken into account in the terracing practices described under input for P (practices).

In calculating the time-invariant Crop factor or C, the % surface and subsurface rock is listed as 64%, which takes into account the 55% rock fragment content of the soil and the application of hydromulch/tackifier.

The Division has the following questions regarding the RUSLE calculation:

1. Choice of time-varying vs. time-invariant cover and management (C factor) option. The C factor chosen was #2 time invariant option using average annual production values and designating the cover crop as desert grassland. The Division believes that the time varying scenario (option #1) fits the site, based on a single disturbance of subsoil fill with no rock cover, adjusting for moisture depletion and calculating the surface cover from soil and slope based on a selection for "no vegetation"
2. If the time-invariant C factor is used, the first choice to make is where the vegetation information is from. The Permittee chose #1 "from plant community & site potential." The Division believes that the choice of #3 "enter directly," might be more appropriate.
3. Hiawatha was added to the City database with a reported rainfall of 5 inches, whereas the 1988 Carbon County Soil Survey (page 151) reports an average of 13.51 inches over the time period 1951 – 1980.

**Findings:**

The information provided does not meet the requirements of Reclamation Plan, Topsoil and Subsoil. Prior to approval, the Permittee must address the following:

**R645-301-244, (1)** The RUSLE calculation for the disturbed area slopes should be based on a 13 inch average annual rainfall for Hiawatha; and provide a rationale for the choices made concerning development of the C factor. **(2)** An As-Built of Dwg 300-1 should reflect the actual acreage seeded.

**MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS**

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

**Analysis:**

**Final Surface Configuration Maps**

Drawing CS1854D has been redrawn to show that profile A3-2D now extends from the top of the reclaimed bathhouse pad to the reclaimed channel. A registered professional engineer certified the map and it appears to be correct.

Elevation contours on Drawing CS1854D are pre-construction estimates. This map should be updated with as-built elevation contours if a new aerial survey is flown over this area.

**Findings:**

Maps, plans and cross sections of reclamation operations meet the requirements of the Coal Mining Rules.