



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

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

ok

October 3, 2001

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

Re: Abatement of NOV-01-7-1-1 Soil Management Plan, PacifiCorp, Des Bee Dove Mine,
C/015/017-AM01A, Outgoing File

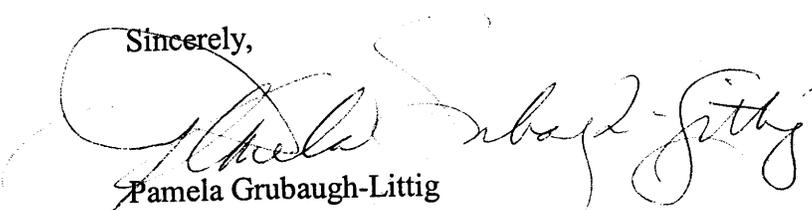
Dear Mr. Semborski:

The above-referenced abatement has been reviewed. The Division has made recommendations based upon earlier sampling information for additional trench locations and to limit sampling to specific parameters that are of particular interest at the Des Bee Dove Mine site.

There are deficiencies that must be discussed and 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 October 31, 2001.

If you have any questions, please call me at (801) 538-5268 or Priscilla Burton at (801) 538-5340.

Sincerely,


Pamela Grubaugh-Littig
Permit Supervisor

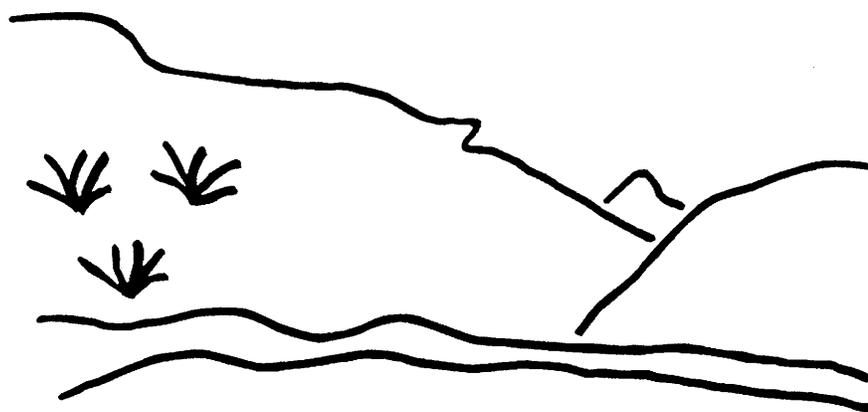
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Enclosure:

cc: Price Field Office

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State of Utah



Utah Oil Gas and Mining

Coal Regulatory Program

Des Bee Dove Mine
Abatement for Notice of Violation
C/015/017-N01-7-1-1
Technical Analysis
October 3, 2001

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TECHNICAL ANALYSIS

INTRODUCTION

A Notice of Violation was written on July 9, 2001 for failure to conduct coal mining and reclamation activities in accordance with the approved plan (page 4-13); failure to comply with the terms and conditions of the permit, all applicable performance standards and requirements of the State program; and failure to remove, segregate and stockpile the best available plant supporting soil medium from within the permit area.

Abatement of NOV 01-7-1-1 required the development of "a soil management plan that includes a complete soil volume and quality analysis to be implemented upon approval." The information received on September 10, 2001 is a proposal to gather information for the requisite plan.

The Division has made recommendations for additional trenches to cover the area more thoroughly. The Division has summarized the parameters of interest for this site and the recommended analytical procedures to be followed.

The Division has requested acreage and yardage information the entire disturbed area as well as for each phase of the reclamation.

The proposal indicates that the Division will be contacted after trenches have been dug at the site. The Division soil scientist would like to be present during the trenching activity, so that field changes can be made with Division input.

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October 3, 2001

INTRODUCTION

SUMMARY OF DEFICIENCIES

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 as 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

- R645-301-120**, The Division has not retained a record of the previous sampling information. Provide the referenced soil sampling information to the Division. 5
- R645-301-130**, The Permittee must commit to the following: 1) Include original Laboratory sheets with the results from the sampling. 2) Record all field information on the NRCS 232 form 3) Employ a qualified soil scientist to direct the field work and evaluate the analytical results of the soil sampling, since judgement is required in taking the soil samples, creating composites from samples taken, and since evaluating the results requires considerable knowledge of soil chemical and physical properties. 6
- R645-301-223**, Provide a summary of the information known about the properties of the spoil and coal waste found within the disturbed area and include laboratory data analysis sheets for the sample sites shown on Plate 2-15. 8
- R645-301-233, Sampling:** The Division requests that there is some representation of the soils existing on the outslope of the Little Dove Beehive access road before the 180° turn and the Deseret pad outslope (including the potential substitute topsoil pile). Further, the Division would like to see a second trench running north/south through the Little Dove Beehive pad. In total, the Division requests three more trenches (six more soil samples). The Division asserts that composite sampling would negate the main purpose of this project, which is to identify the best quality substitute topsoil for reclamation of the site. Samples should only be composited within a trench. The sampling plan should indicate that field notes are taken on the NRCS 232 form to record percent rock fragments and Munsell color and moisture content along with sample location. **Analysis:** The sample analysis should follow the recommended list of analyses outlined in the tables of this technical memo. 18

SUMMARY OF DEFICIENCIES

R645-301-240, What is the acreage of the entire disturbed area? What is the acreage of Phase I and Phase II? What is the acreage and fill yardage required for the bathhouse, the Deseret pad, the Deseret pad outslope and the miscellaneous unnamed areas to be graded during final reclamation. How many yards of suitable topsoil replacement will be needed? How many acres will require substitute topsoil if soil placement is limited to slopes less than 2H/1V and only in pockets on slopes greater than 2H/1V? 20

GENERAL CONTENTS

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

This document does not have page numbers, section numbers or an Appendix number that would help place it in the MRP or which could be referred to by a reviewer.

In the past six months, the Division has reviewed other soil sampling plans for the Des Bee Dove mine. The technical memos for AM01A (valley fill sampling in Appendix A) and AM01B (the Deseret pad/tipple spoil excavation). Information previously gathered was referred to briefly in a statement on the first page of this submittal which reads as follows: "As described earlier, several soil surveys have been conducted in the disturbed and adjacent areas....Based upon this data, compositing of samples of similar material is recommended." This statement refers to the information submitted in AM01A and AM01B. However, both of those amendments were retracted and have been or are in the process of being returned to the Permittee. The Division has not retained a record of the previous sampling information. The previous information referred to in this submittal must be made available again to the Division with this submittal.

Findings:

Information provided in the proposed amendment is not adequate to meet the minimum Operations Plan requirements for Permit Application Format and Contents of the Regulations. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-120, The Division has not retained a record of the previous sampling information. Provide the referenced soil sampling information to the Division.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

The following items are recommended to strengthen the submittal:

- Include original Laboratory sheets with the results from the sampling.

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- Record all field information on the NRCS 232 form
- Employ a qualified soil scientist to direct the field work, since judgement is required in taking the soil samples and creating composites from samples taken, and since evaluating the results requires considerable knowledge of soil chemical and physical properties.

Findings:

The information provided is not adequate to fulfill the technical data reporting requirements of the Regulations. Prior to approval, and in accordance with

R645-301-130, The Permittee must commit to the following: 1) Include original Laboratory sheets with the results from the sampling. 2) Record all field information on the NRCS 232 form 3) Employ a qualified soil scientist to direct the field work and evaluate the analytical results of the soil sampling, since judgement is required in taking the soil samples, creating composites from samples taken, and since evaluating the results requires considerable knowledge of soil chemical and physical properties.

ENVIRONMENTAL RESOURCE INFORMATION

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Minimum Regulatory Requirements:

Provide adequate soil survey information on those portions of the permit area to be affected by surface operations or facilities consisting of a map delineating different soils, soil identification, soil description, and present and potential productivity of existing soils.

Where selected overburden materials are proposed as a supplement or substitute for topsoil, provide results of the analysis, trials and tests required. Results of physical and chemical analyses of overburden and topsoil must be provided to demonstrate that the resulting soil medium is equal to or more suitable for sustaining revegetation than the available topsoil, provided that trials and tests are certified by an approved laboratory. These data may be obtained from any one or a combination of the following sources: U.S. Department of Agriculture Soil Conservation Service published data based on established soil series; U.S. Department of Agriculture Soil Conservation Service Technical Guides; State agricultural agency, university, Tennessee Valley Authority, Bureau of Land Management or U.S. Department of Agriculture Forest Service published data based on soil series properties and behavior; or, results of physical and chemical analyses, field site trials, or greenhouse tests of the topsoil and overburden materials (soil series) from the permit area. If the permittee demonstrates through soil survey or other data that the topsoil and unconsolidated material are insufficient and substitute materials will be used, only the substitute materials must be analyzed.

Analysis:

The average annual precipitation is 6 – 8 inches (page 2-153, Volume 1).

Elevation is 7,800 feet on a south to southeast exposure and slopes of 1 ½ H:1V to 2H:1V. The plant community is Utah juniper and pinyon pine. Plants within this community include Salina wildrye, western wheatgrass, and Indian ricegrass.

Soils have been described in the MRP as either

Typic Ustochrepts (50%) which are characterized by a 35 cm thick (13 inches) sandy loam surface layer with 25% coarse fragments. Underlying this layer is a stony loam layer 100 cm thick (39 inches) with up to 50% coarse fragments.

or

Lithic Ustorthents (25%) which are characterized by rock within 50 cm or 19 inches.

Also present are small areas of Mollisols on the north and east facing slopes. In general, Mollisols are deep, well drained, with a well developed A horizon. See the General Soil Map of the Permit Area, Drawing #CE-10502-DS.

Sampling of adjacent undisturbed slopes was conducted in 1980 and is presented in Table 1, page 4-10 of the MRP. The information shows that undisturbed soils adjacent to the site have on the average a pH of 7.5; EC of 0.4 to 1.0; SAR of 0.8; avail Nitrogen of 0.1%; Organic Matter

ENVIRONMENTAL RESOURCE INFORMATION

of 3%; and extractable phosphorus of 1 ppm. In general, the soils are 11 – 18 inches thick over rock, with small areas of deeper soils.

The Permittee has done previous surveys of the site. The soil sampling locations for these surveys are noted on Plate 2-15 which was submitted with this proposal. The Permittee should summarize the information known about the properties of the spoil and coal waste found within the disturbed area and provide laboratory data analysis sheets for the sample sites shown on Plate 2-15.

Findings:

Information provided in the proposed amendment is not adequate to meet the minimum Operations Plan requirements for Environmental Resource Soils Resource Information of the Regulations. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-223, Provide a summary of the information known about the properties of the spoil and coal waste found within the disturbed area and include laboratory data analysis sheets for the sample sites shown on Plate 2-15.

OPERATION PLAN

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR 817.22; R645-301-230.

Minimum Regulatory Requirements:

Topsoil removal and storage

All topsoil shall be removed as a separate layer from the area to be disturbed, and segregated. Where the topsoil is of insufficient quantity or of poor quality for sustaining vegetation, the selected overburden materials approved by the Division for use as a substitute or supplement to topsoil shall be removed as a separate layer from the area to be disturbed, and segregated. If topsoil is less than 6 inches thick, the operator may remove the topsoil and the unconsolidated materials immediately below the topsoil and treat the mixture as topsoil.

The Division may choose not to require the removal of topsoil for minor disturbances which occur at the site of small structures, such as power poles, signs, or fence lines; or, will not destroy the existing vegetation and will not cause erosion.

All materials shall be removed after the vegetative cover that would interfere with its salvage is cleared from the area to be disturbed, but before any drilling, blasting, mining, or other surface disturbance takes place.

Selected overburden materials may be substituted for, or used as a supplement to, topsoil if the operator demonstrates to the Division that the resulting soil medium is equal to, or more suitable for sustaining vegetation than, the existing topsoil, and the resulting soil medium is the best available in the permit area to support revegetation.

Materials removed shall be segregated and stockpiled when it is impractical to redistribute such materials promptly on regraded areas. Stockpiled materials shall: be selectively placed on a stable site within the permit area; be protected from contaminants and unnecessary compaction that would interfere with revegetation; be protected from wind and water erosion through prompt establishment and maintenance of an effective, quick growing vegetative cover or through other measures approved by the Division; and, not be moved until required for redistribution unless approved by the Division.

Where long-term surface disturbances will result from facilities such as support facilities and preparation plants and where stockpiling of materials would be detrimental to the quality or quantity of those materials, the Division may approve the temporary distribution of the soil materials so removed to an approved site within the permit area to enhance the current use of that site until needed for later reclamation, provided that: such action will not permanently diminish the capability of the topsoil of the host site; and, the material will be retained in a condition more suitable for redistribution than if stockpiled.

The Division may require that the B horizon, C horizon, or other underlying strata, or portions thereof, be removed and segregated, stockpiled, and redistributed as subsoil in accordance with the above requirements if it finds that such subsoil layers are necessary to comply with the revegetation.

Analysis:

The submittal indicates that trenches will be excavated to bedrock or a depth equivalent to the post-mine reclamation elevation with three purposes in mind:

- Identification of bedrock locations,
- Assist channel design,
- Determination of suitable soil resource locations.

As outlined on Plate 2-15, Des-Bee-Dove Coal Mines Soils Map, Energy West proposes to excavate seven soil trenches in the following locations:

- Bathhouse pad through cut slopes,

OPERATION PLAN

- Spoil material stored on bathhouse pad,
- Deseret Mine belt/return portals,
- Near the switchback of the Little Dove/Beehive Access Road,
- Little Dove/Beehive Mine Area between portals parallel to drainage channel,
- Substation Area.

The plan indicates that the Division will be contacted after the trenches have been excavated. Qualified personnel will document the exposed sequences. Fourteen samples will be taken of soil (two per trench) and seven of coal debris/waste (one per trench?). Like samples will be composited. The proposal implies that "detritus deposits [colluvial deposits?], disturbed overburden, and coal waste are relatively similar." Based upon this information, visual comparison and input from the Division staff, samples will be composited to reduce cost, with the exception of unique materials which will be analyzed separately.

The Division asserts that composite sampling would negate the main purpose of this project, which is to identify the best quality substitute topsoil for reclamation of the site. If samples are composited, they should only be composited only within a trench.

The Division has noted during previous reviews of sampling information that the bath house pad materials represented by sample locations 18, 19 and 20 shown on Plate 2-15 had acid/base potentials of greater than 320 Tons/1000 Tons of soil. The valley fill coal fines (now removed) had a negative acid/base potential based upon total sulfur percentage. Therefore, the Division recommends that only refuse or refuse/spoil mixed samples are analyzed for acid/base forming potential and that this potential is calculated based upon the pyritic sulfur content of the samples. Boron and selenium were not issues in all previous sampling, therefore, the Division recommends that these parameters are eliminated from the list for both soil and refuse/spoil.

The Exchangeable Sodium Percentage, based upon the SAR values noted for the coal fines may be an issue. So, the Division recommends that when SAR values are greater than 15 for clay textures and 20 for coarse textured soils, then the Exchangeable Sodium Percentage is measured.

AWC can be estimated based on soil type and soil properties. Soil properties include particle size, soil pores, organic matter, clay type, soil structure, and coarse fragment (gravel, cobble, and stone). The table below 5 contains average values of available water holding capacity for various soil textural classes. These values may be used in-lieu of direct measurements. These estimated values should correlate with the laboratory report for the soil's Saturation Percentage.

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TEXTURE AND AWC*

Soil Texture	Available Water Capacity cm/cm
Clay	0.14 – 0.16
Silty Clay	0.15 – 0.17
Sandy Clay	0.15 – 0.17
Silty Clay Loam	0.19 – 0.21
Clay Loam	0.19 – 0.21
Sandy Clay Loam	0.14 – 0.16
Silt Loam	0.19 – 0.21
Loam	0.16 – 0.18
Very Fine Sandy Loam	0.15 – 0.17
Fine Sandy Loam	0.13 – 0.15
Sandy Loam	0.11 – 0.13
Loamy Fine Sand	0.09 – 0.10
Loamy Sand	0.06 – 0.08
Fine Sand	0.05 – 0.07
Sand	0.06

* adapted from Estimation of Soil Moisture Holding Capacity. USDA Forest Service, Southwestern Region. March 1970.

Keep in mind that Coarse fragments in the soil (gravel, cobble, and stone) occupy volume and therefore reduce the amount of water held in the soil. However, the percent reduction in AWC is not equal to the volume occupied by the coarse fragments since the coarse fragments themselves retain some moisture. Use the following equation to estimate the percent reduction of AWC based on coarse fragment percent:

$$\% \text{ AWC Reduction} = 1.51[\% \text{ coarse fragment}]$$

Finally, AWC is reduced by salts in the soil solution. As a rough guide, reduce the AWC by 25 percent for each 4 mmhos/cm EC of the saturated extract (USDA-NRCS, 1993).¹

¹ U. S. Department of Agriculture. Natural Resources Conservation Service (NRCS). 1993. National Soils Handbook. Title 430. available on the internet at <http://www.statlab.iastate.edu/soils/nssh/>

Missing from the submittal is a discussion of the K-factor values of the soil. This information is of paramount information for the very steep slopes that are proposed. The Revised Universal Soil Loss Equation (RUSLE) is discussed in Agriculture Handbook Number 703 (Renard, et.al. 1997).² The soil erodibility factor ("K") is a numeric representation of the ability of soils to resist erosion and susceptibility of soil particle detachment by water.

For disturbed soils, substitute soils and unpublished soils, the soil erodibility (K) factor must be calculated from the following soil characteristics:

- percent silt and very fine sand
- percent sand
- percent organic matter
- soil structure and
- soil permeability.

The percent very fine sand is the soil fraction that is retained by a 0.05 mm sieve and passes through a 0.100 mm sieve. Procedures for percent organic matter, soil structure and texture (for the percent sand). The soil permeability is estimated from the soil's texture using Soil-Water Data for Major USDA Soil Textural Classes Table below which has been reprinted from Handbook 703 to illustrate the connection between texture and permeability code. An important consideration to be taken into account when assessing the soils permeability is the SAR value of the soil. SAR is not presently part of the RUSLE equation. High SAR values will lower the resistance to erosion and therefore lower the K factor.

The K factor can then be derived using a nomograph located in Agriculture Handbook 703, Chapter 3, page 92 (Renard et.al., 1997). The same nomograph can be found in the National Soils Handbook Title 430 Part 618, Soil erodibility factors, USLE, RUSLE, exhibit 618.12. available on the internet at <http://www.statlab.iastate.edu/soils/nssh>

The nomograph integrates the relationship between the K factor and the five soil properties listed above. The soil erodibility equation also provides an estimate of K, which can be calculated using the following equation:

$$K \text{ factor} = [(0.00021)(M^{1.14})(12 - a) + (3.25)(b - 2) + (2.5)(c - 3)] / 100$$

Where M = (% silt + % very fine sand)(100 - % clay)

a = % organic matter

b = structure code is as follows: 1 = very fine granular; 2 = fine granular; 3 = medium or coarse granular; and 4 = blocky, platy, or massive

c = permeability code

² Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, coordinators. 1997. Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE). U.S. Department of Agriculture, Agriculture Handbook No. 703, 404pp.

OPERATION PLAN

Soil-Water Data for Major USDA Soil Textural Classes

Texture	Permeability Code	Saturated Hydraulic Conductivity ² (in/hr)	Hydrologic Soil Group
Silty clay, clay	6	<0.04	D
Silty clay loam, sand clay	5	0.04-0.08	C-D
Sandy clay loam, clay loam	4	0.08-0.2	C
Loam, silt loam ⁴	3	0.2-0.8	B
Loamy sand, sandy loam	2	0.8-2.4	A
Sand	1	>2.4	A+

The submittal indicates that sample analysis will follow Table 2 of the Division's 1988 Guidelines. Table 2 is a comparison of parameters for overburden evaluation and does not specify analytical methods. Based upon previous sampling at the site, a list of recommended parameters and analytical methods for this site are itemized in the tables 1, 2, & 3 below.

OPERATION PLAN

Table 1. Parameters for Characterization of the Des Bee Dove Mine Site Soils

Test to be Performed	Reported As	Suggested Methods
pH	saturated paste standard units	Soil Science Society of America. 1996. Series No. 5. Methods of Soil Analysis: Part 3 - Chemical Methods . Chapter 14, page 420 and Chapter 16, page 487.
Saturation %	%	Ibid. Chapter 14, pp 420 - 422.
EC_e	dS/m @ 25°C (or mmhos/cm)	Ibid. Chapter 14, pp 420 - 422 and pp 427 - 431.
Soluble Na, K, Mg, Ca	meq/L	Ibid. Chapters 14 pp 420-422 (saturation extract); Chapter 19 pp 555-557; Chapter 20 pp 586-590 (spectroscopic methods).
ALKALINITY OF THE SATURATION EXTRACT	HCO ₃ ⁻ as mg/L CaCO ₃	Western States Laboratory Proficiency Testing Program Soil and Plant Analytical Methods. ³ 1998. v 4.10. p 19. (Saturation Paste Extract Alkalinity, titration with 0.02N HCl)
Available NO₃-N	mg/Kg	Soil Science Society of America. 1996. Series No. 5. Methods of Soil Analysis: Part 3 - Chemical Methods . Chapter 38. p 1129 (KCl extraction). For analysis follow: Sims, J.R. and G.D. Jackson. 1971. Rapid Analysis of Soil Nitrate with Chromotropic Acid. Soil Sci. Soc. Am. Proc. 35-603-606.
Available Phosphorus	mg/Kg	Soil Science Society of America. 1996. Series No. 5. Methods of Soil Analysis: Part 3 - Chemical Methods . Chapter 32, page 895. (NaHCO ₃ Extraction.)
Particle Size Analysis	% sand, very fine sand, silt, and clay	Soil Science Society of America. 1986. Series No. 5. Methods of Soil Analysis: Part 1 - Physical and Mineralogical Methods . Chapter 15 pp 398 and 404-409 (Hydrometer Method).
Organic Matter	%	Western States Laboratory Proficiency Testing Program Soil and Plant Analytical Methods. 1998. v 4.10. p 86. (Loss on Ignition, convert %LOI to OM by regression intercept value as noted in method)
CaCO₃ %	%	Ibid. p. 99 (Soil Carbonates, Gravimetric Determination after extraction with 3 M HCl.) Total Inorganic Carbon = %CaCO ₃ x 0.12.

³ From: Plant, Soil and Water Reference Methods for the Western Region. 1994. R.G. Gavlak, D.A. Horneck, and R.O. Miller. WREP 125.

OPERATION PLAN

Table 2. Additional Analyses Required to Characterize Des Bee Dove Refuse/Coal Mine Waste

PARAMETERS	Reported As	RECOMMENDED METHOD
Total Organic Carbon	%	Western States Laboratory Proficiency Testing Program Soil and Plant Analytical Methods. 1998. v 4.10. p 88. (Combustion Method)
Acid Potential	% pyritic S	U.S. EPA, 1978, EPA 600/278-054. Method 3.2.6, pg 60
Neutralization Potential	% CaCO ₃	U.S. EPA, 1978, EPA 600/278-054. Method 3.2.3, pg 47

The Division requests that during sampling field notes are taken on the NRCS 232 form to record the field parameters outlined in the table below along with sample location. This information should be added to the submittal with the original laboratory analysis sheets. Submitting original laboratory data sheets aides in interpretation of the data and eliminates data entry errors.

Table 3. Field Parameters For Characterization of the Des Bee Dove Mine Site Soils

Test to be Performed	Reported As	Suggested Methods
Texture	%sand, silt, clay	U.S. Department of Agriculture, Natural Resource Conservation Service, 1998. Field Book for Describing and Sampling Soils, Version 1.1. p 2-28 -2-31.
Structure/Consistence	grade, size, type	Ibid. p 2-38 through 2-51.
Visual Estimate % Coal	% area & size fragments	Ibid. p 2-20, 2-26, 7-1, 2-29, and 2-37.
Internal Rock	% volume & size fragments	Ibid. p2-32 through 2-37 and p2-20 and p 2-26.
Surface Rock	% cover & size fragments	Ibid. loc cit.
Soil Color	Hue Value/Chroma	Ibid. p 2-7 through 2-15.
Chemical Response	Effervescence	Ibid. p 2-65.
	Gypsum	U.S. Salinity Laboratory Staff. 1954. Diagnosis and improvement of saline and alkali soils. USDA Handbook 60. Method 22a. p102.

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The following table is recommended for evaluation of the suitability of the soils.

Substitute Topsoil Suitability Evaluation

CRITERIA	GOOD	FAR	POOR	UNACCEPTABLE
Saturation %	25 to 80		<25 >80	
PH	6.1 to 8.2	5.1 to 6.1 8.2 to 8.4	4.5 to 5.0 8.5 to 9.0	< 4.5 > 9.0
EC (mS/cm 25°C)	0 to 4	4 to 8	8 to 15	> 15
SAR ^{a,b}	0 to 4	5 to 10	10 to 15	> 15 ^a
%CaCO ₃	<15	15 - 30	>30	
Texture ^c	sl, l, sil, scl, vfsl, fsl	c, sicl, sc, ls, lfs	sic, s, sc, c, cos, fs, vfs	g, vcoss
Total Organic Carbon	<10%			≥10%
Available Water Capacity ^d	> 0.10 moderate	0.05 to 0.10 low	< 0.05 very low	
K factor ^e	< 0.37		> 0.37	
Acid/Base Potential				≤ 0 tons CaCO ₃ 1000 tons

^a For clay textured soils unacceptable is SAR >14. For sandy textured soils unacceptable is >20.

^b For most Western soils, the SAR to ESP relationship is usually 1:1, up to ESP ≈ 20. If SAR > 20, then determine ESP. (Evangelou, 2000.)

^c s=sand, l= loam, si= silt, c= clay, v= very, f= fine, co=coarse, g=gravel

^d Available Water Capacity is adjusted for texture.

^e K factor recommendations from the USDA Soil Conservation Service. 1978. National Soils Handbook Notice 24. (3/31/78). NSH Part II -403.6(a).

Approximate volumes will be denoted during the survey. Cross-sections will be developed to assist volume calculations.

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From a review of AM01A, the Division understands the following about the Phase I site:

	2.13 acres Little Dove/Beehive	15,000 cy fill
	0.75 acres substation and access road	2,500 cy fill
	<u>0.97</u> acres access road	<u>3,000</u> cy fill
TOTAL	3.85 acres	20,500 cy fill

What is the acreage and fill yardage required for the bathhouse, the Deseret pad, the Deseret pad outslope and the miscellaneous unnamed areas to be graded during final reclamation.

Summary of Planned Trenches Compared by Area Represented

Location	Area	Number of Trenches
Little Dove/Beehive	2.13 acres	1
Little Dove/Beehive Access Road	0.97 acres	1
Bathhouse Pad	2.8 acres (Division estimate)	3
Deseret Mine belt/return	1.0 acres (Division estimate)	1
Potential Substitute Topsoil Pile shown on Plate 2-15		none
Deseret pad outslope	2.0 acres (Division estimate)	None
Outslope of beehive access road before the 180° turn	0.5 acres (Division estimate)	None

The Division requests that there is some representation of the soils existing on the outslope of the Little Dove Beehive access road before the 180° turn and the Deseret pad outslope. Further, the Division would like to see a second trench running north south through the Little Dove Beehive pad. In total, the Division requests three more trenches.

The Division was unaware that there is potential substitute topsoil piled on the slopes above the tipple pad. The potential substitute topsoil was thoroughly mixed with spoils and lost during the remaining operation. However, if this is to be potential substitute topsoil than some sampling of the material will be required.

Removal and Storage

The plan states that “based upon the results of the soil trenching, PacifiCorp will develop a soil management and distribution plan for both Phase 1 and 2 reclamation projects. Identified areas of substitute soil will be excavated, segregated and stored separately during the reclamation process.”

Findings:

Information provided in the proposed amendment is not adequate to meet the minimum Operations Plan requirements for Topsoil Substitute and Supplements of the Regulations. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-233, Sampling: The Division requests that there is some representation of the soils existing on the outslope of the Little Dove Beehive access road before the 180° turn and the Deseret pad outslope (including the potential substitute topsoil pile). Further, the Division would like to see a second trench running north/south through the Little Dove Beehive pad. In total, the Division requests three more trenches (six more soil samples). The Division asserts that composite sampling would negate the main purpose of this project, which is to identify the best quality substitute topsoil for reclamation of the site. Samples should only be composited within a trench. The sampling plan should indicate that field notes are taken on the NRCS 232 form to record percent rock fragments and Munsell color and moisture content along with sample location. **Analysis:** The sample analysis should follow the recommended list of analyses outlined in the tables of this technical memo.

RECLAMATION PLAN

RECLAMATION PLAN

GENERAL REQUIREMENTS

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

Minimum Regulatory Requirements:

Provide a plan for the reclamation of the lands within the proposed permit area, showing how the applicant will comply with the regulatory program and the environmental protection performance standards. The plan shall include, at a minimum, contain the following information for the proposed permit area: a detailed timetable for the completion of each major step in the reclamation plan; a detailed estimate of the cost of the reclamation of the proposed operations required to be covered by a performance bond, with supporting calculations for the estimates; a plan for backfilling, soil stabilization, compacting, and grading, with contour maps or cross sections that show the anticipated final surface configuration of the proposed permit area; a plan for redistribution of topsoil, subsoil, and other material along with a demonstration of the suitability of topsoil substitutes or supplements shall be based upon analysis of the thickness of soil horizons, total depth, texture, percent coarse fragments, pH, and areal extent of the different kinds of soils; other chemical and physical analyses, field-site trials, or greenhouse tests if determined to be necessary or desirable to demonstrate the suitability of the topsoil substitutes or supplements may also be required; a plan for revegetation including, but not limited to, descriptions of the schedule of revegetation, species and amounts per acre of seeds and seedlings to be used, methods to be used in planting and seeding, mulching techniques, irrigation, if appropriate, and pest and disease control measures, if any, measures proposed to be used to determine the success of revegetation, and, a soil testing plan for evaluation of the results of topsoil handling and reclamation procedures related to revegetation; a description of the measures to be used to maximize the use and conservation of the coal resource; a description of measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed of accordingly and a description of the contingency plans which have been developed to preclude sustained combustion of such materials; a description, including appropriate cross sections and maps, of the measures to be used to seal or manage mine openings, and to plug, case, or manage exploration holes, other bore holes, wells, and other openings within the proposed permit area; and, a description of steps to be taken to comply with the requirements of the Clean Air Act, the Clean Water Act, and other applicable air and water quality laws and regulations and health and safety standards.

Analysis:

From a review of AM01A, the Division understands the following about the Phase I site:

2.13 acres Little Dove/Beehive	15,000 cy fill
0.75 acres substation and access road	2,500 cy fill
<u>0.97</u> acres access road	<u>3,000</u> cy fill
TOTAL 3.85 acres	20,500 cy fill

Topsoil substitute replacement depth is not mentioned in this submittal. For a cover of 6 inches over the entire Phase I site, 3,105 cubic yards would be required.

What is the acreage of the entire disturbed area, Phase I and Phase II? How many acres will require substitute topsoil if soil placement is limited to slopes less than 2H/1V and only in pockets on slopes greater than 2H/1V. i.e. The plan indicates the stability study conducted by

RECLAMATION PLAN

RB&G Engineering, slopes greater than 2H/1V will consist of coarse fragments (maximum size 30 inches and with less than 20% minus one inch. Soil placement will be limited on the slopes greater than 2H/1V to areas between the rock armoring.

Findings:

Information provided in the proposed amendment is not adequate to meet the minimum Reclamation Plan requirements for Topsoil and Subsoil of the Regulations. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-240, What is the acreage of the entire disturbed area? What is the acreage of Phase I and Phase II? What is the acreage and fill yardage required for the bathhouse, the Deseret pad, the Deseret pad outslope and the miscellaneous unnamed areas to be graded during final reclamation. How many yards of suitable topsoil replacement will be needed? How many acres will require substitute topsoil if soil placement is limited to slopes less than 2H/1V and only in pockets on slopes greater than 2H/1V?

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