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

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September 27, 2001

TO: Internal File

FROM: Priscilla Burton, Soils Reclamation Specialist

RE: Abatement for Notice of Violation, PacifiCorp, Des Bee Dove Mine

**SUMMARY:**

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.

**TECHNICAL ANAYLSIS:**

# 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.
- 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.

## MAPS AND PLANS

**Regulatory Reference: 30 CFR 777.14; R645-301-140.**

### Analysis:

Drawing CM-10336-DS, otherwise known as Plate 2-15, submitted with the N.O.V. abatement does not have the existing contours.

### Findings:

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

**R645-301-140,** The Permittee must provide existing contours on Drawing CM-10336-DS.

# 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.**

### 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 Ntriogen of 0.1%; Organic Matter 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. Proposed sampling locations are also indicated on the map. A substitute topsoil pile is designated on the map, but has not been discussed in the narrative. The Permittee should summarize the information known about the properties of the substitute topsoil, 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

## TOPSOIL AND SUBSOIL

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

### 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 sample sites SS11 and SS12 and to excavate seven soil trenches in the following locations:

- Bathhouse pad through cut slopes,
- 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 measurement of the Exchangeable Sodium Percentage is performed.

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.

TEXTURE AND AWC*

| Soil Texture | Available Water Capacity $cm^3/cm^3$ |
|---|---|
| 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]

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). The soil erodiblity 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 seive 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).[2] 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:

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[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/

[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.

K 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

Soil-Water Data for Major USDA Soil Textural Classes

| Texture | Permeability Code[1] | Saturated Hydraulic Conductivity[2] (in/hr) | Hydrologic Soil Group[3] |
|---|---|---|---|
| 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, and 3 below.

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

| Test to be Performed | Reported As | Suggested Methods[3] |
|---|---|---|
| **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 pp586-590 (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.[4] 1998. v 4.10. p 19. (Saturation Paste Extract Alkalinity, titration with 0.02N HCl) |
| **Available $NO_3$-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).<br>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) |
| **$CaCO_3$ %** | % | Ibid. p. 99 (Soil Carbonates, Gravimetric Determination after extraction with 3 M HCl.) Total Inorganic Carbon = %$CaCO_3$ x 0.12. |

[3] Laboratories vary in their capabilities. Specify these recommended methods to the laboratory. Use of other methods requires prior approval from the Division.

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

Table 2. Additional Analyses Required to Characterize Refuse

| 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. |

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

**Substitute Topsoil Suitability Evaluation**

| CRITERIA | GOOD | FAIR | POOR | UNACCEPTABLE |
|---|---|---|---|---|
| Saturation % | 25 to 80 | | <25<br>>80 | |
| PH | 6.1 to 8.2 | 5.1 to 6.1<br>8.2 to 8.4 | 4.5 to 5.0<br>8.5 to 9.0 | < 4.5<br>> 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, vcos |
| Total Organic Carbon | <10% | | | ≥10% |
| Available Water Capacity[d] | > 0.10<br>moderate | 0.05 to 0.10<br>low | < 0.05<br>very low | |
| K factor[e] | < 0.37 | | > 0.37 | |
| Acid/Base Potential | | | | $\leq \frac{0 \text{ tons } CaCO_3}{1000 \text{ tons}}$ |

[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.

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 |
| | 0.97 acres access road | 3,000 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. The Division would also recommend a trench of the soil stockpiled in the access road to the north of the valley fill. In total, the Division requests four 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 remining 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. And finally, a trench of the soil stockpiled in the access road to the north of the valley fill. In total, the Division requests four more trenches (eight 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

## GENERAL REQUIREMENTS

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

**Analysis:**

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 |
| | 0.97 acres access road | 3,000 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 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?

**RECCOMENDATIONS:**

This plan requires further refinement before approval and implementation. A Division soil scientist should be present during the trenching activity to facilitate field changes of the plan.

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