

0018



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

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OK

April 12, 2002

Mike Glasson, Sr. Geologist/Environmental Coordinator  
West Ridge Resources, Inc.  
P. O. Box 902  
Price, Utah 84501

RE: Division Order DO00A, West Ridge Resources, Inc., West Ridge Mine, C/007/041-DO00A-5, Outgoing File

Dear Mr. Glasson:

With the most recent submittal relative to Division Order DO00A, West Ridge Resources has provided the Division with one scenario for backfilling the portal highwall area with angular rock fill. This scenario constructs a backfill which will achieve a vertical slope angle of 40 degrees, which is steeper than 1.5H:1V. The Division's experience is that slopes steeper than 1.5H:1V are very difficult to vegetate, which, in turn, creates concerns relative to erosion and stability. Thus, the Division is concerned about re-vegetating slopes this steep, particularly when a 68 percent vegetative cover must be established in order to meet vegetation standards adequate to for bond release. This, plus the fact that several other deficiencies have been identified, requires that the Permittee address the deficiencies which have been identified in the latest technical analysis, which is enclosed.

R645-301-553.110 requires that disturbed areas be backfilled and graded to achieve approximate original contour. Based on the analysis of Figure 4 of the Agapito Associates Inc. slope stability analysis, the undisturbed slope above the portal highwall assumes a thirty-two degree vertical angle. In consideration of the Division's concerns about re-vegetating the proposed forty degree vertical angle reclamation slope, the requirements of approximate original contour and the need to evaluate the impact to the experimental topsoil practice plan, the Permittee needs to evaluate a reclamation plan which would construct a fill slope utilizing a lesser vertical angle.

The extrapolation of the thirty-two degree vertical angle that the undisturbed slope above the portal highwall area assumes onto the reclamation highwall area would require moving the toe of the reclaim slope towards the drainage at least seventy feet. This, in turn, would require relocating the natural drainage channel an equal amount. The Division realizes that an optimum slope angle may exist somewhere between thirty-two and forty degrees which has the capability of meeting all reclamation criteria to the satisfaction of the regulatory requirements.

**DEFICIENCY LETTER**

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Thus, the Division needs to have the Permittee evaluate an alternative scenario that would utilize a backfilled slope at a smaller vertical angle. The development of this scenario is necessary because the Division needs to make a finding that the continued existence of the experimental practice is environmentally sound. The Division's primary concern is that the backfilled slope will be stable. However, other reclamation standards must also be capable of being achieved in order to receive a final approval for the portal area highwall reclamation plan.

The Division's technical review staff would like to meet with you to establish all of the criteria, which must be met in order for the portal reclamation highwall plan to receive final approval.

Please call me to arrange this meeting at (801) 538-5268. Thank you.

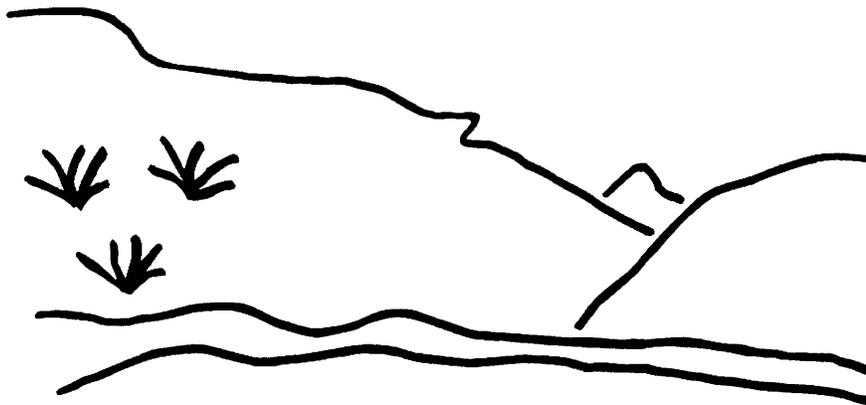
Sincerely,



Pamela Grubaugh-Littig  
Permit Supervisor

PHH/sd  
Enclosure  
cc: Price Field Office  
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# State of Utah



## Utah Oil Gas and Mining

### Coal Regulatory Program

West Ridge Mine  
Division Order DO00A, Round 5  
C/007/041-DO00A-5  
Technical Analysis  
April 1, 2002

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INTRODUCTION

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## TECHNICAL ANALYSIS

### INTRODUCTION

The Permittee has provided the Division with one scenario for backfilling the highwall with angular rock fill to a vertical slope angle of 40 degrees, which is less than 1.5H:1V. The Division is skeptical about revegetating slopes this steep, particularly when a 68 percent vegetative cover must be established in order to meet vegetation standards adequate to meet bond release.

The Permittee needs to evaluate an alternative scenario that would utilize a backfilled slope at a smaller vertical angle. This is necessary so that the Division can make a finding that the continued existence of the experimental practice is environmentally sound. The Division's primary concern is that the backfilled slope will be stable. However, other reclamation standards must also be achieved including approximate original contour.

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April 1, 2002

**INTRODUCTION**

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**SUMMARY OF OUTSTANDING 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- 353**, The reclamation of the highwall must include a rooting zone with fine particles greater than 60% such that adequate rooting depth is replaced for plant establishment. .... 24
- R645-301-121**, Please amend page 30 of Appendix 5-5 to indicate ASCA Y has been dedicated to coal storage and will not serve as an optional topsoil storage site on as as-needed basis. ... 12
- R645-301-121.100**, Please update the Table of Contents – Appendices (page iv of Chapter 5 of the MRP) to include Appendix 5-7 and this most recent submittal and provide C1 and C2 forms that relates the manner of incorporation of the various rounds of DO00A into the MRP.8
- R645-301-121.200**, Appendix 7-4 of the mining and reclamation plan must be corrected to accurately describe the right hand fork topsoil storage pile as an ASCA. Acreages indicated for the other ASCA’s discussed should be verified for accuracy, as the acreages depicted on Map 2-4 for the Strych and Midfork topsoil test plot areas do not coincide with those enumerated in Appendix 7-4..... 14
- R645-301-121.200**, page 7-32 of Volume 3, Chapter 7, Section R645-301-732.100 SEDIMENT CONTROL MEASURES must be revised to accurately reflect the acreages depicted on Map 2-4 (the test plot acreages for the Strych (0.06) and the Midfork (0.07) do not coincide with the statement on page 7-32, “the alternate sediment control area located in the right fork is 0.46 acres...” As noted previously, the left fork stockpile area does not exist, so this statement must also be revised. .... 14
- R645-301-121.200**, The Permittee must clarify each of the following: 1) What is meant by the post-peak friction angle and why it was used instead of the peak friction angle, 2) Why the

**SUMMARY OF OUTSTANDING DEFICIENCIES**

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moist and saturated unit weights in Table 2 of the Agapito report are the same, 3) Why the Proctor value for the lower bench is assumed to be 90%, 4) Why the backfill material must be compacted to 95% of the Proctor value and why the lift should not exceed 2 feet ..... 22

**R645-301-121.222**, The Permittee needs to include complete references in the Agapito report. Incomplete references include Claasen and Hogan (1998) and Rohlman (1993) and Hoek and Brown (1999)..... 22

**R645-301-122**, Please provide the Division with a copy of Terracon Consultants Western, Inc. (1997), "Borrow Source Evaluation Laboratory Results," Terracon Project Report #61971038 Prepared for Andalex, Salt Lake City, Utah, December 18 as referenced on page 6 of the Agapito Report..... 8

**R645-301-130**, Add pertinent information for Terracon Consultants Western, Inc. and Advanced Terra Testing, Inc to the MRP, Appendix 1-6, Consultation and Coordination..... 8

**R645-301-341**, Please provide 1) Detail how the soil surface will be loosened to a four-foot depth to provide for proper root growth; 2) Provide detail as to the degree and amount of roughness for this steep slope; 3) Detail the amount and spacing of boulders; 4) Provide the rate of application for the surface mulch; and 5) Examples of successfully reclaimed slopes near the angle of repose with greater than 60 percent vegetative cover. .... 25

**R645-301-542.200 and R645-301-512.120**, The permittee must have the designs in the Agapito report certified by a registered professional engineer..... 21

**R645-301-542.200**, The permittee must explain why they will incorporate drainage systems into the final slope design if no seeps are present and the drainage system will decrease the slope stability..... 21

**R645-301-542.200**, The permittee must incorporate detailed cross-sections that show the design requirements for the highwall area. The reclamation cross-sections that have been submitted previously and depicted on Maps 5-6A and 5-6B, Mine site Cross Sections, Right Fork, Stations 23+00 through 27+00 must be modified to reflect the design in the Agapito analysis. Maps 5-6A and 5-6B only depict final surface configurations in the portal highwall area. Additional drawings of the aforementioned cross-sections must show the rock fill, the compacted fill, and all drainage controls. These additional cross-sections for the reclaimed highwall must have the same level of detail as Figure 4 in the Agapito study..... 21

**R645-301-542.200**, The permittee must incorporate the design requirements for the highwall elimination plan given in Section 3.1 of the Agapito report into the Mining and Reclamation Plan ..... 21

**R645-301-542.200**, The permittee must show that the backfill material can be compacted in 2-foot lifts to meet the soil properties that are recommended in the Agapito report. .... 22

**SUMMARY OF OUTSTANDING DEFICIENCIES**

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- R645-301-542.200**, The permittee must show that the soil settling will not result in the highwall becoming exposed..... 22
- R645-301-553.130**, The permittee must show that the backfill material used for reclaiming the highwall has an inherent angle of repose greater than the slope angle, which is 40. This material must also meet the other engineering specifications outlined in the Agapito study. In order to meet all the requirements of this section, the permittee must state the source of the backfill material ..... 22
- R645-301-731.760**, Map 7-2, Mine Site Drainage Map must show ASCA..... 14
- R645-302- 212.300 and R645-302-214**, The Permittee must demonstrate to the Division through comparative scenarios that retaining the experimental practice will result in a long-term reclamation of the highwall that is more or at least as environmentally protective as the alternative of eliminating the experimental practice and reducing the slope of the backfill and replacing topsoil..... 28

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**SUMMARY OF OUTSTANDING DEFICIENCIES**

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GENERAL CONTENTS

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## GENERAL CONTENTS

### PERMIT APPLICATION FORMAT AND CONTENTS

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

#### **Analysis:**

This January 15, 2002 submittal includes an Addendum to Appendix 5-9 as specified on the accompanying C1 and C2 forms. The June 2001 submittal included Appendix 5-9 West Ridge Mine Proposed Highwall Reclamation and Attachment A Stability Evaluation for the Proposed Reclaimed Slope At the Portal Excavation (Revision 1) and Appendix A (XSTABL output files).

It is difficult to understand why The Appendix 5-9 was designated as such, because the last Appendix listed in the Table of Contents – Appendices for Chapter 5 ends with Appendix 5-6. However, there is an Appendix 5-7 in the MRP entitled West Ridge Mine Pumphouse Reclamation and Sedimentation Control. Please update the Table of Contents for the Appendices to include Appendix 5-7 and this most recent submittal.

Terracon Consultants (1997) generated the shear strength values for the compacted fill. The Terracon Report is referenced in the Agapito Report, but was not found in the submittal or earlier submittals of DO00A.

Based upon the Terracon Consultant's work, the average values of cohesion and internal angle of friction for the unsaturated (but moist) backfill material are reported in Appendix 5-4, Table 3-1 of the approved MRP as 347.5 psf and 31.5 degrees, respectively. The same backfill material is reported in Table 2 of the January 11, 2002 Agapito report to have a moist cohesion of 771.7 psf and internal angle of friction of 38.4 degrees also based upon the Advanced Terra Testing (2002) study. Later in the 2002 Agapito study, this figure of 38.4 degrees is related to be the post-peak friction angle (page 8). The Division would like an opportunity to review and compare the 1997 Terracon Consultant's report with the 2002 Advanced Terra Testing study.

#### **Findings:**

The submittal does not include material that is referenced, but unavailable to the Division. Prior to approval and in accordance with:

**R645-301-121.100**, Please update the Table of Contents – Appendices (page iv of Chapter 5 of the MRP) to include Appendix 5-7 and this most recent submittal and provide C1 and C2 forms that relates the manner of incorporation of the

various rounds of DO00A into the MRP.

**R645-301-122**, Please provide the Division with a copy of Terracon Consultants Western, Inc. (1997), "Borrow Source Evaluation Laboratory Results," Terracon Project Report #61971038 Prepared for Andalex, Salt Lake City, Utah, December 18 as referenced on page 6 of the Agapito Report.

## REPORTING OF TECHNICAL DATA

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

### Analysis:

The reclamation plan is based upon a report jointly produced by Agapito Associates, Inc. (AAI) and Mt. Nebo Scientific, entitled, "Stability Evaluation for the Proposed Reclaimed Slope at the Portal Excavation, West Ridge Mine, January 2002." AAI was responsible for slope stability and geotechnical design. Mt Nebo supplied the revegetation and erosion control methods. Both these consultants have been listed by names and addresses in Appendix 1-6.

Terracon Consultants Western, Inc. conducted the soil engineering analyses in 1997.

Advanced Terra Testing, Inc. conducted soils investigations in 2002.

### Findings:

The information is not adequate to provide a reporting of technical data. Prior to approval, in accordance with:

**R645-301-130**, Add pertinent information for Terracon Consultants Western, Inc. and Advanced Terra Testing, Inc to the MRP, Appendix 1-6, Consultation and Coordination.

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:

Soils in the vicinity of the highwall are listed on Map 2-2 as Midfork very stony fine sandy loam, 10 – 50% slopes. These soils are described in Appendix 2-2. Pit 14 was located in the immediate area of the highwall. In his January 15, 1997 Soil Resource Assessment, Mr. James Nyenhuis described the soils on the slopes of the highwall thusly:

*It (the Midfork map unit) is located primarily along the more densely vegetated south slope (north-facing slope) of the right fork drainage. Present vegetation is mainly Douglas fir and snowberry. The average annual precipitation is 16 to 20 inches, and the average freeze-free period is 60 to 80 days.*

*The M map unit is 75% Midfork, and 10% Rubbleland, 10% Commodore, and 5% Rock Outcrop. Midfork is deep to very deep, well drained. Effective rooting depth is 60 inches or more. Commodore is similar to Midfork but is shallow (<20 inches) to bedrock. Commodore was not sampled because it is a minor inclusion. Typically, the surface of Midfork is covered by an organic layer of twigs, leaves, and needles about 1.5 inches thick. The very dark grayish brown to brown "A" horizon is 5 – 7 inches thick and has gravelly to very stony fine sandy loam-to-loam texture. Total rock fragment content of the "A" horizon ranges from about 17 – 35% and can include about 10% gravel, 5 to 10% cobble or flagstone, and 2 – 15% stones and boulders.*

*The underlying subsoil layer is typically from about 7 to 18 inches in depth, and has very cobbly sandy loam-to-loam texture. Total rock fragment content of the subsoil ranges from about 7 to 40% and can include 5 to 15% gravel, 5 to 15% cobble or flagstone, and 1 to 15% stones and boulders. The substratum extends from the subsoil to a depth of 60 inches or more and has very gravelly to very stony sandy loam-to-loam texture. Total rock fragment content of the substratum ranges from about 35 to 40% and can include 10 to 15% gravel, 10 to 15% cobble or flagstone, and 10 to 20% stones or boulders. (Appendix 2-2, pp 14 - 15).*

Soils from the highwall slope were salvaged to a depth of 18 inches. Mr. Nyenhuis indicated that below this depth the rock fragment content exceeded 35 – 40% and 20% of that was large stones and boulders (Appendix 2-2, page 15).

**Findings:**

The information provided in the MRP adequately describes the pre-existing condition of the highwall.

OPERATION PLAN

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## 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:

##### Removal and Storage

This submittal revises page 30 of Appendix 5-5 to state, "In the left fork, the secondary topsoil storage area (ASCA Y) has been eliminated. This area is an optional topsoil storage site and is to be used only on an as-needed basis." Since this area has been dedicated to coal storage, the area will not likely be used as a topsoil storage site. The Division recommends that the statement referring to optional topsoil storage in the Left Fork be struck from the plan.

## OPERATION PLAN

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Map 2-2, Mine site Order 1 Soil Survey has been revised accordingly. Sample site locations have been retained on Map 2-2. (The commitment to sample the soil of the operations pad over the next five years is described in the Annual Report year 2000.)

Map 2-4, Topsoil Storage Area provides cross-sections and a profile of the topsoil stockpile, indicating that 7,613 cu yards of soil are presently stored in the topsoil storage area.

### Topsoil Substitutes and Supplements

Borrow area soils have been identified on page 2-14 of the MRP and in Appendix 2-4. Map 2-4 locates the borrow soils and provides reclamation contours for the borrow site.

### Findings:

The As-Built maps submitted are adequate to satisfy the operation plan's topsoil and subsoil requirements of the Regulations. There is one detail to be corrected prior to approval and in accordance with:

**R645-301-121**, Please amend page 30 of Appendix 5-5 to indicate ASCA Y has been dedicated to coal storage and will not serve as an optional topsoil storage site on as as-needed basis.

## MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

### Minimum Regulatory Requirements:

Each application shall contain maps, plans, and cross sections which show the mining activities to be conducted, the lands to be affected throughout the operation, and any change in a facility or feature to be caused by the proposed operations, if the facility or feature was shown and described as an existing structure.

The following shall be shown for the proposed permit area:

#### Mining facilities maps

Location of each facility used in conjunction with mining operations. Such structures and facilities shall include, but not be limited to: buildings, utility corridors, roads, and facilities to be used in mining and reclamation operations or by others within the permit area; each coal storage, cleaning, and loading area; each topsoil, spoil, coal preparation waste, underground development waste, and noncoal waste storage area; each water diversion, collection, conveyance, treatment, storage and discharge facility; each source of waste and each waste disposal facility relating to coal processing or pollution control; each facility to be used to protect and enhance fish and wildlife related environmental values; each explosives storage and handling facility; location of each sedimentation pond, permanent water impoundment, coal processing waste bank, and coal processing water dam and embankment, and disposal areas for underground development waste and excess spoil; and, each plan or profile, at cross sections specified by the Division, of the anticipated surface configuration to be achieved for the affected areas during mining operations.

#### Certification Requirements

Cross sections, maps, and plans required to show the design, location, elevation, or horizontal or vertical extent of the land surface or of a structure or facility used to conduct mining and reclamation operations shall be prepared by, or under the

## OPERATION PLAN

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direction of, and certified by a qualified, registered, professional engineer, a professional geologist, or in any State which authorizes land surveyors to prepare and certify such cross sections, maps, and plans, a qualified, registered, professional land surveyor, with assistance from experts in related fields such as landscape architecture.

Each detailed design plan for an impounding structure that meets or exceeds the size or other criteria of the Mine Safety and Health Administration, 30 CFR Section 77.216(a) shall: be prepared by, or under the direction of, and certified by a qualified registered professional engineer with assistance from experts in related fields such as geology, land surveying, and landscape architecture; include any geotechnical investigation, design, and construction requirements for the structure; describe the operation and maintenance requirements for each structure; and, describe the timetable and plans to remove each structure, if appropriate.

Each detailed design plan for an impounding structure that does not meet the size or other criteria of 30 CFR Section 77.216(a) shall: be prepared by, or under the direction of, and certified by a qualified, registered, professional engineer, or in any State which authorizes land surveyors to prepare and certify such plans, a qualified, registered, professional land surveyor, except that all coal processing waste dams and embankments shall be certified by a qualified, registered, professional engineer; include any design and construction requirements for the structure, including any required geotechnical information; describe the operation and maintenance requirements for each structure; and, describe the timetable and plans to remove each structure, if appropriate.

### Analysis:

#### Mining Facilities Maps

As part of the January 15, 2002 submittal, the permittee included a revised Map 2-4, Topsoil Storage Area, and Map 2-2, Mine site Order 1 Soil Survey. Both maps depict the topsoil storage area in the upper right fork, but Map 2-4 has cross-sections through the topsoil storage area that show the pre-mining and operational phase of the upper right hand fork topsoil pile. Sections 0+00, 0+50 and 1+00 (Map 2-4) show cut banks on the east side of the right fork. These are not considered highwalls, as they do not provide access to the Sunnyside coal seams. Therefore, they have not been analyzed as part of the Agapito slope stability analysis.

Map 2-4 has several problems; however, although a Utah registered professional engineer certifies it. The topsoil storage area and its cross-sections are not depicted as an ASCA, either on Map 2-4, Topsoil Storage Area, or on Map 7-2, Mine Site Drainage Map. This topsoil pile utilizes the following methods of treatment to preserve the resource, and treat the design event, vegetation, pocking, silt fence(s), and a retention basin.

The test plot for the Strych and Midfork test plot area storage piles is identified as ASCA X. The silt fence that surrounds the down slope side of this ASCA is not depicted.

The topsoil storage pile that exists in the right hand fork has not been depicted as an ASCA. Nor is that ASCA discussed in the mining and reclamation plan, (See Appendix 7-4, pages 1, 11 and 12). Although ASCA "Y" is described as a topsoil storage pile, it does not exist, although same was to be located in the upper left fork of "C" Canyon. This must be corrected.

**Findings:**

The information provided in the proposed amendment is not considered adequate to meet the requirement of this section. Before approval, the permittee must provide the following in accordance with:

**R645-301-731.760**, Map 7-2, Mine Site Drainage Map must show ASCA.

**R645-301-121.200**, Appendix 7-4 of the mining and reclamation plan must be corrected to accurately describe the right hand fork topsoil storage pile as an ASCA. Acreages indicated for the other ASCA's discussed should be verified for accuracy, as the acreages depicted on Map 2-4 for the Strych and Midfork topsoil test plot areas do not coincide with those enumerated in Appendix 7-4.

**R645-301-121.200**, page 7-32 of Volume 3, Chapter 7, Section R645-301-732.100 SEDIMENT CONTROL MEASURES must be revised to accurately reflect the acreages depicted on Map 2-4 (the test plot acreages for the Strych (0.06) and the Midfork (0.07) do not coincide with the statement on page 7-32, "the alternate sediment control area located in the right fork is 0.46 acres..." As noted previously, the left fork stockpile area does not exist, so this statement must also be revised.

RECLAMATION PLAN

# RECLAMATION PLAN

## BACKFILLING AND GRADING

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

### Minimum Regulatory Requirements:

#### General

Disturbed areas shall be backfilled and graded to: achieve the approximate original contour; eliminate all highwalls, spoil piles, and depressions; achieve a postmining slope that does not exceed either the angle of repose or such lesser slope as is necessary to achieve a minimum long term static safety factor of 1.3 and to prevent slides; minimize erosion and water pollution both on and off the site; and, support the approved postmining land use.

The postmining slope may vary from the approximate original contour when approval is obtained from the Division for a variance from approximate original contour requirements, or when incomplete elimination of highwalls in previously mined areas is allowed under the regulatory requirements. Small depressions may be constructed if they are needed to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation.

If it is determined by the Division that disturbance of the existing spoil or underground development waste would increase environmental harm or adversely affect the health and safety of the public, the Division may allow the existing spoil or underground development waste pile to remain in place. Accordingly, regrading of settled and revegetated fills to achieve approximate original contour at the conclusion of underground mining activities shall not be required if: the settled and revegetated fills are composed of spoil or nonacid- or nontoxic-forming underground development waste; the spoil or underground development waste is not located so as to be detrimental to the environment, to the health and safety of the public, or to the approved postmining land use; stability of the spoil or underground development waste must be demonstrated through standard geotechnical analysis to be consistent with backfilling and grading requirements for material on the solid bench (1.3 static safety factor) or excess spoil requirements for material not placed on a solid bench (1.5 static safety factor); and, the surface of the spoil or underground development waste shall be vegetated in accordance with the revegetation standards for success, and surface runoff shall be controlled in accordance with the regulatory requirements for diversions.

Spoil shall be returned to the mined-out surface area. Spoil and waste materials shall be compacted where advisable to ensure stability or to prevent leaching of toxic materials. Spoil may be placed on the area outside the mined-out surface area in nonsteep slope areas to restore the approximate original contour by blending the spoil into the surrounding terrain if the following requirements are met: all vegetative and organic materials shall be removed from the area; the topsoil on the area shall be removed, segregated, stored, and redistributed in accordance with regulatory requirements; the spoil shall be backfilled and graded on the area in accordance with the general requirements for backfilling and grading.

Disposal of coal processing waste and underground development waste in the mined-out surface area shall be in accordance with the requirements for the disposal of spoil and waste materials except that a long-term static safety factor of 1.3 shall be achieved.

Exposed coal seams, acid- and toxic-forming materials, and combustible materials exposed, used, or produced during mining shall be adequately covered with nontoxic and noncombustible materials, or treated, to control the impact on surface and ground water, to prevent sustained combustion, and to minimize adverse effects on plant growth and the approved postmining land use.

Cut-and-fill terraces may be allowed by the Division where: needed to conserve soil moisture, ensure stability, and control erosion on final-graded slopes, if the terraces are compatible with the approved postmining land use; or, specialized grading, foundation conditions, or roads are required for the approved postmining land use, in which case the final grading may include a terrace of adequate width to ensure the safety, stability, and erosion control necessary to implement the postmining land-use plan.

Preparation of final-graded surfaces shall be conducted in a manner that minimizes erosion and provides a surface for replacement of topsoil that will minimize slippage.

**Analysis:**

**General**

In the permit application package, the permittee proposed to construct a portal highwall area that was smaller than the one which was necessary to construct access to the coal seams inherent with the "C" Canyon area. During preliminary construction, the permittee encountered burnt coal near the outcrop, which was more extensive than originally anticipated. The high temperatures generated during the burn created very unstable roof conditions several hundred feet into the outcrop, particularly in the run-of-mine belt portal area. The permittee could not follow the approved mine plan because they could not adequately control the fragile roof conditions. The highwall was constructed without the submittal of a revision to the operational plan for the portal area. The highwall was enhanced by the construction of a safety bench, which the Permittee believed was necessary to protect employees and machinery from falling debris.

As part of the permit application package, the permittee had proposed utilizing an experimental practice for the storage of the "C" Canyon topsoil "in-situ." This proposal was reviewed and approved by both the Division and the U.S. Department of the Interior, Office of Surface Mining. With the construction of the more extensive portal highwall, the Division developed concerns relative to the reclaim ability of that area and its potential affect on the "in-situ" topsoil storage plan. The Division aired these concerns to the permittee in Division Order DO00A.

The portal highwall is approximately 300 feet long and varies in height from 0 feet to 85 feet in height. The maximum angle from horizontal of the highwall is 73°. The natural slope angle about the highwall is 32°. The permittee plans to reclaim the highwall with a reclaimed slope angle of 40° from horizontal.

The permittee contracted Agapito Associates, Inc. to conduct the slope stability analyses to address the Division's concerns relative to the slope stability of the reclaimed area. This was done in order to develop an acceptable reclamation plan for the highwall area. In addition to the Agapito analysis, it was necessary for the permittee to conduct a vegetation studies, such that an acceptable revegetation plan could be developed, paying particular attention to the percentage of area covered by flora.

Agapito has on three occasions performed slope stability studies on the highwall area. The Division reviewed two of these and requested additional information. The third analysis was submitted with the permittee's January 15, 2002 response and addresses the following:

- Slope stability
- Pore water pressure
- Vegetation density

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## Slope Stability

The permittee's consultant describes the geotechnical testing that was performed to determine the design properties of the proposed backfill material for the portal area in Section 2 of the study.

The slope stability analysis was presented in Section 4 of the Agapito report. The slope failure modes that were evaluated include:

- The current geometry; static and pseudostatic.
- Reclaimed backfilled slope without the composite drain; rotational failure surface; static and pseudostatic.
- Reclaimed backfilled slope with the composite drain; rotational failure surface; static and pseudostatic.
- Reclaimed backfilled slope with the composite drain; failure surface at geosynthetic/backfill interface, static and pseudostatic.

The permittee used a commercially available computer software program (XSTABL) to conduct the slope stability analysis. The pseudostatic stability analyses were conducted to simulate earthquake loading. The Division does not have requirements for earthquake load for reclaimed slopes. However, that information is useful for evaluating the general backfilling and grading requirements as well as evaluating AOC.

According to the Agapito analysis, the safety factor of the existing portal highwall is 500 for both static and pseudostatic cases. The explanation given for this unusually high safety factor is that there is a very low potential for failure along geologic structures. The dip of the "in-situ" highwall is primarily sub-parallel to the slope face.

The backfilled slope was modeled with and without a composite drain, as recommended by the Agapito analysis. The drain material will only cover 30% of the current slope face if the Division approves the current design. The composite drain material has inherent lower shear strengths than the non-covered surfaces have. The backfilled slope with the composite drain was analyzed by Agapito for two failure modes: rotational, and failure of the geosynthetic/soil surface.

The stability analyses conducted for rotational failure (primarily through the backfill material / no composite drain), indicates stable conditions. The resulting safety factors are static, 1.7 and pseudostatic, 1.6. The results of these analyses are presented in the Agapito study.

The stability analyses conducted for rotational failure (through backfill material, with the composite drain in place), indicates stable conditions. The static safety factor was calculated at 1.5. The pseudostatic safety factor is 1.4.

The stability analyses conducted for plane shear failure at the composite drain/backfill interface also indicates stable conditions. Safety factors of 1.3, static and 1.2, pseudostatic have been determined.

The geotechnical model that was developed represents the most critical slope geometry with respect to slope height and slope angle. Shear strength parameters were developed for the backfill materials based on comprehensive testing. Shear strength values for the other design components of the slope were determined from previous investigations at the West Ridge Mine as well as from manufactures' recommendations.

### **Design**

The slope stability analysis and safety factor determinations were all based upon the design recommendations listed within the Agapito study.

### **Slope angle**

The Permittee does not want to decrease the slope angle because they would be required to move the toe of the slope into the experimental practice area. Therefore, that part of the experimental practice area would be lost and the streambed would have to be disturbed and then reclaimed. Maintaining the toe of the reclaimed slope at the current toe of the lower bench is the Permittee requirement for the consultant.

The Permittee wants to protect the "in-situ" experimental practice topsoil storage area. If the slope were extended, part of the experimental practice area would be destroyed and the Permittee would have to reclaim the stream channel by other means. While the Division supports the preservation of the experimental practice area, their first priority is complete highwall reclamation.

### **Minimum Safety Factor of 1.3**

The consultant did slope stability analysis based on the design involving the use of drains. The first analysis involved a rotational failure for which the safety factor was 1.5. The second involved a plane shear failure along the drain backfill interface. The safety factor for that scenario was 1.3. The Division wants to know why the Permittee wants to place drains in the slope if they will significantly reduce the safety factor.

The consultant's report recommends that the backfill material should have an internal angle of friction of 38.4° and cohesion of 772 psf. The report also states that the material should be compacted to a minimum of 95% Proctor and recommend that the lift not exceed 2 feet. See Page 9 of the Agapito January 11, 2002 report.

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The Division is not aware of any compaction procedures that will result in a 95% proctor when the material is placed in 2-foot lifts. The usual procedure is to place material in 4-inch to 6-inch lifts. Therefore, the Division needs the Permittee to provide information on the type of compaction techniques that would result in a 95% proctor when the material is placed in 2-foot lifts.

### **Maintain the Toe of the Slope in the Present Location**

The Permittee wants to keep the location of the toe of the slope in the present location in order to preserve the experimental practice area. While the Division supports the continuous use of the experimental practice area, the primary concern is the total reclamation of the highwall.

### **Minimizing Pore Water Pressures**

The Permittee proposes to place drains in the backfill to handle any water infiltration. The primary concern is to prevent pore pressure build up.

The Division's main concern with the drains is they reduce the safety factor. The Permittee has stated that no seep or spring exist in the highwall. The most likely source of water is from surface infiltration. If the slope design with the drains meets the minimum safety factor requirements then the Division will allow them to be incorporated into the design.

The engineering design standards for the required backfill are listed in Section 3.1 of the Agapito report. They include the following:

- The backfill material must have an internal angle of friction of 38.4 and shear strength of 771.7 pounds per square foot.
- A test fill should be conducted to assess the maximum lift thickness that will result in a 95% Standard Proctor compaction.
- A maximum lift thickness of 2 feet should be implemented and monitored.
- Hand-operated compaction equipment should be used near the slope face to assure adequate compaction.
- Separation of the backfill from the in situ slope should be ensured.
- The reclamation slope face should be irregular.
- Any boulders buried in the slope should have at least 75% of their volume covered.

In order for the Division to approve the highwall reclamation plan, the permittee needs to incorporate the Agapito design recommendations into the mining and reclamation plan. The design recommendations must include detailed cross-sections that show the rock fill, the compacted fill and all drainage controls. The permittee must commit to ensuring that the verification of lift thickness and adequate compaction are met, and that these design requirements, which are critical to ensuring that the required static safety factor for the reclaimed area is met, are certified by a registered professional geotechnical engineer.

### General Backfilling and Grading Requirements

The general requirements for backfilling and grading are:

Achieve the approximate original contour in the area. The requirements for achieving AOC are couched in the backfilling requirements. Those requirements include:

- Minimize the off-site effects.
- Achieve a final surface configuration that closely resembles the surrounding area.
- Provide a subsurface foundation for vegetation.
- Support the approved postmining land use.

The general plan to achieve AOC will not change with the new highwall elimination plan. The reclaimed slope will be similar to those in the surrounding areas. The issues involving vegetation are addressed in other sections of the technical analysis.

All highwalls will be eliminated. Drawing 4 of the Agapito study is a cross section of the reclaimed highwall. The fill will be placed such that the existing cuts will be fully reclaimed. No spoil piles or depressions are associated with the highwall.

The Division does have a concern that settling will result in the highwall becoming exposed. The lift thickness will be 2 feet. At best, compaction is only effective to 6 inches. Therefore, 18 inches in every lift will be uncompacted. Over time, the uncompacted soil will settle.

The permittee did not address the angle-of-repose for the backfill material and other soils associated with the highwall reclamation. The Division is concerned about the angle-of-repose of the backfill because the reclaimed slope will achieve a vertical angle of 40 from horizontal. Therefore, the permittee must state where the backfill material will come from. The permittee must give the Division all of the engineering properties of the backfill material. These are necessary to ensure that the design requirements, which dictate the required long-term static safety factor, can be met. The Agapito analysis does show that the reclaimed slope should have a static safety factor of 1.3.

The backfilling and grading requirements have associated design requirements. R645-301-542.300 and R645-301-512.130 requires that a registered professional engineer certify the design for the reclaimed highwall. The designs in the Agapito report were not certified. In addition, the designs in the Agapito report were for an idealized cross section that contains the worst-case scenario. **The permittee needs to take the design requirements in the Agapito report and incorporate them into the reclamation cross sections that deal with the highwall area.**

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The Division reviewed the Agapito report and found several items that were not clear to the Division. Those items are:

- What is meant by the post-peak friction angle and why it was used instead of the peak friction angle?
- Why are the moist and saturated unit weights in Table 2 of the Agapito report the same?
- Why is the Proctor value for the lower bench assumed to be 90%?
- Why must the backfill material be compacted to 95% of the Proctor value and why should the lift not exceed 2 feet?
- Why will a drainage system be incorporated into 30% of the slope if no seeps are present and the drainage system will reduce the safety factor?

The Division needs the Permittee to include the laboratory reports for the material properties for the backfill material including the compacted backfill material with cohesion of 772 psf.

**Findings:**

The information in the deficiency response is not adequate to meet the requirements of this section. The permittee must provide the following in accordance with:

**R645-301-542.200**, The permittee must incorporate detailed cross-sections that show the design requirements for the highwall area. The reclamation cross-sections that have been submitted previously and depicted on Maps 5-6A and 5-6B, Mine site Cross Sections, Right Fork, Stations 23+00 through 27+00 must be modified to reflect the design in the Agapito analysis. Maps 5-6A and 5-6B only depict final surface configurations in the portal highwall area. Additional drawings of the aforementioned cross-sections must show the rock fill, the compacted fill, and all drainage controls. These additional cross-sections for the reclaimed highwall must have the same level of detail as Figure 4 in the Agapito study.

**R645-301-542.200**, The permittee must incorporate the design requirements for the highwall elimination plan given in Section 3.1 of the Agapito report into the Mining and Reclamation Plan

**R645-301-542.200 and R645-301-512.120**, The permittee must have the designs in the Agapito report certified by a registered professional engineer.

**R645-301-542.200**, The permittee must explain why they will incorporate drainage systems into the final slope design if no seeps are present and the drainage system will decrease the slope stability.

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**R645-301-542.200**, The permittee must show that the backfill material can be compacted in 2-foot lifts to meet the soil properties that are recommended in the Agapito report.

**R645-301-542.200**, The permittee must show that the soil settling will not result in the highwall becoming exposed.

**R645-301-553.130**, The permittee must show that the backfill material used for reclaiming the highwall has an inherent angle of repose greater than the slope angle, which is 40. This material must also meet the other engineering specifications outlined in the Agapito study. In order to meet all the requirements of this section, the permittee must state the source of the backfill material

**R645-301-121.200**, The Permittee must clarify each of the following: 1) What is meant by the post-peak friction angle and why it was used instead of the peak friction angle, 2) Why the moist and saturated unit weights in Table 2 of the Agapito report are the same, 3) Why the Proctor value for the lower bench is assumed to be 90%, 4) Why the backfill material must be compacted to 95% of the Proctor value and why the lift should not exceed 2 feet

**R645-301-121.222**, The Permittee needs to include complete references in the Agapito report. Incomplete references include Claasen and Hogan (1998) and Rohlman (1993) and Hoek and Brown (1999).

## TOPSOIL AND SUBSOIL

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

Minimum Regulatory Requirements:

### Redistribution

Topsoil materials shall be redistributed in a manner that: achieves an approximately uniform, stable thickness consistent with the approved postmining land use, contours, and surface-water drainage systems; prevents excess compaction of the materials; and, protects the materials from wind and water erosion before and after seeding and planting.

Before redistribution of the material, the regarded land shall be treated if necessary to reduce potential slippage of the redistribution material and to promote root penetration. If no harm will be caused to the redistributed material and reestablished vegetation, such treatment may be conducted after such material is replaced.

The Division may choose not to require the redistribution of topsoil or topsoil substitutes on the approved postmining embankments of permanent impoundments or of roads if it determines that placement of topsoil or topsoil substitutes on such embankments is inconsistent with the requirement to use the best technology currently available to prevent sedimentation, and, such embankments will be otherwise stabilized.

Nutrients and soil amendments shall be applied to the initially redistributed material when necessary to establish the vegetative cover.

The Division may require that the B horizon, C horizon, or other underlying strata, or portions thereof, removed and

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segregated, stockpiled, be redistributed as subsoil in accordance with the requirements of the above if it finds that such subsoil layers are necessary to comply with the revegetation requirements.

### Analysis:

#### Redistribution

The following information from the June 2001 submittal was not retracted with the receipt of the Addendum to Appendix 5-9 and [the Division assumes] still applies to soil redistribution:

- The highwall will be backfilled using clean, angular rock fill as recommended in the [Agapito] report (narrative Appendix 5-9).
- The highwall backfill will not be covered with soil and will not be revegetated.
- The reclaimed highwall will have the appearance of a "talus slope."
- The specifications for rock fill are outlined in Table 1 of Attachment A and remain unchanged in Table 4 of the Addendum. The minimum particle size is in the gravel range with less than 5% fines (Section 4, Attachment A, June 2001 submittal).

Even though the January submittal suggests that, "the slope face can be constructed with a somewhat irregular surface to promote revegetation and aesthetically blend with natural slopes in the area," there has been no change from the statement of June 2001 Agapito report in Section 4.0 that "To be free-draining, the backfill material must be relatively free of fines that could prevent drainage of infiltrated surface water and any groundwater and result in elevated pore-water pressures. Clean, angular, well-graded durable rockfill meets these requirements."

And it is doubtful that an uneven slope of angular rock, with 6-inch minus rock scattered over the surface and boulders embedded into the fill could provide the water retention necessary to "provide 'microhabitats' necessary to enhance the establishment of native plant species on the reclaimed surface" (Section 3.1, January 15, 2002 Agapito report). The report continues on to describe fertilization of the rock fill in the Revegetation Plan (Section 3.2) and planting of containerized plants and the application of slow release 6-3-1 Biosol fertilizer.

The slope will be bonded with a bonded fiber matrix material such as EcoAegis or Soil Guard (page 11, January 15, 2002 Agapito Report). The report goes on to say that this matrix has excellent water-holding capacity and increases soil moisture and that seeds can germinate in this material. Since there is no soil applied to the fill, the ability of EcoAegis or Soil Guard to perform in this manner is questionable. Once germinated, the seeds will likely perish due to lack of substrate for growth.

### Findings:

The plan is unacceptable for reclamation due to the lack of topsoil placement. The Permittee must consider lessening the slope so that soil can be reapplied to the surface to meet

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the requirements of vegetation cover and density and aesthetics which dictate blending with the natural setting of the canyon (described in the MRP as 10% rubbleland and less than 5% rock outcrop). Prior to approval and in accordance with the following:

**R645-301- 353**, The reclamation of the highwall must include a rooting zone with fine particles greater than 60% such that adequate rooting depth is replaced for plant establishment.

## REVEGETATION

Regulatory Reference: 30 CFR 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Minimum Regulatory Requirements:

Revegetation: General requirements

The permittee shall establish on regraded areas and on all other disturbed areas except water areas and surface areas of roads that are approved as part of the postmining land use, a vegetative cover that is in accordance with the approved permit and reclamation plan and that is: diverse, effective, and permanent; comprised of species native to the area, or of introduced species where desirable and necessary to achieve the approved postmining land use and approved by the Division; at least equal in extent of cover to the natural vegetation of the area; and, capable of stabilizing the soil surface from erosion.

The reestablished plant species shall: be compatible with the approved postmining land use; have the same seasonal characteristics of growth as the original vegetation; be capable of self-regeneration and plant succession; be compatible with the plant and animal species of the area; and, meet the requirements of applicable State and Federal seed, poisonous and noxious plant, and introduced species laws or regulations.

The Division may grant exception to these requirements when the species are necessary to achieve a quick-growing, temporary, stabilizing cover, and measures to establish permanent vegetation are included in the approved permit and reclamation plan.

When the Division approves a cropland postmining land use, the Division may grant exceptions to the requirements related to the original and native species of the area. Areas identified as prime farmlands must also meet those specific requirements as specified under that section.

## Analysis:

### General Requirements

The permittee proposes to reclaim the highwall area to a 40° slope angle. The undisturbed slope above the highwall has a 32° slope angle. The Permittee plans to:

- Compact the slope to a 95 percent compaction standard. Near the slope face the soil will be hand compacted to the required standard and use a temporary form against the outside edge of the slope to ensure compaction.
- If desired, the slope can be constructed with a somewhat irregular surface to promote revegetation, but irregularities cannot extend for more than a few vertical feet.
- If desired, boulders will be incorporated into the fill and rocks less than 6" diameter

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scattered on the surface.

- Biosol fertilizer will be applied at the rate of 1500 pounds per acre.
- The slope will be hydroseeded with the seed mixture shown in Table 5.
- The surface mulched with an unspecified rate of a bonded fiber matrix material.
- Containerized woody plants will be planted at the rate of 2500 plants per acre or one plant every 4.27 foot.
- Diverter logs will be used, if needed, for erosion control.

The information presented does not detail how the soil surface will be loosened to a four-foot depth to provide for proper root growth. The Division's experience has shown that steep slopes require extreme roughening to provide sites for seed germination and growth and erosion control. The information presented does not provide adequate detail as to the degree and amount of roughness for this steep of a slope. The Division's standard for roughness is detailed at: [ftp://dogm.nr.state.ut.us/PUB/MINES/Coal\\_Related/RecMan/Reclamation\\_Manual.pdf](ftp://dogm.nr.state.ut.us/PUB/MINES/Coal_Related/RecMan/Reclamation_Manual.pdf). Boulders could potentially provide microsites for plant growth but the amendment fails to detail the amount and spacing of these boulders. A rate of application for the surface mulch has not been provided.

The Division is skeptical about revegetating slopes this steep. Please provide examples of sites, near the angle of repose, successfully reclaimed and revegetated with 68 percent vegetative cover. If the reclaimed highwall slope was reduced, topsoil could be applied and roughened and the approved vegetative cover standard could possibly be met. Reducing the slope gradient may affect the experimental practice. If the experimental practice is affected, then those parts of the MRP will need modification.

**Findings:**

Information provided in the proposed amendment is not considered adequate to meet the requirement of this section. Prior to approval, the permittee must provide the following in accordance with:

- R645-301-341**, Please provide 1) Detail how the soil surface will be loosened to a four-foot depth to provide for proper root growth; 2) Provide detail as to the degree and amount of roughness for this steep slope; 3) Detail the amount and spacing of boulders; 4) Provide the rate of application for the surface mulch; and 5) Examples of successfully reclaimed slopes near the angle of repose with greater than 60 percent vegetative cover.

## STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR 817.95; R645-301-244.

### Minimum Regulatory Requirements:

All exposed surface areas shall be protected and stabilized to effectively control erosion and air pollution attendant to erosion. Rills and gullies which form in areas that have been regraded and topsoiled and which either disrupt the approved postmining land use or the reestablishment of the vegetative cover, or, cause or contribute to a violation of water quality standards for receiving streams, shall be filled, regraded, or otherwise stabilized; topsoil shall be replaced; and the areas shall be reseeded or replanted.

### Analysis:

Nature of the angular rock fill with less than 5% fines is the greatest contributor to stability of the backfill. The angle of repose of a talus slope is between 43 and 45 degrees. This slope will be at 40 degrees. Issues are raised in the Reclamation Backfilling and Grading section of this Technical Analysis, that cast doubt on the values assigned to the backfill material.

In this proposal, a geosynthetic drain will cover 30% of the existing highwall face, in an attempt to minimize water entry into the fill. This drain appears to be the weak link in the construction of the fill; however, as it has the least factor of safety of all the models in Appendix B of the January 15, 2002 submittal.

### Findings:

The information provided is not adequate to describe the stability of the proposed angular backfill slope. Please refer to the Reclamation Plan - Backfilling and Grading section above for the applicable listed deficiencies.

**SPECIAL CATEGORIES OF MINING**

# **REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING**

## **EXPERIMENTAL PRACTICES MINING**

Regulatory Reference: 30 CFR 785.13; R645-302-210, -302-211, -302-212, -302-213, -302-214, -302-215, -302-216, -302-217, -302-218.

### **Minimum Regulatory Requirements**

No application for an experimental practice under this section shall be approved until the Division first finds in writing and the Director then concurs that:

- 1.) The experimental practice encourages advances in mining and reclamation technology or allows a postmining land use for industrial, commercial, residential, or public use (including recreational facilities) on an experimental basis;
- 2.) The experimental practice is potentially more, or at least as, environmentally protective, during and after mining operations, as would otherwise be required by the regulatory standards;
- 3.) The mining 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
- 4.) The experimental practice does not reduce the protection afforded public health and safety below that provided by the regulatory standards.

Experimental practices granting variances from the special environmental protection performance standards applicable to prime farmland shall be approved only after consultation with the U.S. Department of Agriculture, Soil Conservation Service.

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

Each experimental practice shall be reviewed by the Division at a frequency set forth in the approved permit, but no less frequently than every 2 1/2 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 shall be sent to the permittee and shall be subject to the provisions for administrative and judicial review.

Revisions or modifications to an experimental practice shall be processed in accordance with the regulatory requirements for revisions or modifications and approved by the Division. Any revisions which propose significant alterations in the experimental practice shall, at a minimum, be subject to notice, hearing, and public participation and concurrence by the Director. Revisions that do not propose significant alterations in the experimental practice shall not require concurrence by the Director.

### **Analysis:**

Backfilling the highwall to the original contour will be stable if the fill remains porous and free of fines. Yet, creation of a lesser slope would cover part of the experimental practice where topsoil is buried in the fill. The Division is of the opinion that the successful revegetation of the site takes precedence over the experimental practice. If necessary to achieve a stable and revegetated site, then the experimental practice area must be reduced in size.

The buried topsoil could be recovered from beneath C Canyon and utilized in reclamation of the slope.

**Findings:**

The Permittee has failed to consider a scenario, where revegetation of the site takes precedence over the experimental practice. Prior to approval and in accordance with:

**R645-302- 212.300 and R645-302-214,** The Permittee must demonstrate to the Division through comparative scenarios that retaining the experimental practice will result in a long-term reclamation of the highwall that is more or at least as environmentally protective as the alternative of eliminating the experimental practice and reducing the slope of the backfill and replacing topsoil.

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