# T E C H N I C A L  M E M O R A N D U M

Utah Coal Regulatory Program

October 25, 2005

TO: Internal File

THRU: Wayne Western, Team Lead

FROM: Priscilla Burton, Environmental Scientist III/Soils

RE: Division Order 4-6-00, West Ridge Resource Inc., West Ridge Mine, C/007/0041 Task ID #2233

**SUMMARY:**

Approval is recommended.

The Division Order 00A (DO-00A) was written April 6, 2000. Information received from Andalex Resources Inc. in response to the DO 00A has been reviewed by the Division on the following dates: November 30, 2000; September 21, 2001; April 12, 2002; October 10, 2002; June 16, 2003; and November 3, 2004. A meeting held on November 22, 2004 provided the basis for the latest submittal and hopefully the final resolution of DO-00A. Information was received on April 29, 2004 in response to the meeting of November 22, 2004 and information written in Task 1940 (TA dated November 3, 2004).

Appendix 5-9 now describes Alternate Highwall Reclamation Using a Smaller Vertical Angle Slope. This alternative, previously described in Appendix 5-10 by Blackhawk Engineering, is to create a slope that is about 31.2 to 33.6 degrees (approximately 2.5h:1v), extending the toe of the slope to the northwest into the existing experimental practice topsoil storage location, requiring a 40-foot lateral displacement of the reclaimed stream channel for a distance of 500 feet.

The Alternate Highwall Reclamation Using a Smaller Vertical Angle Slope in Appendix 5-9 is preferred over the plan of retaining the stream channel intact (resulting in a 40 degree slope), because:

- The stability of the slope can be assured without the use of drains, geosynthetics and geotextiles.
- The area of experimental practice to be affected is only 0.74 acres.
- The remaining 16.01 acres of experimental practice would remain unaffected.
- The Division calculates that 0.04% of the 16.75 acres dedicated to the entire experimental practice and 15.5% of the acreage dedicated to buried topsoil will be affected by implementation of the Alternate Highwall Reclamation presented in Appendix 5-9.

Supporting geotechnical analyses are provided in Addendum 1 to App. 5-9.

**TECHNICAL ANALYSIS:**

# GENERAL CONTENTS

## REPORTING OF TECHNICAL DATA

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

**Analysis:**

The reclamation plan described in Appendix 5-9, section III is based upon soil information gathered by West Ridge Resources personnel and Agapito Associates in December 2002. The samples were analyzed by Advanced Terra Testing, Inc. The laboratory analysis report is found in Addendum 1 to Appendix 5-9.

Appendix 5-9 has the stamp of a professional engineer, Mr. Dan Guy, Blackhawk Engineering.

Mt. Nebo Scientific supplied the revegetation and erosion control methods. The three consultants have been listed by names and addresses in Appendix 1-6.

Soil analyses found in App. 2-9 were done by Colorado Analytical Laboratories, Inc; Brighton CO.

**Findings:**

The information meets the requirements for reporting of technical data.

# 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:**

Prior to their disturbance, soils in the vicinity of the highwall were described and the results of that survey is found in Appendix 2-2. Map 2-2 identifies the soils as Midfork, very stony fine sandy loam, 10 – 50% slopes and shows Pit 14 in the immediate area of the highwall. In his January 15, 1997 Soil Resource Assessment, Mr. James Nyenhuis described the soils on the slopes 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).

Colorado Analytical laboratories, Inc., Brighton, Colorado analyzed samples of the pad fill and topsoil collected in December in 2002 by West Ridge Resources personnel and Agapito Associates. The information provided indicates that the backfill material has an elevated EC (6.84 mmhos/cm) and an SAR of 8.2. Using native plant species and under cover of the topsoil material tested, the backfill will be suitable for use within the root zone of the reclaimed highwall.

**Findings:**

The information provided in the plan meets the soil resource requirements of the Regulations.

# OPERATION PLAN

## MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR 784.2, 784.11; R645-301-231, -301-526, -301-528.

**Analysis:**

Section 222.400 and Appendix 5-5 of the MRP describes the use of cut slope material as fill during construction of the pad. A large volume of imported fill was not needed, and the Permittee stated that imported bedding material was used around the culvert only, with the rest of the fill generated from the cuts and a surface layer applied from the gravel pit (communication between Priscilla Burton and Mr. Gary Gray and Mr. Dave Shaver on April 29, 2003). Reclamation of the site will not likely include step 7 shown on Map 5-11 (imported fill). However, as a contingency plan, App. 2.5 of the MRP provides a thorough description of the soil material in the borrow area.

**Findings:**

The information provided meets the requirements of Operation Plan, Mining Operations and Facilities.

# TOPSOIL AND SUBSOIL

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

**Analysis:**

**Topsoil Removal and Storage**

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).

This submittal revises page 30 of Appendix 5-5 to indicate that there is no topsoil storage area in the left fork (ASCA Y has been eliminated). The area is dedicated to coal storage. 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.)

Revised 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. Reclamation of the highwall area while retaining the stream channel in its original configuration would result in a roughly triangular in shape fill, with a base of 300 ft and a height of 85 ft (March 17 submittal: page 3, App 5-9). The Division estimates the area of the reclaimed highwall slope would therefore be no less than 12,750 sq ft or one third of an acre and would require approximately 500 cu yds of topsoil at a twelve-inch replacement depth. The Alternate Highwall Area Reclamation Using a Smaller Vertical Angle Slope (Appendix 5-9) would extend the topsoil coverage requirement 80 feet, for a distance of 400 feet (Sec II, Appendix 5-9), using an additional 20 – 35 $yd^3$, at a replacement depth of one foot to eighteen inches.

The Alternate Highwall Area Reclamation Using a Smaller Vertical Angle Slope (Appendix 5-9) will affect 0.74 acres of buried topsoil. The Permittee intends to salvage this topsoil during channel reconstruction for use at final reclamation (Appendix 5-9, Sec II).

***Topsoil Substitutes and Supplements***

As a contingency plan to the Experimental practice, borrow area soils were identified and described (MRP, sec R645-301-224 and Appendix 2-4). Map 2-4 locates the borrow soils and provides reclamation contours for the borrow site. The plan indicates in Appendix 2-6, page 23 that these soils would be utilized only if needed during final reclamation.

**Findings:**

The information supplied meets the requirements of the Regulations.

# RECLAMATION PLAN

## BACKFILLING AND GRADING

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

**Analysis:**

**Backfilling and Grading On Steep Slopes**

A 40-degree slope was approved for the short slope length in the original reclamation plan. When burned coal was encountered and construction of the portal at the West Ridge Mine did not go according to plan, an extensive highwall was created and the 40 degree slope was not acceptable for the increased length of slope. Therefore, the Permittee has redesigned the reclamation of the highwall. Appendix 5-9 describes a slope of 31.2 to 33.6 degrees.

The backfill was sampled at locations shown on Plate 1 App. 5-9. Table 1 of Appendix 5-9 provides the backfill characteristics of density, cohesion and friction angles. The supporting laboratory analyses are provided in Addendum 1 to App. 5-9.

The Alternate Highwall Reclamation Using a Smaller Vertical Angle Slope in Appendix 5-9 is preferred over the plan that would retain the stream channel intact (a 40 degree slope), because:

- The stability of the slope can be assured without the use of drains, geosynthetics and geotextiles.
- The area of experimental practice to be affected is only 0.74 acres.
- The remaining 16.01 acres of experimental practice would remain unaffected.
- The Division calculates that 0.04% of the 16.75 acres dedicated to the entire experimental practice and 15.5% of the acreage dedicated to buried topsoil will be affected by implementation of the Alternate Highwall Reclamation presented in Appendix 5-9.

The Permittee continues to refer to the 40 degree slope as the approved plan (Plates 2A, B, C, and D of Appendix 5-9). However, the Permittee indicates in Section 541.400 that once approved, the reclamation design of App. 5-9 will be the preferred design.

**Finding:**

The information supplied meets the requirements of Reclamation Plan, Backfilling and Grading.

## TOPSOIL AND SUBSOIL

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

**Analysis:**

**Redistribution**

Soil redistribution plans for reclamation have not changed with this application and will be the same as that described for other cut slopes on the site (App. 5-9, Sec I). This reclamation sequence is described in Appendix 5-5, Part II and on Maps 5-12 of the MRP. Key reclamation tasks are summarized in App. 5-5, Part II, Section 3 and detailed in Section 4.

The approved MRP indicates in Appendix 5-5 Section 4e that backfilling and grading of the highwall will not take place until the excess fill has been removed. The Permittee has re-evaluated the quantity of excess fill under the reclamation scenario proposed in App. 5-9 and revised Table B of App. 5-1 to indicate that there will be 42,108 $yd^3$ of excess cut which will be permanently stored underground.

**Findings:**

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

## STABILIZATION OF SURFACE AREAS

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

**Analysis:**

The approved MRP utilizes boulders (App. 5-5, Section 4e) and scarification 6 – 12 inches (Section R645-301-542.200, page 5-49) and extreme gouging with dimensions approximately 24" x 36" x 18" deep (Section R645-301-341, page 3-11). These measures will remain unchanged with the Alternate Highwall Reclamation Using a Smaller Vertical Angle Slope (Appendix 5-9).

**Findings:**

The information provided meets the requirements of the regulations for applying the best technology available to stabilize surface areas.

# REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

## EXPERIMENTAL PRACTICES MINING

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

**Analysis:**

Appendix 2-6, West Ridge Mine Experimental Practice In-Place Topsoil Protection, details protecting topsoil resources in-place for (1) buried topsoil areas, and (2) buried RO/RL (rock outcrop/rubbleland) Travessilla Complex soil area. These two combined areas account for 16.75 acres of the total 29 acres of disturbed area.

*(1) Buried Topsoil Areas*

The West Ridge Resources topsoil protection protects in-place soil with a layer of geotextile fabric. The geotextile fabric provides a protective barrier between the existing soils and the imported fill materials used to construct the mine pads. By utilizing this procedure, soils were not only preserved in-place, but the existing stream channel geomorphology and original ground surface configuration were also preserved. Approximately 4.75 acres of the proposed 29-acre disturbed area were preserved using the geotextile fabric.

*(2) Buried RO/RL Travessilla Complex Areas*

The buried RO/RL Travessilla Complex mapping was also included in the Experimental Practices. As stated in the Order-III soil survey, the RO/RL Travessilla Complex unit contains 35% soils by volume (25% Travessilla plus 10% other soils) that supports a significant vegetation community. As stated in the plan, the RO/RL areas were not covered with geotextile, but instead, fill was placed directly over the existing ground surface which was marked with brightly colored marker flagging strips placed on 8-foot centers for the purpose of identifying the original surface during reclamation and excavation of the pad fills. Marker strips were used on approximately 12 of the 29 acres of the disturbed area.

(2) *Appendix 5-9 and The Experimental Practice*

A reclamation design for a 31.2 to 33.6 degree slope has been presented in appendix 5-9. This slope would affect the experimental practice between cross sections 24+00 and 28+00 shown on Plates 1 through 3 of appendix 5-9.

After careful evaluation of the significance of the Appendix 5-9 reclamation design to the in-place topsoil experimental practice, the Division concludes that the App. 5-9 design is the preferred method of reclamation and that the reclamation design is not a significant alteration to the experimental practice (correspondence with OSM on this matter dated June 17, 2003). The area of buried topsoil to be affected would be 400 ft x 80 ft or approximately 0.74 acres or 15.5% of the buried topsoil portion of the experimental practice and 0.04% of the entire experimental practice area that includes both buried salvageable topsoil and buried Rockoutcrop/Rubbleland Travessilla complex (sec II, appendix 5-9). No affect on the buried RO/RL Travesilla Complex areas of the experimental practice is expected. These areas comprise 12 acres, (not indicated on Map 2-2).

The reclamation design presented in Appendix 5-9 will create a stable and revegetated site. The topsoil will not be lost, but will be harvested as it is encountered in the process of moving the channel (Appendix 5-9, Section II and IV). There would be no additional disturbance to the south-facing slope of the right fork of C Canyon according to the cross sections shown in Plate 2 of Appendix 5-9.

**Findings:**

The Division finds that the changes to the reclamation plan are not a significant alteration to the experimental practice and that the information provided meets the requirements of the Experimental Practice and Reclamation Plan, Topsoil Subsoil sections of the Regulations.

**RECOMMENDATIONS:**

The Permittee has provided the Division with an Alternate Highwall Reclamation Using a Smaller Vertical Angle Slope in Appendix 5-9. This alternative is recommended for approval and is preferred over the 40 degree slope with an intact stream channel, because:

- The stability of the slope can be assured without the use of drains, geosynthetics and geotextiles.
- The area of experimental practice to be affected is only 0.74 acres.
- The remaining 16.01 acres of experimental practice would remain unaffected.
- The Division calculates that 0.04% of the 16.75 acres dedicated to the entire experimental practice and 15.5% of the 4.75 acres dedicated to buried topsoil will be affected by implementation of the Alternate Highwall Reclamation presented in Appendix 5-9.

Supporting geotechnical analyses are included in Addendum 1 to App. 5-9.