



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

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July 1, 1992

TO: Daron Haddock, Permit Supervisor

FROM: Randy Harden 

RE: Hardscrabble Submittal, AMAX Coal Company, Castle Gate Mine, ACT/007/004-92A, Folder #2, Carbon County, Utah

## Summary:

In accordance with the Stipulation under Docket 91-001, AMAX Coal Company has submitted revised plans for the Hardscrabble Canyon Area. These plans were received by the Division on February 18, 1992. Additional comments as a result of an initial review by the Division were received on June 2, 1992.

The following review in consideration of the outstanding information as a result of the Division Order issued to AMAX and the information incorporated into those proposed changes to the mining and reclamation plan.

Comments and completeness of the information within the text of this review is in regard only to those areas described in Hardscrabble Canyon unless noted otherwise in the comments. Determination of completeness of the response to the Division Order and Compliance of those requirements for approval cannot be made until such time that all of the required information has been submitted as required by the Division Order.

## Analysis:

### Division Order 2)

***R614-301-122. Permit Application Format and Contents. The information contained within the permit must be organized to ensure that each Figure, Plate, Diagram, Analysis etc. that is referenced is included within the Permit Application. The language used in the permit application must accurately differentiate existing and proposed facilities, activities, treatments, etc. This information shall be provided on or before June 1, 1991.***

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**Proposal:**

Information submitted for the Hardscrabble Canyon area is specific only to that section of the plan. A new table of contents for section 3.3 of the plan has been provided.

**Analysis:**

With respect to section 3.3 of the plan, the operator has revised the plan. However, requirements of this section of the Division Order apply to the plan in its entirety.

**Deficiencies:**

The organization and contents of the plan must be revised to comply with this section of the Division Order. This information should be provided with the information provided for the Remaining areas as part of the Settlement Agreement.

Division Order 3)

*R614-301-140. Maps and Plans. The PERMITTEE shall submit to the DIVISION, a schedule for providing complete and accurate maps and drawings to depict the current existing conditions for all facilities, and, proposed reclamation treatments. This schedule shall be provided on or before March 1, 1991.*

**Proposal:**

In accordance with the terms and conditions of the Stipulation (Settlement Agreement), the operator has committed to a schedule for the submittal of the information required in this section of the Division Order.

**Analysis:**

The schedule submitted in conjunction with the Stipulation will be administered, revised and completed under the terms and conditions of the Stipulation.

**Deficiencies:**

None.

Division Order 4)

*R614-301-142. Maps and Plans. The PERMITTEE has not provided maps and plans with the permit application which distinguish among each of the phases during which coal mining and reclamation operations were or will be conducted at any place within the life of operations. At a minimum, distinctions will be clearly shown among those portions of the life of operations in which coal mining and reclamation operations occurred: prior to August 3, 1977; after August 3, 1977, and prior to either May 3, 1978; after May 3, 1978 and prior to the approval of the State Program; and, after the estimated date of issuance of a permit by the Division under the State Program. The PERMITTEE must provide identification as to the date and the use of those areas and facilities within the permit area which have been incorporated into the underground mining activities. Those areas affected by previous mining operations (including cutslopes and outslopes of pads and roads) and used in conjunction with current underground coal mining facilities are to be included in the disturbed areas. This information shall be provided on or before March 1, 1991.*

**Proposal:**

The operator has provided revised drawings for the Hardscrabble Canyon Area. The Post Mining Reclamation Treatments Map, Exhibit 3.3-5 shows the proposed final contours of the area, cross section locations and watershed areas used for reclamation drainage area calculations.

Exhibit 3.3-1 shows the location and the extent of the areas previously disturbed by mining (pre-SMCRA) and those portions of the previously disturbed area which are incorporated into the disturbed area boundary for current mining operations. This exhibit is also used to identify surface facilities within the Hardscrabble Canyon Area.

**Analysis:**

Exhibit 3.3-1 sufficiently shows the areas which were previously affected by mining operations (pre-SMCRA), and identifies those areas which lay within the disturbed area boundaries which are used in conjunction with current mining operations. In the text of the mining and reclamation plan, the operator has indicated that essentially all of the disturbed area shown with the exception of drainage controls, occurred prior to 1977. In context with the requirements of this section of the regulations, it can be assumed that these disturbances occurred prior to August 3, 1977.

Exhibit 3.3-1 also adequately shows that the cutslopes and outslopes of pads and roads used in conjunction with current underground coal mining facilities have been included in the disturbed areas.

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**Deficiencies:**

The operator is considered to be in compliance with this Division Order in regard to the Hardscrabble Canyon Area.

Division Order 13)

*R614-301-340. Reclamation Plan. The PERMITTEE must provide plans to protect reclaimed areas for a minimum 2-year period. The PERMITTEE will revise the MRP to show 1) seedbed preparation plans(i.e. deep ripping to 18-24 inches), 2) that seed and fertilizer will not be mixed in the hydroseeder, 3) plans for the use of the supplemental planting mix for ephemeral/intermittent drainages, including locations(shown on the reclamation maps) and timing of the planting operations, 4) the final revegetation plans (as identified in the July 1990 correspondence) for the cut and fill slopes associated with the Crandall Canyon access road, 5) Clear plans for the reclamation of Gravel Canyon. This information must be provided on or before March 1, 1991.*

**Proposal:**

This Division Order was not specifically addressed as part of the Hardscrabble Canyon area submittal.

**Analysis:**

The requirements of this section of the Division Order apply to the plan in its entirety.

**Deficiencies:**

This information should be provided with the information provided for the Remaining Areas as part of the Settlement Agreement.

Division Order 17)

*R614-301-550. Reclamation Design Criteria and Plans. The permit application must include site specific plans that incorporate the design criteria for reclamation activities. These design criteria and plans shall include but not be limited to: phased reclamation treatments and designs throughout the permit liability period, designs for temporary and permanent surface features, including diversions, impoundments, sediment control structures, and other facilities which will require construction throughout the reclamation process; specific plans and details for all permanent facilities to remain as part of or in conjunction with post mining land use, including roads, utilities, and structures; and, maps and drawings which clearly show the areal and vertical extent of the existing facility areas and those areas throughout all phases of reclamation. This information shall be provided on or before June 1, 1991.*

**Proposal:**

The operator has indicated in section 3.3-4(1) that all existing structures which lie within the disturbed area boundary will be removed and that portals will be sealed according to the plans shown on Figures 3.1-3 and 3.1-4.

The operator has stated that grading will be done in order to establish drainage and stabilize highwalls and cutslopes. The operator states that the disturbed areas are to be graded to approximate the original contours by blending into the surrounding area and creating landforms which resemble the surrounding terrain. Cutslope areas which are left, resemble the cliffs in the surrounding topography and were analyzed for slope stability.

Design criteria for slope stability was conducted by EarthFax as found in Appendix 3.3D. Many of the existing cut slopes will be buttressed at the base of the cuts to allow these areas to bend in with the surrounding area.

The operator's plan states that during the grading process, berms and temporary diversions will be eliminated, grading will establish surface overland flow drainage where possible, culverts will be removed, sediment ponds will be removed, and paved surfaces will be removed prior to the placement of soil. The operator will construct permanent stream channels and provide for alternative sediment control practices following reclamation construction.

Phases of reclamation are discussed in section 3.3-5 of the proposal. Phase I activities include demolition, grading, portal sealing, soil preparation and soil amendments. Phase II activity is listed as seeding and mulching activities. Phase III work includes reclamation monitoring and pond maintenance.

The timing of the reclamation activities calls for the reclamation of the #4 Mine Canyon in the fall of 1992.

**Analysis:**

The revised information submitted has incorporated all facilities within the Hardscrabble Canyon area disturbed area boundary into the reclamation plan. The operator has indicated that the area will be returned to a post mining land use of wildlife and grazing.

Due to tight physical constraints, the operator has proposed the elimination of all sediment ponds within the Hardscrabble Canyon during Phase I reclamation activities. The disturbed area within Hardscrabble Canyon become dissected by the numerous side canyon drainages leaving small, narrow reaches of disturbed areas between and on either side of the main and side canyons. Incorporation of sediment ponds into these areas can be considered impractical. Utilizing sediment ponds for each of these areas would require that a significant amount of the area would have to be redisturbed to eliminate such sediment ponds thus reducing the potential for early reclamation success in the area. These considerations may be used to help justify alternate sediment control measures in lieu of sediment ponds for the area if BCTA practices can demonstrate adequate sediment control for the area.

The text in the plan was revise to indicate that the No. 5 Mine return air shaft configuration is more similar to a down dip portal rather than a shaft. The air shaft itself is underground within the mine workings. Figures 3.1-3 and 3.1-4 are referenced by the operator as part of the portal sealing plan to show a detailed section of the closure of these openings. In May of 1991, the operator submitted a proposal for the sealing of the No. 3 mine and associated openings. Currently all mine openings for the Hardscrabble area have been backfilled as indicated in the portal sealing plan.

**Deficiencies:**

No outstanding deficiencies were found in regard to this portion of the division Order.

Division Order 18)

*R614-301.553. Backfilling and Grading. Backfilling and grading design criteria must be described in the permit application. Disturbed areas must be backfilled and graded to: achieve the approximate original contour, except as provided in R614-301-553.600 through R614-301-553.642; eliminate all highwalls, spoil piles, and depressions, except as provided in R614-301-552.100 (small depressions); R614-301-553.620 (previously mined highwalls); and in R614-301-553.650 (retention of highwalls); 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. Information within the plan does not specifically address the above requirements. This information shall be provided on or before June 1, 1991.*

**Proposal:**

Information regarding backfilling and grading is found in section 3.3-4 of the mining and reclamation plan. The operator has indicated that backfilling and grading will be done in order to establish drainage and stabilize highwalls and cutslopes. The postmining topography is found on Exhibits 3.3-4 and 3.3-5 and the operator has indicated that the proposed grading is compatible with the approved postmining land use of grazing and wildlife habitat, provides adequate drainage and long-term stability.

The operator has indicated that the disturbed areas will be graded to approximate the original contours by blending spoil into the surrounding area and creating landforms which resemble the surrounding terrain. Cutslope areas which are left, resemble the cliffs in the surrounding topography. The retained cutslopes were analyzed by EarthFax Consulting Engineers for slope stability. This information is found in Appendix 3.3D of the plan.

The reclamation plan calls for a maximum grade of 2h:1v. In general, the fill material used at 2h:1v(26.6°) is less than the internal angle of friction for the materials to be used for backfilling which range from 30° to 45°.

Details of the post mining topography can also be found in the cross sections as provided in Exhibits 3.3-8A through F.

**Analysis:**

The operator has not requested a variance for any structures of facilities to be left upon completion of reclamation or as part of an alternative postmining land use. In order to demonstrate compliance with AOC requirements the operator has conducted stability analysis of the slopes to be left for final reclamation, and, has found those slopes to be designed to have a static factor of safety of 1.3 or greater. Cutslopes associated with roads and pads within the Hardscrabble Canyon area have been proposed to be left in some areas and are included in the stability analysis previously described.

The operator has provided maps and drawings for backfilling and grading of the area. Mass balance calculations indicate that there is not an excess of materials which could be utilized to eliminate all highwalls and cut slopes within the disturbed area. However, in areas where the minimum factor of safety was found to be less than 1.3, the operator has provided additional materials at the base of these slopes to buttress the hillsides and increase the factor of safety to be in excess of 1.3. Information shown on map 3.3-5 and the supporting cross sections indicate that much of the area will be returned to approximate original contour, except that highwalls and cut slopes found within portions of the site will not be completely reduced or eliminated. Constraints which limit these areas are primarily the lack of excess materials which can effectively be used to eliminate these cuts and highwalls, and, in some cases, fill required to eliminate such cut slopes would not be considered stable. The operator is considered to have adequately addressed the requirements for this provision for a variance from AOC requirements.

In accordance with R645-301-553.130, disturbed areas must be graded and backfilled to 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. Backfilled portions of the area are in general, graded to the most moderate slope possible. The steepest backfilled slopes are designed to be no greater than 2h:1v (26.6° slope angle), which is considered to be less than the angle of repose for the backfilled materials.

Cut slope areas have been defined on the cross sections provided in the mining and reclamation plan. The maps and cross sections provided show the extent of the disturbed area boundaries.

Information regarding the cut slopes must also be expanded in the plan to incorporate other reclamation treatments that are proposed in the plan. To date the current plan discusses the soiling, vegetation, and sediment control treatments for the backfilled areas only. The operator has committed to revise and rewrite Chapter IX, Revegetation, to add reclamation treatments, methods of monitoring, and evaluation of

the cut slope areas in conjunction with the midterm permit review. Discussion of these cut slope areas needs to be provided in the plan in conjunction with vegetation monitoring and the criteria used to measure the disturbed area for density and diversity prior to any final determination for AOC adequacy and to allow a highwall variance from AOC requirements. This information must be provided prior to satisfaction of the Division Order.

**Deficiencies:**

1. Detailed information needs to be presented in the plan for reclamation treatments of cut slope areas to remain on final reclamation. This information must address methods for monitoring and evaluating vegetation cover and diversity for the entire disturbed area, including the cut slopes. This information should be provided with the information for the remaining areas as part of the Settlement Agreement.

Division Order 19)

*R614-301-553.500. Previously Mined Areas. The PERMITTEE shall demonstrate in writing, that the volume of all reasonably available spoil material is insufficient to completely backfill the reaffected or enlarged highwalls to be retained throughout the mine facilities. The PERMITTEE must also demonstrate that the remaining highwalls shall be eliminated to the maximum extent technically practical in accordance with the following criteria: (1) All spoil generated by the remining operation and any other reasonably available spoil shall be used to backfill the area. Reasonably available spoil in the immediate vicinity of the remining operation shall be included within the permit area. (2) The backfill will be graded to a slope which is compatible with the approved postmining land use and which provides adequate drainage and long term stability. (3) Any highwall remnant shall be stable and not pose a hazard to the public health and safety or to the environment. The PERMITTEE shall demonstrate, to the satisfaction of the regulatory authority (DIVISION), that the highwall remnant is stable. (4) Spoil placed on the outslope during previous mining operations shall not be disturbed if such disturbances will cause instability of the remaining spoil or otherwise increase the hazard to the public health and safety or to the environment. This information shall be provided on or before June 1, 1991.*

**Proposal:**

Section 3.3-5 of the proposal discusses a request for highwall variance from approximate original contour (AOC). The operator has indicated that the highwalls created to access the coal outcrops in Hardscrabble Canyon were created during the

early 1960's prior to the advent of SMCRA and were not reaffected after SMCRA. The location and extent of the highwalls in which the operator is requesting a variance are found on Exhibit 3.3-2 and are the No. 3 portal highwall, the No. 4 portal highwall and the No. 5 mine return air shaft.

The operator has concluded that the highwalls in the Hardscrabble Canyon area are not significantly greater in height or length than the dimensions of existing cliffs in the surrounding area. The highwalls are similar in structural composition to the preexisting cliffs in the surrounding area and are compatible with the visual attributes and geomorphic processes of the area. Slope stability analysis and an evaluation of the highwalls proposed to be retained is provided in Appendix 3.3D in a consultant's report entitled Slope Stability Analyses, Hardscrabble Canyon, Carbon County, Utah, prepared by EarthFax Engineering, Inc., dated February 14, 1992.

The operator has stated that spoil material is unavailable in Hardscrabble Canyon for several reasons. When the highwalls were cut in the 19660's, most of this material was pushed onto the sideslopes of the canyons. The operator has stated that this material has since settled into a stable and vegetated condition and if disturbed, will create unstable slope conditions. There has been no additional spoil material generated during the remining operations because remining did not reffect or enlarge the existing highwalls.

The operator has indicated that any available spoil materials as a result of stream channel excavation will be used to create talus slopes at the base of the highwalls. No other reasonably available spoil material exists in the immediate vicinity of the remining operations.

**Analysis:**

In accordance with section R645-301-600, the operator has requested a variance for the retention of highwalls. Information found in Appendix 3.3D has been provided by the operator to address the specific requirements for highwall retention, and to demonstrate that slopes left upon the completion of backfilling and grading operations will be stable and meet a static factor of safety of 1.3.

The operator has demonstrated by design that the "retained" highwalls and cut slopes proposed within the disturbed area boundary are not significantly greater in height or length than the dimensions of existing cliffs in the surrounding areas. It was found that cliffs adjacent to and within the surrounding area varied from 200 to greater than 1,000 feet in length with heights varying from 5 to 200 feet. Highwalls and cut slopes within the disturbed area measure from 250 to 300 feet in length and to 60 feet in height. These measurements and the documentation found in Appendix 3.3D indicate that the

highwalls and the cut slopes to be retained within the disturbed area are not significantly greater in height or length than the surrounding cliffs found in the area.

The retained highwalls and cutslopes within the disturbed area boundary are of similar structure and composition in comparison to the surrounding natural cliffs and ledges. Many of these highwalls are partially or nearly completely composed of sandstone rock which is part of the cliff forming members of the region. Other cut slopes and highwalls are similar to stream downcutting and erosion which can be found within and adjacent to the disturbed areas. This colluvial material was found in most cases to be reasonably well cemented with sufficient cohesion to remain as stable cut slopes. These highwalls are geomorphically comparable to the cliffs and downcut slopes found throughout the area. In comparison, disturbed fills and regraded areas lack the cohesive structure of these undisturbed soils within the cut slopes, and must be maintained at a more moderate slope than that of the cut slopes.

Approval for incomplete elimination of highwalls in previously mined areas can be accomplished in accordance with R645-301-553.500. The operator has requested a variance from AOC requirements for incomplete elimination of highwalls. Based on the design information presented in the proposal, the operator has maintained that the "retained" highwalls are not significantly greater in height or length than the dimensions of existing cliffs in the surrounding areas. Information presented in the EarthFax slope Stability Analysis indicates that: the residual highwalls have been shown by the operator to be similar in structural composition to the preexisting cliffs in the surrounding area and is compatible with the visual attributes of the area; and, the residual highwall is compatible with the geomorphic processes of the area. The Division will allow for a variance from AOC requirements for preexisting highwalls based on the design information presented in the plan. Accordingly, the permit will need to be revised to indicate that such a variance has been allowed for. Attached to this review is a draft copy of the AOC Variance For Preexisting Highwalls which will be incorporated into the permit as "Exhibit C". It is anticipated that additional requests for highwall variance may be made by the operator in regard to other surface facilities which are not part of this proposal. Those areas will be considered and incorporated into this variance as they are reviewed and approved by the Division.

**Deficiencies:**

None.

Division Order 21)

*R614-301-731. Operation Plan. General Requirements. The operational plan must be specific to the local hydrologic conditions and will contain steps to be taken during coal mining and reclamation operation through bond release. The PERMITTEE needs to correct the MRP to include monitoring plans specific to ground water and surface water during reclamation through bond release. These monitoring plans should reflect the requirements of R614-301-731.200, and must reflect the language of R614-301-731.212, R614-301-731.233, R614-301-731.214, and R614-301-731-224. The PERMITTEE shall submit a reclamation plan for all phases of reclamation indicating how the relevant requirements for R614-301-730. through R614-301-760. will be met. This shall be required on or before June 1, 1991.*

**Proposal:**

No comments regarding the above division order are part of this review.

Division Order 25)

*R614-301-800. Bonding and Insurance. The PERMITTEE shall provide to the DIVISION, the Certificate of Liability Insurance Form which is incorporated into the Reclamation Agreement. Bonding calculations do not include the following information: a map specifying each area of land for which bond will be posted; mass balance calculations presented in sufficient detail to show backfilling and grading requirements for distribution and disposal of excess spoil and mine development waste, backfilling to meet AOC requirements, subsoil, topsoil and substitute topsoil distribution and quantities for each sub area of the permit; calculations for determination of quantities, equipment selection and productivity used in determining the bond amount which reflect the quantities determined in the mass balance calculations; determination of Phase I and Phase II reclamation activities including a map showing those facilities to be constructed and/or removed during each phase of reclamation. This information shall be required on or before June 1, 1991.*

**Proposal:**

Bonding information previously found in section 3.3-6 has been eliminated from Section 3.3, Hardscrabble Canyon.

**Analysis:**

It is anticipated that the bonding information previously provided for Hardscrabble Canyon will be incorporated into the final plan and that calculations will be

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provided on or before the due date for the submittal of all remaining areas in June 15, 1992. Mass balance calculations, especially in regard to Gravel Canyon cannot be completed until all topsoil distribution requirements are determined for the entire permit area.

**Deficiencies:**

The operator will need to provide revised bonding calculations in conjunction with the submittal of information for the remaining areas as required in the Settlement Agreement.

**RECOMMENDATIONS:**

Deficiencies found within the review of the Hardscrabble Canyon area have been corrected as a result of the revised information submitted to the Division on June 2, 1992. The only outstanding items in regard to the Hardscrabble Canyon area also reflect information which needs to be updated or provided to address deficiencies for all areas in general and will be incorporated into the submittal of information for the remaining areas as part of the Settlement Agreement.

Attached to this review is the **DRAFT** form of the **AOC VARIANCE FOR PREEXISTING HIGHWALLS** which will be included in the revised Permit as a result of the changes in the Mining and Reclamation Plan brought about by the Division Order and the midterm permit review. This operator has requested this Draft to be incorporated into the MRP as Figure 3.3-2. Upon final approval by the Division of the revised plans, the operator may then copy the AOC variance for previously existing highwalls from the permit itself to replace the draft copy.

**"Attachment C"**  
(Draft Copy)

## **AOC VARIANCE FOR PREEXISTING HIGHWALLS**

In accordance with R645-301-553.500, the Division has reviewed and accepted a variance from Approximate Original Contour (AOC) requirements for incomplete elimination of highwalls in previously mined areas in accordance with the following findings:

1. Remining operations on previously mined areas that contain the preexisting highwall(s) comply with the requirements of R645-301-537.200, R645-301-552 through R645-301-553.230, R645-301-553.260 through R645-301-553.900, and R645-302-234, except as provided in R645-301-553.500.
2. The requirements of R645-301-553.110 and R645-301-553.120 requiring that elimination of highwalls do not apply to remining operations where the volume of all reasonably available spoil is demonstrated in writing to the Division to be insufficient to completely backfill the reaffected or enlarged highwall. The highwall(s) will be eliminated to the maximum extent technically practical in accordance with the following criteria:
  - A. All spoil generated by the remining operation and any other reasonably available spoil will be used to backfill the area;
  - B. The backfill will be graded to a slope which is compatible with the approved postmining land use and which provides adequate drainage and long-term stability;
  - C. Any highwall remnant will be stable and not pose a hazard to the public health and safety or to the environment. The operator has demonstrated, to the satisfaction of the Division, that the highwall remnant is stable; and
  - D. Spoil placed on the outslope during previous mining operations will not be disturbed if such disturbances will cause instability of the remaining spoil or otherwise increase the hazard to the public health and safety or to the environment.

### **SPECIFIC CONDITIONS OF VARIANCE**

This variance from Approximate Original Contour for Preexisting Highwalls is issued in conjunction with the Coal Mining and Reclamation Permit. This AOC variance is specific to the following locations and conditions:

1. Variance from AOC for Preexisting Highwalls shall include only those areas which have been identified in the plan and approved by the Division and are as follows:
  - A. The location and the extent of highwalls delineated on Exhibit 3.3-2, as the No. 3 portal highwall, the No. 4 portal highwall and the No. 5 mine return air shaft highwall.
2. The terms and conditions of this permit may be modified at any time by the Division, if it determines that more stringent measures are necessary to ensure that the operations involved are conducted in compliance with the requirements of the State Program.