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

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July 30, 1996

John Pappas, Sr. Environmental Engineer
AMAX Coal Holding Company
P.O. Drawer PMC
Price Utah 84501

Re: Castle Gate MRP Section 3.3 Revised Reclamation Plan, ACT/007/004-96F,
Deficiency Response and Technical Analysis, AMAX Coal Holding Company,
Folder #2, Carbon County, Utah

Dear Mr. Pappas:

Enclosed you will find on pages 1 and 2 a summary of outstanding deficiencies for the referenced submittal. The remaining portion of the analysis and findings is also provided for your review. We look forward to resolving these deficiencies as quickly as possible to allow for the completion of reclamation activities this fall. Please submit three (3) copies of your response to the Division at your convenience.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Joseph C. Helfrich'.

Joseph C. Helfrich
Permit Supervisor

blb

Enclosure

cc: Daron Haddock
Paul Baker



State of Utah
Division of Oil, Gas and Mining
Utah Coal Regulatory Program



Analysis and Findings
Castle Gate Mine
Hardscrabble Canyon Reclamation Plan
ACT/007/004 - 96F
July 29, 1996

TECHNICAL ANALYSIS

Last revised - July 30, 1996

TECHNICAL ANALYSIS

INTRODUCTION

On May 1, 1996, the Division received a proposal from Amax Coal Company to revise the reclamation plan for Hardscrabble Canyon. Portions of Hardscrabble Canyon were reclaimed in 1984, 1993, and 1995. The Division previously approved a reclamation plan for the remainder of the canyon, but the Permittee has acquired new soils and coal refuse information that made it necessary to alter the backfilling and grading plan. Also, a person who owns grazing rights above the property requested that the road not be fully reclaimed but left so he can trail his livestock through the area.

Information included in the permit changes include as-built drawings and information related to the No. 4 mine area, a revised backfilling and grading plan for the reclamation of Hardscrabble Canyon and the incorporation of a permanent road as part of the postmining land use. Other changes include different surface preparation and mulching techniques which are included as part of the sediment and erosion control plan.

SUMMARY OF OUTSTANDING DEFICIENCIES

As determined in the following analysis and findings, information found in the plan was not considered adequate to meet all of the regulatory requirements.

The permittee must comply with the following requirements prior to approval of the proposed permit changes in accordance with the requirements of:

R645-301-412 through 414, the permittee must explain: how the proposed postmining land use is to be achieved and the necessary support activities which may be needed to achieve the proposed land use; where a land use different from the premining land use is proposed, all materials needed for approval of the alternative use; and, the consideration given to making all of the proposed underground mining activities consistent with surface owner plans and applicable State and local land-use plans and programs. Specifically, the plan needs to address how the existence and the use of the road may affect reclamation efforts (i.e. moving livestock through the reclaimed site). The description shall be accompanied by a copy of the

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OPERATION PLAN

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Disposal of noncoal waste.

Page 3.3-24 of the proposal indicates that nonhazardous and nonflammable materials, such as concrete, asphalt, and steel, will be used as backfill in areas such as sediment pond 007, highwalls, and cut slopes.

Inert non-coal waste materials can be incorporated into backfill areas but a more complete characterization of how this will be accomplished should be incorporated into the plan. The following text more closely characterizes what should be provided in the plan.

Concrete slabs and foundations, as well as other inert materials, must be incorporated into the backfill in a manner that will not create voids in the backfilled area or reduce the effective compaction necessary for backfilling. These materials should be intermixed with backfill to ensure that voids are completely filled and compacted. Additionally, the top four feet of fill should be clean and not include any non-coal waste materials. Any concrete slabs or foundations buried in place must also be covered with a minimum of four feet of fill to ensure adequate root depth and moisture retention of the soils for revegetation. Steel should be salvaged rather than buried whenever possible except for rebar or other steel which was poured into the concrete.

Noncoal mine wastes including, but not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber and other combustible materials generated during mining activities will be placed and stored in a controlled manner in a designated portion of the permit area. Final disposal of noncoal mine wastes must be in a designated disposal site in the permit area or a State-approved solid waste disposal area.

Notwithstanding any other provision to the R645 Rules, any noncoal mine waste defined as "hazardous" under 3001 of the Resource Conservation and Recovery Act (RCRA) (Pub. L. 94-

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R645-301-528.330, the plan must more concisely describe the procedures used for the disposal of noncoal waste materials within the permit area and provide a commitment to dispose of noncoal waste materials in accordance with the regulatory requirements.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

The remaining 20 acres scheduled for reclamation in Hardscrabble Canyon were disturbed by mining prior to the enactment of SMCRA. As a result, no topsoil was salvaged from the site. The existing soil and overburden material at the site will be used as substitute topsoil. Several studies have been performed to assess the usefulness of these materials for reclamation purposes. Both the 1990 and 1995 soil investigations were conducted to evaluate the physical and chemical characteristics of the soil materials according to the Division's guidelines for topsoil and overburden¹. In addition, the 1995 soil investigation was conducted to locate areas of buried coal debris that would likely be encountered during reclamation. Descriptions of the soils and coal debris were made using trenches, soil pits and soil borings at varying depths.

Generally, overburden samples have a loam to sandy loam texture, possess a weak, sub-angular to granular structure, and have a pH in the range of 7.4 to 8.6. Coal samples range from loamy sand to sandy loam in texture, and are generally loose to single grained with a pH range from 7.5 to 8.0. Overburden and coal samples meet the Division's requirements for toxicity and acid-forming potential. Boron concentration does not exceed 5 mg/kg in any sample with only 2 samples in excess of 3 mg/kg. Selenium is rarely above the method of detection (0.02 mg/kg) limit for the hot water extraction procedure with only three samples HC-COMP-3 (0.02 mg/kg), HC-COMP-6 (0.04 mg/kg) and HC-COMP-12 (0.02 mg/kg) exceeding the detection limit. In terms of surface acidity potential, all samples meet DOGM's limit of -5 tons CaCO₃ per 1000 tons

¹Leatherwood, J., and Duce, D. 1988. Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. State of Utah Department of Natural Resources, Division of Oil, Gas and Mining.

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Alternate sediment control measures (ASCMS) will be implemented during reclamation to reduce erosion of the soil growth media. These ASCMS will include the following and are discussed below:

1. Ripping of the regraded surface prior to placement of growth media,
2. Contour furrowing,
3. Incorporation of hay and/or straw mulch into the growth media,
4. Deep gouging of the growth media,
5. Seeding and fertilizing the prepared soil,
6. Addition of more mulch following seeding, and
7. Physically or chemically anchoring the final mulch layer.

Ripping the fill surface prior to soil placement will help promote a smooth fill: soil boundary interface that will encourage both root penetration and water infiltration. This smooth interface is especially critical on reclaimed compacted fill slopes to help retain soil and prevent sloughing of the soil surface.

Following placement of the soil growth media, an organic mulch will be incorporated into the soil at a rate of 2 tons/acre by either plowing along the contour, deep gouging, or a combination of these two methods. The soil surface will be gouged to an approximate 12 to 18 inch depth using the bucket of a trackhoe. Deep gouging will thus extend below the 9 inch thickness of the growth media. However, the 1995 soil investigation shows that the soil materials which will be used for backfilling in the canyon are neither acid nor toxic-forming. Therefore, if these materials are exposed, they will not create revegetation concerns. With time, wind and water transport of adjacent soil material will cover exposed fill.

Approximately 25 pounds of nitrogen and 50 pounds of phosphorus will be applied per acre of reclaimed area. The nitrogen will be a slow-release form (i.e., urea), while the phosphorus will be in the form of phosphate (P_2O_5).

Following seeding, an additional 2 tons/acre of straw mulch will be spread over the seeded area by mechanical blowers or hand spreading. This final mulch will either be crimped with the trackhoe bucket or sprayed with a tackifier.

Stability analyses in the No. 4 Mine canyon indicate that fill slopes as steep as 39° (1.2H:1V) will be stable with a static safety factor exceeding 1.3, provided that the fill is properly placed and compacted during construction. These stability analyses are considered representative of all slopes to be reclaimed within Hardscrabble Canyon. It is noted that reclamation slopes have been designed to be concave in cross section and not exceed a slope of 2H:1V. Slopes shown to

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Analysis:

Following placement of the growth medium, hay, straw, or another organic amendment will be incorporated into the medium at a rate of two tons per acre. It will be incorporated by either plowing on the contour, deep gouging, or a combination of these methods. Either after or during mulch incorporation, depending on which method is used, the surface soil will be gouged in several locations to a depth of about twelve to eighteen inches using a trackhoe bucket.

This depth of gouging will extend into materials below the growth medium. This could be a concern, but the application demonstrates that these materials are not acid-forming or toxic. Also, the gouges will gradually fill in mostly with material originally placed on the surface.

After gouging, the area will be seeded with species mix 1 except within 20 feet of the edge of channels where species list 5 will be used. Seed will be broadcast seeded. Next, the area will be fertilized and mulched. Mulch will be spread with mechanical blowers or by hand and will be anchored either by crimping it with a trackhoe bucket or shovel or by spraying it with a tackifier. Two tons per acre of straw will be used for mulch.

A few changes are recommended for species list one based on results over the past two years in Sowbelly Gulch and Hardscrabble Canyon. Some species from this list have not been observed in either canyon while others have done very well. It is recommended that Utah serviceberry, curleaf mountain mahogany, purple prairie clover, skunkbrush, and sand dropseed be deleted from the mix. To make up for these species, it is recommended that the following species be added or the rates be changed (pounds PLS per acre for drilled seed):

Yarrow (<i>Achillea millefolium</i>)	0.5
Fourwing saltbush (<i>Atriplex canescens</i>)	4.0
Gooseberryleaf globemallow (<i>Sphaeralcea grossulariaefolia</i>)	0.5
Rocky Mountain Penstemon (<i>Penstemon strictus</i>)	0.5
Winterfat (<i>Ceratoides lanata</i>)	2.0

No changes are recommended for species list five.

The revegetation methods proposed are expected to produce good revegetation results. Gouging is a very effective water harvesting treatment, and the organic matter additions and mulching should improve the chances for revegetation success.

Other parts of the revegetation plan are not changed. Chapter 9 includes methods for judging revegetation success and to enhance wildlife habitat.

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using the land for grazing since the mid-1960's. This letter requests retention of a road following reclamation based on historic use of the road for ingress and egress to the higher mountain grazing areas.

Text describing the road is found on page 3.3-27 of the plan. The proposed reclamation road is stated to be used for accessing the substation in the Goose Island area, for reclamation repair as needed, and to provide access to grazing lands in the canyon. The reclamation road will, in effect, replace the existing road designated as P-1, which is part of the current mining operations. Re-alignment and relocation of the existing road is necessary in order achieve drainage control and backfilling and grading necessary during reclamation operations.

Of the proposed uses for road R-1, only access for grazing is indicated as a suitable postmining land use. Use of the road for reclamation treatments and for access to the substation are only uses which would occur during mining and reclamation activities and would not occur following final reclamation of the site. The operator may wish to consider other and more varied uses in support of retention of the road. Such uses could include, but not be limited to; public access or use; hunting; access for the Bureau of Land Management for land management; and/or, other recreational use. Varied and multiple use would help support a higher and better use in consideration of retention of the road.

In order to approve road R-1 as a permanent road, the operator must provide a detailed description of the proposed use, following reclamation, of the land to be affected within the proposed permit area by surface operations or facilities, including a discussion of the utility and capacity of the reclaimed land to support a variety of alternative uses, and the relationship of the proposed use to existing land-use policies and plans. This description shall explain how the proposed postmining land use is to be achieved and the necessary support activities which may be needed to achieve the proposed land use. Where a land use different from the premining land use is proposed, the plan must contain all materials needed for approval of the alternative use and it must show the consideration given to making all of the proposed underground mining activities consistent with surface owner plans and applicable State and local land-use plans and programs. Specifically, the plan needs to address how the existence and the use of the road may affect reclamation efforts (i.e. moving livestock through the reclaimed site).

The description shall be accompanied by a copy of the comments concerning the proposed use from the legal or equitable owner of record of the surface areas to be affected by surface operations or facilities within the proposed permit area and the State and local government agencies which would have to initiate, implement, approve, or authorize the proposed use of the land following reclamation. (This would include adjacent landowners who could potentially be affected by the road and its use.)

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of record of the surface areas to be affected by surface operations or facilities within the proposed permit area and the State and local government agencies which would have to initiate, implement, approve, or authorize the proposed use of the land following reclamation.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

Proposed changes to the Hardscrabble Canyon reclamation plan include redisturbance of the Dog Flat area which was initially reclaimed in 1987 (see page 3.3-23 of the plan). This area is to be regraded to accommodate improved drainage and runoff control through HCRD-2 to the main channel. Refuse material placed in the Dog Flat area will be removed and used as backfill materials in areas adjacent to the Dog Flat area.

Another change in the backfilling and grading plan involves the retention of a road up the main canyon as a permanent road following reclamation. Cross section provided in the plan to show the location of the permanent road are provided as Exhibits 3.3-8A and B.

Allowing retention of the road does not appear to significantly affect reclamation efforts within the Hardscrabble Canyon area. Cut slope areas will be retained in conjunction with the final backfilling and grading plan and are shown in plan and on the cross sections. Retention of a road through the site only has a minimal effect on areas to be backfilled within the canyon and does not significantly increase the areas where cutslopes are to be retained. The elevation of the road was increased in most areas to accommodate fill materials necessary for backfilling and grading.

In conjunction with relocation and realignment of the existing road to the proposed post-mining road, R-1, the profile of the road was reduced from a two-lane to a single-lane configuration. Ditches and culverts associated with the existing road are to be eliminated. The proposed road plans on utilizing swales where drainage is necessary across the road.

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Regrading plans increased the amount of backfilling and grading from just over 22,000 cubic yards to over 61,000 cubic yards for the Hardscrabble Canyon earthwork (excluding the No. 4. Canyon). Comparison of the contours provided in the re-engineered plans indicate that a significantly greater amount of earthwork will result in a surface configuration which will more closely resemble pre-mining contours.

One of the major changes in the plan is to regrade the Dog Flat area which was initially regraded in 1987. The refuse material will be taken from the Dog Flat area and will be utilized as fill material in the areas adjacent to it. The primary benefit of relocating this material is that reconfiguration of drainage channel HCRD-2. The proposed plan calls for utilizing underlying bedrock as gradient control rather than construction of a steep channel, over fill, which would require extensive use of large riprap.

Another change in the plan calls for the removal of mine development waste material which was sidecast over a steep slope during the development of the No. 3 mine portals. The existing materials below the portal area have unsuccessfully been revegetated in an attempt to stabilize and prevent erosion in that area. The proposed plan calls for the removal of the mine development waste down to the underlying bedrock and talus slope found at the base of the natural cliff which existed below the coal seam at the No. 3 portal area. The removal of the mine development waste will re-expose the natural cliff formed below the portals and the elimination of the fill materials in that area will increase the overall stability of that area.

Factors which limit the degree and amount of backfilling and grading possible are the establishment and alignment of the permanent drainage through Hardscrabble Canyon and the narrow and constricting geometry of the canyon itself. Re-evaluation of the backfilling and grading plan appears to be based primarily on re-establishing the natural drainage through the canyon. The proposed channel alignment is superior in comparison to the alignment of the channel as currently approved. The additional survey data used during evaluation of site also indicated that the alignment of the channel would have to be revised from the currently approved design.

Two areas are noted on Exhibit 3.3-4A as conceptual topography, actual final topography may vary. These areas are the Dog Flat and the No. 3 portal areas where the operator intends on removing materials down to bedrock and natural cliffs which were covered with refuse and mine development waste materials. Because the actual location of the bedrock beneath these areas is not known, these areas have been noted as such on the drawing.

Incorporation of a road, R-1, into the backfilling and grading plan included changes in the profile and the alignment of the existing road to accommodate backfilling and grading. The cross

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Maps and information provided of the No. 4 portal area appear adequate for evaluation during phase-I bond release.

Findings:

Information regarding this section of the regulations was found to meet the minimum regulatory requirements.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Analysis:

The proposed permit changes for Hardscrabble Canyon include the construction of a road to be permanently retained as part of reclamation. This road has been designated as reclamation road R-1, and can be seen on the postmining reclamation map for Hardscrabble Canyon as Exhibit 3.3-4A.

Text in the plan describing the road is found on page 3.3-27 of the plan. The reclamation road will, in effect, replace the existing road designated as P-1, which is part of the current mining operations. Re-alignment and relocation of the existing road is necessary in order to achieve drainage control and backfilling and grading necessary during reclamation operations.

The plan describes the road as being reduced to a single lane width of approximately 10-12 feet. Where possible, the outslope of the existing road will be maintained. The road will be relocated in those areas where the road would limit or impinge upon the reclaimed channel. The surface of the reclamation road will not receive an application of substitute topsoil. However, the road will be rough graded and left as an unimproved road. Maintenance of the road will be minimal and performed on an as-needed basis.

Existing culverts associated with the road are to be removed. Broad swales will be utilized in three areas to accommodate small tributary drainages and an additional swale crossing the main drainage will occur near the #4 Mine canyon.

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Information provided in the proposal does not meet all of the minimum regulatory requirements of this section.

Prior to final approval, the applicant must provide the following:

R645-301-527.123, the plan must redefine the road R-1 as a primary road as required by this section of the regulations. The plan must also demonstrate that all design and certification requirements applicable to primary roads are/will be met including, but not limited to, road surfacing, road drainage, and certification requirements for road design and road construction.

RECLAMATION HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Diversions

Reclamation diversion designs are found in Appendix 3.3C, Reclamation Hydrologic Structures. Discussion is found on page 3.3-29, Section 3.3-4(2). Table 3.3-9, 9A, and 10 are summaries of diversion designs. Exhibit 3.3-4A and 3.3-16 show the location of the drainages and Exhibit 3.3-8C shows the profile of the main diversion (HCRD-7 and 8).

The intermittent drainages HCRD-7 and 8 are designed to convey the 100-year, 24-hour storm event. The smaller diversions are designed for the 10-year, 24-hour storm event. Riprap has been designed for all diversions for protection from erosion and stabilization. Granular filters are proposed where riprap size is much larger than base material.

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properly for reclamation, therefore, the alternate sediment control measures are BTCA for treating sediment in runoff.

Exemptions for Siltation Structures

All reclaimed areas will be treated by alternate sediment control measures. While no sediment ponds will be used, these areas will not be exempt from sediment control.

Discharge Structures

There are no plans for siltation structures in reclamation. Without siltation structures there is no need for discharge structures.

Structure Removal

The removal of structures is listed in Section 3.3-4(1), under the grading subheading. Section 3.3-5 has a timetable for the removal of structures. This list is not specific to the timing of sediment pond removal compared to alternate sediment control measures construction. It appears that this section is saying that alternate sediment control measures will be placed as regrading is completed.

Findings:

The hydrologic reclamation plan appears to be complete and accurate except for the following deficiencies:

R645-301-764, Amax must show the specific order of reclamation activities, especially the order of removal of sediment control structures and the placement of alternate sediment control measures.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.