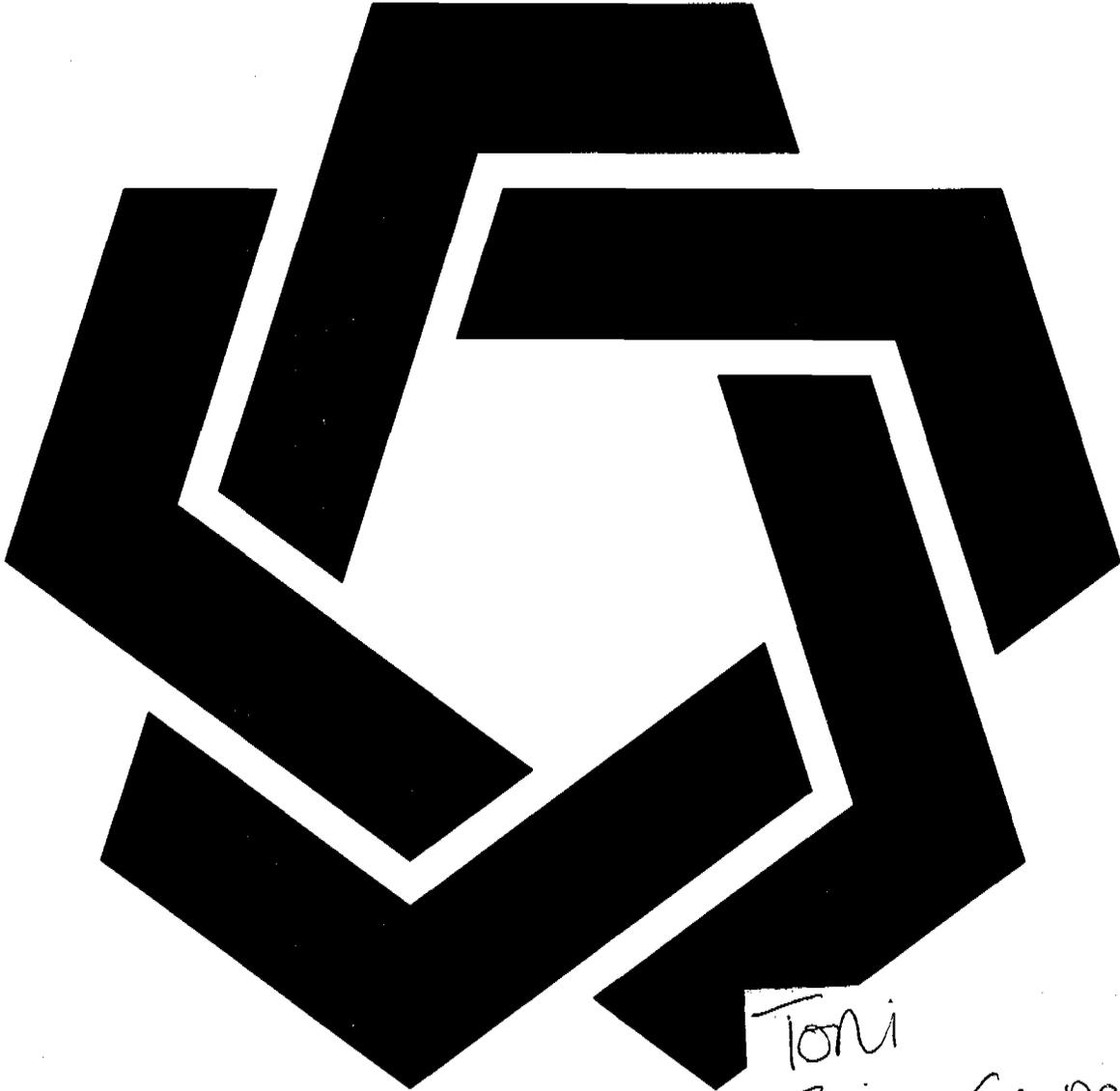


State of Utah
Division of Oil, Gas and Mining
Utah Coal Regulatory Program



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

Toni 7/31
This supersedes
the one I gave
you 7/30. for
ACT/007/004
#2

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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 comments

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- 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. 12
- 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. 19
- 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. 5
- 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. 21
- R645-301-800**, prior to approval for any bond release or application for adjustment to the bond amount, the applicant must provide complete and updated information regarding the reclamation cost estimate provided in the plan for all areas within the permit area. No determination as to the amount of bond available for release or transfer can be made by the Division until such time as current cost information is provided to the Division. 22

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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)

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(Pub. L. 94-580, as amended) and 40 CFR Part 261 will be handled in accordance with the requirements of Subtitle C of RCRA and any implementing regulations.

Coal mine waste.

Page 3.3-26 states that coal debris and acid- and/or toxic-forming material exposed or excavated during reclamation will be removed, if possible, and used as backfill against highwalls, cut slopes, or as backfill in existing sedimentation ponds. These materials will then be covered by a minimum of four feet of acceptable overburden material. Where coal debris and acid- and/or toxic-forming material is found and cannot be effectively completely removed, the area will be over-excavated to allow for reclamation of the area with a cover of at least four feet of appropriate overburden material. The over-excavated material will be used as backfill against highwalls, cut slopes, etc., and then covered by a minimum of four feet of acceptable overburden material.

Exact quantities and locations of such materials is not and cannot be determined until such time as reclamation activities occur. The majority of the disturbance is pre-SMCRA with little known information as to the location and disposition of refuse materials, spoil, coal mine waste, and mine development waste. The operator has committed to handle these materials in accordance with the parameters set forth in the performance standards and as described in the plan. The regulatory standards allow for the use of spoil as backfill material so long as they are not acid- or toxic forming.

Refuse piles.

Refuse material, when encountered, will be handled similarly to that indicated in coal mine waste.

Findings:

Information regarding the requirements of this section of the regulations was found to meet the minimum regulatory requirements except that more consideration must be provided in the plan for the disposal of inert noncoal materials into the backfill.

Accordingly, prior to approval, the operator must meet the requirements of:

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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

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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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 material. Coal samples have a higher acid potential with their neutralization capacity four times greater than their total sulfur acidity. The composite loam sample HC-COMP-8 has elevated sodicity with a sodium adsorption ratio (SAR) of 15.7 exceeding DOGM's SAR limit of 12 for fine textured soils. DOGM's guidelines require that in soils with unacceptable SAR values, exchangeable sodium percentage (ESP) is needed to verify a true sodicity problem. By traditional classification, soils with an ESP greater than 15% having an electrical conductivity less than 4 are classified as sodic soils².

Any overburden identified as a sodic soil may not be used as substitute topsoil material. The composite sample from HC-3 and HC-5 (HC-COMP-8) had higher than acceptable SAR values. However, samples from the nearby sampling points HCTP-6 and HCTP-4, did not have excessive SAR values. Resampling of the soils in the vicinity of HC-3 and HC-5 to substantiate the SAR values may be prudent. All samples found with unacceptable SAR values must be further analyzed for ESP to verify and classify possible sodic soils.

With the exception of overburden between 30 and 72" in HC-3, and 18 and 48" in HC-5 (Sample HC-COMP-8 has high SAR values), soil material encountered in the 1995 sampling has the potential for use as alternate topsoil within Hardscrabble Canyon. However, the use of identified overburden suitable as substitute topsoil may produce water limiting conditions for regenerating vegetation since the overburden has a weak soil structure and is essentially void of organic matter. To mitigate against the drought nature of the overburden, AMAX proposes that hay and/or straw mulch, or suitable substitute with high organic matter content, be incorporated into the upper layers of soil thus improving aeration and water holding capacity of the overburden material. The plan further notes that care should be taken during the mulching process to avoid compaction of the upper regions of the soil. Loam soils, with elevated sodium levels, even concentrations well below the Division's minimum requirements, are prone to aggregate slaking. Aggregate slaking increases bulk density of the soil and may cause reductions in hydraulic conductivity. Compaction would exacerbate this condition by further reducing the micropore space of the soil.

Based on the results of the 1995 soil sampling and the types of material found within the excavations and borings, approximately 20,270 yd³ of substitute topsoil may be available

²Terminology Committee, *Glossary of Soil Science Terms*, Soil Science Society of America, Madison, Wisconsin, 1973.

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for use as appropriate growth media. The total area to be reclaimed in Hardscrabble Canyon is approximately 869,122 ft². The volume of salvaged soil will allow approximately 9 inches of soil cover over the reclaimed areas with the exception of road R-1 and the reclamation channels. The postmining land use for Hardscrabble Canyon is undeveloped land with grazing and wildlife.

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 (P₂O₅).

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.

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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 be steeper than 2H:1V are natural rock outcrops that will be retained following reclamation. To the extent possible, using the reasonably-available material, existing cut slopes will be backfilled during reclamation operations; however, given the extent of pre-SMCRA disturbances in the canyon, some cut slopes will likely remain following reclamation. Pertaining to reclaimed cut slopes and other steep reclaimed slopes, deep gouging and/or straw mulch are not sufficient alone to protect the soil surface from erosion on steep slopes (\geq 2H:1V) before and after seeding. In addition to deep gouging and mulching, erosion control materials are needed on surface slopes at 25° (2H:1V) and steeper to protect the soil material from erosion. These materials may include erosion control matting, blankets, tackifiers, etc.

Coal debris and acid- and/or toxic-forming material exposed or excavated during reclamation grading will be removed, if possible, and used as backfill against highwall, cut slopes, or as backfill in existing sedimentation ponds. Where these materials are found and cannot be effectively removed, the area will be over-excavated with the over-excavated material used as backfill. The plan states that all coal debris and acid- and/or toxic-forming material will then be covered by a minimum of four feet of overburden material. However, the analytical section (Appendix 3.3M, Overburden and Coal Evaluation, April 1, 1996, Section 5-1 Coal Disposal) states that "based upon the nontoxic/non-acidic nature of the coal, the depth of cover placed on coal and mixed coal waste will be determined by the amount of overburden and alternative growth media available on site." The plan prevails and the consultant report in Appendix 3.3M is a recommendation only. As discussed in the analytical appendix 3.3M, section 4.0 Analytical Results, coal samples range from loamy sand to sandy loam in texture, and are generally loose to single grained. Because of the water limiting conditions of coal and coal-waste material, vegetation regeneration is severely restricted. In addition, coal and coal-waste material is flammable. Therefore, the Division requires that all coal, and inextricably mixed coal waste and overburden, will be buried under a cover of four feet of overburden. In the event that inadequate overburden exists and the operator wants to use less than four feet of cover, the operator must specifically request a variance to the four foot cover requirement.

Findings:

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Information provided in the proposal meets the minimum regulatory requirements of this section.

REVEGETATION

Regulatory Reference: R645-301-340

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, curlleaf 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

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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.

In 1993, the Permittee sampled the Goose Island area for revegetation success. Vegetation cover data were compared with cover data from reference areas in Gilson Gulch and Sowbelly Gulch. The amount of cover in Goose Island was similar to what was in the reference areas, but there were not as many shrubs, so the reclaimed area did not meet the diversity success standard established in the mining and reclamation plan. More recently, however, it appears numerous sagebrush seedlings have become established.

Hopefully, the rest of Hardscrabble Canyon will have greater shrub density than Goose Island. If vegetation in Goose Island is sampled with vegetation in the remainder of Hardscrabble Canyon for judging revegetation success, the amount of shrub cover for the entire site could be compared with the reference areas. Hopefully, the average would be enough to meet success standards. Alternatively, the Permittee could wait to see if the sagebrush seedlings mature or could try to establish shrubs from seed or seedlings. This last option is not recommended.

Findings:

Information regarding the requirements of this section of the regulations was found to meet the minimum regulatory requirements. Some changes are recommended to one of the revegetation seed mixtures.

POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

Analysis:

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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.

Appendix 3.3L provides a letter requesting post-reclamation access in Hardscrabble Canyon by Nick Sampinos, attorney for Boyd Marsing. The letter explains that private and BLM land grazing allotments are in close proximity to Hardscrabble Canyon and that the existing road through the mine property has historically been used for grazing access. Mr. Marsing has been 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 to 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

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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.)

Where a variance from the premining land use is proposed, documentation must be provided in the plan that the surface landowner of the permit area has knowingly requested, in writing, that a variance be granted, so as to render the land after reclamation, suitable for the intended land use. Federal, State, and local government agencies with an interest in the proposed land use must have an adequate period in which to review and comment on the proposed use. (Such a change constitutes a significant permit revision and public notice.)

The letter provided on behalf of Mr. Marsing in Appendix 3.3L only expresses the interest of an individual holding grazing allotments and, while in support of the proposed retention of the road, does not constitute landowner approval from the surface landowner(s) within the permit area or those lands which may be affected by retention of the road.

Information regarding the relationship of the proposed road to the existing county road which adjoins the proposed road at the disturbed area boundary should also be discussed in the plan. Ingress and egress through the permit area and access control (gates) necessary from the county road or adjacent lands above the permit area should also be included in the plan.

Findings:

Information found in the proposal does not successfully demonstrate the regulatory requirements necessary to approve the retention of road R-1 as part of the post-reclamation land use. This road may be constructed and utilized during phase I and phase II reclamation activities but will require additional information for approval as a permanent road following reclamation.

Prior to approval of the road for permanent post mining land use, the following requirements must be met:

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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 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.

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

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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 affect 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.

Proposed changes to the backfilling and grading plan do not alter requested highwall variances from approximate original contour. These highwall variances include the No. 3 portal highwall, the No. 4 portal highwall and the No. 5 mine return air shaft. These variances were requested and approved by the Division in previously approved permit changes.

The proposed backfilling and grading changes for the Hardscrabble Canyon area increases the amount of backfilling from the previously approved plan by about 3 times. The additional earthwork further reduces the areas in which cutslopes are planned to be retained and more closely approximates pre-mining contours. The proposed permit changes are a significant improvement over the previously approved reclamation plan for the Hardscrabble Canyon area.

Findings:

Information included in the proposed plan regarding the Hardscrabble Canyon area was found to meet the requirements of this section of the regulations.

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:

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The proposed permit changes regarding backfilling and grading can be found on Exhibit 3.3-4A which show the proposed contours for final reclamation. Cross sections of the area showing the existing surface and the final surface configuration are provided as exhibits 3.3-8A and B.

Proposed changes to the plan were a result primarily from the operator's desire to establish a permanent road through the Hardscrabble Canyon area and to more effectively utilize available materials as backfill. Map information for the Hardscrabble Canyon area required that additional survey information be collected to evaluate the reclamation plan. Contour information provided on the proposed maps varies somewhat from previous plans based on the new survey data.

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

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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 sections indicate that the inslopes and the outslopes of the road were made to blend into the adjacent slopes and conform to AOC requirements. The road appears to sloped to accommodate overland flow from the adjacent slopes above the road.

In comparison to the currently approved backfilling and grading plan for Hardscrabble Canyon, the proposed plan is superior.

In addition to the proposed changes for Hardscrabble Canyon, as-built drawings were provided of the No. 4 mine canyon area. These drawings are provided as Exhibits 3.3-16 through 18. The as-built drawings reflect the changes to the plan to further reduce the highwall at the No. 4 portals and eliminate the vertical drop and plunge pool at the head end of the drainage of the disturbed area. This additional fill also covered the mined coal seam exposed near the No. 4 portals. While some exposed coal areas remain, especially on the south side of the canyon, these are stringer and rider seams which are not part of the mined coal seam. These changes also eliminated the ramp which existed as access above the portal area to the MSHA bench of the highwall. This area was cut down and reduced in slope and the material was used as fill to cover the exposed coal seam and further backfill the portal areas. Portions of the highwall remain and are considered as part of the highwall variance provided by the Division for the No. 4 portal highwall.

Findings:

Information regarding the requirements of this section of the regulation was considered to meet the minimum regulatory requirements.

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MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

As-built drawings were provided for the completion of the No. 4 mine canyon area. These as-builts included the changes to the No. 4 portal area. The vertical extent of the highwall was eliminated by cutting down portions of the highwall above the portals and by providing additional backfill at the base of the highwall.

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

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in order 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.

Cross sections of the postmining reclamation backfilling and grading can be found in the plan as Exhibits 3.3-8A and B. Centerlines for the cross sections coincide with the centerline of the proposed road. Road elevations at most of the cross sections are at the existing road elevation or at a higher elevation (on fill) than the existing road. These changes in the road elevations were made to allow backfilling of the cut slopes associated with the existing road construction. These cross sections also indicate that the road will be sloped outwards toward the drainage channel rather than center crowned or retro graded back toward the hillside. Grading the road in this manner will eliminate ditches along the cut slope side of the road. Road ditches are not planned for construction along either side of the roadway.

The plan states that during the reclamation monitoring period, the areas where water from the road surface toward the reclamation stream channels will be observed for evidence of erosion. If excessive erosion is noted, appropriate repairs will be made to prevent long-term re-occurrence of this erosion.

In analysis of the proposed reclamation road, several considerations need to be addressed. These considerations are discussed as follow.

The post-reclamation road, R-1, is designated in Table 3.3-15 as an ancillary road. In accordance with R645-301-527.120, all roads to be retained ad part of the post-mining land use shall be classified as primary roads.

Design information related to the construction of road R-1 does not adequately address R645-301-527.210. Specifications for each road width, road gradient, road surface, road cut, fill embankment, culvert, bridge, drainage ditch, and drainage structure need to be incorporated into the plan. Specifically, the plan needs to provide a typical cross section of

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the road indicating the width and slope (crowning) of the road. Surfacing of the road should be provided because the road is permanent and should be non erodible by design. A gravel roadbase (about 8" in depth) for the width of the road should be indicated in the design. Surfacing the road with gravel is further supported by the elimination of culverts and ditches which would normally be used for drainage control. Most runoff from the road and runoff from areas adjacent to the road will be overland (sheet) flow over the road surface. Providing gravel surfacing will help eliminate or prevent erosion of the road surface and minimize maintenance of the road throughout the reclamation liability period and following bond release.

Findings:

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

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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.

Stream Buffer Zones

The stream buffer zones information is given in Section 3.3-7, page 3.3-37. No stream buffer zone is included in the permit application because all channels were altered prior to the enactment of the law.

Sediment Control Measures

Sediment control measures are covered in Section 3.3-4(3) beginning on page 3.3-32 and in Appendix 3.3E. All areas are intended to be alternate sediment control areas. Treatment will be consistent throughout the reclaimed area, consisting of practicing contour plowing, deep gouging, mulching, applying a tackifier for the mulch, and revegetation.

The sequence of effectiveness from these measures insures that sediment will be consistently controlled from the point of reclamation to the establishment of vegetation. These are considered sediment control areas rather than exemption from sediment control because the measures used will be subject to maintenance. If any of these measures fail to a point that the Division does not think sediment control is adequately met, the Permittee will be required to either re-implement the designed practices (i.e. reseed and remulch), or they must design new sediment control measures that will treat areas where failure is discovered and the Division does not think the existing designs will work.

The operational sediment ponds are not sized properly for reclamation, therefore, the alternate sediment control measures are best technology currently available (BTCA) for treating sediment in runoff.

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Siltation Structures

There are no plans for siltation structures in reclamation. All sediment control will be fulfilled by alternate sediment control measures.

Sedimentation Ponds

There are no plans for siltation structures in reclamation. All sediment control will be fulfilled by alternate sediment control measures. The operational sediment ponds are not sized 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:

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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.

Analysis:

No additional reclamation cost information was provided as part of the applicant's proposal. Significant changes to the reclamation treatments should also be reflected in the reclamation costs. However, since the applicant is considered to currently be over-bonded due to shared permit areas with the Willow Creek permit area and other changes to the plan since the determination of the current bond amount, no adjustment to the current bond amount is considered necessary at this time. However, prior to any phased bond release or transfer of permit areas to other operations, such reconciliation of the bond amount must be presented in the plan and a new bond amount be determined by the Division.

Findings:

Information presented in the plan is considered adequate for approval at this time. However, the following condition is applicable regarding the bond amount.

Prior to approval by the Division for any adjustment to the current bond amount, the applicant must provide the following:

R645-301-800, prior to approval for any bond release or application for adjustment to the bond amount, the applicant must provide complete and updated information regarding the reclamation cost estimate provided in the plan for all areas within the permit area. No determination as to the amount of bond available for release or transfer can be made by the Division until such time as current cost information is provided to the Division.