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March 24, 1992

TO: Daron Haddock, Permit Supervisor

FROM: Rick P. Summers, Hydrologist

RE: Review Hardscrabble Canyon Reclamation Plan (received February 18, 1992), AMAX Coal Company, Castle Gate Mine, ACT/007/004-92A, Carbon County, Utah

SUMMARY

In accordance with 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.

Comments and completeness of the information within the text of this review is in regard only to those areas described in Hardscrabble Canyon. 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.

This review is specific to Division Order #17 relative to Hardscrabble Canyon Reclamation designs and hydrology concerns. Hydrology issues involved in Division Order 21 regarding water monitoring are not addressed in this review. As per agreement with R. Allison (3/16/92, Division Offices), this issue will be addressed upon completion of the response to the Division Order scheduled for June, 1992. Additionally, potential changes to the existing MRP material not related to reclamation plans and designs were not reviewed and cannot be considered to be approved amendments to the MRP.

ANALYSIS

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 application proposes to remove all sedimentation ponds during the reclamation period and utilize alternative sediment control measures to provide for sediment control and drainage treatment. The discussion is presented in Chapter 3, Section 3.3, item 6). Drainage designs and plans are included to restore the site drainage in Chapters 3, Appendix 3.3C, and Chapter 7.

Analysis:

R645-301-732. Sediment Control Measures.

The presentation does not include plans demonstrating that the proposed sediment control measures are designed, constructed and maintained using the best technology currently available to prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area and minimize erosion to the extent possible. The plan should discuss and justify the concept that the "best technology currently available" is proposed with the alternative sediment control measures selected. Additional sediment control measures should be considered.

The application should present designs demonstrating that the sediment yields from the reclaimed area are not greater than background levels. The use of the USLE equation in the application is a simplistic approach to the permitting requirements for ASCMs. The USLE approach is valid, however, the results of the calculation should be compared with calculations for an undisturbed area rather than compared with a verbal estimate of the sediment yield (e.g. George Cook, SCS estimate). The calculation (USLE) presented in Table 3.3.-2B needs more narrative, discussion and justification of the inputs and assumptions used in the calculation. Each of the inputs to the calculation needs justification. For example, the Division requests that the equation be applied to more discrete subareas and the results totaled for the canyon yield estimate. The Division requests the applicant review and justify the LS factor in the equation. A cursory estimate for 2:1 slopes indicates the factor is on the order of 21 rather than 0.66. The

basis for the K factor should be presented (e.g. soil type and location in MRP). Factors for the CP factors more representative of the treatments to be used in Hardscrabble are available in the literature and should be used as possible. The total acres involved with the disturbance in Hardscrabble Canyon is not given in the application.

The use of the MUSLE should be explored as a means to estimate the sediment yield for a discrete precipitation event and compared with undisturbed or background conditions. The use of a computerized sedimentation model may be necessary to provide adequate justification for the sediment control for the site. A diagram and construction details for each type of ASCM should be submitted. The use of 2000 #/acre mulch should be addressed in more detail (i.e. installation, rainfall intensity limit, crimping, hydromulched, etc.). Locations of alternative controls structures should be depicted on an appropriate map as possible.

An inspection and monitoring plan needs to be included in the proposal. This will include frequency of inspection of the structures and criteria for maintenance (e.g., replacement of straw bales/silt fence @ 1/2 capacity). The narrative should propose a maintenance schedule (including record keeping procedures) and sediment disposal plans (i.e. commit to removal of sediment from channels trapped in proposed straw bales).

The installation, inspection, maintenance and monitoring, and removal of alternative sediment control measures needs to be added to the reclamation timetable in the appropriate phases of the reclamation (e.g. installation first, removal last). Similarly, language in section 3.3-4 (1) needs to add more detail on sediment control installation prior to initiation of construction/reclamation disturbance. Scheduling of the reclamation progress should be considered to maintain existing sedimentation ponds as long as possible during the backfilling and grading operations.

R645-301-742.300. Diversions.

Rule R645-301-742.223 requires that the reclamation channels be designed to pass safely the 100 yr. - 6 hr. precipitation event. The proposal utilized the 25 yr. - 6 hr. event for stability designs. This is not approvable, the stability and riprap designs must be based upon the 100 yr. - 6 hr. event. Additionally, the use of the threshold of 5 fps for velocity to determine riprap protection must be justified. Soil/expected base material characterization should to be used to determine the maximum permissible velocities for the channel materials and stability designs (refer to Barfield, Hann, 1981 for examples).

The reaches with varying slopes and riprap designs identified in the calculations for the reclamation channels (Appendix 3.3C) need to be located on a map (or identified by station) for the determination of riprap volumes and final grade characterization.

The designs for HRC-6 (Dog Flat) are not adequate. The use of riprap on a 80% slope is not feasible. This slope is beyond the angle of repose for riprap material. The submittal must include a design for the reclamation of HRC-6 that will be installed if competent rock ledges are not found in the excavated channel area. The nature of this site will require excavation of the pad to a stable channel grade for the alternative design.

The channel design for the main channel between stations 3600 and 3900 (appx.) is confusing and undefined. The cross-sections depicted on Exhibit 3.3-8F show the channel to broaden significantly in this area (especially sta. 3700). Design calculations do not reflect this channel dimension. This channel design should incorporate a more defined channel in this area.

Section 7.2-2(5) needs to be revised to reflect the commitment and plan for development of the filter blanket for the reclamation channels. The operator must commit to the collection of samples of material following excavation to grade for the channels for use in the design of the filter blanket. A general worst-case filter blanket design must be presented for calculation of filter blanket volumes and bonding estimates. That section needs to present general riprap specifications (depth, gradation, durability, etc.).

R645-301-744. Discharge Structures.

Any energy dissipator structures at channel confluences necessary for the drainage plan need to be designed (e.g. HRC-2 and HRC-6).

cc: R. Harden
Bill Richards
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