



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

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September 18, 1992

TO: Daron Haddock, Permit Supervisor

FROM: Rick P. Summers, Hydrologist *SF & ES*

RE: Review Sowbelly Canyon Reclamation Plan (received August 18, 1992), Castle Gate Mine, Amax Coal Company, ACT/007/004-92A, Folder #2, Carbon County, Utah

## SUMMARY:

In accordance with Stipulation under Docket 91-001, AMAX Coal Company has submitted a reclamation plan for the Sowbelly Canyon area of the Castle Gate Coal Mine. These plans were received by the Division on August 18, 1992.

Comments and completeness of the information within the text of this review is in regard only to those areas described in Sowbelly 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 Sowbelly 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 final completion of the response to the Division Order scheduled for Fall of 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 construct two new sedimentation ponds and utilize alternative sediment control measures to provide for sediment control and drainage treatment during the reclamation period. 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. There are no exploration, monitoring or culinary wells located in the project (Sowbelly Canyon) area. The Applicant does not propose any permanent impoundments or retention of roads at the site. There is no proposed discharge from the #5 Portal (pg. 3.2-3).

**Analysis:**

The Applicant proposes to utilize the following alternative sediment control measures to meet the best technology currently available criteria of the R645 rules:

1. Filter fabric (silt) fences
2. Surface ripping
3. Mulch
4. Chemical tackifier added to mulch
5. Straw bales
6. Seeding and revegetation practices
7. Reseeding areas as needed

The application contains calculations that predict the sediment loss for the site using the Universal Soil Loss Equation (USLE) and the Modified Universal Soil Loss Equation (MUSLE). The calculations were performed for the site assuming no alternative treatment measures and with the alternative measures in place (Appendix 3.3E). The application concludes that the cumulative sediment control measures reduce the sediment yield from the reclaimed areas more effectively than the undisturbed ground cover.

The installation, inspection, maintenance and monitoring, and removal of alternative sediment control measures is discussed in Section 3.3. The reclamation timetable schedules the installation of the alternative sediment control measures prior to grading of the site. The site will be inspected quarterly and following each major storm to observe the effectiveness and integrity of the sediment control measures. Scheduling of the reclamation progress has been planned to maintain existing sedimentation ponds as long as possible during the backfilling and grading operations.

Rule R645-301-742.223 requires that the reclamation channels be designed to pass safely the 100 yr. - 6 hr. precipitation event for intermittent and perennial channels and the 10 yr. - 6 hr. event for channels classified as ephemeral. The channel capacity, stability, and riprap designs are based upon the 100 yr. - 6 hr. event for the main stem intermittent channel, with the remainder of the proposed channels designed for the 10 yr. - 6 hr. event.

Soil/expected base material characterization has not been used to determine the maximum permissible velocities for the channel materials and stability designs (Barfield, Hann, 1981). The application proposes that the threshold for erosive velocities is five (5) fps. The application should justify this value using maximum permissible velocities methods. Due to the uncertainty of the expected base material size fractions to be encountered, following regrading and channel excavation, the Applicant has presented a commitment to sample the material and a methodology to be employed to design the filter blankets during the reclamation process.

## **SUMMARY**

The following review comments were itemized to facilitate Operator response to the Division's review. The comments are not identified as to the specific Division Order, but the content should make the intent obvious. The level of deficiencies in this submittal precluded a thorough technical analysis of the material. That analysis will be conducted following the Operator response to this review. The Operator is encouraged to contact me if additional clarification on these line items deficiencies is needed.

The proposal needs to make the following minor changes to complete the response:

1. The submittal proposes to utilize alternative sediment control measures to treat the reclaimed area to the north of SBRD-1 and to the east of SBRD-2. It appears as if this area could be treated in sediment Pond 017. The Applicant should evaluate this alternative and include a discussion of the evaluation in the text.
2. The application needs to be more specific on the reclamation plans for the main channel (SBRD-1) below the existing culvert along the access road. The extent

of reach SBRD-1A needs to be defined. The application should ensure that the planned reclamation addresses all portions of the channel that are within the disturbed area boundary (see Exhibit 3.2-3 for area of channel in the disturbed area). If the existing channel is not proposed to be modified, the application must contain designs demonstrating the channel is in compliance with R645-301-742.300.

3. The application proposes a monitoring station (B-17) below #5. An upstream monitoring station should be proposed to assist in demonstrating that Phase II and Phase III bond release criteria are met.
4. The designs for channel stability measures should be based on maximum permissible velocity criteria for the expected channel material. The application proposes erosive threshold criteria as 5 fps. This value should be justified based on the channel materials.
5. Page 3.2-15-16 discusses the possibility of retaining the sediment ponds as permanent impoundments. The application must contain a demonstration for the items enumerated in R645-301-733.220 in order to obtain approval for a permanent impoundment. As an alternative, the Applicant may consider permitting the ponds to be removed, regraded, and revegetated. The ponds can then be evaluated (i.e. wildlife use study, water quality sampling, etc.) during the bonding period to provide adequate demonstration for a permit amendment to be submitted and approved proposing retention of the ponds.
6. The proposal for the design of the filter blanket is discussed on pg. 3.2-19. This section should be revised to state the final design will be submitted to the Division and approved prior to installation. The application should be clarified to commit to the installation of graded filter blankets in all channels rather than the use of a synthetic fabric blanket. The methodology to be used in the design should be referenced.
7. The proposed sediment cleanout for Ponds 016 and 017 commits to maintaining the ponds for 2 years (p.3.2-20). R645-301-742.220 requires that the ponds be maintained to provide for containment of the 10 yr. -24 hr. precipitation event throughout the permit life.
8. The narrative describes spillway outslope designs based on a 3:1 slope, but Exhibit 3.2-8 does not depict the spillway extending to the receiving channel (SBRD-4). The application should be revised to clearly depict the spillway

extending to the channel. A discussion/design for energy dissipation at this confluence should be presented.

9. Page 3.2-27 discusses removal of silt fences upon successful completion of vegetation establishment. The section should be revised to incorporate the erosion/water quality standards of R645-301-880.320. Also, the discussion should incorporate the requirements of R645-301-742 to "prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area" for the bonding period.
10. The plan needs to include a plan for recontouring, reseeding, and sediment control for pond/berm removal if pond retention criteria are not met.
11. The proposal for all alternative sediment control areas (ASCA's) needs to include each ASCA area and design storm volume. Chapter 7 should incorporate a summary of all ASCA areas for the entire permit area. It is suggested that the summary partition the ASCA's into operational and reclamation categories. The summary should given each ASCA area acreage, runoff volume, treatment measures, and total percent of disturbed area treated as ASCA's.
12. The narrative discussing the use of mulch, page 3.5-13, Section 3.5, and page 3.6-9, Section 3.6 proposes the use of woodchips as a mulch. The literature suggests that long fiber mulches are more successful in reducing erosion. The application should be revised to utilize this preferred best technology.
13. The permit discussion needs to demonstrate that the reclaimed channels will have equal capacity to the unmodified channels directly upstream of the disturbed area. The current discussion states that the natural channel sections were measured in the field and approximated with a trapezoidal cross-section, yet no calculations were presented or discussion stating the capacity of the undisturbed channel.
14. The reclamation timetables on pages 3.2-28 and 3.2-29 needs to be modified to include sediment pond and sediment control measure **installation and removal**. The reclamation timetable needs to include evaluation of pond/depression criteria for retention of permanent impoundments and commit to remove structures if criteria not met.