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

Michael O. Leavitt  
Governor  
Ted Stewart  
Executive Director  
James W. Carter  
Division Director

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340  
801-359-3940 (Fax)  
801-538-5319 (TDD)

November 26, 1996

TO: File

THROUGH: Joseph Helfrich, Permit Supervisor 

FROM: Paul Baker, Reclamation Biologist 

Re: Sowbelly Phase I Bond Release, Amax Coal Company, Castle Gate Mine, ACT/007/004-96D, Folder #2, Carbon County, Utah

## SUMMARY

Amax Coal Company completed backfilling, grading, seeding and mulching on about 18.2 acres of the Sowbelly Gulch disturbed area in the fall of 1995. On February 8, 1996, the Division received as-built drawings for the reclamation and a completely revised Section 3.2.

It is likely the revegetation success standards can be achieved with the reclamation methods the operator used.

## ANALYSIS

### REVEGETATION SUCCESS STANDARDS

Regulatory Reference: R645-301-350

The Division may grant Phase I bond release after an operator has satisfactorily completed backfilling and grading and established drainage controls. However, R645-301-880.210 requires the Division to make an evaluation of, among other factors, the degree of difficulty to complete any remaining reclamation. Backfilling and grading necessarily affect the potential for revegetation success and achieving the postmining land use. The pre- and postmining land uses are wildlife and grazing.

Sowbelly Gulch was originally reclaimed in 1993-1994, but in the fall of 1995, the operator reworked about two-thirds of the area. Originally, the operator had installed contour furrows to trap moisture, but reworked areas were gouged. The gouges vary but are

approximately one to two feet deep and about four to six feet across. This method of water harvesting is considered superior to contour furrowing in this instance. It is anticipated these gouges will trap water and thus increase the amount of soil moisture and the ability for plants to establish and survive. Gouging combined with the other treatments the permittee used are the best revegetation methods known to the Division for this area. If weather cooperates, revegetation should be successful.

Seeding was done in the fall of 1993, 1994 and 1995 using the seed mixtures specified in the plan. Transplants were planted along the stream channel in the spring of 1996. Species used for transplanting were chokecherries, serviceberries, curleaf mountain mahogany, Wood's rose, and elderberries. About 1200 seedlings were planted along the length of the channel.

Slopes created in the grading process are not extremely steep, but some very steep cut slopes were not regraded. As much as possible, these slopes were seeded, but it is not anticipated that much vegetation will become established on them.

About 8% of the reclaimed area, about 1.5 acres, was left as cut slopes. The total regraded area is about 18.2 acres. The revegetation reference areas are abandoned mines in the Spring Canyon area. Considering the reclamation methods used in all of these areas, it is anticipated that there will be at least as much vegetation in the Sowbelly disturbed area as at the abandoned mine reference areas. Assuming, however, there is no vegetation on the steep cut slopes, the overall amount of vegetation in the reclaimed area would be reduced by 8%. If vegetation in the rest of the reclaimed area was as much as in the reference areas, the overall amount of vegetation would be 92% of the reference areas. This would meet the revegetation success standards because the success standards consider the reclaimed area to be equal to the standard when it is within 90% of the standard with 90% confidence.

Vegetation should be adequate to control erosion on regraded areas assuming the cover will be the same as at nearby abandoned mines and that vegetation is controlling erosion in these areas. The ungraded cut slopes have been in place for many years and should be stable according to information presented in the mining and reclamation plan.

The mining and reclamation plan says the diversity index used to compare reference and reclaimed areas will be used to show revegetation success for the parameters of diversity, seasonal characteristics, permanence, and utility for the postmining land use. The seed mix used should result in diversity at least as great as in the reference areas.

The remaining cut slopes are probably not useful for either a grazing or wildlife postmining land use. The Bureau of Land Management considers any slopes steeper than 2h:1v to be unusable for grazing, so the cut slopes that were left are not suitable for this use. Division personnel have seen deer on some of the cut slopes, but it is unlikely big game animals would use vegetation on the cuts for forage or cover.

Although the cut slopes are probably not particularly useful for the postmining land use, they are not extensive and would not keep any animals from gaining access to surrounding areas. The cuts resemble adjacent, undisturbed areas which also have very steep areas that produce little forage or cover for wildlife or livestock and may not be entirely accessible.

**Findings:**

The permittee has met the backfilling and grading requirements for the postmining land use in the Sowbelly Gulch area. In addition, the permittee is likely to achieve successful revegetation if there is adequate moisture. The grading, soil surface preparation, and other reclamation methods used are the best of which the Division is aware for this area .

Although some steep cut slopes remain, they are similar to cliffs in undisturbed areas and should not adversely affect the postmining land use. There should be adequate vegetation to achieve revegetation success standards. Although the steep slopes will not produce much forage, they do not restrict movements by wildlife or livestock any more than cliffs in undisturbed areas.

**RECOMMENDATIONS**

The permittee has completed backfilling and grading in Sowbelly Gulch in a manner that fulfills the requirements for the postmining land uses and makes it likely that revegetation efforts will succeed.