



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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TO: Daron Haddock, Permit Supervisor

FROM: Paul Baker, Reclamation Biologist 

DATE: May 27, 1992

RE: Castle Gate Prep Plant Reclamation Plan, Amax Coal Co., Castle Gate Mine, Folder #2, ACT/007/004, Carbon County, Utah

SUMMARY

Amax has revised the mining and reclamation plan for the Castle Gate Preparation Plant area. Much of the revegetation plan is contained in Chapter 9.

In a meeting on May 20, 1992, with Mickey Steward of Amax, I discussed seedbed preparation, seeding, and mulching methodology for the Hardscrabble Canyon area. Based on this meeting, I expect the revegetation plans to be revised to include new soil roughening techniques, planting methods, and mulching technologies. If this occurs, some of the comments in this memorandum may become obsolete.

ANALYSIS

R645-301-321

Vegetation Information

Proposal:

Two reference areas are described in Chapter 9 for the Castle Gate area. They are in mixed brush and riparian vegetative types.

The mixed brush reference area had 41% vegetative cover, primarily from Agropyron sp., but with substantial contributions from sagebrush, Utah serviceberry, and fourwing saltbush.

The riparian reference area had 56% vegetative cover. More cover was provided from downy brome than any other species. Other species mentioned include narrowleaf cottonwood, virgin's bower, Gambel oak, skunkbush sumac, and rose.

Analysis:

Appendix 9-B contains the detailed information needed for this section of the plan, but it is still missing. Memoranda from Lynn Kunzler acknowledge that the Division once had a copy of this appendix, but it has not yet been located. The search is continuing.

Since most of the vegetation in the mixed brush reference area was identified as "Agropyron sp." and since the seed mix needs to reflect as closely as possible the species already at the site, this grass needs to be identified.

Revegetation of the refuse pile in Schoolhouse Canyon occurred in 1985 and possibly one more time before then. Page 64 of Chapter 9 of the MRP states that reclamation sites will be monitored for cover, density, and frequency during each of the first three years to determine if supplemental planting and seeding is needed and at years 5, 7, and 9 using the same random sampling and statistical analysis techniques used in the original reference area sampling. This information would be valuable in evaluating the seed mix that was used to see if some changes to the currently proposed seed mix should be made. The seed mix appears to have been mix 3 from the old Price River Coal MRP. The evaluation information will be requested at the next inspection.

Deficiencies:

1. If Appendix 9-B is found, it must be included in the MRP.
2. Amax must identify the dominant grass in the mixed brush reference area.

R645-301-341

Revegetation Plan

Proposal:

Seeding and mulching will occur in week 74 of reclamation, after October 1, according to page 18 of the revised section 3.4. Chapter 9 page 52 says that planting of the ephemeral/intermittent drainage planting mixes will occur in the spring, mid to late April.

Seed mix 1 will be used for the majority of the area at the prep plant. Mix 2, a riparian mix consisting of both seed and transplants, will be used near the Price River.

Fertilizer may be mechanically or hydraulically broadcast prior to seeding. The seed will then be applied using a hydroseeder or drilled where accessible. In areas inaccessible to the hydroseeder or drill, the seed will be broadcast by mechanical means.

Seeded areas will be mulched with hydromulch at the rate of 2000 pounds per acre. Areas inaccessible to the hydromulch will be mulched with straw at the rate of 2000 pounds per acre and tacked with nylon or other suitable netting.

No irrigation is planned, and no pests or diseases are anticipated. A plan to control diseases or pests will be developed with the Division if a problem arises.

Reclamation sites will be monitored for cover, density, and frequency during the first three years to determine if supplemental planting and seeding is needed. Sites will be checked again at 5, 7, and 9 years to find problems affecting the density of the cover vegetation. Analyses at these defined intervals will be through the use of the same random sampling and statistical analysis techniques used in the original reference area sampling.

There are apparently no field trials or greenhouse studies at the Castle Gate Preparation Plant.

Analysis:

The plan does not discuss timing of transplanting other than for ephemeral and intermittent drainages, but the Price River is not ephemeral or intermittent. Depending on the type of materials to be planted, planting should probably be conducted during the dormant season, either fall or early spring.

The riparian reference area contains 1127 shrubs and 17 trees per acre, but Amax only proposes to plant 900 trees and shrubs per acre and not include seed of any trees or shrubs. Some additional provisions will need to be made to meet the tree and shrub density standard. The amount of woods rose should probably be increased to about 500 per acre, and skunkbush sumac and Gambel oak could be added. Willows could possibly be reduced since they are not mentioned in the text as a major species in the riparian area. Another possibility would be to seed some of the tree and shrub species.

The plan needs to further discuss the types of transplant materials that will be used, i.e. bare root stock, containerized plants, cuttings, etc. If cuttings are used, some of the materials may be available on the site, but a nursery will need to know at least one and probably two years before reclamation begins what materials will be needed.

Seed mix 1 is a diverse mixture that should work well at the site. It contains two wheatgrasses, thickspike and western, but it is not known if either of these is the species that dominates the reference area. When information from deficiency 2 under R645-301-321 is received, this seed mixture should be evaluated to determine if a different

wheatgrass should be used.

Seed of Utah serviceberry is available commercially, and this species should be used in place of Saskatoon serviceberry since the reference area contained A. utahensis.

Seed and planting mix 2 is also a diverse mixture that is appropriate for a riparian area. Seed of Geranium viscosissimum is not generally available commercially and could be simply deleted from the mixture.

Even where species used in revegetation are the same as those in the immediate area, slight variations in genotypes and physiology can cause revegetation failure. This is especially true for shrubs. The Utah Crop Improvement Association has begun a program of verifying seed origin where seed collection locations are documented, especially for wildland shrubs. This program is not yet well established but should be soon and will become more established as demand for this type of seed increases. Other possibilities for obtaining this kind of seed include making special collections on site and only buying seed from a similar location as the mine and labelled with the county and elevation of collection as per Utah State law for tree and shrub seed. Most nurseries recognize the need for using adapted ecotypes in plantings, and source information is commonly available for nursery stock. Nurseries will also contract collectors to gather seed from a specific site and grow those plant materials to a transplant stage. In order to have a diverse, permanent and effective vegetative cover, adapted ecotypes need to be used.

Surface roughening techniques have been discussed with Amax personnel, and a proposal is anticipated. Slopes, especially those steeper than 3h:1v, should be left in a roughened condition that will not be substantially disturbed by seeding and mulching operations. Included in the surface preparation techniques should be rock piles that will provide microclimates suitable for seed germination and establishment and provide wildlife habitat enhancement.

The seeding methods proposed are adequate. Drill seeding should not be performed where surface roughening techniques have been used to prepare the soil on steep slopes. Broadcast seed needs to be placed in good contact with the soil by raking or another means.

The most current recommendations are to use at least 1.5 tons per acre of straw or, preferably, hay mulch instead of wood fiber hydromulch. These mulches last longer and control erosion better than hydromulch. Synthetic mulches may be available; Amax is expected to provide information about them.

The plan needs to contain a contingency plan to irrigate seedlings in case of

drought. Transplants will need to be protected at the first sign of wildlife degradation.

The monitoring procedures proposed should be adequate.

The plan calls for placing only 6" of topsoil on the refuse pile and justifies this by stating that the refuse materials are not toxic. Priscilla Burton discussed in her soils memorandum the suitability of the refuse material for use as a substitute soil and required that the refuse be covered with at least two feet of suitable substitute soil cover material. Any attempt to justify less soil cover than this would need to be accompanied by data from reclamation at similar sites or test plots which show that revegetation can be accomplished using less soil material.

Deficiencies:

1. The plan must discuss when transplanting operations will be performed on perennial streams.
2. The planting list or seed mix in mix 2 for riparian areas must be revised to include enough trees and shrubs to make it possible to achieve the standard for success for the riparian reference area. Addition of skunkbush sumac and Gambel oak and more Wood's rose to the planting mix are recommended.
3. The plan must detail the types of transplant materials that will be used in the riparian area, i.e. bare root stock, containerized stock, etc.
4. Seed mixture 1 must be revised, if necessary, according to the results of identification of the dominant wheatgrass in the Castle Gate Mixed Brush reference area. Utah serviceberry must be substituted for Saskatoon serviceberry in seed mix 1.
5. The Applicant must show how seed and transplants of adapted ecotypes, especially of shrubs, will be obtained that will provide a diverse, permanent, and effective vegetative cover.
6. Amax must include a plan to roughen slopes, especially those steeper than 3h:1v, through methods such as gouging, pitting, or terracing. Seeding operations must not destroy these roughening features. Included in this plan must be methods to establish rock piles both for plant establishment and for wildlife enhancement.

7. The plan must include methods to place broadcast seed in good contact with the soil, such as through raking.
8. Mulching methods must be changed to reflect the best technology currently available for erosion and sediment control and for seedling establishment. Straw or hay applied at the rate of 1.5 to 2 tons per acre and anchored by netting, crimping, or application of a chemical tackifier appears to be the best available method.
9. The plan must contain contingency plans for irrigating transplants in case of drought. Transplants must be protected at the first sign of wildlife degradation.

R645-301-342

Fish and Wildlife

Proposal:

Several high country ponds were created during the drilling program of 1970-1977. They catch seeps for grazing animals and are probably used by wildlife.

Species to be used in final reclamation were selected based partially on their nutritional value for wildlife.

Analysis:

Amax should consult with the Division of Wildlife Resources to determine if other wildlife habitat enhancement measures are practicable or needed for this area. The plan should provide evidence and results of this consultation.

Deficiencies:

1. Amax must include in the plan wildlife enhancement measures for the postmining phase of operations or must make a statement as to why these measures are not practicable. Consultation with the Division of Wildlife Resources is highly recommended.

RECOMMENDATIONS

Approval of the reclamation plan for the Castle Gate Preparation Plant area is not recommended until issues discussed above are resolved.