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DIVISION OF OIL, GAS AND MINING

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June 5, 2001

TO: Internal File

THRU: Daron R. Haddock, Permit Supervisor

FROM: Paul B. Baker, Reclamation Biologist

Re: Review of Biology Sections of the Emery Deep Mining and Reclamation Plan, Consolidation Coal Company, Emery Deep Mine, C/015/015-AM01A

SUMMARY:

Other than some aspects of the test plot and interim revegetation plans, the biology portions of the Emery Deep mining and reclamation plan had not been reviewed for several years. On January 29, 2001, the Division sent a review of this section of the Emery plan, and the permittee responded with a submittal the Division received April 10, 2001.

Some issues raised in the review cannot be resolved without a coordinated visit that includes the Division, the permittee, and a representative of the Natural Resources Conservation Service, and the Division is trying to arrange for this visit. There are other issues that also need to be resolved, particularly in the success standards.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.19; R645-301-320.

Analysis:

The mining and reclamation plan shows nine vegetation communities within the Emery Deep permit area. Plate VIII-1 shows the locations of these communities and a surface operations area including proposed disturbances. While it is impossible to know what vegetation communities existed in pre-law disturbance areas, adjacent communities are greasewood shrubland, riparian shrubland, and mixed desert shrubland. Other communities that have been or would be disturbed include an annual forb community and riparian meadow.

Dominant species, total cover, and production are shown for the predominant communities, and the plan also includes a list of all species encountered in vegetation sampling.

Appropriateness of the vegetation reference areas is discussed under the revegetation section of this analysis.

Findings:

Information provided in the mining and reclamation plan is adequate to meet the requirements of this section of the regulations.

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.21; R645-301-322.

Analysis:

Fish and Wildlife Information

Baseline wildlife information is in Appendix IX-1. Most of this information was gathered in a 1980 study which included aerial survey followed by ground truthing. Most of the permit area is critical habitat for ring-necked pheasants. The riparian areas along Christiansen Wash, Quitchupah Creek, and an unnamed stream are also critical wildlife habitats.

A burrowing owl was found near a prairie dog town. While the permittee's consultant only saw one owl and no chicks, the area does appears to have good habitat for this species. Burrowing owls are classified by the State Division of Wildlife Resources as a species of concern because of declining populations.

The only other raptor found in the wildlife survey was an American kestrel. Trees along the streams have some large nests that could be used by raptors, but these nests were not active. There are several species that could make large nests such as these, including both raptors and corvids.

A few deer can sometimes be found in the area, and elk are sometimes forced to come down from higher rangelands because of heavy snow. Pronghorns are not known to occur in the area although there is probably a limited amount of habitat.

The wildlife study included surveys for macroinvertebrates in the streams. Because of poor substrate quality, there is limited potential for macroinvertebrates; however, there are some in certain stretches. Species richness decreases markedly in certain stretches of the stream, and it happens that these are immediately below mine water discharge points. The report explains this is probably due to a change in the substrate quality rather than a result of the effluent; nevertheless, the Division should confirm the conditions discussed in the report.

The permit area contained several white-tailed prairie dog towns, so the consultant searched for any sign of black-footed ferrets and found none.

Threatened and Endangered Species

The information in Section VIII.B.4 has been updated to include a current list of threatened, endangered, and candidate species that might occur in the permit area. None of these species has been found in the permit area although there is some potential that some of these species could occur in the area. The species most likely to be in the area are Wright fishhook cactus (*Sclerocactus wrightiae*), last chance Townsendia (*Townsendia aprica*), and San Rafael cactus (*Pediocactus despainii*).

Additional field work to determine whether these species occur in the permit area is not required at this time; however, if the permittee proposes to disturb new areas, surveys for species potentially in proposed disturbed areas would be needed. In addition, the Division and the Fish and Wildlife Service would need to examine potential effects on the threatened and endangered fish species of the upper Colorado River if the mine begins operating again.

Findings:

Information provided in the mining and reclamation plan is adequate to meet the requirements of this section of the regulations. The Division anticipates no threat to any threatened or endangered species under current operating conditions. The Division should confirm the stream conditions discussed in the consultant's report. If the permittee decides to proceed with any development plans that include new disturbance, the areas to be disturbed will

need to be checked for threatened and endangered species. In addition, the Division and the Fish and Wildlife Service would need to examine potential effects on the threatened and endangered fish species of the upper Colorado River if the mine begins operating again.

OPERATION PLAN

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

The fish and wildlife protection plan is in Chapter IX, Section 817.97. The primary impacts are reduced habitat in the actual disturbed areas and some reduction of habitat quality in adjacent areas. There is also some disruption of movement patterns.

Mitigative measures include educating mine employees about wildlife, and they are advised to not harass wildlife, particularly during high stress periods. All hazards associated with mining activities are appropriately fenced. Water quantity and quality are maintained in all streams. It appears that power lines were designed to be safe for raptors.

The Division is not aware of additional protective measures that need to be implemented at this time. The permittee is required to use the best technology currently available to protect wildlife and enhance wildlife habitat.

Findings:

Information provided in the mining and reclamation plan is adequate to meet the requirements of this section of the regulations.

VEGETATION

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis:

Section VIII.C.3 has two species lists that could be used for contemporaneous reclamation. One of the mixes consists primarily of native species, and the other has two aggressive introduced grasses and one native shrub. Because of the difficulty in establishing vegetation at this site, it may be necessary to use the mix with introduced grasses, but, as far as possible, the mix with mostly native species should be used.

The application says simply that an approved seeding method will be used, and the Division assumes this means the methods to be used for final reclamation will also be used for interim revegetation. These methods are acceptable.

Findings:

Information provided in the mining and reclamation plan is considered adequate to meet the requirements of this section.

RECLAMATION PLAN

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Timing

Section III.F.1 of the plan says permanent seeding will generally be done in the late fall, after October 20. If adequate soil moisture is available, seeding could also be done in the early spring before June 1 and in the early fall between August 10 and September 10. Seeding in the early spring and early fall could enhance the establishment of warm season grasses, but it may not be successful. Revegetation at this site is likely to be difficult, and it will probably be necessary to reseed some areas no matter what revegetation techniques are used. The Division can accept the plan to potentially do limited seeding in the spring and late summer, but the permittee must realize it will probably be necessary to reseed these areas.

Revegetation Techniques

The mining and reclamation plan says the soil will be tested and amendments added according to these results. Section III.B.1, page 10, now includes a commitment to sample soils under the roads that will be reclaimed.

After grading is completed, the regraded land will be roughened by either ripping or gouging or a combination of these methods. Next, stockpiled topsoil will be redistributed, and low-ground-pressure equipment will be used to rough grade the surface and leave depressions. Based on soil tests, fertilizer may be broadcast or sprayed onto the soil, and this will be incorporated into the soil by surface roughening prior to seeding.

Following the commitments in the application should lead to a well prepared seed bed that will retain as much water as possible. The test plots had varying degrees of success, but the highest vegetation cover was clearly in depressions where water was able to accumulate. It is

vital that the permittee follow these commitments; unless the area is irrigated, the Division considers a roughened seedbed to be critical to revegetation success at this site. As discussed below, the plan does include irrigation as an option.

Section VIII.C.4 has seed mixes that will be used to revegetate the mixed desert shrub and annual forb community, the greasewood community, and the riparian community. Except yellow sweet clover and alfalfa, every species in the seed mixes is native to Utah. In this amendment, the permittee has reduced the amount of yellow sweet clover to be applied. Alfalfa and yellow sweet clover have been used at other mines and have not generally been aggressive to the point of excluding other species. Yellow sweet clover may help decrease the numbers of weeds and may also be a host for nitrogen fixing bacteria.

The permittee has made other changes to the seed mixes according to Division recommendations. Some of these species, such as trident saltbush, alkali sacaton, and Castle Valley clover, have been very successful at the Emery Deep Mine or at other sites with similarly harsh soil and climate conditions. In addition, the permittee has included the scientific names of all but one of the species in the mixes.

Some species in the seed mixes, including species the Division recommended, may not be available at the time of reclamation, particularly if the permittee does not order them well in advance. The Division recommends that the mining and reclamation plan contain a statement indicating what will happen if seed is not available. The permittee could commit to consult with the Division if this happens and document in the annual report what substitutions were made. Although the Division made this recommendation in the previous analysis of the biology chapter, the permittee did not choose to follow it in this submittal.

Although it is probably possible to revegetate the site using only seed, some species of transplants were moderately successful in the test plots. The permittee should consider planting seedlings of some species, such as fourwing saltbush and mat saltbush.

Seeding will be done through a combination of drilling and broadcast seeding depending on the seed type and soil conditions. Because of seed size and physiology, some seeds need to stay near the surface. Seeds of other species need to be broadcast simply because of mechanical problems with drilling them. The method will be chosen to minimize leveling of the surface because a roughened surface is essential to revegetation efforts.

The Division does not feel drill seeding should be used, but, as long as some species are broadcast seeded and the permittee is aware of the need to keep the surface rough, the plan is considered acceptable.

Mulch may be applied on all graded areas where suitable plant growth material has been respread to promote seed germination and improve moisture retention. Straw or hay may be applied at the rate of one or two tons per acre. The application says the straw or hay needs to be free of noxious weeds but does not contain a commitment to use certified noxious weed free straw or hay. On steeper slopes where vegetation does not adequately control erosion, rock may be used on the surface or incorporated into the soil.

If organic mulch is used, it may be necessary to crimp it. This would be done in a way that does not affect surface roughening. Other methods, such as matting or netting, may be used to control erosion and to hold the mulch in place. Chemical binders or tackifiers could also be used to hold the mulch. Other methods included in the application that might be used to control erosion include terracing, riprapping, rock check dams, organic tackifiers, wood fiber mulch, and straw bale dikes.

While the Division recommends using mulch and the chances for revegetation success are probably greater if mulch is used, it is not critical on flatter areas. Where there are slopes steeper than about 5h:1v, mulch should definitely be used both to help reestablish vegetation and for erosion control.

The Division recommends, but does not require, using certified noxious weed free straw or hay where these are used as mulch. Certified straw and hay are required on federal lands. Straw or hay mulch can be a significant source of noxious weed seeds.

Section III.G.2 discusses revegetation and erosion monitoring and maintenance. All rills and gullies nine inches or more deep will be backfilled or graded, reseeded and mulched or otherwise stabilized. Certain other normal conservation practices, such as weed and insect control, will also be used.

Irrigation and fertilization may be used during the first two growing seasons to enhance vegetation establishment. It is unlikely fertilization will have a significant positive effect on vegetation establishment, but irrigation could. The results of trying irrigation on the test plots are not conclusive, but if done right, irrigation could increase vegetation establishment. Before approving irrigation, the Division would need to know the quality of the water, how much and how frequently reclaimed areas would be irrigated, and how water would be applied.

Rule R645-301-357.300 discusses husbandry practices that may be used during the extended responsibility period. The methods discussed in the mining and reclamation plan are acceptable, but they could restart the extended responsibility period for particular areas. The permittee needs to be aware of these restrictions.

Standards for Success

The mine disturbed area includes areas disturbed both before and after passage of the Surface Mining Control and Reclamation Act (SMCRA). In areas disturbed before 1977, it is assumed, and the application states, that no vegetation existed in 1977. The applicant proposes that the revegetation success standard for areas disturbed before 1977 will be that the areas will have adequate vegetation to control erosion and at least as much vegetation as existed before reclamation, i.e. none. The application says that in the second year following seeding, a request can be made to release these pre-August 3, 1977, areas.

In previous instances, the Division has determined that the extended period for revegetation success applies to all areas where revegetation is required. Therefore, although the success standard for areas disturbed prior to August 3, 1977, may be lowered, the period for extended responsibility does not change. Theoretically, the permittee could apply for final bond release after only two growing seasons, but it could not be approved. To avoid confusion and the assumption that the Division would allow final bond release after only two years, this statement should be changed.

The application says that the success standards for revegetation of previously disturbed areas are that ground cover will be adequate to control erosion and that the ground cover will be not less than existed before reclamation. In saying this, the application implies there are no other success standards for pre-SMCRA areas. This is not correct. The general requirements in regulation R645-301-353 apply to all areas, not just those disturbed after SMCRA was enacted or came into effect. With certain exceptions, such as cropland, all revegetated areas must have vegetation that is diverse, effective for the postmining land use, permanent, capable of self-regeneration and plant succession, and in compliance with state and federal noxious weed laws.

The application needs to be modified to explicitly include the requirements of R645-301-353 as part of the success standards for areas disturbed before August 3, 1977. It should also discuss the standards that will be used for these areas. This could be a statement that previously disturbed areas will be compared with appropriate reference areas in the same manner as those areas disturbed after 1977 for the parameters in R645-301-353.

According to Section VIII.C.9, three reference areas were set up as revegetation success standards for areas disturbed after 1977. Section VIII.A and Plate VIII-1 indicate there is a fourth reference area in a pinyon/juniper community. Section VIII.A shows the sizes of these reference areas, and the locations are shown on Plate VIII-1. Based on the disturbance areas and vegetation communities shown on Plate VIII-1, it does not appear there are any areas that would need to be compared with a pinyon/juniper reference area.

The Division requires that reference areas be at least one acre, and the largest reference area is only about one-fourth acre. The plan contains no information indicating whether the Natural Resources Conservation Service has evaluated the range condition of the reference areas. They need to be in fair or better range condition for the Division to accept them as revegetation success standards. Even if the reference areas were evaluated at some time in the past, it would be best to check them again. The plan does not say whether the reference area locations were marked, but this should also be checked.

In its letter responding to the Division's January 2001 review, the permittee acknowledged a fourth reference area was established in a pinyon juniper area for the base vegetation study in 1980. According to the letter, since the proposed disturbance area does not contain a pinyon/juniper community, "a reference area was not established for Pinyon/Juniper." Since the pinyon/juniper reference area will not be used as a revegetation success standard, reference to it should be removed from both the maps and text.

The reference areas were established before the Division's Vegetation Information Guidelines were approved in 1992. These guidelines require that reference areas be at least one acre and that they be in fair or better range condition. It is assumed they were not checked for range condition. The permittee suggests in its cover letter that Division representatives meet on site with representatives of Consolidation Coal and the Soil Conservation Service (Natural Resources Conservation Service) to look at the reference areas and decide whether and how to change them. The Division will work to coordinate this meeting. Until this issue is resolved, the Division will still consider the size and condition of the reference areas to be a deficiency in the plan.

The application includes methods for measuring cover and analyzing this information. The reference and reclaimed area cover values would be compared using the Wilcoxon Rank Sum test. While this is a legitimate non-parametric test, Appendix A of the Division's Vegetation Information Guidelines only have one method for testing whether the reclaimed area meets reference area standards: the t-test. The guidelines could be changed to allow for the Wilcoxon test, but because the guidelines are referenced in the regulations, this change would have to go through the rulemaking process. Unless this happens, the Division cannot accept another method.

Cover would be measured using the line-intercept method, and this method is allowed by the guidelines. This would normally be done within two weeks from October 1. The application also says sampling will occur to coincide with the mature phenological stage of the majority of the species under investigation. It would be best for the application to not specify an approximate date when sampling would occur but just to say that sampling will coincide with the mature phenological stage of the majority of the species under investigation. Probably the best time to measure vegetation cover in this area is in the late spring or early summer. Otherwise, most annuals would be gone or, at best, difficult to identify. By late summer, depending on the weather, many grasses are likely to be dormant, and it may be hard to tell if they are alive.

According to the application, diversity calculations will be based on a life-form analysis of warm season grasses, cool season grasses, shrubs, and forbs. Either the Motyka or the Bray and Curtis similarity indices will be used to assess comparability between reclaimed and reference areas. The application says the diversity of reclaimed areas will be considered to have met the success standard if there is a 50% or greater similarity of the life forms present between the reference area and the reclaimed plant community.

The Division considers the proposed diversity standards in the application acceptable. While the indexes are for similarity and do not truly measure diversity, they do make an appropriate comparison between the reclaimed and reference areas. When the permittee applies for bond release, both the Division and the permittee will need to make a qualitative analysis of the diversity of the reclaimed area and the suitability of the species for the postmining land use.

Fish and Wildlife

The species in the revegetation plan meet the requirements of R645-301-342. Not all of these species are particularly palatable, but there must be a balance between those species adapted to the site and the species best for wildlife.

According to the application, best management practices and technology will be applied at the time of reclamation to enhance wildlife habitat. Surface roughening will provide undulating terrain and vegetation that will be conducive to small animals, birds, and rodents.

When reclamation occurs, there may be limited opportunities to enhance the site for wildlife, particularly along the streams. The application includes revegetation plans for these areas that should enhance the wildlife habitat.

Findings:

Information in the mining and reclamation plan is not adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must provide the following in accordance with:

R645-301-341.220, The application indicates mulch may be used, but mulch should definitely be used, both for reestablishing vegetation and for erosion control, on slopes steeper than 5h:1v.

R645-301-341.250, The success standards proposed for areas disturbed by mining before 1977 are not acceptable and need to be revised.

R645-301-341.250, Section VIII.C.9 says three reference areas were set up as revegetation success standards for areas disturbed after 1977, but Section VIII.A and Plate VIII-1 indicate there is a fourth reference area in a pinyon/juniper community. These portions of the plan need to be consistent. While it is clear from the cover letter included with this application that there are only three reference areas, this needs to be clear in the plan as well.

R645-301-341.250, The applicant proposes to use the Wilcoxon Rank Sum test for comparing reference and reclaimed areas, and while this is a valid non-parametric statistical test, it is not included in the Division's regulations as an acceptable method of comparison. The only recognized statistical test is the t-test.

R645-301-341.250, The application indicates vegetation measurements would be taken within two weeks of October 1 and that sampling will occur to coincide with the mature phenological stage of the majority of the species under investigation. The applicant should not give an approximate date when sampling would occur but, instead, just indicate it will occur at the height of the growing season or when most dominant plants are mature. This is likely to be in late spring or early summer.

R645-301-341.250, The plan gives no indication whether the reference areas have ever been checked for range condition by the Soil Conservation Service or the Natural Resources Conservation Service. To be acceptable, they need to be in fair or better range condition. In addition, the reference areas are not as large as required by current regulations. The permittee has suggested meeting on site with a Natural Resources Conservation Service representative, and the Division will try to coordinate this meeting. However, until this happens, the plan remains deficient.

REWCOMMENDATIONS:

The application should not be approved until the deficiencies discussed in this memorandum have been adequately addressed.

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