



# 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: January 6, 1992

RE: Technical Deficiency Review, Genwal Mining and Reclamation Plan  
Amendment Chapter 3, Genwal Coal Company, Folder #2,  
ACT/015/032/91F, Emery County, Utah

## SUMMARY

Genwal Coal has submitted some changes to its mining and reclamation plan Chapters 3. Changes pertaining to biology are minor, but some existing problems with these sections have been found in the review process. This review only considers proposals where problems have been found rather than discussing all of the regulations.

## ANALYSIS

**R645-301-322. Fish and Wildlife Information**

### Operator's Proposal:

The MRP in section 3.4.6.3 page 3-20 states that the Operator proposes no wildlife monitoring procedures but then elaborates to say that the golden eagle nest will be monitored prior to pillaring of the area affecting the nest and report to the Division any golden eagles in the area.

### Technical Deficiencies:

The recent response to Division Order DO 91-B proposes an annual helicopter survey for golden eagles to be done in conjunction with the Division of Wildlife Resources.

### Compliance:

The Operator is not in compliance with this regulation. Information about

the helicopter survey must be included in this section and the statement about no monitoring deleted.

**R645-301-340.**

### **Reclamation Plan**

#### Operator's Proposal:

Section 3.5.1 Contemporaneous Reclamation discusses achieving 80% cover on disturbed areas which report to the sediment pond and which have been contemporaneously reclaimed. If 80% cover is not achieved, the areas will need to be irrigated. Appendix 3-16 defines the areas to be irrigated and says that when groundcover and litter are at 80% or better, irrigation will be discontinued until the following June.

On pages 3-29 and 30, there is a discussion of temporary seeding which is to be performed. This seeding is to be observed by officials from the Division, the Forest Service, and Genwal.

Section 3.5.5.2 references an agreement made between the Division, the Forest Service, and Genwal about using seed mixes for each soil type in final reclamation. Only one seed mix is shown rather than different ones for different soil types. This mix is to be used both for final and for interim reclamation.

Genwal commits on page 3-32 to only use seed with a high percentage of germination, low in common weeds, and with no noxious weeds.

Appendix 3-15 shows the amount of seed to be broadcast seeded. Broadcast seeding is to be done on slopes greater than 30%; slopes less than 30% are to be drilled.

The MRP states that wood fiber mulch will be applied at the rate of one ton per acre on slopes steeper than 30% and that straw will be used at the rate of 1.5 tons per acre on slopes of 30% or less. Section 3.5.5.3 page 3-32 says that the straw will be anchored using a notched disc pulled over the straw cover. Section 8.8 page 8-9, however, says that the straw will be anchored with an offset disc, a notched disc, a sheepfoot roller, or by spraying with an emulsion.

Appendix 3-15 contains a planting mix which is to be used in the area between the road and the stream.

No irrigation is proposed except on sites with slopes greater than 30%

receiving contemporaneous reclamation treatments. Appendix 3-16 further defined the area to be irrigated as the area below the powder magazine bench and above the Main area.

Technical Deficiencies:

The reference to achieving 80% cover on contemporaneous reclamation areas that report to the sediment pond must be clarified. There are various interpretations of what cover means, but it should not include rocks or bare soil; minimally, it would include live vegetative cover and litter. Appendix 3-16 refers to "groundcover and litter" in the contemporaneously reclaimed area that will be irrigated, but, again, the definition of groundcover is not given.

I believe that the temporary seeding discussed on pages 3-29 and 3-30 has been performed. If so, the verb tenses in this section need to be changed.

Hay and straw can be a source of seeds for the introduction of noxious weeds. The Utah Department of Agriculture has developed a program of certifying fields to be free of noxious weeds, and certified noxious weed free hay and straw are available commercially. The National Forest Service will probably require the use of certified noxious weed free straw or hay on its lands beginning in 1994.

The statement in the MRP about using different seed mixes on different soil types is not clear. I have found correspondence in the files discussing the seed mix and which show how it was developed, but there is no reference to different soil types.

Only accepting seed sold in compliance with the Utah Seed Act would help to ensure that seed used for reclamation was of the quality needed. A high percentage of germination, for example, is not necessarily needed as long as the proper amount of pure live seed is used. This law also restricts the proportions of common and noxious weed seeds that can be contained in seed and the amount of time that can elapse between testing and sale.

Seeding rates for broadcast seed are shown, but the rates for drilled seed are not. The amount of seed to be broadcast seeded is minimal but adequate to meet the recommendations of the Interagency Forage and Conservation Planting Guide for Utah. Drill seeding rates must be shown and must be no less than one-half of the broadcast rates.

The following alternative to current revegetation methodology is suggested:

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Rather than drilling seed on part of the site and hydroseeding on part, the Operator may consider hydroseeding the entire area. Areas with slopes less than 30% would then be mulched with straw and the mulch anchored with an offset disc. This would incorporate seed into the surface without placing it too deeply and would also leave a roughened surface more amenable to water collection, seed germination, and seedling survival. Areas steeper than 30% would still be hydromulched.

The plan for anchoring straw needs to be clarified and must be consistent within the plan. The use of an offset disc is preferred because it leaves a more roughened surface.

On August 14, 1990, seedlings were transplanted as part of final reclamation in an area west of the pond and south of the road. This work was not done according to the MRP; however, the species are desirable and none of the plants need to be removed. Bob Thompson of the Forest Service stated that the species used are acceptable to his agency except that blue spruce should be added. The plan calls for 150 plants per acre of blue spruce to be used. The area involved is about 0.2 acres. Thirty blue spruce seedlings need to be added to the planting.

The standard for success is still not attainable, however, with this addition (see R645-301-356. below). The Operator must propose further tree planting that is likely to achieve the standard for success.

August 15, 1990, correspondence from Mt. Nebo Scientific gives a watering schedule for the tree and shrub seedlings planted on the 14th. August 30, 1990, correspondence from the Operator to Lynn Kunzler states that a log of the watering is being kept at the mine site. Although irrigation was not planned for final reclamation, survival information from this area may be helpful in deciding whether or not irrigation should be used in the future. Based on this information, the Operator may want to consider the use of limited irrigation for the transplants for the first season after they are planted. Monitoring of the area should have been done in June 1991, the first year following revegetation (page 3-35). If survival rates with irrigation are not as high as anticipated in the plan, additional seedlings will need to be planted.

Compliance:

The Operator is not in compliance with this regulation.

The definition of cover used for determining if irrigation is needed on contemporaneously reclaimed slopes that report to the sediment pond must be given.

Discussion of the temporary seeding must delineate between work that has and will be performed.

The statement about the seed mix agreement between the Forest Service, the Division, and Genwal must be clarified or could be deleted altogether.

Genwal must commit to only use seed sold in compliance with the Utah Seed Act and with this commitment could eliminate plans to use seed with high germination percentage and low in weed content.

Drill seeding rates must be shown for those areas with slopes of less than 30% unless the Operator accepts the suggestion to hydroseed all areas.

The plan for anchoring straw must be clarified. Genwal must commit to using certified noxious weed free straw.

The plan must be updated to show the seedling species and planting rates used in August 1990 as part of final reclamation south of the road and west of the pond. The plan must also include the planting of at least 30 blue spruce seedlings in the area where the August 1990 planting occurred. Additional planting of trees is necessary to make it possible to achieve the standard for success for tree density.

The plan must include details of the watering schedule that was used on the trees and shrubs that were planted August 14, 1990, and statements that no irrigation will be used in final reclamation must be modified to show that irrigation was used for these transplants whether or not it will be used in the future. Genwal must appropriately change the planned number of seedlings to be planted in future wooded area reclamation according to the results of monitoring the wooded area that has received final reclamation.

**R645-301-356.            Revegetation: Standards for Success**

**Operator's Proposal:**

Areas that have been revegetated will be evaluated for cover, density, and productivity, and revegetation will be considered successful if these parameters are

90% of the reference area with 90% confidence. Minimum and maximum relative species densities are established for different disturbed area communities. Reclaimed areas must meet these criteria in years nine and ten of the liability period. Adequate sampling according to the Division's guidelines will be ensured.

The reference area will be monitored every five years during the field season prior to permit renewal using Soil Conservation Service personnel or methods.

Page 3-36 shows the formula to be used to determine sample adequacy, and it also shows the calculation of a "t" value and degrees of freedom to test similarity between the reference area and its vegetational counterpart. The same formula for determining "t" is shown in Appendices 9-1 and 9-2.

The standard for success for trees is 550 per acre, and the standard for shrubs is 1336 per acre according to pages 3-34 and 9-5 but 1280 per acre according to page 9 of Appendix 9-2.

Technical Deficiencies:

The plan does discuss species composition and diversity, but no comparisons using similarity indexes or similar quantitative methods are proposed for comparing revegetated areas to the reference area. Judging these parameters is an important part of evaluating revegetation success.

The "t" test is a standard statistical test, but the formulas given in the plan are only correct for the special case where the n values of both samples being compared are the same. The formulas shown in the plan must be corrected, and a decision rule must be included. The following are the formulas for calculating "t" and for the decision rule.

$$t_{\text{calculated}} = (\bar{x}_{rv} - c\bar{x}_{rf})/s(\bar{x}_{rv} - \bar{x}_{rf})$$

Where:

$$s(\bar{x}_{rv} - \bar{x}_{rf}) = [s_p^2(n_{rv} + n_{rf})/(n_{rv}n_{rf})]^{1/2}$$

$$s_p^2 = \frac{(n_{rv} - 1)s_{rv}^2 + (n_{rf} - 1)s_{rf}^2}{n_{rv} + n_{rf} - 2}$$

c is the value used to reduce the standard (reference area), in this case 0.9

and subscripts rv and rf refer to the revegetated and reference areas respectively

The decision rule is that revegetation has been successful if:

1.  $\bar{x}_{rv} \geq c\bar{x}_{rf}$ , or
2.  $|t_{\text{calculated}}| \leq |t_{\text{tabular}}|$

The incorrect formula for the "t" test was used in Appendices 9-2 and 9-3; however, the conclusions were not affected by this mistake.

The standard for success for trees is not achievable without help from nature. Almost the entire area that is to receive the supplemental planting mix will have 500 trees per acre planted, and the standard for success is 550. Only one small area is within 20 feet of the stream and would be planted with willows to bring the total number of seedlings planted to 610 per acre. Also, the area that was planted in August 1990 only had 59 trees (= 295 per acre) planted. The additional 30 blue spruce seedlings would bring this to 445 per acre.

The standard for success for shrubs is not consistent within the plan.

Compliance:

The Operator is not in compliance with this regulation.

The "t" test formula for comparing revegetated sites to the reference area must be corrected and must include a decision rule.

A quantitative comparison of revegetated areas with the reference area for species composition and diversity must be made using accepted similarity indexes. The final analysis must also include a narrative description of these parameters with species utility.

The Operator must propose methods that are likely to produce the standard for success for tree density. The standard for success for shrubs must be consistent within the plan.