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 DEPARTMENT OF NATURAL RESOURCES
 DIVISION OF OIL, GAS AND MINING

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THROUGH: Daron Haddock, Permit Supervisor *DRH*

FROM: Paul Baker, Reclamation Biologist *PAB*

DATE: February 17, 1994

RE: Response to Mid-Term Review Deficiencies, Castle Valley Resources, Wellington Preparation Plant, Folder #2, ACT/007/012, Carbon County, Utah

SUMMARY

I have reviewed Castle Valley Resources' (CVR) responses to Priscilla Burton's mid-term review. The plan still contains several problems with the amount and quality of cover proposed to be placed over refuse. Very little of the refuse has been adequately characterized. The Division must require that four feet of non-toxic, noncombustible cover be placed over all refuse until CVR shows through chemical and physical tests that soil stabilization and revegetation requirements can be met using less than four feet of cover.

ANALYSIS

R645-301-233 Topsoil Substitutes and Supplements

Deficiency from Mid-Term Review:

1. The incorporation of organic matter into the soil as an amendment to improve water holding capacity and fertility should be incorporated into the reclamation plan for the entire site.

Response and Analysis:

The response states that an organic amendment was used in the earlier test plots with no significant differences apparent in the 1991 sampling. The test plots may show different results in 1994 when compared to 1991; therefore, the operator will analyze differences in organic matter on the existing plots in 1994. Based on the results, additional or different organic matter will be incorporated in the proposed renovated coarse refuse test plot.

Additional commitments may be required in the future. The plan does not give information on what organic amendments were used when the test plots were originally



implemented; therefore, it is unknown if other forms of organic amendments might have been more beneficial. However, the test plots have not yet demonstrated vegetation responses that appeared to be caused by the addition of organic matter. This problem will be addressed further in discussions on reworking the coarse refuse test plots.

Deficiencies:

None.

R645-301-240

Reclamation Plan

Deficiencies from Mid-Term Review:

1. The MRP should state the total area requiring topsoil and the volume of topsoils and substitutes required to achieve the reclamation plan.
2. The MRP should also provide information on the depth of borrow disturbance, acreage of disturbance, quality of material obtained, as well as the ability of subsoils remaining to be reclaimed.

Response and Analysis:

The plan says that the topsoil borrow area is shown on Drawings E9-3339 and E9-3341. Drawing E9-3339 shows several different borrow areas with a total area of about 203 acres. Drawing E9-3341 only shows one borrow area which has an area of about 82 acres. To clarify the status of the borrow areas shown on Drawing E9-3339, either this drawing or the text of the plan should explain that not all of the borrow areas on this map are proposed to be used but that the areas shown are those that have been investigated for suitability.

The response does not show the total area requiring borrowed topsoil, but the area can be calculated with the information given. Total topsoil volumes for each area are shown. The total amount of topsoil required from the borrow area for all areas is 211,800 cubic yards. According to my calculations, there would be about a 1000 cubic yard surplus obtained by stripping 1.6 feet from the 82.4 acre borrow area.

The response also states that the depth removed from the borrow area should not affect the revegetation potential of the remaining soil. There will be an adequate depth and quality remaining to successfully reestablish viable plant communities on these soils according to communications with the Soil Conservation Service.

The plan does not contain adequate information on the current and planned postmining

land uses of the borrow areas to determine if revegetation to a cropland postmining land use is feasible. Some of the area from which topsoil would be taken are croplands which might be irrigated. If these areas are irrigated, what will be the effects of lowering them 1.6 feet? Would excess irrigation water be able to drain from the fields? Even if the fields are not irrigated, will it still be possible to operate harvesting equipment and other machinery on them?

Requirements discussed below to cover coal refuse with at least four feet of non-toxic, noncombustible material may increase the depth to which soil is borrowed or the extent of the required borrow area. If either of these is used as an option to cover the refuse, the suitability of the additional soil and the reclaimability of the areas from which it comes must be addressed.

Deficiencies:

1. The plan needs to clarify the status of the borrow areas shown on Drawing E9-3339. The text or the map needs to contain a qualifying statement about this map that shows which borrow area is proposed to be used.
2. The plan needs to give more detail on the effects of borrowing soil from the cropland areas. It needs to show that the postmining topography is compatible with a cropland postmining land use.

R645-301-242

Soil Redistribution

Deficiency from Mid-Term Review:

1. Please provide an estimated depth of ripping of the redistributed or regraded surface to be reclaimed (Section 2.42). The depth estimated will provide a performance standard during final reclamation.

Response and Analysis:

Compacted soils in the surface facilities area will be ripped to a depth of 12-inches before receiving topsoil. Soil ripping may be implemented in the slurry pond area if heavy equipment used for reclamation to distribute materials compacts the area. Commitments to rip other areas have been deleted from the plan.

Compaction is commonly a limiting factor in plant reestablishment on reclaimed sites. It becomes a problem in nearly any area where rubber-tired machinery operates. I anticipate that compaction mitigation will be needed on most or all of the reclaimed areas.

Unless bulk density tests show that it is not needed, I recommend that CVR commit to rip all of the regraded areas both before and after soil distribution. Minimally, CVR needs to commit to conduct bulk density tests, such as with a portable penetrometer, to determine if ripping is needed.

Deficiencies:

1. At a minimum, CVR needs to commit to conduct bulk density tests of regraded soil and spoil to determine where compaction mitigation, such as ripping, is needed. It is recommended that all areas be ripped prior to soil distribution and that soiled areas be ripped prior to seeding.

R645-301-243

Soil Nutrients and Amendments

Deficiencies from Mid-Term Review:

1. Exchangeable sodium and Cation Exchange Capacity should be added to the list of parameters tested during the final reclamation soil testing program described on pg 4 of Section 2.31.
2. The MRP should outline final reclamation sampling as follows: frequency (number of tests and spacing of tests within each acre); depth of sampling; and type of sampling (composite or depth segregated). The sampling outline will provide a performance standard during final reclamation.

Response and Analysis:

Exchangeable sodium and cation exchange capacity have been added to the list of parameters for which soil will be tested at final reclamation.

The response says that soil sampling will initially be implemented at a frequency of 10 acres on the disturbed area. A composite sample will be blended with six, twelve, 24- and 48-inch depths (or to bedrock). If any problem areas are found, additional sampling will be conducted in the area where the problems seem to have occurred. Subsequent sampling would be done at a one acre frequency at depths of twelve, 24- and 48-inches if determined to be appropriate.

The proposed sampling plan is minimal but probably adequate.

Deficiencies:

None.

R645-301-244

Soil Stabilization

Deficiency from Mid-Term Review:

1. The plan must indicate that there will be mulching of the regraded spoils and topsoiled areas and provide an indication of the type of mulch and coverage which will be used for a soil stabilization performance standard.

Response and Analysis:

The response says that all exposed areas will be protected and stabilized to effectively control erosion and air pollution. Straw or hay mulch at the rate of two tons per acre and other soil stabilizing practices will be used on all areas that have been regraded and covered with topsoil or topsoil substitutes. This will be done as close to seeding as possible at the time of final reclamation.

Deficiencies:

None

R645-301-553.250

Refuse Piles

Deficiencies from Mid-Term Review:

1. The final slope angle for the Coarse Refuse Pile should be stated within the plan for performance standard evaluation during final reclamation.
2. Castle Valley Resources must provide information to address the requirements for requesting less than four feet of cover over the spoil and refuse stored in the surface facilities area as per R645-301-553.252.
3. Information concerning the reclamation of the spoil pile located within the surface facilities area must be addressed in the MRP.

Response and Analysis:

In revised Section 5.53, page 2, the response says that the slopes at final reclamation will not exceed 2h:1v. It also says that future sampling will include the coarse refuse pile

and will be done in conjunction with renovation of the coarse refuse test plot. This sampling will address appropriate requirements and reevaluate reclaimability of the coarse refuse pile.

I have not been able to locate any analyses of coarse refuse from the coarse refuse pile, but the coal storage and processing area is located over coarse refuse material according to the plan. The precise location of the refuse in relation to the samples taken in 1989 is not known. Results from sample sites 4-9 were examined. With the exception of sites 4 and 6, nearly all of the analyses showed unacceptable SAR levels. These samples were not analyzed for some potentially toxic elements, such as boron, selenium, molybdenum, and arsenic, and it is not known if these samples are representative of the material in the coarse refuse pile.

Considering the nature of the material in the storage and processing area, the Division must consider all of the coarse refuse as potentially toxic and within the requirement to cover it with at least four feet of non-toxic, noncombustible material. Although the reasons for the lack of revegetation success on the coarse refuse pile test plot are not known, the lack of success may have been caused, at least in part, by the chemical nature of the coarse refuse. To allow less than four feet of non-toxic, noncombustible cover over this refuse, the Division would need to receive evidence that previous samples were not representative of the coarse refuse. Any toxic materials previously identified would need to be covered with at least four feet of non-toxic, noncombustible cover.

The proposed plan says that the spoil pile near the road pond is mislabeled and that it is actually subsoil from excavation of the pond. The sign on the pile will be changed to show that it is subsoil. The pile will be reclaimed by placing it back into the pond followed by reclamation.

Deficiencies:

1. CVR must commit to cover the coarse refuse with at least four feet of non-toxic, noncombustible material at final reclamation. Depending on sampling results, it may be possible to reduce this requirement, but the regulatory requirement is that refuse be covered with four feet of non-toxic, noncombustible material unless chemical and physical tests show and CVR can demonstrate that soil stabilization and revegetation requirements can be met without the four feet of cover.

R645-301-553.260

Coal Processing Waste

Deficiency from Mid-Term Review:

1. Castle Valley Resources should provide information to address the requirements for requesting less than four feet of cover over the fine and coarse slurry as per R645-301-553.252.

Response and Analysis:

The response says that the new reclamation plan described above and approved by DOGM for the bond estimates commits to covering the lower slurry pond with four feet of cover and the upper pond with six inches of topsoil. The coarse slurry will first be used as cover on the slurry pond, then the remainder covered with six inches of topsoil.

Division guidelines show that the maximum allowable boron level in soil and overburden is 5 parts per million and the maximum allowable selenium concentration is 0.1 ppm. Anything over these levels is unacceptable and is considered toxic. The samples of fine slurry taken in 1990 were from the upper slurry pond. The analyses of these samples showed levels up to over twice the allowable boron level and over five times the upper limit for selenium. High selenium levels were found throughout both profiles, but high boron levels tended to be in the upper four feet of fine slurry. I am aware of only one sample ever being taken in the lower pond. This is sample 9WD shown on pages 42, 43 and 44 of the July 15, 1990, submittal. Analysis of this sample did not include boron or selenium, but the sodium adsorption ratio (SAR) was well above Division guidelines at 59.5.

On page 58 of Section 2.22, the response says that samples were collected in 1990 associated with the (then) proposed fines removal project and that no significant toxicity problems were evident. It says that selenium levels did seem high. The statement that no significant toxicity problems were evident, as discussed above, is not correct. In Section 7.31, Page 6, the response says that no acid or toxic forming materials have been identified in the permit area and that the fine refuse sample results in Table 7.28.6 indicate that the materials found within the pond are not acid or toxic producing. The information in Table 7.28.6 is not complete; it only contains information on sulfur content and acid/base potential. It does not show that there are no toxic materials on the property.

Unless future sampling shows that these three samples are not representative of the fine slurry material, the fine slurry must be considered toxic. Therefore, according to the regulatory requirements, the slurry ponds must be covered with at least four feet of non-toxic, noncombustible material. For unknown reasons, the proposed addition to the plan only contains a commitment to cover the *lower* pond with 42-inches of coarse slurry plus six inches of topsoil for four feet total. The upper pond would only be covered with six inches of topsoil. The *upper* pond is where high boron and selenium levels were found.

Although the coarse slurry has been used in test plots to cover the fine slurry, apparently with beneficial results, this material has not been shown to be non-toxic or

noncombustible. I know of only one sample of this material. It had reasonable to low SAR and electrical conductivity (EC) levels, but it was not tested for boron, selenium, or other potentially toxic elements. One sample is not enough to adequately characterize 600,000 cubic yards of material. The coarse slurry is the material which CVR proposes to place on the lower slurry pond. To show that it is suitable for this purpose, samples need to be analyzed for boron, hot water-extractable selenium, and other potentially toxic elements that might be present. It should also be tested for combustibility. Otherwise, the coarse slurry should also be considered within the requirements to cover waste with at least four feet of non-toxic, noncombustible cover.

If the coarse slurry can be shown to be non-toxic and noncombustible, CVR should consider using some of the material on the upper slurry pond to fulfill part of the requirement for covering the fine slurry four feet deep. The plan indicates that 428,200 cubic yards would be needed for the lower pond and that a total of about 600,000 cubic yards is available. The coarse slurry refuse available after covering the lower pond with 42 inches would cover a 60 acre area about 21 inches deep. If all of the coarse slurry is used to cover the fine slurry, it might not be necessary to use borrowed topsoil on the temporary pond refuse pile, so more soil could be used over the fine and coarse slurry without disturbing a larger area.

Deficiencies:

1. The plan needs to show compliance with R645-301-553.252 for the coarse and fine slurry.

RECOMMENDATIONS

Certain elements of the reclamation plan that were deleted or reduced in this submittal, such as ripping and gouging, may need to be restored. Minimally, CVR needs to commit to conduct bulk density measurements to determine if ripping is needed.

Unless CVR can provide adequate justification for allowing less than four feet of non-toxic, noncombustible cover over coal mine waste, the Division must require at least this much cover. The bonding calculations assumed that coarse refuse would be used to cover the lower slurry pond with 42-inches of material, but the coarse refuse cannot be considered suitable cover without further tests.