0027
STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dr. G. A. (Jim) Shirazi, Division Director

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

October 27, 1983

Mr. Richard Holbrook
Consolidation Coal Company
2 Inverness Drive East
Englewood, Colorado 80112

RE: Determination of Completeness
Emery Deep Mine
ACT/015/015, Folder No. 2
Emery County, Utah

Dear Mr. Holbrook:

The Division has completed its Determination of Completeness review (DOC) of the Mining and Reclamation Plan (MRP) and Consolidation Coal Company's (Consol) response to the Apparent Completeness Review (ACR) for its Emery Deep Mine.

At this time, the Division finds the MRP to be apparently complete and will begin its Technical Analysis (TA) of the permit application.

Consol is hereby directed to publish a notice of filing a complete plan in a local newspaper of general circulation as required by UMC 786.11(a) and submit proof of publication as per the requirements of UMC 782.21.

The enclosed DOC review document contains several technical questions that were identified during the review. These items need to be clarified before the TA can be completed. Therefore, please provide an adequate response to these questions on or before November 11, 1983.

Should Consol desire to meet with the Division staff or have any questions regarding this review, please contact me or Lynn Kunzler of my staff immediately.

Sincerely,

JAMES W. SMITH, JR.
COORDINATOR OF MINED
LAND DEVELOPMENT

JWS/LMK:btb
Enclosures
cc: Allen Klein, OSM
Lou Hamm, OSM
John Rice, BioWest
Debbie Richardson, Richardson & Associates
L. Kunzler, DOGM
R. Summers, DOGM

DETERMINATION OF COMPLETENESS

Consolidation Coal Company
Emery Deep Mine
ACT/015/015, Emery County, Utah

October 27, 1983

The following technical deficiencies were identified during the Determination of Completeness (DOC) review. Although the Mining and Reclamation Plan (MRP) is apparently complete, these deficiencies must be adequately addressed prior to the completion of the Technical Analysis (TA).

UMC 782.17 Permit Term Information

Map 3-7, which shows anticipated mining over the next five years should be updated. Currently, Map 3-7 only shows anticipated mining through 1985. It is expected that the permit will run from 1984 to 1989. Due to the slow down in mining, it may be possible that the anticipated mining during the permit term is still in this area. If so, the applicant need only submit a table comparing the year of mining on Map 3-7 to the anticipated year of mining during the permit term. In addition, the actual permit boundary will only be the area encompassing the anticipated five years of mining. On Map 3-7, the permit boundary has been shown as much larger than the anticipated five years of mining. The applicant should provide a statement indicating that the permit boundary is only that area encompassed by the anticipated five years of mining for all maps showing the permit boundary.

Map 3-8 shows additional permit terms. On this map, the years 1980 to 1985 are shown for the area indicated as the permit boundary in Map 3-7. However, Map 3-7 indicates that mining will extend beyond the project five years. In addition, this map is most likely out of date due to the slow down in operations. Therefore, the applicant must provide a table correlating the dates shown on Map 3-8 to dates which reflect current projections. In addition, it would appear that the five year projection for 1980 to 1985 is incorrect and the areas should be revised to reflect information from Map 3-7.

DETERMINATION OF COMPLETENESS

UMC 783.19 Vegetation Information

The applicant should provide a map that overlays vegetation types over disturbed and proposed disturbed areas. This was done for the preparation plant, but not the mine area.

DETERMINATION OF COMPLETENESS

The applicant's response indicated that Plate 9-1 had been revised to include previously disturbed areas and proposed disturbance areas. However, no such areas could be identified on Plate 9-1. There are no legend entries for these types of areas, nor is there any indication of revision.

UMC 783.22 Land-Use Information

Since the applicant is proposing to reclaim the surface facilities in part as rangeland, the grazing conditions, capacities and productivity of the existing lands must be described to provide a comparison with the postmining land-use.

DETERMINATION OF COMPLETENESS

The applicant has provided information showing the vegetation type, production, vegetation cover and major species on the rangelands within the mine disturbance boundary. However, the applicant should discuss the grazing history, including the number of animals and kinds of animals that have been used in the area. Also, please document the range condition (i.e., letter from Soil Conservation Service [SCS]).

UMC 784.11 Operation Plan: General Requirements

(b)(3) For the reclamation of the coal handlings and storage areas, the applicant must show either how coal will be removed from the site and be properly disposed, or if coal will be left in these area, i.e., material left on the base of the areas mixed with overburden and not able to be utilized; the applicant must show that the coal will be covered with four feet of material unless testing shows that less material can be utilized. If the coal is to be hauled out, the applicant must show how much material is involved, where it will be disposed of and that the disposal area meets the requirements of the regulations. The cost associated with this activity must be included in the bond amount.

DETERMINATION OF COMPLETENESS

Information has been provided on the reclamation of these areas. Coal will be removed where it occurs in depths greater than four feet to a depth of four feet and the excavation will be backfilled with material in the road embankmetns. The applicant has not specifically stated that the coal that might exist in depths of less than four feet will also be covered with four feet of material. The applicant must provide information on the amount of cover that will be placed over coal that might exist at the site in depths of less than four feet.

UMC 784.13 Reclamation Plan: General Requirements

(b)(4) Since no topsoil is available from the disturbed areas, the applicant needs to propose substitute material. As per UMC 817.22(e), the applicant must demonstrate that the substitute material is equal to or more suitable for sustaining the vegetation than is the available topsoil and the substitute material is the best available to support the vegetation.

DETERMINATION OF COMPLETENESS

On the exisiting facilities sites, the applicant proposes excavation (to a maximum of four feet) of gravels and coal materials overlying the original surface. In "isolated" areas where gravels and coal materials extend beyond four feet in depth, "topsoil and dirt materials" from the reclaimed road and borrow site will be used as "fill" material. The applicant also proposes a revegetation demonstration site be established in an area where gravels and coal material will be excavated. The demonstration site will include seeding and transplanting. Since the applicant is proposing to use what is no longer topsoil, but a substitute medium, physical and chemical testing should be done in conjunction with the demonstration site to determine the suitability of the exposed surface material as a topsoil substitute. Also, the "topsoil and dirt material" from the reclaimed road areas and borrow site should be included in any testing and demonstration if they are to be substituted for topsoil. The applicant needs to supply a topsoil (or substitute material) balance showing whether or not there is sufficient material from the reclaimed road and borrow site. This should include an estimate of the surface area and depth of coverage.

(b)(5) The applicant must clarify which seed mixture will be used, those included in Chapter 10, Appendix C, or those in Chapter 3.

Although several seed mixes are proposed for different plant associations, please indicate which mix will be used for each vegetation type that is or will be disturbed.

Alternative species are listed with each seed mix. Specifically, what species will be used? What species will they replace?

It is suggested that the applicant develop new seed mixes, giving consideration to the native species in each vegetation type (as indicated in the vegetation study) and local conditions.

The applicant must provide justification for the use of introduced plant species and show that they are compatible with the plan and animal species of the area as required in UMC 817.112.

DETERMINATION OF COMPLETENESS

The applicant is proposing to use four seed mixes: Seed Plan A for the mixed desert shrub, annual forb and rock outcrop/talus communities; Seed Plan B for the greasewood shrubland and riparian meadow communities; a separate seed mix for the evaporation lagoon; and, a separate seed mixture for the mine discharge sedimentation pond road. From this and the applicant's response to the ACR questions related to revegetation success, it appears that the applicant does not intend to reclaim areas based on the vegetation types which existed (or are presumed to have existed) prior to mining disturbance. Of particular concern is the use of Seed Plan B in

revegetating both the greasewood shrubland and riparian meadow communities. There also seems to have been little consideration given to the pre-disturbance community(ies) that existed prior to disturbance at the evaporation lagoon and mine discharge sedimentation pond road. Although the applicant has provided some justification for the use of introduced species, the applicant should consider substituting them for other species due to their poor establishment during contemporaneous reclamation efforts to date (as per UMC 817.112, Introduced Species, should be necessary to achieve a quick, stabilizing cover). Why are there no forbs in Seed Plan A? Also, seeding rates appear to be quite low for several species. These rates should be revised in consultation with DOGM.

The method proposed to be used to determine the success of the vegetation as required in UMC 817.116 should be described.

DETERMINATION OF COMPLETENESS

The applicant should include a monitoring schedule and comparisons of woody plant density and diversity. Each revegetation area must be compared to the reference area for the vegetation type existing prior to disturbance or presumed to have existed prior to disturbance. Measurement techniques and statistical adequacy should be discussed.

Temporary and contemporaneous reclamation should be addressed by the applicant, including: methods to be employed for seeding and mulching; seed mix(es) to be used for outslopes on dams, embankments, road cuts, etc.; and irrigation and pest (weed) control measures (if used) according to UMC 817.100.

DETERMINATION OF COMPLETENESS

The applicant indicates that there will be no additional disturbance. However, Table 9-2 (Vegetation) and Map 10-1 (Wildlife) indicate future areas of disturbance. The applicant should commit to revegetating any disturbed areas as contemporaneously as practicable. It is suggested that the same seed mixes, techniques, etc., that are proposed for final reclamation be used rather than that submitted in the ACR response (page 31). With proper monitoring, valuable site specific information could be obtained to modify final plans so as to maximize revegetation success.

(b)(8) The methodology for sealing mine entrances is described in 3.5.3.1. The applicant states that "the piezometric surface of the Ferron aquifer is well below the present mine openings; therefore, these openings need only be sealed against entrance of people, wildlife and surface runoff." Once pumping of the mine is terminated, however, this may not be the case, and ground water could exit through improperly sealed mining openings. This circumstance is made more likely by the fact that the Upper and Lower Ferron aquifers are known contributors of subsurface outflow to Quitchupah Creek and Christiansen Wash (page 7-55). The applicant should re-assess plans for sealing mine opening to preclude disruption of the hydrologic balance, and to comply with performance standards established in Subchapter K.

DETERMINATION OF COMPLETENESS

Information has been provided on the closure of the portals relative to potential discharge from the Ferron Sandstone. The applicant has provided plans for placement of a discharge pipe in the portals. Water from the pipe will discharge into the sedimentation ponds in the facilities area. The size of the pipe(s) must be provided to ensure that they will be of sufficient size to handle an "adequate" amount of outflow. Possibly the figure of 0.4 cfs could be utilized to size the pipes. The location of the piping to the sediment ponds must be shown on a plan view map. In addition, there is some concern surrounding the location of the pipe(s). They are shown on the diagram as being elevated to a certain extent. If ponding of the water should occur behind the backfilled material due to the position of the pipe, then discharge through the fill material could occur. It is probably advantageous, however, to locate the pipe in this manner to prevent discharge of sediment from the floor. The applicant should provide plans for sealing of the backfill material below the pipe to prevent discharge through the backfill.

UMC 784.14 Reclamation Plan: Protection of the Hydrologic Balance

(a)(2) Given that there is no assessment of the effects of degraded Quitchupah Creek waters on Ivie Creek, the impacts to water users (along Ivie and Muddy creeks) must be quantified or the applicant must justify why this should not be required. According to page 7-163, there are no surface water rights on or immediately adjacent to the mine area, but no information is given as to the presence of water rights on Ivie and Muddy creeks. If there are such rights, there is a potential for serious water quality impacts which must be addressed.

DETERMINATION OF COMPLETENESS

The applicant has provided information concerning the existence of surface water rights for Ivie Creek and portions of Muddy Creek. As a point of clarification, however, a discussion of surface water rigths for Muddy Creek below its confluence with Ivie Creek should be presented. The information provided by the applicant did not clearly address the types of water rights that will be impacted below the confluence since this area was considered outside the influence of the mine. Information on the types of water rights near the gaging station below I-70 could prove to be valuable in assessing the significant of the impact of increased TDS loading to Muddy Creek, as the applicant has projected that the TDS contribution from the mine as measured at the station will increase from 9 percent to 18 percent during the five-year permit term.

A plan for disposing of sediment cleaned out of the ponds and stored above pond 3 should be provided for final reclamation and included in Section 3.5.3.3 of the permit application.

DETERMINATION OF COMPLETENESS

An explanation has been provided for the sediment storage pile reclamation plan. Now that the mine discharge pond has accumulated a significant amount of sediment, the applicant should also indicate where that material will be stored after clean-out.

(c) The applicant should reevalute the quantity of ground-water which will enter the mine as operations continue. The following factors should be incorporated into the analysis:

1. increase in the fracturing of the roof material to the Ferron Sandstone due to retreat mining and increase overburden depths; and

2. increase in the hydraulic head of water in the Ferron Sandstone.

Both of these factors would lead to an increase in the quantity of flow into the mine. Extrapolation of ground-water inflows in the existing mine may not be valid.

DETERMINATION OF COMPLETENESS

The applicant makes reference to a new computer simulation of mine inflows to be anticipated over the five-year permit term. This simulation was performed using the CONOSIM model.

In order to evalute the reasonableness of the model results, the applicant should provide a narrative which explains the assumptions, boundary conditions, calibration values and other pertinent information which were utilized in the simulation. At this time, sufficient information to evaluate and verify the CONOSIM results has not been provided.

A similar analysis was apparently performed previously, as described on pages 7-88 to 7-91 of the permit application. Again, little documentation was provided in the text so that the calculations could be verified. Of importance is that fact that these same calculations were also used to project five-year water level declines in the Upper Ferron Sandstone, shown on Pate 7-5 of the permit application. It appears that the CONOSIM results presented in the applicant's ACR response (page 44) supercede the calculated inflows presented on page 7-90 of the permit application. However, the applicant did not provide a corresponding five-year water-level decline projection map for the new CONOSIM inflow results. Since the two sets of projected inflows differ (as evidenced by the two years of overlap, 1984 and 1985) the applicant should revise Plate 7-5 to agree with the new CONOSIM inflow projections. If the applicant feels that the drawdowns shown in Plate 7-5 are still valid, he should state his reasons why and also provide all the necessary information utilized to initially prepare Plate 7-5. The brief discussion on page 7-89 is insufficent to assess the model and supporting calculations used to generate Plate 7-5.

The applicant has stated that the inflows to the mine were reevaluated using the CONOSIM model. Information must be provided on how the model handles increase in inflows due to fracturing of the roof materials and caving. Specifically, what was the height of caving anticipated and over what timeframe was the analysis done. As pillars fail, it can be expected that significant caving will occur. However, the problem is complex as is evident in the discussion on the lineament study. Three of the major roof falls were associated with "high long-term ground-water inflow areas" and other roof fall areas showed only moderate increases in inflow. How was this issue dealt with in the model? Is there any other field observations that might correlate water inflows and roof falls such as the height of the cave or tye type of roof material?

UMC 784.20 Subsidence Control Plan

The area that the applicant intends to leave whole pillars to protect surface structures and streams should be defined by the expected angle of draw. This angle may define an area where retreat mining should not occur which is greater than the one pillar width that the applicant intends to leave. An operations map should be provided showing where these pillars are to be left.

DETERMINATION OF COMPLETENESS

The angle of draw has been used by the applicant to define the area where pillars will be left to protect the surface. The applicant did not provide an operations map showing the location of these areas. These areas must be defined in order to evaluate whether or not all "significant structures" and renewable resources will be protected and that the mining operation will be conducted to protect these structures and renewable resources. The applicant states in Section 12.4.3.1 Subsidence Control, that final planning of mining sections "should" incorporate the application of steps 1 and 2 for surface protection. An operation plan must be provided which shows that the mining plan "will" incorporate these steps. This must be done for anticipated mining over the five-year permit term.

The Cultural Resources survey submitted in the ACR response for the preparation plant shows a study area which does not include the entire area overlying the underground workings. If there are structures which can be considered Cultural Resources, then protection of these structures must be addressed.

DETERMINATION OF COMPLETENESS

The applicant has stated that a Cultural Resources survey of the area will be conducted prior to mining under any unsurveyed area. The applicant must state a duration of time prior to mining that this will take place in order to ensure that there will be adequate time to evaluate the site and obtain approval from the regulatory authority for mitigation or removal plans.

TECHNICAL QUESTIONS RELATED TO SUBSIDENCE

The geotechnical section of the ACR Response was reviewed in greater detail to determine possible deficiencies at this time so that the TA phase will be able to be completed within the required timeframes.

The applicant has provided information relating to the prediction of the extent of subsidence at the Emery Mine. The approach primarily centered on the stability of pillars in the mine. That is pillar failure will lead to subsidence or if a stable pillar is constructed, no subsidence will occur.

Initially, the applicant identified a minimum size pillar and determined the depth at which failure of the pillar would occur and thus subsidence in Section 12.4.2.1. Areas where the dpeth of overburden was less than this predicted depth would not subside. The analysis which was utilized by the applicant closely followed the method described by Holland (1962). The following questions concern this analysis:

The value for "K" that was used was 2,432 (psi feet$^{.5}$). Assuming that the "K" value would have been determined using methods proposed by Holland, K = ultimate compressive strength of the coal X (the edge dimension of the cube used to determine the compressive strength)$^{.5}$. The applicant has stated that the compressive strength of the coal is 5,000 psi. From Peng (1978, page 185) this would appear to be the strength of a two inch cube. Therefore, the "K" value would be equal to 7,071 psi inches$^{.5}$ or 2,041 psi feet$^{.5}$ compared to 2,432 used in the analysis. Information must be provided showing how the "K" value was determined or references sited showing that 2,432 is appropriate.

It is not certain how the applicant determined the area supported by the pillar (AT). Upon evaluating figures 12-2 and 12-3, and figuring that the smallest stump shown would represent the 15 foot square pillar and by defining the tributary area as that area half the ditrance to the adjacent pillars, the tributary area appears to be 2,358 square feet and 1,693 square feet in the respective figures. This value would substantially alter the stability of the pillar stumps. The applicant must show how the tributary areas were defined.

A safety factor of one was used in the analysis. Since the evaluation has been used to evaluate the stability of the pillars to support the surface and prevent subsidence, the safety factor must be greater than one. Holland recommended a safety factor of two in his presentation.

In addition, he stated that if there is water in the workings, which would be the case at Emery after mining is complete and the water table has reestablished, that it would decrease the stability of the pillars. Therefore, the applicant should use a safety factor of at least two plus some additional amount for the conditions at the mine with respect to water. If the safety factor is not required, then additional information must be provided showing why this information must be referenced.

The allowable load in bearing on the roof and floor rock must be evaluated. Holland has stated that this is approximately one-half to two-thirds of the unconfined compressive strength of these strata.

The applicant must consider all of the above questions and reevaluate the minimum depth of cover where the pillars will become unstable.

An analysis was also presented in Section 12.4.2.1 on the design of pillars at depths of greater than the 214 feet. Several parameters were identified for this analysis. The following questions concern the parameters identified:

An average center to center pillar width (stump width) of 40 feet was used in the analysis. Why wasn't the minimum pillar width used in the above analysis? It will still be this minimum pillar width which will initially fail. Once this pillar fails, it is likely that additional stresses will be placed on adjacent larger pillars due to the sandstone layer in the roof material. This would then increase the pillar load, decrease the safety factor, and failure would be more likely. Once time effects are considered, failure would be reasonably certain. The applicant must evaluate failure based upon the weakest pillar in the system and also evaluate how the failure of this pillar will impact other pillars in the section.

The applicant must identify how the angle of draw was determined.

References must be supplied showing how the caving height factors and the equation for effective mining height were determined.

The design of pillars for control of subsidence is discussed in Section 12.4.3.1 of the ACR Response. Many of the above questions relate to this section also. In particular, the question on safety factor. Changes to this section may be appropriate once the above questions on Section 12.4.2.1 are addressed.

The applicant has requested that monitoring for subsidence be discontinued after two years above a mined section. Due to the time involved in pillar deterioration and thus the period of time until subsidence would be expected, the applicant should continue to monitor the site for a longer period of time. It is uncertain what this time should be. The applicant should commit to monitoring at least during this permit term to attempt to identify the effects of time on pilar deterioration. This timeframe should be reevaluated during the next permit review.