



State of Utah  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

COO70016

Michael O. Leavitt  
Governor  
Ted Stewart  
Executive Director  
James W. Carter  
Division Director

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340  
801-359-3940 (Fax)  
801-538-5319 (TDD)

July 20, 1995

Paige B. Beville, Manager  
Environmental, Health & Safety  
Mountain Coal Company  
ARCO Coal Company  
555 17th Street, Room 2170  
Denver, Colorado 80202

Re: Approval of Reclamation Plans, Mountain Coal Company, Gordon Creek 2, 7, & 8 Mines, ACT/007/016, Folder #3, Carbon County, Utah

Dear Ms. Beville:

The Division has completed the Technical Analysis and Findings for your reclamation plans for the Gordon Creek 2, 7, & 8 Mines. A copy is enclosed for your records. As you are aware this has been a lengthy process which has included involvement of technical staff from your office, from OSM, and from the Division. We have concluded that the plans you have proposed will satisfy the regulatory requirements and are acceptable for use in reclaiming this area. There is one noted deficiency that still must be addressed. Mountain Coal must provide a copy of the comments made by the legal owner of record of the reclaimed land surface concerning the proposed postmining land use. We have no record of any comments from Robert & Linda Jewkes. Once these comments have been received your plans can be considered approved with the following two conditions.

- 1) During the growing season, a determination will need to be made as to whether or not a pre-disturbance vegetation inventory of the proposed 2/7/8 Sediment Pond is necessary.
- 2) Backfilled slopes in the #7 Mine portal area shall be backfilled to the extent possible while maintaining a factor of safety of 1.3. The operator shall determine, based on site conditions, where additional materials may be developed and placed as fill to further reduce or eliminate cut slopes associated with the reclamation plan. Slope measurements and stability analysis based on site conditions during construction shall be provided in conjunction with certified as-built reports or plans demonstrating stability and that backfilling of cutslopes to the extent possible during reclamation activities has been accomplished.

We appreciate the work you have done to finalize these reclamation plans. We encourage you to proceed with the reclamation of this mine site as quickly as possible. Please don't hesitate to call if you have any questions.

Sincerely,

  
Lowell P. Braxton  
Associate Director - Mining

Enclosure

cc: D. Haddock  
P. Grubaugh-Littig  
J. Helfrich  
S. White  
J. Kelley  
R. Harden  
H. Sauer

FINTACOV.278

# TECHNICAL ANALYSIS AND FINDINGS RECLAMATION PLAN

MOUNTAIN COAL COMPANY  
GORDON CREEK #2, #7, #8 MINES  
ACT/007/016

July 20, 1995

## SUMMARY OF PERMIT CONDITIONS

As determined in the analysis and findings of this Technical Analysis, approval of the plan is subject to the following Permit Conditions. The applicant is subject to compliance with the following Permit Conditions and must commit to comply with the requirements of these conditions as referenced in the approved Permit.

Accordingly, as a condition of this permit, the permittee must do the following, in accordance with the requirements of:

### **R645-301-412.200**

The permittee must provide a copy of the comments concerning the proposed postmining land use by the legal or equitable owner of record (Robert F. & Linda M. Jewkes) of the surface of the land following reclamation. In lieu of comments, the permittee may provide evidence that the surface land owner has been given ample opportunity to comment.

### **R645-301-321.100**

During the growing season, a determination will need to be made as to whether or not a predisturbance vegetation inventory of the proposed 2/7/8 Sediment Pond is necessary.

### **R645-301-553**

Backfilling and Grading, backfilled slopes in the #7 Mine portal area shall be backfilled to the extent possible while maintaining a factor of safety of 1.3. The operator shall determine, based on site conditions, where additional materials may be developed and placed as fill to further reduce or eliminate cut slopes associated with the reclamation plan. Slope measurements and stability analysis based on site conditions during construction shall be provided in conjunction with certified as-built reports or plans demonstrating stability and that backfilling of cutslopes to the extent possible during reclamation activities has been accomplished.

## RECLAMATION PLAN

### GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

**Analysis:**

See individual sections.

### POSTMINING LAND USES

Regulatory Reference: R645-301-412, 301-413

**Analysis:**

Coal mining has been a land use in this area since the early 1900s. Some of the larger mines to be opened in the area were Sweets in 1925 and Consumers and National in 1928 (page 5-19). The Swisher No. 1 Mine lies immediately adjacent to the disturbed area and was reclaimed by the Utah Abandoned Mine Lands program.

The stated postmining land use is the same as the premining land use of wildlife habitat (page 3-8) and the intent of the reclamation designs is to restore the site to a condition compatible with the premining land use. Private landowners presently manage the lands surrounding the mine site for limited livestock forage. There are no range improvements in the area (page 4-53).

Appendix 3-10 contains a copy of a letter from Mountain Coal Company to the landowners, informing them of the anticipated postmining land use and proposed

reclamation. Two of the landowners, James and Mark Jacob, signed and returned the letter, thus acknowledging and agreeing to the land use. However, Robert F. and Linda M. Jewkes, who are the landowners of the #7 and #8 Mine areas, do not want the site returned to the premining land use and approximate original contour. The Jewkeses want the road to remain.

The Sweets Canyon Water Fill Area, also known as "Sweets Pond," will not be reclaimed. The pond is located on private land and the land owner has requested that the pond remain for private use (Page 3-32 and Appendix 3-5). The landowner has committed to leave the fence surrounding the pond in place in order to keep livestock out of the pond and riparian area. The pond constitutes a utility improvement for the area, supports a fish population, and provides for wildlife habitat.

**Findings:**

Comments regarding the postmining land use have not been received from all landowners. Accordingly the following permit condition is required:

**R645-301-412.200**

The permittee must provide a copy of the comments concerning the proposed postmining land use by the legal or equitable owner of record (Robert F. & Linda M. Jewkes) of the surface of the land following reclamation. In lieu of comments, the permittee may provide evidence that the surface land owner has been given ample opportunity to comment.

**PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES**

Regulatory Reference: R645-301-333, 301-342, 301-358

**Analysis:**

The permittee will employ the following measures to enhance the suitability of the site for wildlife habitat:

1. A small native rock holding basin will be constructed for wildlife watering near the No. 8 Mine seep.

2. A fence will prevent livestock grazing of the revegetated area for the entire bond liability period.

3. The seeps in the No. 7 area will flow across the surface of the backfill and will thus be accessible to wildlife.

4. The plant species to be used in revegetation have been selected for their value as wildlife forage and cover.

5. Drainage and seep areas will be enhanced by the addition of both seeded and transplanted riparian species.

6. Sweets Pond will remain for the intended postmining land use of wildlife habitat. The pond will be fenced to exclude livestock. The pond currently supports fish and occasional beaver.

#### Findings

The plan fulfills the requirements of this section.

### APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

#### Analysis:

The No. 2 area and the Old Fan Portal area were both built prior to SMCRA and thus do not come under the requirement of restoration to approximate original contour (AOC) *per se*. Only the No. 7 and No. 8 areas come under the requirements of restoration to approximate original contour and both of these areas will be restored to approximate original contour, as required by R645-301-553.110. For a more general discussion, see also **Backfilling and Grading** below.

#### No. 2 Area

A stability analysis of this area was done by the Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. in August of 1992. Based on samples taken from the site, the #2 Mine area estimates soils values at 120 pcf dry density, 5.75 psi (828 psf) cohesion, and an internal friction angle of 23.8 degrees. Due to the steep and narrow canyon configuration in which the surface facilities exist, slope stability is a critical factor in determination of the extent to which highwalls and cutslopes can be backfilled. The #2 Mine

area was evaluated for factors of safety of 1.3 and 1.5. The minimum requirements for long-term stability as required under the regulations dictate a minimum factor of safety of 1.3. Slope charts, under saturated conditions, were used in the proposal to determine maximum embankment heights for varying slope angles under saturated conditions. For this area, Agapito determined the following slope geometry parameters for a stability safety factor of 1.3 (see page 4 of Appendix 3-8).

Slope Angle (degrees)	Width of Base (feet)	Maximum Height (feet)
15	933	250
20	343	125
25	197	92
30	126	73
35	90	63

The natural channels that must be reestablished through the No. 2 area limit the width of the base of the fill. Therefore, the slope of 20° and base width of 343 feet were used in the design of the fill. These geometric parameters allow for a maximum slope height of approximately 125 feet, which will at the same time allow for the backfilling of most of the cut slopes *and* the attainment of the required stability (page 3-35).

The No. 2 area was disturbed prior to SMCRA. For such a site, both the R645- rules and the Federal regulations require *both* that "all reasonably available spoil" be used in backfilling the highwall *and* that the backfill be stable. The designed backfills of the highwalls and cut slopes of the No. 2 area fulfill both of these requirements. Given the amount of material available and the space constraints imposed by the reestablished natural channels, it would not be possible to completely backfill the cut slopes. The final reclaimed slope must be less than the original slope because the fill material is now unconsolidated. To completely backfill the cut slopes with a fill of a lesser slope than the original would create a fill with a larger cross-sectional area than the original configuration and would thus require more material than the original quantity. The designed backfills use all the reasonably available spoil that is necessary to achieve a stable configuration *and* they eliminate as much of the cut slope as possible, even though the upper part of the cut slope will not be eliminated.

#### No. 7 Area

A stability analysis of this area was done by the Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. in April of 1992. The #7 Mine area samples yielded 120 pcf dry density, 3.5 psi (504 psf) cohesion, and an internal friction angle of 21 degrees. As indicated in the analysis, the #7 Mine area was evaluated for factors of safety of 1.25 and 1.5. For this area, Agapito determined the following slope geometry parameters for a stability safety factor of 1.5 (see page 3 of Appendix 3-7).

Slope Angle (degrees)	Width of Base (feet)	Maximum Height (feet)
15	291	78
20	124	45
25	77	36
30	50	29
35	36	25

A safety factor of 1.5, rather than 1.3, was used for this area for a couple of reasons. First, the area contains two seeps and a small fault and the highwall below the MSHA safety bench has a history of natural instability. And since the planned earthwork will make it impossible to reach and repair this site in the event that it requires maintenance, the slightly higher safety factor will provide a greater margin of safety. Second, the MSHA safety bench in this area, which marks the upper extent of the highwall, is approximately 40 feet high and thus forms a good place into which to key the crest of the fill. The planned backfill will be approximately 45 feet high and will thus cover the safety bench while leaving the upper 60 feet of the faceup as it is. Backfilling the highwall to attain the lower safety factor of 1.3 would result in the elimination of only about 19 additional feet of the cutslope (see page 3 of Appendix 3-7). The natural channel that must be reestablished through this area limits the width of the base of the fill. So again, as in the No. 2 area, the slope of 20° was used in the design of the fill. This allows a maximum base width of 124 feet and a maximum slope height of 45 feet (page 3-39).

Given the amount of material available and the space constraint imposed by the reestablished natural channel, it would not be possible to completely backfill the portal faceup above the highwall and still achieve a stable configuration. As in the No. 2 area, the final reclaimed slope must be less than the original slope because the fill material is now unconsolidated. To completely backfill the cut slopes with a fill of a lesser slope than the original would create a fill with a larger cross-sectional area than the original configuration, would require more material than the original quantity, and would interfere with the

reestablished natural channel. The designed backfill eliminates as much of the cut slope above the highwall as possible, as required by R645-301-553.110, and at the same time achieves a stable configuration, as required by R645-301-553.130. The designed backfill is, in fact, the only possible configuration that will fulfill the requirements of these two regulations in the No. 7 area.

R645-301-553.100 requires that disturbed areas be backfilled and grade to 1) achieve the approximate original contour, 2) eliminate all highwalls, spoil piles, and depressions, 3) achieve a stable postmining slope which has a stability safety factor of at least 1.3, 4) minimize erosion and water pollution both on and off the site, and 5) support the postmining land use. Furthermore, R645-100-200 defines approximate original contour as "that [final] surface configuration achieved by backfilling and grading of the mined areas so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain with all highwalls, spoil piles, and coal refuse piles having a design approved under the R645- rules and prepared for abandonment." Thus, the concept of approximate original contour involves not only the original geometry of an area, but the stability, hydrology, and suitability to the postmining land use of that area as well. The planned final configuration of the No. 7 area meets all of the parameters of approximate original contour, as the following discussion will demonstrate.

The stability of the final surface configuration has already been discussed at some length. Indeed, it has been shown that the planned final surface configuration is really the only one possible given the space constraints imposed by the natural drainage channel, the amount of fill material available, and the stability characteristics of that material, including density, cohesion, and internal friction angle (page 3-39).

R645-301-553.140 requires that the postmining configuration minimize water pollution both on and off the site. The planned configuration will best fulfill this requirement for several reasons. First, the stable configuration achieved using the stability safety factor of 1.5 will prevent slides and minimize erosion. Second, the designed slope of approximately 2.7h:1v will best promote successful revegetation by providing a stable seed bed. Third, the lower fill height will allow for the channeling of water from a seep above the fill over the surface of the fill, which will prevent the seep from saturating and destabilizing the fill. And fourth, the planned configuration is the only possible configuration which will meet all the requirements of approximate original contour without interfering with the reestablishment of the natural drainage channel (pages 3-39 to 3-41).

The planned configuration will also closely resemble the general surface configuration that existed prior to mining and will mimic the visual attributes of the surrounding area. The surrounding area is steep and contains many cliffs and ledges. The remaining 60 feet of

faceup above the fill will resemble these cliffs and ledges and the fill at its base will closely resemble the talus slopes which underlie those cliffs and ledges (page 3-40).

The planned configuration will be entirely compatible with the postmining land use of grazing and wildlife habitat. Grazing area and wildlife habitat will merely be displaced, but not eliminated, by the remaining faceup. And the emphasis given in designing the fill to stability, good vegetation, and preservation of good water quality will enhance the value of this area as livestock land and wildlife habitat (page 3-41).

**No. 8 Area**

This area, which lies opposite the No. 7 area and on a much gentler slope, will be completely backfilled and restored to approximate original contour (page 3-42).

**Old Fan Portal Area**

This area contains a partially reclaimed highwall and cut slope. The area was abandoned in 1984 and is, therefore, subject to the reclamation requirements of both SMCRA and the R645- rules.

The same stability and slope geometry parameters that were used in the reclamation design of the No. 2 area were used to design the reclaimed slopes in this area. As with the No. 2 Area, these slope parameters achieve a factor of safety for the reclaimed slopes of at least 1.3 (see page 4 of Appendix 3-8).

Slope Angle (degrees)	Width of Base (feet)	Maximum Height (feet)
15	933	250
20	343	125
25	197	92
30	126	73
35	90	63

For such a site, both the R645- rules and the Federal regulations require that "all reasonably available spoil" be used in backfilling the highwall *and* that the backfill be stable.

Again, as with the No. 2 area, the Old Fan Portal area was initially disturbed prior to SMCRA. For such a site, both the R645- rules and the Federal regulations require *both* that "all reasonably available spoil" be used in backfilling the highwall *and* that the backfill be stable. The designed backfills of the highwalls and cut slopes of the Old Fan Portal area fulfill both of these requirements. Given the amount of material available and the space constraints imposed by the presence of the county road, it would not be possible to completely backfill the cut slopes. The final reclaimed slope must be less than the original slope because the fill material is now unconsolidated. To completely backfill the cut slopes with a fill of a lesser slope than the original would create a fill with a larger cross-sectional area than the original configuration and would thus require more material than the original quantity. Such a fill would also extend for some distance down slope from the present fill toe and would cover the county road and interfere with the reestablished main channel. The designed backfills use all the reasonably available spoil that is necessary to achieve a stable configuration *and* they eliminate as much of the cut slope as possible, even though the upper part of the cut slope between cross sections #10 and #11 will not be eliminated (pages 3-36 to 3-37).

#### Public Comments and Comments from Other Agencies

On May 15, 1995, the Division received comments regarding the regrading plan in a letter from the Western Regional Coordinating Center of the Office of Surface Mining. These comments were in the form of an analysis of the regrading plan and followed a brief site visit made by OSM representative Gene Hay in April of 1995.

The OSM analysis concentrated particularly on the restoration of the site to approximate original contour (AOC). The analysis used the data provided by the permittee, but made different assumptions regarding the conditions of the fill material. The analysis concluded that the highwalls and cutslopes at this site could be completely backfilled with no risk of slope instability using material available on the site. The Division made a full assessment of the analysis, but still found the plan for incomplete elimination of the highwalls and cutslopes to be the best for this site.

The OSM analysis appears to be based on 2 overlying ideas. The first is that it is highly unlikely that backfill material at this site will become saturated with water and that, therefore, backfill design should be based on an assumption of less-than-full saturation. The second is that there is a large quantity of surplus spoil available at this site for backfilling.

Regarding the first, the OSM analysis assumed a fill saturation level of  $\frac{1}{3}$  the fill height, as opposed to the assumption of total saturation made by the permittee. The OSM letter stated: "Due to the amount of time moisture remains in the [No. 7] area, it is a more realistic design standard to assume that only the bottom one third of the fill material will be

saturated." The OSM letter did not state the provenance of the  $\frac{1}{3}$  figure, but even so, the Division is convinced that the assumption of total saturation is much more realistic for this area, particularly as a worst-case condition. The rock in this area is fractured and thus provides numerous routes by which water can saturate the fill from behind. In addition, the fill will be placed and compacted against a rock face and the rock/fill interface will also provide a route whereby water can saturate the fill from behind. This problem is compounded by the fact that the rock face provides an impermeable or partly permeable water barrier and can thus allow the buildup of hydrostatic pressure behind the fill. The Division has observed the phenomenon of fill saturation by way of the rock/fill interface, with the resulting lateral displacement of saturated fill material, at several reclaimed sites in this area, even where the fill and the parent material are similar. The potential for saturation of the fill is high during the Spring thaw and is especially high in years of high snowfall or during periods of unusually heavy rain.

The necessity of long-term stability dictates that any fill in this area be designed assuming events and conditions which might be unusual, but nevertheless likely, over a long period of time and which might, therefore, jeopardize the stability of the fill. To require, on the basis of an assumption of less-than-complete saturation, that the highwalls and cutslopes at this site be completely backfilled, would deprive the backfill designs of a prudent and necessary cautiousness. All of these considerations are discussed in a May 22, 1995 letter which the permittee's consultant, Agapito Associates, Inc. wrote, at the permittee's request, to further explain the assumption of full fill saturation used in the stability analysis. Agapito's reasoning, as expressed in this letter, reflects the Division's reasoning in approving the stability analysis of the fills based on the assumption of full saturation.

In light of all this, the Division agrees with the OSM that the factor of safety for the slope design should be reduced to 1.3 for the #7 Mine area, especially in regard to saturated slopes. Typically, engineering practices allow for a long term static factor of safety of 1.3 under normal conditions and a factor of safety of 1.1 for saturated conditions. However, regulatory requirements do not allow for factors of safety of less than 1.3. As further explained below, the Division also considers slope evaluation under saturated conditions as a valid precaution in design of these slopes for long-term stability.

Through modeling and analysis, it was found by the Division that saturated conditions dramatically affect the slope angle and height allowable in comparison to unsaturated conditions where cohesion can be developed. OSM analysis varied the extent to which the fill areas were saturated and theorized that a significant change in the slope could be obtained under certain circumstances. Under certain conditions, the Division agrees that such slopes could be achieved. However, modeling and analysis also indicated that only small changes in the phreatic line (saturation elevation and gradient) would drastically affect these

assumptions. The conjecture made by OSM as to where saturation occurs within these fills cannot be reasonably assured on a long-term basis. In the event that saturation occurs in and through a critical failure surface, factors of safety were found to drop from 1.3 under dry conditions to less than 1 (failure) under saturation.

As an example of the problems associated with the saturation level, a cross section taken from the plan and indicated on the drawings as Section 3 was used to show how saturation can affect slope stability. The soil parameters used in the analysis are taken from the plan and are shown in the sample data labeled as Gordon Creek #7 Portal Area, Saturation limited to top of MSHA bench. This example shows a slope from the top of the cutslope above the portal area projected at the least slope possible, to where it encroaches on the stream channel. The slope shown is a approximately 2:1 slope. Dry, the embankment exceeds a 1.3 FS. The graphic section provided with the example, with a phreatic line projecting from the MSHA bench to the toe of the fill indicates a FS of 1.2. A second graphic, with the slope fully saturated, indicates a FS of .69, resulting in slope failure. Refer to data and figures found in Appendix I to the this technical analysis.

While technically feasible, the use of underdrains, and rock buttressing of the slopes could be utilized to increase the slope angle of these fills, such practices are usually reserved for critical or high-risk construction sites. Extensive engineering and design requirements are necessary to build such structures and costs associated with construction are very high. Rock and underdrain material needed to construct such features would have to be brought in or developed elsewhere within the permitted area, thus further increasing the disturbed area. Such structures also require some degree of monitoring and maintenance in order to assure their proper function. Due to the remoteness of the site and the low hazards associated with the area, underdrains and rock toe buttresses of these slope is not warranted.

The Division agrees that due to varying climate and soils conditions within the Gordon Creek Area, that long-term static factors of safety should be evaluated under saturated conditions. Inaccessibility of the site following reclamation and the inability to maintain the site with major following revegetation warrant a conservative approach in stability design.

Terracing, benching and surface diversions are indicated in the rules and also mentioned by OSM as possible alternatives to alleviate problems with slope stability and saturation of fills. Known seeps within the fill areas are identified in the plan and have been developed in a manner that will endeavor to bring and keep these seep areas on the surface of the fills to reduce saturation. Benching and terracing of the slopes is not proposed in the plan. Because of the tight constraints within the canyon, development of benches in the fills would increase the lateral or base requirements for the fills in order to effectively decrease slopes and increase stability. Diversions along the tops of the slopes are considered

impractical for several reasons. Because of the steep natural slopes above the fill areas, construction of diversion would further increase the disturbed areas and potentially decrease the stability of the natural slopes above the disturbed areas. Placement of diversions in the fill at the top of the slopes is also considered impractical due to the steepness of these backfilled areas. Differential settling between the fill and the adjacent natural materials can often cause cracks or voids in the fill material at the interface which if diversions were to be placed in these areas could inadvertently divert water directly into and behind the filled areas. These diversions as well as diversions associated with the use of terraces also would require a higher degree of maintenance on the site. Diversions, benches and terraces, although allowed in the regulations, are considered impractical based on site conditions.

These limitations do however restrict the amount of backfill material that can be placed along some of the cutslopes and above the highwalls within the mine site. In addition to the analysis performed for the fill areas, the cutslopes and cutslope areas above the highwalls were also evaluated by the operator for stability. These areas were found to have significantly higher factors of safety than the 1.3 minimum regulatory requirement. These high factors of safety are attributable to the high amount of bedrock in these cutslopes.

Although complete elimination of highwalls and cutslopes by backfilling those areas is the preferred alternative during reclamation, such practices cannot be achieved throughout the Gordon Creek Mine site due to factor of safety limitations, soils conditions and the geometry of the cutslopes in relationship to the natural slopes above the cuts and the establishment of permanent drainage channels below the cutslopes.

Regarding the second idea upon which the OSM analysis is based--that there is a large surplus of spoil available for backfilling the cutslopes and highwalls--this is simply not true and the OSM analysis acknowledges that fact. There is indeed, as the OSM analysis states, a large quantity of spoil in the original stream channel both adjacent to the No. 7 area and below sediment pond #7A. But all of this material came from the construction of the No. 2, No. 7, No. 8, and Old Fan Portal faceups. None has been hauled in or added as a result of mining. If all of this material were placed back in the cuts and compacted perfectly (speaking as if this were possible), without regard to stability, it would just fill the cuts and restore the area to its original configuration. Mine development wastes and spoils resulting from underground mining operations generally result in volumes of materials greater than the volumes originally excavated during mining operations. Use of all of these materials in backfilling and grading to achieve AOC is more desirable than the development of additional disturbed areas above or adjacent to highwalls for disposal. No historic maps of sufficient detail are available to show the pre-mining surface configuration for the entire mine site. Consequently, a detailed accounting of the location and extent of these materials is not available for evaluation.

OSM considers in their analysis that additional spoil is (or should be) reasonably available within the Gordon Creek Mine site. The Division agrees that, due to swell factors resultant from excavation of the mine facilities and that none of the materials excavated during mine development were removed from the area, that the volume of material currently placed as fill within the mine facilities is greater than the volume of the cuts that were concurrently developed during mine development. However, due to the limitations dictated by the factor of safety and site geometry, such fill material cannot effectively be used to eliminate all cut areas and cutslopes. Further discussion of this subject is found under the Backfilling and Grading Section of this TA.

The proposal put forth by the OSM analysis is to completely backfill the cutslopes and highwalls, which would require huge quantities of surplus spoil. Page 1 of the OSM analysis states: ". . . the amount of spoil needed to eliminate the [No. 2] highwall will increase the fill volume for Portal No. 2 by about 64% (from 75,378 to 123,620 cubic yards)." Then page 5 states: "At the most, the combination [of the permittee's plan and the OSM proposal for the No. 7 area] will require the company to move an additional 24,930 compacted cubic yards." And then, having established that the OSM proposal would require large quantities of additional spoil, page 4 of the analysis states: "If [the spoil material beneath and below the 7A pond is] not needed to reclaim the No. 2 portal, it could be used to backfill the No. 7 portal." The last of these 3 comments illustrates that, even according to OSM's own analysis, there is no surfeit of fill material with which to completely backfill the cutslopes and highwalls. The OSM proposal would require all the spoil available plus a great deal more.

The additional quantities of spoil which would be needed to implement the OSM proposal are enormous. The additional 64% needed in the No. 2 area would constitute an increase of 48,242 cubic yards. The additional quantity of 24,930 cubic yards which the OSM proposal would require for the No. 7 area is half again larger than the present total for the No. 7 and No. 8 areas combined. This site is located in a narrow canyon with steep walls on both sides and an intermittent stream channel in the bottom. The additional fill material required by the OSM analysis simply isn't there.

#### **Findings:**

The plan fulfills the requirements of this section.

The Division's goal in reclaiming this site is the same as OSM's: to formulate a plan for restoring the site to AOC which both complies with the applicable Federal and state regulations and is also stable and environmentally sound over the long term. In assessing the proposed reclamation plan, the Division has worked with the permittee and has been sensible of OSM's concerns, as expressed in its May 15 letter to the Division. The Division

maintains that the plan for incomplete backfilling of the cutslopes and highwalls is the best plan for this site on all counts.

First, the highwall backfills, as designed, will be stable over the long term. This long-term stability is the result of a great deal of caution having been built into the plan. The assumption of full saturation in the stability analyses and the safety factor of 1.5 used in the No. 7 area are part of this caution. While this caution may seem excessive, it is sound in the context of a worst-case design philosophy and is thus certainly sound in designing for long-term stability. The cutslopes in the No. 2, the Old Fan Portal areas, and above the No. 7 highwall will not be completely eliminated, but given the limited quantity of spoil material and the space limitations of the canyon, their complete elimination is not possible in any event. And changing the saturation assumption in order to increase the fill height would only serve to remove a prudent caution from the plan and would gain only a few additional feet on the respective cutslope and highwalls. The OSM analysis suggests that the backfill material be terraced or that diversions be cut into its face to break up the long continuous slopes and thus prevent saturation of the fill and enhance its surface and mass stability. But diversions require maintenance and are thus not suited to long-term reclamation and they are a liability to surface stability as well. And there is neither space nor spoil enough for actual terraces.

Second, the stability of the backfills will make for quick and effective revegetation. This revegetation, of course, will enhance the surface stability of the fills and prevent damage from erosion. The long continuous slopes proposed by the OSM analysis would increase the risk of erosion damage and surface instability and would thus not be conducive to revegetation. Again, while higher and steeper fill slopes would eliminate more of the highwalls and cutslopes, their deleterious effect on revegetation would negate whatever benefit might be gained from the elimination of a very few more feet of the highwalls and cutslope.

Third, and related to the second, the stability of the backfills due to the lesser slopes will result in a reduced sediment production potential for the entire site. Erosion damage and sediment production will be decreased and the resulting contribution of sediment to surface waters off the site will be decreased. And again, while higher and steeper slopes would eliminate more of the highwalls and cutslopes, their increased potential for erosion and sediment production would negate any benefit which might result from the very small additional highwall and cutslope reduction.

And finally, the remaining portions of the No. 2 and the No. 7 cutslope will be similar in structural composition to the preexisting cliffs in the surrounding area and will be compatible with the visual attributes of the area. The and cutslope remnants are composed of the same rock which forms natural cliffs and outcrops in many of the canyons in the Gordon Creek area and are thus identical in structural composition to those natural features. And the

existence of these natural cliffs and outcrops elsewhere in the surrounding area assures that the cutslope remnants will blend into the surrounding topography and be visually compatible with the scenery of the surrounding area.

## **BACKFILLING AND GRADING**

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

### **Analysis:**

The first reclamation operation following the final closure of the mining operation was the sealing of the portals. The No. 2 mine was sealed permanently in October of 1985 and the No. 7 and 8 mines were sealed in December of 1990. Each portal was first sealed by placing a block seal 25 to 50 feet inby the portal. The portal structure was then removed and the area outby the seal was completely backfilled to prevent access to the seal and to minimize roof breaking. Exposed coal seams in the portal areas were also covered.

The 2, 7 & 8 mines are considered dry mines, i.e., the mines themselves do not produce enough water to supply the needs of the mining operation. Most of the workings are downdip from the portals. The only area updip from the portal is the area northwest of the No. 2 west portals through the 70-acre lease modification. No water was encountered during the mining of this area. Because of the dryness of the mines and the locations of the portals relative to the dip of the seam, the seals will not impound water and so no hydrologic seals were used.

Shortly after final cessation of operations and portal sealing, all surface structures were removed. Metal, wood, pipe, and other such structural material was hauled away and either sold for scrap or disposed of in a municipal landfill. All concrete, including foundations, floors, and structural supports, was broken up and buried at the toe of the portal faceups.

Reclamation of the minesite will occur in two phases. During the first phase, the entire site will be reclaimed and the natural drainage channels reestablished and reconfigured from the No. 8 area down to the lower end of the No. 2 mine area. The present sediment ponds will be eliminated and a new 3-cell sediment pond will be constructed at the lower end of the site adjacent to the present main entrance gate. The new 3-cell pond will receive runoff from the entire site. All disturbed *and* undisturbed drainage will flow into the pond.

Once vegetation is reestablished and the sediment contribution to the pond is within acceptable limits, the second phase of the reclamation process will be carried out. The 3-cell sediment pond will first be removed and the area reclaimed. The reclaimed main drainage channel will then be extended to intersect the undisturbed channel below the site.

Sweets Pond will not be reclaimed. It is located on private land and the landowner has requested that the pond be left in place for private use. The permittee will turn the pond over to the landowner when reclamation is complete. The pond is designed for long-term stability and is a utility improvement as well as a source of water for wildlife.

All cutslopes along pad and road areas will be reduced as much as possible while maintaining the required minimum stability safety factor of 1.3. This will be accomplished by recovering downslope material with a backhoe and placing it against the cutslope faces with a bulldozer. The fill material will be compacted with a sheepsfoot compactor to improve stability. Temporary erosion controls, such as straw bales and silt fences, will be placed below these backfilled areas to prevent sediment from leaving the site and entering the natural drainage. The Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. determined the limiting dimensions of the fills in the respective areas by a detailed stability analysis. This analysis is discussed and its results are shown in the discussion which follows.

Since different parts of the site were originally disturbed at different times and under different regulatory requirements, the site has been divided, for the purposes of the backfilling and grading plan, into 4 different areas: the No. 2 area, the No. 7 area, the No. 8 area, and the Old Fan Portal area.

#### No. 2 Area

A stability analysis of this area was done by the Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. in April of 1992. The slope geometry parameters for this area were discussed in the Approximate Original Contour section above.

In 1993, the permittee performed a stability investigation of the cut slope above the portals in the No. 7 area, which is very similar to, but higher than, the cut slopes in the No. 2 area. This stability investigation, the results of which are found in Appendix 3-1, revealed that the No. 7 cut slope has a stability safety factor of 2.62. Since the No. 2 cut slopes are lower than those in the No. 7 area, and since the No. 2 cut slopes will be at least partially backfilled, which will further increase their stability, then the No. 2 cut slopes can be expected to achieve a stability safety factor *at least* equal to the value 2.62 achieved by the

No. 7 cut slope. And this, combined with the fact that the No. 2 cut slopes have been stable throughout the more than 30 years of their existence, demonstrates that the No 2 cut slope remnants fulfill the stability requirement of R645-301-553.523.

There are two seeps which daylight in the cutslope of the No. 2 area: one near the lower end of the No. 7 road and one above the office/shop area. Water from these seeps will flow over the surface of the fill in rip rap channels.

R645-301-542.300 and R645-301-542.310 require that the reclamation plan include ". . . final surface configuration maps with cross sections (at intervals specified by the Division) that indicate: . . . [t]he final surface configuration to be achieved for the affected areas." The cross sections of the No. 2 area which are shown on Plates 3-8B and 3-8C depict the final surface configuration. These cross sections were taken directly from the contours of Plate 3-7A and are of insufficient resolution to adequately show the extent to which the cut slopes of the area will be backfilled. Therefore, in 1995, at the Division's request, the permittee submitted 4 surveyed cross sections of the No. 2 area and superimposed upon these cross sections profiles of the anticipated final surface configuration. These 4 cross sections are designated #6, #7, #8, and #9. Their locations are shown on Plate 3-7A while the cross sections themselves are found on Plate 3-14. These additional cross sections are adequate to further define the present and final surface configuration of the No. 2 area.

### No. 7 Area

A stability analysis of this area was done by the Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. in April of 1992. The slope geometry parameters for this area were discussed in the Approximate Original Contour section above.

Natural conditions within this canyon would typically place slopes at angles with factors of safety at or near a FS of 1 to 1.1. Development of backfilled slopes to a factor of safety of 1.3 requires a reduction in the natural slopes which existed prior to mining and a significantly greater amount of material than would be available from mine development waste and fill. If such fill materials were readily available, it would have to be placed within the bottom of the canyon and would elevate the drainage areas, reducing the gradient in these fill areas, and over-steepening the gradient down stream of the fills. Such practices would not be conducive to re-establishment of the natural drainage patterns within the canyon. Development of borrow areas for additional fill materials would further increase the disturbed area.

Surface contours within the site were revised by the Division to determine to what extent additional material may be available, within the currently disturbed area, to minimize or further reduce the extent and the height of the cutslopes associated with backfilling and grading. The Division found that material within the site is sufficient to further backfill the #7 Mine portal area to the extent that would be allowed by reducing the factor of safety from 1.5 to 1.3. The revised contours were used only to roughly approximate changes to the entire facilities that would occur. These revised contours, developed approximately 42,000 additional cubic yards of material which could be used for fill within the cutslope areas. Of this, approximately 14,000 cubic yards were used in the #7 Mine portal area with the remainder of the material used in and around the #2 Mine portal area. This material was derived from the gentle slopes adjacent to and to the southeast of the #2 Mine portal area. EarthVision volumetric mass balance calculations from revision of the surface contours are as found in the Volumetrics Report attached to this TA in Appendix I. These calculations only consider the movement of material in comparison to the final reclamation contours proposed by the operator and as such do not relate to the mass balance calculations in the plan used in design earthwork from the mine operation stage to final reclamation. Revision of the proposed surface contours was accomplished by the Division only to determine whether or not additional material could be utilized from within the currently disturbed area.

Placement of this additional material along the cutslopes within the site did not eliminate any significant amount of cutslope areas as delineated on the maps in the proposal. The additional fill material did help to reduce the vertical extent of some of these cutslopes. The cutslopes above the #7 Mine portal area were reduced from approximately 85 feet to 45 feet vertically, but due to factor of safety limitations, could not be completely eliminated. The cutslopes above the #2 portal area were also reduced by 10-15 feet but slopes were constrained by the main drainage channel located in the bottom of the canyon.

Variations in the soils characteristics in consideration of the placement of backfill material should also be noted. Analysis of the soils for the #7 Mine area and the #2 Mine area are different enough so as to affect the degree to which slopes can be developed and the extent to which cutslopes can be reduced. During field construction, the operator should be aware that the identification and location of materials which have the best characteristics for constructing slopes in critical areas may have a marked effect on the final slopes that can be attained during reclamation. Should higher quality materials be encountered during earthmoving activities, field amendments to the plan could enhance the final reclamation configuration.

In 1993, the permittee performed a stability investigation of the cut slopes above the portals and the road in the No. 7 area. This stability investigation, the results of which are found in Appendix 3-1, revealed that the No. 7 portal cut slope has a stability safety factor of 2.62 and that the cut slopes above the road have a stability safety factor of 4.01. Since the

No. 7 highwall below the MSHA safety bench, which has had a history of natural instability, will be completely eliminated by backfilling, and since the No. 7 road cut slopes will be at least partially backfilled, which will further increase their stability, the No. 7 cut slopes can be expected to be stable. And this, combined with the fact that the No. 7 cut slopes have been stable throughout their 15-year existence, demonstrates that the No. 7 cut slope remnants fulfill the stability requirement of R645-301-553.130.

R645-301-553.100 requires that disturbed areas be backfilled and graded to 1) achieve the approximate original contour, 2) eliminate all highwalls, spoil piles, and depressions, 3) achieve a stable postmining slope which has a stability safety factor of at least 1.3, 4) minimize erosion and water pollution both on and off the site, and 5) support the postmining land use. Furthermore, R645-100-200 defines approximate original contour as "that [final] surface configuration achieved by backfilling and grading of the mined areas so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain with all highwalls, spoil piles, and coal refuse piles having a design approved under the R645- rules and prepared for abandonment." Thus, the concept of approximate original contour involves not only the original geometry of an area, but the stability, hydrology, and suitability to the postmining land use of that area as well. The planned final configuration of the No. 7 area meets all of the parameters of approximate original contour, as the following discussion will demonstrate.

The stability of the final surface configuration has already been discussed at some length. Indeed, it has been shown that the planned final surface configuration is really the only one possible given the space constraints imposed by the natural drainage channel, the amount of fill material available, and the stability characteristics of that material, including density, cohesion, and internal friction angle (page 3-39).

R645-301-553.140 requires that the postmining configuration minimize water pollution both on and off the site. The planned configuration will best fulfill this requirement for several reasons. First, the stable configuration achieved using the stability safety factor of at least 1.3 will prevent slides and minimize erosion. Second, the designed slope of approximately 2.7h:1v will best promote successful revegetation by providing a stable seed bed. Third, the lower fill height will allow for the channeling of water from a seep above the fill over the surface of the fill, which will prevent the seep from saturating and destabilizing the fill. And fourth, the planned configuration is the only possible configuration which will meet all the requirements of approximate original contour without interfering with the reestablishment of the natural drainage channel (pages 3-39 to 3-41).

The planned configuration will also closely resemble the general surface configuration that existed prior to mining and will mimic the visual attributes of the surrounding area. The

surrounding area is steep and contains many cliffs and ledges. The remaining 60 feet of faceup above the fill will resemble these cliffs and ledges and the fill at its base will closely resemble the talus slopes which underlie those cliffs and ledges (page 3-40).

The planned configuration will be entirely compatible with the postmining land use of grazing and wildlife habitat. Grazing area and wildlife habitat will merely be displaced, but not eliminated, by the remaining faceup. And the emphasis given in designing the fill to stability, good vegetation, and preservation of good water quality will enhance the value of this area as livestock land and wildlife habitat (page 3-41).

R645-301-542.300 and R645-301-542.310 require that the reclamation plan include ". . . final surface configuration maps with cross sections (at intervals specified by the Division) that indicate: . . . [t]he final surface configuration to be achieved for the affected areas." The cross sections of the No. 7 area which are shown on Plates 3-8A and 3-8B depict the final surface configuration. These cross sections were taken directly from the contours of Plate 3-7A and are of insufficient resolution to adequately show the extent to which the cut slope and highwall of the area will be backfilled. Therefore, in 1995, at the Division's request, the permittee submitted 3 surveyed cross sections of the No. 7 area and superimposed upon these cross sections profiles of the anticipated final surface configuration. These 3 cross sections are designated #1, #2, and #3. Their locations are shown on Plate 3-7A while the cross sections themselves are found on Plate 3-13. These additional cross sections are adequate to further define the present and final surface configuration of the No. 7 area.

Although the incorporation of cutslopes into the reclamation design does have advantages as noted above, there are also adverse effects. Most important, is the consideration that due to the steepness of the cut slopes, their existence may pose a safety hazard to people, livestock and wildlife who encounter them. Because of the location of these cutslopes, the hazards associated with them are considered minimal. Steep natural slopes occur above these areas which limit access to the cutslopes. All access to the cutslope areas is below the cutslopes and no roads or trails are found immediately above these areas. Natural terrain in the area can be found as steep or steeper than the cutslope areas such that the natural hazards are at least equal or greater to the hazards associated with the cutslopes.

Another adverse effect is the visual and esthetic impact from the retained cutslopes. The visual impact is that the cutslopes will remain visible following revegetation and will be most visible from the bottom of the canyon where the site is accessible. However, the cutslopes are not visible from other vistas or viewing areas which would be generally accessible to the public or within view of any residences. The cutslopes will also appear similar to scarps which are found throughout the region resulting from natural land surface failures. Accordingly, while the visual impact from the cutslopes is adverse, it is not

considered as significant or limiting in regard to the post mining land use or as having any impact outside of the permit area.

As part of the backfilling and grading evaluation of the site, the Division considered the elimination or the reduction of cutslopes within the site. The visual effects regarding the placement of additional materials to reduce the vertical extent of cutslopes is not significant in comparison to the final surface configuration as proposed by the operator. To compare the difference, 3-D models looking at the #2 Mine area and the #7 Mine area were developed. Figure 1 shows the #2 Portal area as proposed in the plan while Figure 2 show the site following the relocation of the additional materials. Similarly, Figures 3 and 4, are shown for the #7 Portal area. Unfortunately, digital data was not made available to compare the pre-mining surface configuration or the operational surface configuration to the final reclaimed surface configuration.

#### No. 8 Area

This area, which lies opposite the No. 7 area and on a much gentler slope, will be completely backfilled and restored to approximate original contour (page 3-42).

There is a seep in the road cut just below the No. 8 mine pad. This seep has been controlled by two gravel drains. The first, which is approximately 36 inches deep by 12 inches thick by 24 inches wide, crosses the road and discharges into a small concrete retention basin in an otherwise undisturbed area. The second is approximately 24 inches wide by 18 inches deep and parallels the road to where it discharges into the main undisturbed culvert.

Both gravel drains will be left in place and covered with additional fill material. The second gravel drain will be supplemented with an additional 24-inch-square section of gravel along the road ditch. This will be covered with roofing paper before it is covered with fill material. The resulting enlarged drain will empty into the restored natural drainage channel between the No. 8 and No. 7 areas (page 3-40a).

#### Old Fan Portal Area

Backfilling and Grading of this area is discussed in the section on Approximate Original Contour above.

R645-301-542.300 and R645-301-542.310 require that the reclamation plan include " . . . final surface configuration maps with cross sections (at intervals specified by the

Division) that indicate: . . . [t]he final surface configuration to be achieved for the affected areas." The cross sections of the Old Fan Portal area which are shown on Plates 3-8D and 3-8E depict the final surface configuration. These cross sections were taken directly from the contours of Plate 3-7B and are of insufficient resolution to adequately show the extent to which the cut slope and highwall of the area will be backfilled. Therefore, in 1995, at the Division's request, the permittee submitted 4 surveyed cross sections of the Old Fan Portal area and superimposed upon these cross sections profiles of the anticipated final surface configuration. These 4 cross sections are designated #9, #10, #11, and #12. Their locations are shown on Plate 3-7B while the cross sections themselves are found on Plates 3-14 and 3-15. These additional cross sections are adequate to further define the present and final surface configuration of the Old Fan Portal area.

#### Findings:

Although OSM and Division disagree in part, to some of the assumptions used in the design and the development of the reclamation plan for the Gordon Creek 2, 7 & 8 Mines, the plan was found to meet the minimum regulatory requirements with respect to highwall elimination, backfilling and grading, and meeting AOC requirements. Additional materials potentially can be placed to reduce the vertical extent of cutslopes within the existing disturbed area. However, such considerations are not significant to warrant re-design and re-evaluation of the reclamation plan as proposed.

Backfilling in the #7 Mine portal area should be increased by reducing the factor of safety from 1.5 to 1.3. Evaluation of other areas, including the #2 Mine portal area are already proposed with a 1.3 factor of safety. Accordingly, the following permit condition is required:

**R645-301-553, Backfilling and Grading, backfilled slopes in the #7 Mine portal area shall be backfilled to the extent possible while maintaining a factor of safety of 1.3. The operator shall determine, based on site conditions, where additional materials may be developed and placed as fill to further reduce or eliminate cut slopes associated with the reclamation plan. Slope measurements and stability analysis based on site conditions during construction shall be provided in conjunction with certified as-built reports or plans demonstrating stability and that backfilling of cutslopes to the extent possible during reclamation activities has been accomplished.**

## **MINE OPENINGS**

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

### **Analysis:**

The first reclamation operation following the final closure of the mining operation was the sealing of the portals. The No. 2 mine was sealed permanently in October of 1985 and the No. 7 and 8 mines were sealed in December of 1990. Each portal was first sealed by placing a block seal 25 to 50 feet in by the portal. The portal structure was then removed and the area out by the seal was completely backfilled to prevent access to the seal and to minimize roofbreaking. Exposed coal seams in the portal areas were also covered.

### **Findings:**

The plan fulfills the requirements of this section.

## **TOPSOIL AND SUBSOIL**

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-232, -301-233, -301-234, -301-242, -301-243.

### **Analysis:**

Prelaw (i.e. P.L.95-87) disturbance at this site is approximately 10.82 acres and comprises the No.2 Mine operation yard and access road (approximately 9.18 acres) and the Old Fan Portal (approximately 1.64 acres). Topsoil was not separately salvaged from these prelaw disturbed areas prior to their disturbance.

The permittee plans to use material from the No. 2 Mine fill and the No.2 Mine access road fill as substitute topsoil (Page 3-14). Laboratory analyses characterizing the proposed substitute topsoil material are found in Appendix 8-1.

The permittee has committed to sample the regraded surface of the No.2 Mine to determine fertilizer requirements (page 3-15).

Topsoil and subsoil from the No.7 Mine area were salvaged from all disturbed areas

except those areas which were excessively rocky, where topsoil was of limited depth, or where the steepness of the terrain posed a safety hazard to machinery. Topsoil from the No. 7 Mine (3684 cubic yards) is stored adjacent to the No. 2 Mine operations area and subsoil from the No. 7 Mine (8000 cubic yards) is stored adjacent to the No. 7 Mine operational area. This topsoil and subsoil material will be evenly distributed along the contour (page 3-43) to a depth of twelve inches subsequent to backfilling and grading (Table 8-5A).

Topsoil which was salvaged from the No. 8 Mine (2514 cubic yards) disturbance is stored on top of the subsoil pile adjacent to the No.7 Mine operations area. Subsequent to the completion of backfilling and grading, this topsoil material will also be evenly distributed along the contour to a depth of twelve inches (Table 8-5A).

Interim reclamation of the Old Fan Portal area was done in 1984. The existing fill was used as topsoil since no topsoil had been salvaged initially. Vegetation has been established on the regraded spoils. The permittee proposes additional regrading in the Old Fan Portal area.

The permittee proposes that the surface material on slopes steeper than 70 percent (areas depicted on Plate 3-7A, 3-7B, and 3-7C) be left in place and used as substitute topsoil (page 3-17). To demonstrate its suitability as substitute topsoil material, this surface material will be sampled in May and June and analyzed as described in Section 3.5.5.1. Sample site locations are shown on Plate 3-1.

In order to alleviate compaction, all regraded soil will be deep ripped to a depth of 18-inches (page 3-33 & 47). Plant growth medium will be gouged and roughened in order to maximize its surface roughness and thus enhance its revegetation capability. This will be accomplished by using a large backhoe bucket to create 2'-3' diameter, irregularly-placed depressions (page 8-32).

Prior to reexcavation, the topsoil and subsoil stockpiles will be analyzed for nitrogen, phosphorus and potassium (page 3-50). An appropriate fertilizer will then be formulated based on that analysis.

**Findings:**

The plan fulfills the requirements of this section.

## **ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES**

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

### **Analysis:**

The Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. determined the limiting dimensions of the fills in the respective areas by a detailed stability analysis. All cutslopes along road areas will be reduced as much as possible while maintaining the required minimum stability safety factor of 1.3. This will be accomplished by recovering downslope material with a backhoe and placing and compacting it against the cutslope faces with a bulldozer. Temporary erosion controls, such as straw bales and silt fences, will be placed below these backfilled areas to prevent sediment from leaving the site and entering the natural drainage.

### **Findings:**

The plan fulfills the requirements of this section.

## **HYDROLOGIC INFORMATION**

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

### **Analysis:**

#### **Acid and toxic-forming materials**

The permittee has committed to the removal and relocation of contaminated material from the No. 2, 7 & 8 Mine yard fills. This includes removal of material contaminated with oil and grease, material which is more than 50 percent coal, and acid- and toxic-forming material as defined by the Utah Coal Mining Regulations and qualified by the Division's Guidelines for Topsoil and Overburden, Table 2. These contaminated materials will be identified during backfilling and grading based on visual observation, combustibility analysis and the sampling outline on pages 3-50 & 3-51. The contaminated materials will then be completely removed from their original location and buried onsite with four feet of non-

combustible, nonacid- and nontoxic-forming material.

Exposed coal seams will be covered with a minimum of four feet of noncombustible material. Some small rider seams will not be covered in areas where the fill configuration required to cover them would be unstable (See also **Backfilling and Grading** above). The coal seams will be covered with three feet of "rock material" and one foot of topsoil and/or suitable substitute topsoil (page 3-34).

**Findings:**

The plan fulfills the requirements of this section.

**Sedimentation Ponds R645-301-742.220 thru 742.225.2**

**Analysis:**

The hydrologic portion of the reclamation plan calls for a new 3-celled sedimentation pond to be constructed at the downstream end of the disturbed area. The Operator has provided for maintenance of the temporary sediment pond during the reclamation phase (page 7-40). It will be reclaimed and the original channel restored when bond release requirements are met for sediment control and vegetation (page 7-40). Per the requirements of R645-301-880-320 and R645-301-732-210 and Phase II bond release criteria, the following structures will be affected (Sweet's Canyon Pond and the temporary sediment pond) and as such, a Division of Water Rights permit, a Division of Dam Safety permit and a maintenance agreement for these structures have been supplied. The Operator has stated how he will comply with the requirements for permanent maintenance including sediment removal if required for the reconstructed sediment pond on page 7-40 of the plan. Sediment levels are shown as being determined by direct measurement at the sediment marker, as shown on Plate 7-14 and will be cleaned-out when the sediment reaches the cleanout level of 7748.5'. The pond will be inspected quarterly and on an annual basis as required.

The Sweet's Canyon Pond will remain and be maintained by the landowner as stated in the September 28, 1994 letters found in Appendix 3-5 to Beaver Creek Coal Company from Agnes K. Pierce. A Slope Stability Analysis for the Sweet's Canyon Pond is found in Appendix 3-4 demonstrating a slope stability of 2.35 for saturated conditions. Water Rights Lease and Sale Agreement allocated to the Sweet's Canyon Pond was entered into on the 7th of April, 1993 and is found in Appendix 3-9.

The following forms and applications have been approved for the following impoundments to be retained or used during reclamation.

Sweet's Pond

- 1) Form 69 filed with the Division of Water Rights is found in appendix 7-4.
- 2) A transfer of Water Rights to the Sweet's Pond from Gordon Creek is found in appendix 3-9 but a change application for the point of use needs to be filed by the owner for the water rights to be valid.
- 3) A clarification of the use and responsibility for maintenance of the pond now that Mr. E.E. Pierce is deceased is found in appendix 3-5.

Temporary Sediment Pond

- 1) Sediment clean-out levels will be marked with a sediment marker in the pond.
- 2) Clean-out of the pond will occur at the 60 % sediment storage level (7748.5').
- 3) Form 69 for the temporary 3-celled structure is found in appendix 7-4. An approval letter, dated February 7, 1995, is also found in Appendix 7-4.
- 4) The pond will be decanted using a portable pump to the maximum sediment storage level elevation when necessary. (page 4-2).

**Findings:**

The permittee meets the requirements of the rules regarding the sediment ponds and permanent impoundments.

**Diversions R645-301-742.300 et.al. and R645-301-742.400 thru 743**

**Analysis**

The plan provides for reclamation of the Right and Left Forks of Bryner Canyon using the 100-year 6-hour storm event in accordance with R645-301-742.323. Permanent channels for the ephemeral drainages were designed using the 10-year 6-hour event in accordance with R645-301-742.333. The main channel and the Right Fork of Bryner Canyon were considered intermittent and all others considered ephemeral. The watershed boundaries used to determine precipitation runoff from undisturbed areas within Bryner Canyon are shown on Plate 7-5A. The locations of all channels showing riprap sizes and slopes are shown on Plate 3-7A, 3-7B, and 3-7C. All design information for the plan regarding the applicable calculations and methodologies is found in Appendix 7-1.

The plan provides for the restoration of the Right Fork of Bryner Canyon to restore premining characteristics of the original stream channel where it meets the old pad fill. Ponding, in what is considered a natural depression that appeared to be caused by the

presence of the pad and failure to reestablish original grade for the channel, has been eliminated.

Reclamation of the mine site will be completed in a single phase, with the exception of the removal of the new sediment ponds. The first step will be to build the new three celled pond in the Bryner Canyon drainage below the mine site. (See Plates 3-7B and 7-14). The minesite will be reclaimed starting from the top down, with No. 8 first, followed by No. 7, No.2 Access Road, and finally, the Old Fan Portal Area. The natural drainage will be restored down to the undisturbed drainage below the No. 2 Mine, as shown on Plate 3-7A. At this point the No.2 pond and 7A pond will be removed and all drainage above the new 2/7/8 Sediment Ponds will flow into the ponds.

There are several diversions of miscellaneous spring flow which drains across reclaimed slopes (springs located at the 2,7, and 8 mine areas). Provisions are discussed on page 7-33 regarding the use of riprap and filter blankets for the appropriate areas and a french drain for the No. 8 Mine road cut seep.

#### **Findings:**

The permittee has supplied the necessary information regarding the restoration of the natural drainages in the area of the No.2,7, and 8 Mine sites

1. The Permittee has filed the necessary Stream Alteration Permit for the reclaimed stream channel with the Division of Water Rights and as such a positive finding can be made pending approval by the Division of Water Rights.

#### **Sediment Control Measures R645-301-742**

#### **Analysis**

The Permittee has provided details on mulching rates, hydromulch application rates, tackifier amounts and types, and erosion control matting. Commitments to maintain the site from an erosion standpoint have been made in the permit in Section 7.2.8.5 (page 7-58), Maintenance Plan For Erosion. A design summary of the one BTCA area associated with the Old Fan Portal Area is found in Appendix 7-5 and designated as such on Plate 3-2.

There will be a lot of earth moving taking place adjacent to presently undisturbed drainages and it will be considered prudent sediment control to prevent the migration of earth disturbance into those presently undisturbed drainages. The contractor should be made aware

of this potential and instructed in regards to using care when operating adjacent to these areas.

**Findings:**

The Permittee meets the requirements of the rules regarding erosion control and control of sediment from the reclaimed areas.

**Water Quality Monitoring R645-301-723 and 742.100,200,300**

**Analysis**

The Permittee has proposed a plan which monitors 6 stations for the parameters shown in Table 7-18. The sampling program provides information on seasonal flow and water quality on intermittent and ephemeral streams that have potential to be affected by mine discharge and surface disturbance. Discussion of surface water monitoring locations, type, frequency and flow device may be found in Table 7-17. A map of monitoring locations is provided on Plate 7-2. Analyses will be for parameters listed in Table 7-18. The Post Mining Water Monitoring plan is described on 7-67 of the permit.

**Findings:**

The Permittee meets the requirements of the regulations regarding water monitoring.

**REVEGETATION**

Regulatory Reference: R645-301-244, 301-353, 301-355, 301-356

**Analysis:**

**General requirements**

The revegetation portion of the plan is found on pages 3-52 thru 3-65. The revegetation seed mixture is specified on page 3-54 and 3-55. The mixture contains grasses, forbs, and shrubs which are known to be palatable to big game animals. Cicer milkvetch and alfalfa are the only non-native species in the mixture. Cicer milkvetch has been included both because it is a legume and also because it is palatable to big game animals. Alfalfa is desirable for its quick establishment and nitrogen-fixing capabilities. Alfalfa usually does not

persist on these sites for more than a few years. Five other native forb species are included in the mixture.

In addition to the five shrub species which will be seeded, the riparian areas will also be transplanted with containerized stock of Salix, Elderberry, Serviceberry and Chokecherry (page 3-55). Seeps and springs will be planted at 25-foot intervals and the main drainages will be planted at 50-foot intervals on each side. An augmented seed mixture which includes additional grass and forb species will be applied to the riparian areas.

All seeding will be done by either hydroseeding or hand broadcasting and will be followed by light raking (page 3-53). Past interim seeding efforts have shown this procedure to be effective for this area. The permittee has committed to limit the amount of time the seed is in the hydroseeder to no more than 30 minutes.

The plan commits to leaving the site in a roughened state (page 8-32). By using a large backhoe bucket to redistribute the topsoil, depressions 2 feet to 3 feet in diameter will be left. The surface material in areas which are not backfilled and which will not receive topsoil will be amended with straw or hay at a rate of 1500 pounds per acre. Where feasible, the straw or hay will be incorporated into the soil with a trackhoe. In less accessible areas, the straw or hay will be incorporated by punching and gouging the soil (page 3-51). Hand roughening will consist of surface loosening of the soil to a depth of 4 to 6 inches with hand tools.

### **Timing**

The plan commits to begin seeding no earlier than September 1 (page 3-54) and to complete the seeding in the fall of the year. This is the time of year normally accepted for seeding with this particular seed mixture and for this area. The revegetation schedule is outlined on page 3-57. Preliminary work such as seed ordering and soil sampling will begin, respectively, in May and June. Recontouring will begin in July with final mulching occurring in October.

### **Mulching and other soil stabilizing practices**

A wood fiber hydromulch will be applied, at the rate of 2000 lbs per acre (3-56), to all seeded areas with slopes less than 2h:1v and to all nontopsoiled areas with slopes greater than 2h:1v (page 3-58). Hydromulching has been shown, in interim revegetation on this site, to be effective in controlling erosion and stabilizing the soil surface on slopes less than 2h:1v.

On slopes steeper than 70 percent where topsoil and/or subsoil is not applied, alfalfa mulch will be placed on the surface at the rate of 1500 lbs per acre. In areas which can be reached by a trackhoe, surface gouging will be performed to create surface roughness and incorporate mulch. In steep areas which cannot be reached by a backhoe, hand tools will be used to roughen the soil surface and incorporate the mulch.

#### Standards for success

The postmining land use is wildlife habitat. Therefore, the requirements of R645-301-356.230 must be met. Success of vegetation will be determined on the basis of shrub stocking and vegetative ground cover. The plan does not specify a shrub standard. The Division, DWR and the permittee have agreed, as shown by a 10/31/94 letter from Bill Bates of DWR (page 3-58), that a minimum shrub stocking standard of 2000 shrubs per acre will be the success standard to be achieved by this site. The permittee's commitment to this success standard is found on page 3-61 of the plan.

The stated success standard for cover and diversity is to be that of the Mountain Grassland community (page 3-58). The Mountain Grassland (also referred to as Mountain Brush/Grass Community) reference area is located above the No. 2 Mine and identified on Plate 9-1. The data for this reference area were collected in July of 1981. The most frequent species in the reference area during the 1981 inventory were Salina Wildrye and Indian Ricegrass. Based on an ocular estimate, total vegetative cover was 20 percent. In 1993 the Mountain Grassland reference was again sampled and the vegetative cover was estimated to be 43 percent (Appendix 9-2). Salina Wildrye and Broom Snakeweed were the most frequently encountered plants. Because of the large differences in percent cover values, some doubt exists that the same areas were sampled. However, approval of the reference area is based on the 1993 sampling. If subsequent sampling indicates that the 1981 sampling is more representative of the actual cover value, then the use of the Mountain Grassland reference area as a standard for the entire site will have to be reevaluated.

The proposed 2/7/8 Sediment Pond is to be constructed in an area which is not included in the current approved disturbed area. However, the area was previously disturbed by the construction of the adjacent Carbon County road and by the operation of the abandoned Swisher No. 1 Mine. The plan commits to revegetate this area to meet the success standard of the Mountain Grassland reference area. A determination will have to be made during the growing season, prior to disturbance, as to whether or not a vegetation inventory of this area is necessary.

#### Findings:

The plan fulfills the requirements of this section. However, as a condition of this

permit, the permittee must commit to do the following, in accordance with the requirements of:

**R645-301-321.100**

During the growing season, a determination will need to be made as to whether or not a predisturbance vegetation inventory of the proposed 2/7/8 Sediment Pond is necessary.

## **STABILIZATION OF SURFACE AREAS**

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

**Analysis:**

See **Revegetation and Backfilling and Grading** above.

**Findings:**

The plan fulfills the requirements of this section.

## **MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS**

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

**Analysis:**

See also **Backfilling and Grading** above.

**Affected area boundary maps.**

Plates 3-7A, 3-7B, and 3-7C accurately and adequately show the disturbed area boundaries for the No. 2, No. 7, No. 8, and Old Fan Portal areas. Approximately 1.5 acres will be added to the disturbed area with the construction of the new sediment ponds and this added area is shown on Plates 3-7B and 3-7C. Since this area constitutes less than 15% of the total present disturbed area, its addition to the disturbed area does not constitute a significant revision of the permit, but only an amendment.

**Bonded area map.**

Plates 3-7A, 3-7B, and 3-7C accurately and adequately show the bonded area boundaries for the No. 2, No. 7, No. 8, and Old Fan Portal areas. Plate 3-1A shows Sweets Pond, which will not be reclaimed, and its associated bonded area. For this site, the bonded area is identical to the disturbed area and comprises approximately 17.2 acres. Approximately 1.5 acres will be added to the disturbed area with the construction of the new sediment ponds and this added area is shown on Plates 3-7B and 3-7C.

**Reclamation backfilling and grading maps.**

Plates 3-7A, 3-7B, and 3-7C show the backfilling and grading which will be done at this site. In addition, Plates 3-8A, 3-8B, 3-8C, 3-8D, and 3-8E contain cross sections, taken from topographic maps, which depict the present surface configuration and the anticipated reclaimed surface configuration.

**Reclamation facilities maps.**

The only reclamation facilities which will remain will be the new sediment ponds, which will be reclaimed at the end of the Phase II reclamation period. These ponds are shown on Plates 3-7B and 3-7C.

**Final surface configuration maps.**

Plates 3-7A, 3-7B, and 3-7C show the anticipated final surface configuration. In addition, Plates 3-8A, 3-8B, 3-8C, 3-8D, and 3-8E contain cross sections, taken from topographic maps, which depict the present surface configuration and the anticipated final surface configuration.

**Reclamation surface and subsurface manmade features maps.**

There are no buildings within 1000 feet of this site and no electrical transmission lines or pipelines passing over or under the site.

Plates 3-7A, 3-7B, 3-7C, and 3-1A show the anticipated final surface configuration. These maps show the location and extent of the fence which will be erected around the site to keep livestock from destroying the developing vegetation. Plates 3-7B and 3-7C show the Carbon County access road in relation to the rest of the site and Plate 3-1A shows Sweets Pond and its surrounding area.

**Reclamation treatments maps.**

The only reclamation treatment facilities which will remain will be the new sediment ponds, which will be reclaimed at the end of the Phase II reclamation period. These ponds are shown on Plates 3-7B and 3-7C.

All facilities which will be used to protect and enhance fish and wildlife related environmental values are shown on Plates 3-7A, 3-7B, and 3-7C. These include a small native rock holding basin for wildlife watering near the No. 8 Mine seep, the fence which will prevent livestock grazing of the revegetated area for the entire bond liability period, and the seeps in the No. 7 area which will flow across the surface of the backfill and thus be accessible to wildlife.

**Findings:**

The plan fulfills the requirements of this section.

**BONDING AND INSURANCE REQUIREMENTS**

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

**Analysis:**

**Form of bond. (Reclamation Agreement)**

A surety bond in the amount of \$641,443 is held with the United Pacific Insurance Company.

**Determination of bond amount.**

The total cost of reclaiming this site was estimated to be approximately \$327,826, in 1983 dollars. The costs of sealing and backfilling the portals and of removing and disposing of the surface facilities were left out of the calculation of this sum since all of this work was done in 1991, while at the same time the cost of reclaiming the Old Fan Portal area was added in. This estimated cost was escalated through 1988, when the No. 8 Mine started operation, at which time the reclamation costs associated with the No. 8 area were added in, to make up a total of \$394,074, in 1988 dollars. This amount was then escalated through 1999 in order to get an estimate of the required bond amount through the end of the present permit term. The required amount turns out to be \$505,643, in 1999 dollars. Since the reclamation bond is in the amount of \$641,443, this site is more than adequately bonded

through 1999. The following table summarizes the foregoing discussion.

YEAR	ESCALATION FACTOR*	RECLAMATION COST	REMARKS
1983	----	\$327,826	#2 and #7 Mines Only
1984	0.92	\$330,842	#2 and #7 Mines Only
1985	2.90	\$340,436	#2 and #7 Mines Only
1986	2.10	\$347,586	#2 and #7 Mines Only
1987	1.95	\$354,364	#2 and #7 Mines Only
1988	1.81	\$360,777 + \$33,297 = \$394,074	#8 Mine Added to #2 and #7 Mines
1989	1.77	\$401,050	#2, #7 & #8 Mines
1990	0.77	\$404,138	#2, #7 & #8 Mines
1991	1.27	\$409,270	#2, #7 & #8 Mines
1992	2.21	\$418,315	#2, #7 & #8 Mines
1993	2.61	\$429,233	#2, #7 & #8 Mines
1994	3.21	\$443,012	#2, #7 & #8 Mines
1995	2.68	\$454,884	#2, #7 & #8 Mines
1996	2.68	\$467,075	#2, #7 & #8 Mines
1997	2.68	\$479,593	#2, #7 & #8 Mines
1998	2.68	\$492,446	#2, #7 & #8 Mines
1999	2.68	\$505,643	#2, #7 & #8 Mines

\*Escalation factors are taken from Means<sup>©</sup>

**Terms and conditions for liability insurance.**

Liability insurance policy ISL G1 519134-A is held with the Insurance Company of North America through the agency of the CIGNA Insurance Company. The effective term of this policy goes from January 1, 1993 through January 1, 1996. The combined coverage

Page 36  
Technical Analysis & Findings  
ACT/007/016  
July 20, 1995

for bodily injury and property damage is \$500,000 for each occurrence and \$500,000 aggregate. The certificate of insurance which the Division holds states that, in the event that the policy is cancelled for any reason by the permittee, the insurance agency, CIGNA, will give the Division written notification within 45 days.

**Findings:**

The plan fulfills the requirements of this section.

# APPENDIX I

to  
Gordon Creek 2, 7 & 8 Mine  
Reclamation Plan TA

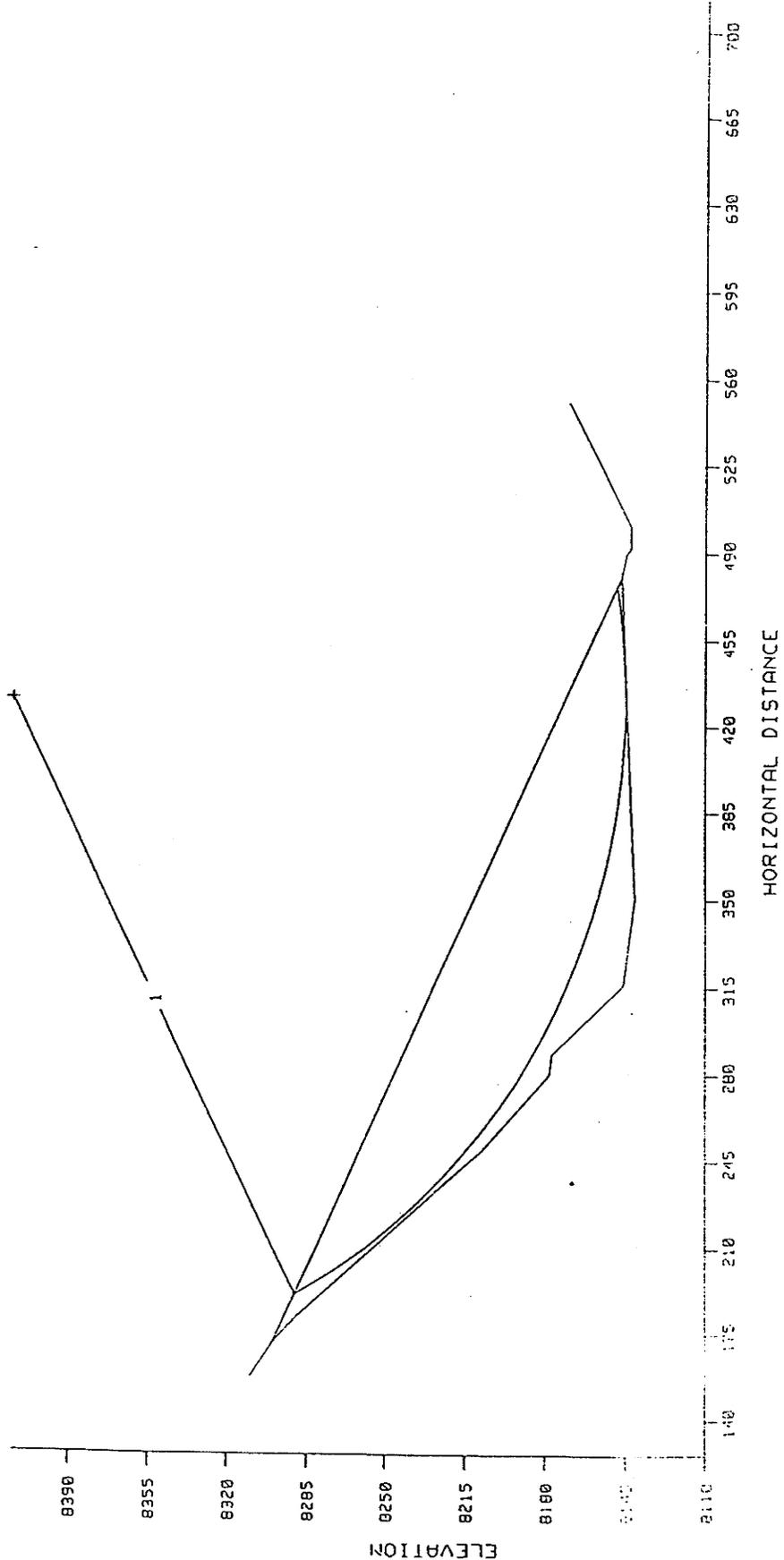
Technical Exhibits, Calculations, and Supporting Data

**SB-SLOPE**  
Simplified Bishop Slope Stability Analysis

PROJECT: Gordon Creek #7 Portal Area  
 LOCATION: Saturation limited to top of MSHA bench.  
 FILE: 2785

COMPLETE SLOPE CROSS SECTION SHOWN

CIRCLE	X	Y	RADIUS	FS
1	430.0	8415.0	270.0	1.20



OSMRE - TIPS

VOLUMETRICS REPORT

Run by: rharden  
 Version: 2.0  
 Date: 06/07/95  
 Report file: t1.2vrpt

Polygon file: cutfill.vply  
 Zone definition: Operational  
 Deposition operation: base.2grd  
 Unconformity operation: revised.2grd  
 Unconformity operation: base.2grd  
 Primary field: Polygon ID  
 Sorting method: Polygon order  
 Input units: feet square by feet  
 Volumetrics conversion factor: .037037037313  
 Output units: Cubic yards  
 Global minimum thickness: 0.0

----- Zone name: cut -----

Minimum z: none  
 Maximum z: none  
 Minimum thickness: 1  
 Yield factor: 1.0

----- Zone name: fill -----

Minimum z: none  
 Maximum z: none  
 Minimum thickness: 1  
 Yield factor: 1.0

Volumetrics Report

Zone name: cut

Polygon ID	Polygon Class	Polygon Area	Volume	Positive Area
Cutfill		1,901,825.6875	42,205.8104	148,064.882682
Subtotal for Cutfill		1,901,825.6875	42,205.8104	148,064.882682
Total for cut		1,901,825.6875	42,205.8104	148,064.882682

Zone name: fill

Polygon ID	Polygon Class	Polygon Area	Volume	Positive Area
Cutfill		1,901,825.6875	41,966.0424	186,838.363121
Subtotal for Cutfill		1,901,825.6875	41,966.0424	186,838.363121
Total for fill		1,901,825.6875	41,966.0424	186,838.363121



Figure 2 - #2 Portal Area as Revised, Looking West

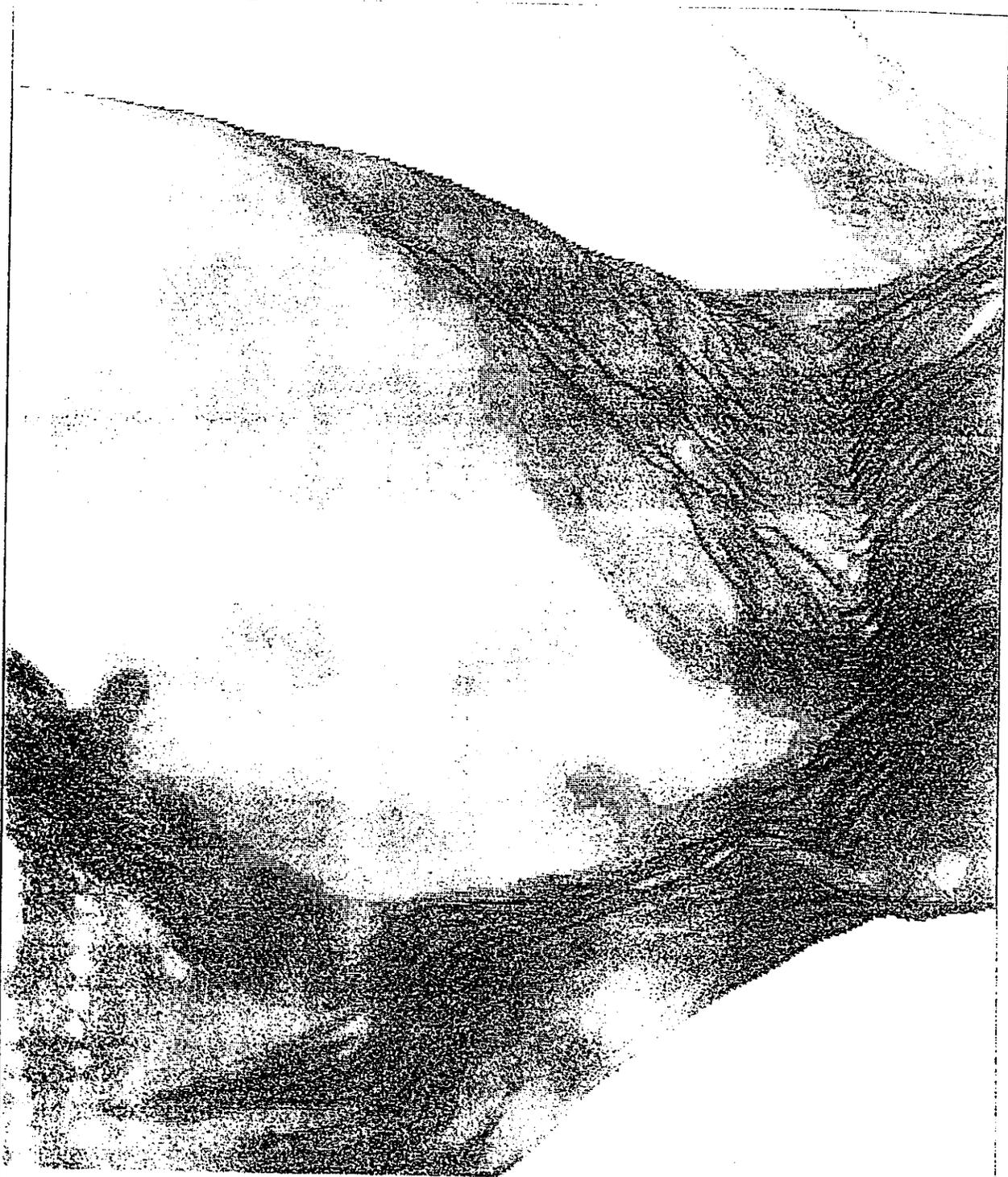


Figure 4 - #7 Portal Area as Revised, Looking East

Beaver Creek Coal Company  
Gordon Creek #2 Mine (includes Southwest Lease)  
ACT/007/016, Carbon County, Utah

July 27, 1984

Introduction

The Gordon Creek #2 Mine is owned and operated by Beaver Creek Coal Company, a wholly owned subsidiary of the Atlantic Richfield Company of Los Angeles, California. The operation is located in Bryner Canyon approximately 20 road miles northwest of Price, Carbon County, Utah, Township 13 South, Range 7 and 8 East. The mine was opened in 1969 and has remained in continuous production.

An application for a mining permit was received by the regulatory authority on March 20, 1981. Additional information concerning Vegetation Resources and Fish and Wildlife Resources was submitted on July 14, 1982. An Apparent Completeness Review (ACR) was prepared and sent to the applicant on September 30, 1982. Beaver Creek Coal Company responded to the review with a revised Mining and Reclamation Plan (MRP) submitted on March 9, 1983. A Determination of Completeness Review (DOC) was performed by the Division and a request for additional information was sent to the operator on June 9, 1983.

On October 31, 1983, Beaver Creek Coal Company submitted a major revision to the MRP. This revision incorporated the Southwest Lease Area, which will provide access to the southwest portion of existing Federal Coal Lease #U-8319 and an additional Federal Coal Lease #U-47975, and associated disturbance already approved under coal exploration, into the existing plan. The regulatory authority reviewed the Southwest Lease information and prepared a DOC review. A request for additional information was sent to the operator on November 15, 1983. The operator submitted its response on November 25, 1983 and the Gordon Creek #2 Mine MRP (including the Southwest Lease) was declared complete on December 2, 1983. Newspaper advertisement of the application has been published in the Price, Utah, Sun Advocate for four consecutive weeks, beginning on December 14, 1983. The technical adequacy phase of the review process was then begun, culminating in the preparation of a Final Technical Analysis and Findings package by the regulatory authority on April 26, 1984. During May 1984, Beaver Creek Coal Company experienced heavy spring runoff at the Southwest Lease area facilities construction site, which resulted in damage or potential damage to the disturbed and undisturbed drainages and the sedimentation pond and pad area. The approval process was temporarily delayed on May 25, 1984 until the applicant demonstrated that the appropriate corrective and preventive measures were taken and provided the necessary amended material in the MRP in order that the regulatory authority could technically reassess the MRP. The MRP was appropriately amended during June 1984 and the technical analysis was revised accordingly.

A total of 20.81 acres of surface area has been disturbed, mainly during construction of portals and pad facilities. Approximately 9.18 acres of surface disturbance occurred prior to enactment of the Surface Mining Control and Reclamation Act of 1977 and implementation of the Utah Interim Program. The additional acreage has been disturbed for diversions, ponds and culverts installed subsequent to this legislation and for exploration access and facilities for the Southwest Lease Area.

The Gordon Creek #2 Mine will operate in the Castlegate "A" and Hiawatha coal seams. All mining will be by room-and-pillar methods. Present production is approximately 1,500 tons per day. When the Southwest Lease becomes operative, total production for the Gordon Creek #2 Mine will be 2,700 tons per day with an estimated annual production of 860,000 tons per year over the life of the mine.

The surface is 100 percent fee owned and mineral leases are approximately 75 percent Federal and 25 percent fee. Total acreage is 2,300 acres. The Gordon Creek #2 Mine at full operation will employ approximately 90 people.

#### Existing Environment

The Gordon Creek #2 Mine is located within the northeastern portion of the Wasatch Plateau. The Wasatch Plateau is the northwestern outlier of the eroded San Rafael Swell.

The permit area is characterized by steep, narrow canyons containing conspicuous sandstone cliffs. Intermittent, ephemeral and perennial streams occupy the drainages. The complex geological and geomorphological conditions have produced a variety of site specific soils that support the Douglas fir forest, sagebrush-grassland and oak-scrub vegetation communities and scattered areas of riparian habitat.

Beaver Creek is the only perennial stream that flows through the permit area. Perennial flow is maintained by a series of beaver ponds and by Jewkes Spring and Gunnison Homestead Spring. Two other principal water courses are found within the permit area—North Fork of Gordon Creek (intermittent) and Bryner Creek (ephemeral). Bryner Canyon contains the mine facilities and surface operations and thus is the only stream that could be directly impacted by surface disturbance associated with mining. Due to the extensive overburden over much of the mined area, no significant hydrologic or other surface impacts are expected to occur due to subsidence.

The land on which the #2 Mine is located has long been used for coal mining. Four underground operations were located within a short distance of the #2 Mine--Sweets, National Blue Blaze and Consumers mines. These mines were active in the 1940's and are presently closed. Other than coal mining, private landowners presently administer the lands in this area for limited livestock grazing, wildlife habitat, watershed and dispersed recreation. No threatened or endangered species are known to occur on the permit area.

#### UMC 785.19 Alluvial Valley Floors

##### Existing Environment and Applicant's Proposal

The applicant has identified two potential Alluvial Valley Floor (AVF) areas of approximately 20 acres each in size which are either on or adjacent to the lease area for the Gordon Creek #2 Mine. The details of the AVF reconnaissance investigation undertaken by the applicant are contained on pages 7-84 through 7-86 of the MRP.

##### Compliance

Based on the information supplied by the applicant and an on-site review by Division of Oil, Gas and Mining representatives, the regulatory authority has determined pursuant to UMC 785.19(c)(3)(ii), that the areas identified as potential AVF's would provide negligible support for farm production should the areas ever be brought into production. The high elevation (approximately 7,800 to 8,200 feet) and generally unsuitable terrain, with narrow, steep-sided V-shaped valleys, would impede greatly any efforts to economically farm the small area. The Division has determined that no lands designated as AVF's occur within or adjacent to the permit area. Thus, pursuant to UMC 785.19(c)(3)(ii), the requirements of paragraph (d) and (3) of UMC 785.19 and Section 822 are hereby waived.

##### Stipulations

None.

#### UMC 817.11 Signs and Markers

##### Existing Environment and Applicant's Proposal

The applicant has placed identification signs at the entrance to the mine area. Perimeter markers have been placed around the perimeter of the disturbed area and buffer zone signs have been placed along Bryner Creek to prevent disturbance of this ephemeral drainage (MRP, page 3-20 through 3-26). The one existing topsoil stockpile has been adequately marked. No explosives are present on the permit area. The applicant has committed to placing the appropriate signs if this condition changes.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.13-.15 Casing and Sealing of Underground Openings

Existing Environment and Applicant's Proposal

All exploration drill holes within the permit boundary have been identified as to location, elevation at the collar, extent of casing, if any, and type of plug. All holes have either been cemented entirely or cased and cemented to total depth, with a cement plug at the surface. Table 6-2 (pages 6-12 and 6-13) is a listing of all surface drill holes that have been plugged and Plate 6-1 shows surface drilling locations.

Upon final abandonment of the mine entries, a permanent block seal will be placed 20 to 50 feet inby the portal. The area outby the seals will be backfilled, the portal structures will be removed and all the exposed coal, including the portal areas, will be covered during reclamation of the upper pad and highwall areas.

Figures 3-7 and 3-8, pages 3-56 and 3-57, show cross-sectional views of typical portal seals to be used at the time of final abandonment.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.21-.25 Topsoil

Existing Environment and Applicant's Proposal

The Gordon Creek #2 Mine is located in the Wasatch Plateau at an elevation of 7,900 to 8,300 feet. The native vegetation consists of aspen, snowberry, gambel oak, bitterbrush and perennial grasses. The mean annual air temperature is 38° to 45° F, the frost-free days are between 60 and 120, with an annual precipitation of 12 to 16 inches.

- 3 -

Soils in the area are derived from weathered sandstone and shale on slopes ranging from 30 to 70 percent. Three soils series were found within the permit area: Benteen--a cryoboroll; Gappmeyer--an argiboroll; and Patmos--an Ustiorthent (see Section 8.3 of the MRP). A horizons range from as deep as 20 inches in the Gappmeyer to as shallow as 5 inches in parts of the Benteen series. All three soils are deep and well drained with permeability of moderate to moderately slow. The native soils have textures of loam, silt loam and sandy loam, a pH range from 6.8 to 7.8 and an electroconductivity ranging from 1.6 to 2.2 mmhos/cm.

Development of the Gordon Creek #2 Mine has taken place in two major steps. The first part was developed prior to the enactment of Public Law 95-87, and the second step developed after Public Law 95-87. During the construction of the initial portal and pad areas, approximately nine acres were disturbed and no topsoil salvaged and stockpiled for final reclamation.

The applicant has proposed to use the soil material in the pad and road areas as an alternate soil material. Random samples of the proposed soil substitute material were taken for chemical and physical analyses. Results of these analyses, presented in Table 8-7 (page 8-28B), indicate favorable soil characteristics in all areas except for one sample location. Sample Number 3 indicates high levels of sodium.

As discussed in Section 8.6.4 of the MRP, within 90 days of reclamation, additional soil samples will be taken in the area of high sodium. The applicant will start in the location of #3 Sample and proceed outward in four directions sampling every 10 feet until suitable SAR values are obtained. The high sodium soil material will then be disposed of in an approved landfill.

At the time of final reclamation, the substitute soil material will be redistributed back into the highwall cut areas. Coarse fragments greater than 18 inches will be removed from the fill-soil material. Areas of compaction will be deep-chiseled and cloddy surface areas will be pulverized with a disc, slope chain and/or harrow prior to seeding in accordance with the revegetation plan, (see Section 8.8 of the MRP).

The Southwest Lease, approved under an exploration permit, disturbed an additional 7.5 acres. Of this 7.5 acres, 4.4 acres were on slopes of between 50 and 70 percent. Because of these steep slopes, a variance from topsoil removal was requested and granted for the 4.4 acres. The remaining 3.1 acres generated approximately 5,000 cubic yards of topsoil (Table 8-2, page 8-11 of the Southwest Lease MRP). To supplement the 5,000 yd<sup>3</sup> of topsoil, an additional 8,000 yd<sup>3</sup> of soil material generated during

construction of the Pioneer Road have been stockpiled. Soil samples of the soil supplement were taken and the analytical results (Tables 8-3 and 8-4, pages 8-14 and 8-15 of the MRP) indicate that the soil material is suitable as a plant growth medium. All topsoil and supplemental material have been stockpiled and protected by construction of a three foot berm at the toe and planting with the approved interim seed mix. The stockpile storage area is depicted on Plate 3-1a.

During reclamation, backfilled and graded areas will be ripped to reduce compaction, then topsoil will be applied to a thickness of approximately 12 inches, ( $13,000 \text{ yd}^3 / 7.5 \text{ Acres} = 12" \text{ depth}$ ) (Section 3.5.4.4 p. 3-42, Southwest Lease MRP). The area will then be seeded in accordance with the revegetation plan.

### Compliance

During May 1984, heavy spring runoff was encountered by the applicant at the Southwest Lease surface facilities construction site, resulting in concern on the part of the regulatory authority for the stability of the pad where topsoil substitute material is stored, due to percolation under that portion of the pad where the substitute material is stored. Pad stability is addressed in the Compliance section of UMC 817.99 of this TA document. The mitigating measures undertaken by the applicant are explained in the Compliance sections of UMC 817.46 and 817.99 of this TA.

During an on-site inspection on May 22, 1984, it appeared to the regulatory authority that the quality of the topsoil substitute material as a plant growth medium may be marginal. Thus, samples of the topsoil substitute were taken by the regulatory authority on June 20, 1984 and underwent analysis at Utah State University. Results of this analysis were received by the regulatory authority during July and indicated that the material is suitable as a plant growth medium.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.41 Hydrologic Balance: General Requirements

#### Existing Environment and Applicant's Proposal

The Gordon Creek #2 Mine is located within the northern portion of the Wasatch Plateau. The Wasatch Plateau is the northwest outlier of the eroded San Rafael Swell. The Plateau dips westward producing a great monoclinial fold that is interrupted by faults in the border lands of the Great Basin.

The coal producing formation found within the Gordon Creek #2 Mine permit area is the Blackhawk Formation. It measures 900 feet thick in the Gordon Creek area and consists of interbedded sandstone, siltstone, shale and coal. A total of eight coal seams can be identified in the Gordon Creek region. Five of the eight seams crop out along the North Fork of Gordon Creek, Coal Canyon and Bryner Canyon. Weathering, burning and vegetation cover obscures the majority of coal outcrops of the Hiawatha, Gordon, Castlegate "A", Haley and Bob Wright seams. The Hiawatha and Castlegate "A" seams have been or will be mined in the Gordon Creek #2 Mine area. The Hiawatha Seam marks the base of the Blackhawk Formation. Currently, Beaver Creek Coal Company is mining the Castlegate "A" Seam. Also within this vicinity, the seam was mined at the Blue Blaze, Gordon Creek #1 and #6 Mines. The area of the Gordon Creek #2 Mine is heavily faulted. The three major fault zones that affect the lease block are the North Gordon, Pleasant Valley and Fish Creek fault zones. Displacements of the faults in the mine plan area are variable. Displacements as great as 200 feet have been encountered and have historically altered original mine plans several times (MRP Section 6.3.2). A 110 foot downdrop box fault was encountered during mining and has prevented Beaver Creek Coal from expanding in a westward direction. The zone which separated the coal seam was approximately 300-400 feet wide. Rock slopes to tie the two seams together are not possible and, therefore, an entry way will be required to expand mining within the Castlegate "A" Seam in a westerly direction.

Most of the regional area is drained by tributaries to the Green and Colorado rivers; principal tributaries are the Price and San Rafael rivers and Muddy Creek. The Price River drainage is approximately 1,900 square miles and flows in a southeasterly direction towards its junction with the Green River. Elevations within the basin vary from 10,440 feet in its headwaters to 4,200 feet at its mouth. Normal annual precipitation taken from records of 1931-1960 varies from 30 inches in headwater regions to 8 inches in downstream regions. Surface rocks in the basin range in age from Jurassic to Quaternary, but the rocks having predominant influence on water quality are the marine shales of Cretaceous age.

The Gordon Creek #2 Mine site lies near the headwaters of the North Fork of Gordon Creek. Three principal surface water courses are found within 100 horizontal feet of the mine permit area--Beaver Creek, North Fork of Gordon Creek and Bryner Creek.

Beaver Creek is a perennial stream that flows through the permit area. Perennial flow is maintained by a series of beaver ponds and by Jewkes Spring and Gunnison Homestead Spring. The ground water source for these springs is discharged from a sandstone unit that

probably has a fairly large aerial extent within the Blackhawk Formation (MRP, Section 7.1.2.2, page 7-8). Both springs have dried up during drought periods, but, in non-drought years, these spring provide contributions during low flow periods.

The general flow direction of Beaver Creek is northeast toward the Price River. The Gordon Creek lease block is near the headwaters of Beaver Creek. The watershed areas of Beaver Creek or its tributaries above the lease boundary are less than one square mile. The drainage pattern in the upper portions of the Beaver Creek basin near the lease block is dendritic. The valley profile is not as steep as Bryner Canyon or North Fork of Gordon Creek. Beaver ponds are common along the stream channel.

The North Fork of Gordon Creek is the other principal stream found on the lease block. The drainage area above the lease block, about four square miles, is considerably larger than Bryner Canyon. Stream flows in the North Fork are also larger than Bryner. Two water monitoring stations on the North Fork of Gordon Creek show that the stream is losing flow between the upper and lower stations.

Bryner Canyon is a small basin of about one square mile in an area that is located almost entirely with the lease block. Bryner Canyon contains an ephemeral stream which flows east into the North Fork of Gordon Creek just below the coal lease. The stream normally flows during the snowmelt period and is usually dry throughout the remainder of the year. The North and South Forks of Bryner Canyon meet at the mine yard. The South Fork is diverted around the site and the North Fork is culverted through the pad (MRP, Section 7.2.2.2).

The North Fork of Bryner Canyon is an ephemeral stream that flows over some of the old Sweet's Mine workings (from the 1940's). A culvert is in place to divert this flow around the #2 Mine area; however, the water level has reached this culvert only once (1983) since its installation. It has been noted that water will dam up against the #2 Mine yard, and then disappear into the ground before reaching the culvert. Page 3-16 of the MRP notes that it is suspected that this water is infiltrating downward through cracks generated by the Sweet's Mine; however, there are no detectable subsidence cracks at this point, and there is no evidence to show this water actually reaches the Sweet's Mine. Since no springs or seeps are evident below the #2 Mine area, and since there is no water running from the Sweet's Mine portals, it is assumed this water is transmitted through underground fractures and finds its way to the Gordon Creek drainage at some point well below the minesite (possibly in the bottom of Sweet's Canyon) (MRP Section 7.2.5). Since there is no apparent resurfacing of this water, and since the Sweet's Canyon Mine is inaccessible underground, the final disposition of this water is not known. However, the Beaver Creek

- 3 -

workings have not included the Sweet's Mine and there are no plans for undermining this drainage, so no further impacts are expected. Impacts to the North Fork of Gordon Creek occurred before Beaver Creek Coal Company entered the area and was either a product of the Sweet's Mine or some natural geologic occurrence undetectable at the surface.

Some small springs and seeps are located on the property and are either dry or producing water dependent on the amount of precipitation in any given year. The applicant notes in Section 7.2.2.2 of the MRP that Jewkes Spring and Gunnison Homestead Spring, two larger springs identified on the property, have dried up during drought years, but normally provide contributions during low flow period. Several intermittent springs or seeps are found on the Bryner Canyon watershed. The primary spring in the South Fork of Bryner Canyon appears as seepage emanating from below the coal seam immediately south of west portal. Even when this spring is flowing, stream flow is not observed in the main channel unless there is snowmelt or an extreme rainfall event that produces flow. During wet years, like 1983 and 1984, springs and seeps flow year round in response to ground water recharge.

Ground water recharge in the Gordon Creek #2 Mine permit area is complex and, due to the extensive faulting in the area, may be hard to identify. Due to the discontinuous and lenticular nature of the sandstone units and interbedded impervious shales in the area combined with extensive faulting, it is impossible to model the movement of ground water within the region. Most of the water encountered within the mine dries up within a short period after it is encountered. Subsidence effects have not been documented for previously mined areas under Beaver Creek. The lack of subsidence has been attributed to overburden thickness (450 feet) and lithology (massive sandstone). The applicant notes that similar geologic conditions exist for areas of future mine development under Beaver Creek. Mining under Beaver Creek will be closely evaluated for subsidence by monitoring surface monuments and conducting intensive stream flow measurements. If any subsidence effects are detected, a protective barrier will be left for a distance of 250 feet on each side of the stream (panels beneath Beaver Creek will be mined first, see page 3-53 of MPR). The Blackhawk Formation is the principal surficial bedrock unit. The Blackhawk is disconformably overlain by the massive, coarse-grained fluvial Castlegate Sandstone. The typical dewatering of the fluvial sandstone channels occurs within the Gordon Creek #2 Mine. These channels produce small quantities of water that dewater within several weeks. This confirms the existence of perched water within these aquifers. The Starpoint Sandstone, approximately 200 feet below the Castlegate "A" Seam, is the principal ground water aquifer in the area. The Hiawatha Seam, which is 140 feet below the Castlegate "A" Seam, is not projected to be mined until the 1990's, which is not within the permit term (see Plate 3-4, MRP).

## Compliance

The applicant is in compliance with this section.

## Stipulations

None.

## UMC 817.42 Hydrologic Balance: Water Quality Standards and Effluent Limitations

### Existing Environment and Applicant's Proposal

Information regarding this regulation can be found in Section 7 of the MRP.

All drainage which affects the disturbed area at Gordon Creek #2 is routed via ditches, berms and culverts to one of two sediment ponds.\* The majority of natural drainage above the site is diverted around the site and the pond. The applicant has calculated design velocities for ditches and culvert outlets throughout the minesite. The applicant notes that riprap has been placed at the outlet of culvert U-1 and that erosion control is accomplished by the use of riprap at critical points (Plate 7-5 of the MRP).

The applicant has implemented a water monitoring program since 1977 (MRP, page 7-80). The sampling program encompasses two springs, the North Fork of Gordon Creek (intermittent), the discharge point of the sediment pond, the upper and lower sites on Beaver Creek (perennial) and two upper sites and one lower site on Bryner Canyon (ephemeral).

The applicant has identified three storage areas at the original minesite for stockpiling snow from snow removal operations (see Plate 7-5). These areas are located on the disturbed area with all snowmelt being routed to the sediment pond. With the development of the Southwest Lease, one of the storage sites is now used for topsoil storage.

## Compliance

Detailed calculations and a discussion of the technical aspects of sediment control can be found under Sections UMC 817.46 and UMC 817.47 of this document. The applicant has presented acceptable plans of sediment control to meet water quality standards and effluent limitations.

Adequate plans have been presented to show compliance with water quality standards and effluent limitations of this section for "water truck fill-up area at the confluence of the North Fork and Bryner Canyon" and the "old fan portal area east of the main minesite area" (MRP, page 3-10, Plate 3-1c, Plate 3-1b).

An area of pre-Law disturbance is located east of the main mine pad and does not drain to the sediment pond. This is the old fan portal area and consists of an access road and a small pad where three portals are located. These portals are used primarily for air intake. The applicant notes that the access road is used less than once per day (MRP, page 3-10). The disturbed area has been graded to drain to a small catch basin to allow for sediment control. Undisturbed runoff is diverted away from the area by a previously cut highwall terrace.

An additional area of pre-Law disturbance is located further southeast from the minesite. This is the Sweet's Canyon water system and consists of a small pad, a catchment basin and pump to allow filling of the water truck for road maintenance and an alluvial well and pump to supply water to the #2 Mine. The drainage in this area is controlled by culvert, the basin and berms located in a manner to control runoff from the area traveled by the water truck.

On November 3, 1983, the State regulatory authority met with Beaver Creek Coal at the Gordon Creek #2 main minesite. During this visit, two important issues were resolved in terms of commitment on the part of Beaver Creek Coal. These issues related to the main sediment pond inlet and outlet structures. Beaver Creek Coal committed to extending the culvert for the outlet culvert down to the Bryner Canyon drainage and to extend the outlet culvert out into the pond to get the necessary freeboard between sediment levels and the outlet culvert. The sediment pond improvements will be implemented by July 31, 1984 (February 23, 1984 letter, Beaver Creek Coal Company to Division of Oil, Gas and Mining).

The applicant designated an area at the Southwest Lease Mine site for snow storage to assure that all snowmelt from snow on the disturbed area is routed to the sediment pond.

The applicant is in compliance with this section.

#### Stipulations

None.

- 12 -

UMC 817.43-.44 Hydrologic Balance: Diversions

Existing Environment and Applicant's Proposal

The Bryner Canyon drainage and its Right Fork Tributary (both ephemeral drainages) are the only diversions of natural stream channels at the Gordon Creek #2 original minesite. The main Bryner Canyon drainage is routed past the original minesite via a trapezoidal channel. The Right Fork of the Bryner Canyon drainage is routed under the disturbed area via a 24-inch, 340-foot long culvert. (See Section 7.2.3.2 of MRP for details).

The applicant has proposed disturbed area diversion ditches and culverts to route disturbed area drainage to the sediment pond. The three culverts and ditches for the original minesite are delineated on Plate 7-5, with design specifications contained in Section 7.2.3.2 of the MRP.

The applicant has utilized the Soil Conservation Service (SCS) runoff curve number method along with the TR-20 computer model to predict peak flows and runoff volumes. Times of concentration were calculated using the SCS basin lag method outlined in TR No. 55. In lieu of the SCS type II storm, the rainfall distribution proposed by Farmer and Fletcher (1972) was utilized (page 7-87 MRP).

The applicant's Southwest Lease development proposes (in Section 3.4.3.2 of the Southwest Lease MRP) a 36 inch bypass culvert to route flows in the Bryner Canyon drainage down the highwall. Since seeps were observed along the south side of the proposed highwall culvert site, the applicant has proposed the use of drain rock and a filter cloth beneath the culvert to drain flows from the seeps (see page 3-26 MRP). A trapezoidal channel from the outlet of the 36 inch culvert routes undisturbed flows along the edge of the disturbed area and back into the stream channel. Due to concerns about flow from the bypass channel (DU-2) seeping into the pad and fill material under the topsoil substitute pile, the applicant has proposed (page 3-24a Map) lining approximately 340 feet of DU-2 from the outlet end of the sediment pond and downstream with an impervious material.

Two disturbed area ditches route drainage from the Southwest Lease minesite into the sediment pond (Plate 7-6a).

Compliance

Verification of the applicant's design calculations raises a few questions in regards to the peak flows predicted. The slope utilized in time of concentration calculations on the original minesite for undisturbed areas appears to be understated by a factor of 4. Apparently, the applicant mistook the contour interval of 80 feet as 20 feet on Plate 7-2.

The curve number of 54 utilized for undisturbed areas appears low. During this Technical Analysis, a curve number of 66 was used to verify design capacity of the undisturbed drainage through the culvert and ditch (see SCS TR55, Table 2-2 for curve number selection).

Plate 7-5 clearly delineates the culverts, both disturbed and undisturbed, which will be utilized. The ditches proposed to route disturbed drainage on the minesite are also delineated on Plate 7-5.

The sizing calculations for undisturbed flows given the revised times of concentration and a curve number of 66 produces significantly higher peak flows than calculated by the applicant. However, the applicant has oversized the Bryner Canyon diversions. The regulatory authority's calculations show these two undisturbed diversions as adequately sized even when using the revised assumptions.

The disturbed area culverts D-2, D-3 and D-4 appear to be adequately sized even when using outlet control assumptions.

In the proposal for the Southwest Lease, using the 10-year, 24-hour peak flows calculated by the regulatory authority (four cfs), undisturbed diversion DU-3 needs protection from erosive velocities.

The applicant's use of drain rock and filter cloth under the highwall culvert installation at the Southwest Lease should adequately address any concerns about seeps in this area undermining the culvert installation.

Installation of the liner in diversion DU-2 appears to be the best practice to prevent undue seepage into the fill material adjacent to the ditch.

The applicant will be in compliance when the following stipulation is met.

Stipulation 817.43-.44-(1)-JW

1. The applicant shall, within 30 days of permit approval, provide acceptable measures (accompanied by supporting calculations) which will be used for erosion protection for undisturbed ditch DU-3. If the regulatory authority notifies the permittee that these measures are not acceptable, the permittee must submit revised plans within 30 days of notification, and adequate protection measures for DU-3 must be in place within 90 days of permit approval.

UMC 817.45 Hydrologic Balance: Sediment Control Measures

Existing Environment and Applicant's Proposal

All disturbed area drainage, with the exception of the water truck fill-up area and the old fan portal area, is routed via ditches, berms and culverts around the disturbed areas or through them to the sediment pond. Any water which comes into contact with mining wastes or stockpiles flows by means of disturbed area ditches to the sediment pond. The applicant addresses the general and specific considerations taken into account when designing sediment control structures in Section 7.2.3.2 of the MRP, Sedimentation Control Structures and Diversions, pages 7-60 through 7-78. Sections 3.5.4.2, 3.5.5.3 and 7.2.5 also contain additional information on sediment control measures.

Compliance

Any outstanding construction plans during the 1984 construction season will be dealt with in the following sections. For specific time frames, to implement the necessary construction plans, see the compliance sections of regulations UMC 817.42 and 817.47.

The applicant has still not adequately provided the necessary riprap design measures to adequately address the presence of erosional velocities in the lower section of ditch DU-3. See the compliance section and revised stipulation found under UMC 817.43-.44 for specific details.

Stipulation 817.45-(1)-TM

1. See Stipulation under UMC 817.43-.44.

UMC 817.46 Hydrologic Balance: Sedimentation Pond

Existing Environment and Applicant's Proposal

The sedimentation pond for the original minesite was designed to store runoff from a 10-year, 24-hour precipitation event, from areas Sub-1, Sub-2 and Sub-3 (Section 7.2.3.2 of the MRP). Area Sub-3 includes all undisturbed runoff from upslope areas that is not diverted around the site and the sedimentation pond. Storm hydrographs from these subareas were generated using the TR-20 computer model.

Combined flows from Sub-1 and Sub-2 were determined by routing the hydrograph from area Sub-1 through culvert D-4 and through a diversion and combining with the hydrograph from area Sub-3.

Total combined flows to the pond were obtained by routing combined flow from Sub-1 and Sub-2 through culvert D-2 and combining with the hydrograph from area Sub-3. Discharge from the pond was obtained by routing the total combined flows through the pond.

The total runoff from the 10-year, 24-hour precipitation event for all areas draining to the sedimentation pond is 0.68 ac-ft.

Using the Universal Soil Loss Equation (USLE), the sediment yield was calculated for the disturbed areas. All erosion was assumed to be delivered to and deposited in the pond. Total sediment yield from Subarea 1 and 2 was figured to be 0.196 ac-ft for three years.

Total capacity below the invert of the spillway is 1.3 ac-ft. The potential for mine water discharge is handled by allowing for 0.42 ac-ft of mine water storage in the pond below the invert of the spillway.

The applicant notes on page 7-76 of the MRP that the spillway for the pond is designed to pass the runoff from a 25-year, 24-hour precipitation event.

On page 3-30 of the MRP (Southwest Lease Plan), it is indicated that the sedimentation pond proposed for the Southwest Lease area is designed to contain a three year sediment volume and contain the 10-year, 24-hour storm runoff. The Universal Soil Loss Equation (USLE) was used to calculate sediment volumes. The TR-20 computer model (SCS curve number approach) was used by the applicant to calculate runoff volumes for the 10-year, 24-hour storm. (See pages 3-28, 3-30 and Plate 7-8a for the design specifications.)

The applicant has committed to, on page 3-27b and 3-27c of the MRP, visual observations for areas of saturation and to quarterly dye tracer studies for a year to determine if a bentonite or similar lining technique will be needed to address concerns about leakage from the sediment pond into the fill material underneath and down canyon from the pond.

### Compliance

The applicant has specifically addressed sizing considerations regarding the Gordon Creek #2 Mine site sediment pond, offering comparative design discharge estimates of "state-of-the-art" runoff models. After a close inspection of the models used, the input parameters submitted by the applicant, and the outputs found in Section 7.2.3.2 of the MRP, the application is found to fully comply with this regulation regarding the main minesite pond.

The applicant has submitted updated information and drawings on the Southwest Lease sediment pond (pages 3-28, 3-30, Plate 7-8). Additionally revised runoff volumes have been calculated and used to size the pond. The pond sizing and discharge device meet the requirements of this section.

During the spring of 1984, a concern was raised when the sediment pond at the Southwest Lease exploration site developed a leak. The applicant undertook repairs to stop the leak, however, the fact that the pond, which will remain in use through the permit term, rests on fill material is a concern. Should the pond leak significantly, a saturated condition and subsequent mass failure of the pad could occur. The applicant's commitment to undertake dye studies and make observations for saturated areas on page 3-27c of the MRP adequately addresses this concern.

Additionally, since the sediment pond is excavated into the pad, the stability of the pad dictates the integrity of the sediment pond. During the spring of 1984, flow from the Bryner Canyon diversion began percolating under a portion of the pad, posing a threat to its stability. To ascertain if the pad material had been properly compacted, and thus insure its stability, the Division conducted compaction tests via a third party.

On June 13, 1984, compaction testing was undertaken on the pad area at the Southwest Lease. A certified operator utilizing a Troxler Unit (nuclear moisture density device) sampled the percent compaction at various horizons in the pad. The results of sampling in the vicinity of the sediment pond showed compaction levels of 97.2 percent at the two foot depth, 98.4 percent at the four foot depth and 96.2 percent at the six foot depth. The moisture content for these tests ranged between 13.1 percent and 14.9 percent. The compaction levels in the pad were in excess of the 90 percent level committed to by the applicant. Thus, the Division concludes that the pad adjacent to the sediment pond is properly compacted and stable.

The applicant is in compliance with this section.

Stipulations

None.

UMC 817.47 Hydrologic Balance: Discharge Structures

Existing Environment and Applicant's Proposal

The applicant has calculated, in Section 7.2.3.2 of the MRP, design velocities for ditches and culvert outlets throughout the minesite. The applicant notes that riprap has been placed at the outlet of culvert U-1 and that erosion control is accomplished by use of riprap at critical points. The critical points are specified on Plate 7-5. Additionally, pages 7-76d and e show riprap size calculations for the sediment pond outlet.

At the Southwest Lease site, the applicant has proposed (MRP, page 3-26 and 3-27) an energy dissipating apron at the outlet of the highwall culvert incorporating eight inch riprap to reduce erosive velocities exiting this culvert. Velocity calculations and riprap sizing for the outlet of the sediment pond at the Southwest Lease site have also been proposed (MRP, page 3-31).

The applicant has undertaken a field investigation of bedrock levels in the Bryner Canyon disturbed and undisturbed diversions to design erosion protection measures for approval by the regulatory authority.

Compliance

Using the larger peak flows predicted from regulatory authority calculations (see discussion under UMC 817.43-.44, Compliance of this TA document), velocity predictions were made for each culvert outflow and diversion ditch. Based on the velocities calculated, the culvert outlets and diversion ditches, except as specified in the following paragraphs, will experience no problem with regard to erosion from excessive flow velocities.

At the point where the Bryner Canyon bypass channel and the disturbed area ditch which parallels it pass the existing coal stockpile area, a two to three foot drop off occurs in both channels. Additionally, the Bryner Canyon bypass ditch experiences a steep (approximately 30 percent) drop off as it empties into the natural channel. Both of these drop off points pose erosion threats.

The riprap proposed, as shown on Plate 7-5 and discussed on page 7-63 of the MRP, lacks supporting design specifications. The design specifications will hinge on the bedrock study the applicant has committed to undertake at the points of concern noted in the previous paragraph.

The applicant will be in compliance with this section when the following stipulation has been met.

Stipulation 817.47 (1)-JW

1. Based on the results of the bedrock study the applicant has performed, the applicant will submit design and installation measures, within 30 days of permit approval, for the erosion protection measures in the Bryner Canyon bypass ditch and the disturbed area ditch which parallels it at the points identified in the compliance section of UMC 817.47. The design and installation measures submitted will contain flow velocity calculations, riprap sizing and depth of placement, channel bedding or lining materials to be used under the riprap and drawings showing configuration, location and size of gabions if used. If the regulatory authority notifies the applicant that the design and installation measures submitted are not adequate, the applicant shall submit revised plans within 30 days of notification and within 90 days of such notification shall achieve compliance with the applicable standards.

UMC 817.48 Hydrologic Balance: Acid-forming and Toxic-forming Materials

Existing Environment and Applicant's Proposal

The applicant has provided chemical analyses (page 6-22 of the MRP) of roof, floor and interburden between the two seams to be mined.

Compliance

Based on the regulatory authority's review of chemical analyses provided, it is concluded that the potential for acid or toxic drainage, should any underground development waste be generated, is minimal. Therefore, the applicant complies with this section.

Stipulations

None.

UMC 817.49 Hydrologic Balance: Permanent and Temporary Impoundments

Existing Environment and Applicant's Proposal

Temporary impoundments on the Gordon Creek #2 Mine site include the two sediment ponds. The sedimentation ponds are discussed in UMC 817.46 of this document.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.50 Hydrologic Balance: Underground Mine Entry and Access Discharges

Existing Environment and Applicant's Proposal

The applicant notes (MRP, page 7-49) that the mine has not encountered underground water of sufficient quantity to necessitate pumping from the mine. Conversations with the applicant have indicated that water used in the mine exceeds water encountered in the workings, thus requiring additional water from the surface to be pumped in. Further, the Hiawatha Seam (the second seam to be mined) lies approximately 100-200 feet below the elevation of portals, thus making the potential for underground discharges minimal.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.52 Hydrologic Balance: Surface and Ground-Water Monitoring

Existing Environment and Applicant's Proposal

Beaver Creek Coal Company has implemented a water monitoring program since 1977 (MRP, page 7-80). The sampling program encompasses two springs, the North Fork of Gordon Creek (intermittent), the discharge points of the sediment ponds, upper and lower sites on Beaver Creek (perennial) and sites in Bryner Canyon (ephemeral).

The applicant has also committed to undertake a spring and seep survey over the Southwest Lease (page 7-13) to identify any additional monitoring points which will be added to the monitoring plans. Additionally, the applicant has committed to include in the spring survey springs with water right file numbers 1929, 1930, 1931, 1935, 1936, 1937, 1938, 1939, 3616, 3617, 3618, 3669, 3670 and 3671 (see Appendix No. 5, Vol. II, MRP). Data from this survey will be submitted to the regulatory authority for determination if additional springs will be added to the monitoring program.

Sampling includes field measurement of pH, temperature, specific conductance and flow. A chemical analysis for constituents listed on Table 7-13 (page 7-83) of the MRP is performed on samples taken. The sampling frequency proposed for the Bryner Canyon sites is quarterly, and all other sites are monthly (except for the Beaver Creek sites which are shown as continuous).

The two springs noted previously are the only current representation of ground water available for the Gordon Creek #2 Mine. The plan commits to undertaking an underground monitoring program to identify significant inflows to the underground workings. The details of this plan are delineated on pages 7-49 and 7-50 of the MRP and in the applicant's letter of February 23, 1984.

The applicant's February 23, 1984 letter proposes that where more than one gpm inflow occurs within 100 feet in any direction of a significant inflow, sampling will be conducted on one representative point for every five such points.

### Compliance

The applicant's surface water monitoring proposal has been clarified with updated material (December 15, 1983). The frequency of chemical sampling for sites 2-3-W, 2-4-W, 2-5-W and 2-6-W has been proposed as biannual (page 7-81 of the MRP). This frequency is acceptable in light of the fact that the drainages considered here are not impacted by surface disturbance and that good baseline water quality data are contained in the plan for the above noted sites.

The applicant has added two additional surface water monitoring points (2-10-W and 2-11-W) for the Southwest Lease area. The sampling frequency or chemical constituents to be sampled for these two points are not specified. This could be easily accomplished by updating Table 7-12 on page 7-82 in the original Gordon Creek #2 MRP. This must be clarified.

The applicant's ground water monitoring proposal, with the inclusion of the in-mine monitoring program, will meet the requirements of this section with one exception. The applicant's proposal (February 23, 1984 letter) to sample one point for every five which occur when points are closer than 100 feet apart must be modified. An inventory of in-mine inflow locations should be undertaken and if an excessive number of points occur in one area, the regulatory authority will make a determination as to how many and which points must be sampled to obtain a representative sample of ground water. The basis for this determination will be the source area of inflow (e.g., roof, floor, channel sands, etc.) and geologic strata in the immediate area.

The applicant's commitment in the February 23, 1984 letter from Beaver Creek Coal Company to undertake a spring and seep survey on the Southwest Lease and survey additional springs with water right file numbers 1929, 1930, 1931, 1935, 1936, 1937, 1938, 1939, 3616, 3617, 3618, 3669, 3670 and 3671 will satisfy the need to assess additional springs for possible inclusion in the sampling program.

The applicant will be in compliance with this section when the following stipulations are met.

Stipulation 817.52-(1-2)-JW

1. The applicant shall monitor all inflows of 1 gpm or greater in the "in-mine" water monitoring program. If more than 1 gpm or larger inflow occurs within 100 feet in any direction from the source of the flow, the applicant will forward to the regulatory authority information outlining the number, source area, flow rate and locations of such inflows. The number and location of sampling points at the multiple inflow areas will then be determined by the regulatory authority.
2. The applicant shall quarterly monitor sampling sites 2-10-W and 2-11-W and utilize the field measurements and chemical parameters on page 7-83 of the Gordon Creek MRP.

UMC 817.53 Hydrologic Balance: Transfer of Wells

Existing Environment and Applicant's Proposal

Page 6-12 of the MRP notes that all drill holes with the exception of GCD-13 have been sealed. The applicant commits on page 6-14 of the MRP to sealing the hole in accordance with UMC 817.15 or complying with all terms of transfer contained in UMC 817.53.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.54 Water Rights and Replacement (40-10-29[2], Utah Code Annotated)

Existing Environment and Applicant's Proposal

The applicant's MRP commits 377.1 shares (one share = one ac-ft) of Scofield Reservoir water rights to replace any water affected by mining activities of the Gordon Creek #2 Mine. The applicant includes water quality data for the replacement water on page 3-33 of the MRP.

Appendix 5 of the MRP delineates the water rights which are on and adjacent to the lease area. The water rights which could be impacted by mining activities are indicated along with the acre feet for each right.

Compliance

Existing water rights for the Gordon Creek #2 lease area and adjacent areas have been adequately identified. It appears that the applicant's proposal to replace existing water rights with Scofield Reservoir water is valid. The applicant complies with this section.

Stipulations

None.

UMC 817.55 Hydrologic Balance: Discharge of Water Into an Underground Mine

Existing Environment and Applicant's Proposal

The applicant does not propose to route drainage into any of the portal entries. The drainage control plan pictured on Plate 7-5 shows surface drainage conveyed away from portal entries.

Water for use in-mine is pumped from Sweet's Canyon to storage tanks near the portals and into the mine (page 3-6 of the MRP). The primary use of this water in the mine is for dust suppression at the working face.

Compliance

The importing of water for use in-mine is an operational requirement for safety at the working face. It is apparent that this section of the regulations is not intended to be in conflict with 30 CFR 71.100. It is the regulatory authority's conclusion that UMC 817.55 is not applicable to the importation of water into the mine strictly for operational needs, but, in fact, is to address surface water drainage to be disposed of underground.

The applicant complies with this section.

Stipulations

None.

UMC 817.56 Hydrologic Balance: Postmining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments and Treatment Facilities

Existing Environment and Applicant's Proposal

No permanent sedimentation ponds, impoundments, diversions or treatment facilities are planned for the Gordon Creek #2 Mine.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.57 Hydrologic Balance: Stream Buffer Zones

Existing Environment and Applicant's Proposal

The applicant's mining activities at the truck water fill-up area in Sweet's Canyon (North Fork of Gordon Creek) fall within the 100 foot stream buffer zone. The applicant's proposal for the truck water fill-up area is contained on page 3-10 and Plate 3-1c (see discussion under section UMC 817.42 of this document).

Compliance

The applicant's use of drainage control structures, which includes berms and a catch basin, to separate any disturbed drainage from the North Fork of Gordon Creek will protect the creek from mining related impacts. The 100' buffer zone requirement is hereby waived for the truck water fill-up area. The applicant complies with this section.

Stipulations

None.

UMC 817.59 Coal Recovery

Existing Environment and Applicant's Proposal

The Gordon Creek #2 Mine is extracting coal from the Castlegate "A" and will begin extracting coal from the Hiawatha Seam in 1986. All mining is done with a continuous miner/shuttle car haulage. In second mining, a standard room-and-pillar method is used to maximize coal recovery. Recovery within the room-and-pillar panels is approximately 75 percent to 78 percent with an overall recovery factor (including barriers) estimated at 50 percent (Sections 3.3 and 3.3.3 of the MRP).

Compliance

The Bureau of Land Management has determined (March 29, 1984) that the Resource Recovery and Protection Plan is compatible with 43CFR 3482.1 (c) rules and regulations and is adequate for BLM administration of the Federal coal leases. The applicant complies with this section.

Stipulations

None.

UMC 817.61-.68 Use of Explosives

Existing Environment and Applicant's Proposal

No surface blasting is employed at the lower minesite. Surface blasting which takes place at the Southwest Lease site will be for the construction of the pad and portals. It will be done in accordance with State and Federal laws and by certified persons (MRP, page 3-27).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.71-.74 Disposal of Underground Development Waste and Excess Spoil and Nonacid and Nontoxic-forming Coal Processing: General Requirements

Existing Environment and Applicant's Proposal

The operator states that all underground development waste is gobbled in cross cuts and no longer needed entries (MRP, page 3-12).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.81-.88 Coal Processing Waste Banks: General Requirements

Existing Environment and Applicant's Proposal

There are no coal processing facilities planned for use at the Gordon Creek #2 Mine. All raw coal will be hauled from the site to CV Spur processing and load out facilities (separate permit application) as outlined in Section 3.2.4 (MRP, pages 3-7).

Compliance

Not applicable.

Stipulations

None.

UMC 817.89 Disposal of Noncoal Waste

Existing Environment and Applicant's Proposal

Noncoal waste is temporarily stored in a metal trash receptacle within a fenced area on-site. This receptacle is loaded out on an as-needed basis by a local contractor and the trash is hauled to an approved Carbon County landfill northeast of Price (MRP, page 3-12a).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.91-.93 Coal Processing Waste: Dams and Embankments:  
General Requirements

Existing Environment and Applicant's Proposal

There are no coal processing facilities planned for use at the Gordon Creek #2 Mine. All raw coal will be hauled from the site, as stated in Section 3.2.4 (MRP, pages 3-7).

Compliance

Not applicable.

Stipulations

None.

UMC 817.95 Air Resources Protection

Existing Environment and Applicant's Proposal

Dust suppression sprays are used on the continuous miners at the face underground and as coal is loaded onto the underground mine conveyor. Limited drop distances from the conveyor and coal loading by front-end loaders to haul trucks will further reduce fugitive dust emissions. During haulage, mitigation measures include non-overloading of haul trucks, abiding by speed limits, watering the road surface as needed and application of a chemical dust suppressant and roadbed stabilizer which will reduce fugitive emissions by approximately 80 to 85 percent (MRP, page 3-44).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.97 Protection of Fish, Wildlife and Related Environmental  
Values

Existing Environment and Applicant's Proposal

Information regarding this regulation can be found in section 10.5 of the MRP.

A wide variety of wildlife species utilize habitats present within and adjacent to the permit area. Economically important and high interest species include mule deer, elk, moose, black bear, mountain lion, bobcat, coyote, mountain cottontail, snowshoe hare, flying squirrel and beaver. Thirty species of birds including gamebirds and raptors are listed as being of high State interest. Seven species of raptors have been observed on the permit area and nesting areas for goshawks, great horned owls, long-eared owls, red-tailed hawks and golden eagles have been found on-site (MRP, Section 10.3.2.4). Gamebirds include blue grouse and ruffed grouse, bandtailed pigeons and mourning doves.

Aquatic habitat is limited to two streams on the study area, North Fork Gordon Creek and Beaver Creek. North Fork Gordon Creek is limited as a fishery because it does not support game species. Beaver Creek, however, is ranked by the Utah Division of Wildlife Resources (DWR) as being substantial as a salmonid fishery with a self-sustaining population of introduced Yellowstone cutthroat trout (MRP, Section 10.3.2.1). Disturbance has occurred primarily in Bryner Creek, a tributary of North Fork Gordon Creek. Habitat loss or deterioration of the North Fork Gordon Creek aquatic ecosystem has been limited by installation of sediment ponds and diversions and reseeded of disturbed areas adjacent to Bryner Creek. Buffer zone signs have also been placed along this drainage (see Section UMC 817.11 of this document). In addition, Beaver Creek Coal Company has initiated monthly inspections of surface water to determine any changes in water quality which may be attributed to mining operations at the #2 Mine (see Section UMC 817.42 of the document). Should change in quality occur, the applicant will identify the source of the problem and take measures to correct the deficiencies.

Beaver Creek has not been impacted by the mining operation. No future surface disturbance is planned in the area and subsidence under the stream is not expected (see Section UMC 817.121-.126 of this document).

Mitigation and management plans for terrestrial species focus on minimizing impacts related to continued mining activities and facilitating rapid return of the site to suitable habitat following mining (MRP, Section 10.5).

The applicant has committed to avoiding important or sensitive habitats such as riparian zones, to not using persistent pesticides (MRP, Section 10.5.1), to the use of powerpole and line configurations designed as raptor-protected (Southwest Lease, Section 3.4.1.1), and to promptly reporting the presence of any threatened or endangered species observed on the permit area (MRP, Section 3.4.6.3).

Other mitigation measures include conducting future surveys to evaluate raptor electrocution hazards during winter and early spring on selected powerlines (MRP, Section 10.7.) and conducting "employee awareness" programs for mine personnel (Southwest Lease, Section 3.4.1.1).

Elk and mule deer are the most prominent big game species on the permit area. Much of the land south and east of the permit area is classified by DWR as high priority and crucial-critical elk and deer winter range (Figures 10-9a and 10-10). The southeast portion of the permit area, including the surface facilities, is also included in crucial-critical elk winter range (Figure 10-10). In addition, the haul road/access road (a county road established prior to the Act) between the mine site and the C.V. Spur facilities traverse the elk and deer winter ranges. Figures 10-16 a, b, and c show areas of heaviest deer crossing.

Since the majority of mine-related disturbance occurred prior to Act, mitigation for loss of habitat consists of restoring the area to suitable wildlife habitat after mining operations cease. In addition, roadkills of large animals, particularly mule deer, will be mitigated by an awareness program, speed limits and game crossing signs. Routine reporting of roadkills along the access corridor by selected personnel will be conducted. If reports indicate that kills are increasing, the applicant will consult with UDWR for recommendations (MRP, Section 3.4.6.2).

The overland conveyor associated with the Southwest Lease Area has been designed to provide passage for big game animals. Two designated elk crossings are provided. In addition, a conveyor monitoring program will be implemented. It will consist of placement and maintenance of day/night remote sensing cameras at each crossing to observe behavioral responses of animals attempting to cross the corridor. An initial study will be conducted for one year and will be implemented within sixty (60) days of initiation of operation at the Southwest Lease. The applicant has also committed to additional mitigation if the conveyor is shown to be a significant barrier to big game (Southwest Lease, Section 10.5).

To partially mitigate the loss of wildlife habitat caused by construction of the Southwest Lease pad area, the applicant will establish approximately four acres of riparian area at the Gordon Creek #3 Mine site in the fall of 1984. Plans for establishment of this area are presented (MRP, Section 10-5, Appendix I, Plate 3-1A). In addition, the riparian area destroyed during construction of the road will be restored upon cessation of mining operations by restoring the natural channel (MRP, Section 3.5.3.3) and planting a diverse seed mixture (MRP, Table 3-6).

Following mining, the applicant will implement revegetation methods designed to restore and enhance wildlife habitat on disturbed areas. The revegetation plant mix includes herbaceous and woody species that are adapted to on-site conditions and are of known value to wildlife for cover, forage, or both. A complete revegetation plan including species lists and site specific revegetation procedures is given in Section 3.5.5.

### Compliance

The applicant has submitted mitigation and management techniques which adequately address the requirements of UMC 817.97 for the most part. However, the establishment of the riparian area at the Gordon Creek #3 Mine is proposed to be implemented under the Bureau of Land Management (BLM) exploration permit (3400, U-8319, U-066) and permits issued by the UDWR (October 13, 1983) and U. S. Fish & Wildlife Service (USFWS) (October 12, 1983) as mitigation for removal of one raptor nest in the area of exploration. This mitigation must be implemented as part of the Gordon Creek #2 Mining and Reclamation Plan. Therefore, a commitment must be made to establish the riparian area as part of the wildlife mitigation plan for the Gordon Creek #2 Mine. Further, the applicant erroneously states (page 10-18, Southwest Lease MRP) that Beaver Creek Coal Company had permits from USFWS and DWR to remove two raptor nests in the area of exploration. This must be corrected (see Stipulation 817.97-(2)-SC, below).

According to the regulatory authority and the Utah Division of Wildlife Resources, there is some question as to whether it will be possible for Beaver Creek Coal Company to establish the total four acres of riparian habitat at the Gordon Creek #3 Mine site. Should it not be possible to obtain four acres total at this site, Beaver Creek Coal Company is currently working with the Utah Division of Wildlife Resources to assist in the creation of additional off-site marsh riparian habitat at Desert Lake Waterfowl Management Area which will account for the remainder of the four acre riparian area as appropriate mitigation (personal communication M. Boucek, DOGM, to L. Dalton, DWR, Southeast Region Resource Analyst, April 9, 1984).

The applicant will be in compliance with this section when the following stipulations are met.

### Stipulation 817.97-(1-2)-SC

1. The applicant shall establish a riparian area at the Gordon Creek #3 Mine site not only under BLM, USFWS and DWR permits, but also as part of the wildlife mitigation plan for the Gordon Creek #2 Mine, and shall abide by the provisions of the October 13, 1983 Division of Wildlife Resources Certificate of Registration.

2. The applicant shall amend the statement on page 10-18 of the Southwest Lease MRP to show that Beaver Creek Coal Company had permits from U. S. Fish & Wildlife Service and Division of Wildlife Resources for removal of one nest in the area of exploration.

## UMC 817.99 Slides and Other Damage

### Existing Environment and Applicant's Proposal

There are active slumps at the Southwest Lease surface facilities area (MRP, page 3-33). Two minor slumps have occurred above the highwall location, and a moderate-sized slide occurred in a side canyon below the minesite in 1983 (Figure 3-2 of the MRP illustrates that location and size). Another area of potential instability is located along the highwall to the north of the access road.

The applicant proposes to monitor by a line and stake from April to October to detect the movement in the side canyon slide and the two slumps above the highwall to determine the rate of movement, if any, in these areas. The slumps above the highwall will be visually inspected at least once a week for movement (page 3-33a, MRP).

The area of concern in the access road highwall at the Southwest Lease (Gordon Creek #7) will be staked and monitored bi-weekly to determine if any movement is taking place (page 3-33a of the MRP).

There are no active slides at Gordon Creek #2 (page 3-49 of the MRP).

### Compliance

The applicant has committed to notify the regulatory authority any time a slide occurs which may have a potential adverse effect on public property, health, safety or the environment and comply with any remedial measures required (MRP, page 3-16a). In addition, the applicant outlined in Figure 3-2 of the MRP the areas where there are active slumps or recent slides.

An on-site inspection on May 22, 1984 by the regulatory authority (as mentioned in the TA Compliance section of UMC 817.21-.25) noted a potentially unstable area under the topsoil substitute material. The drainage diverted (possibly beneath the pad) and reappeared below the pad where the topsoil substitute material is stored. The operator lined the drainage around the pad with brattice cloth and riprap to avoid any further diversions in the area as a mitigation measure. The leakage of the sediment pond

also contributing to possible instability was addressed by the applicant by undertaking repairs to stop the leak and committing to undertake dye studies and make observations for saturated areas, as discussed under the compliance section of UMC 817.46 of the TA.

The applicant will comply with this section when the following stipulation is met.

Stipulation 817.99-(1)-PGL

1. If there is movement of material in the mine permit area, the applicant will notify the Division immediately and within 30 days of such notice submit mitigation plans for the slide area. Within 60 days of such notice, the applicant shall achieve compliance with the applicable standards.

UMC 817.100 Contemporaneous Reclamation

Existing Environment and Applicant's Proposal

The applicant has committed (Section 3.5.1, page 3-54, of the MRP) to contemporaneous reclamation of disturbed areas as they become available. Areas will be backfilled, graded, retopsoiled and revegetated to acceptable reclamation standards.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.101 Backfilling and Grading

Existing Environment and Applicant's Proposal

In Section 3.5.4, pages 3-58 to 3-63, of the MRP, the applicant justifies leaving highwalls based on the fact that they have been stable for 14 years, blend in with the existing terrain, demonstrate a safety factor of 2.94 (dry) and 2.62 (saturated), and greater instability would result from blasting.

The highwalls on the Southwest Lease will be reduced along the pad and road areas where feasible. These areas are outlined on Plate 3-7a and page 3-62 of the MRP. The rationale for leaving or reducing rock highwalls is based on the following:

1. If the rock highwalls were partially shot down, this would extend the highwall effect further up the steep slopes, disturbing more area and causing more erosion.
2. The highwalls are consistent with the existing natural cliffs common in the Blackhawk Formation area; and
3. The fill areas at the base of the highwalls will be stabilized by reseeding and erosion controls taking the appearance of "talus slopes," common at the base of the exposed cliffs in the area.

The surface of the area at Gordon Creek #2 was originally disturbed in late 1969. When this area was disturbed, no topsoil or other material was saved. It is the intent of the applicant to restore it to a topography suitable for wildlife habitat and livestock grazing (see Section UMC 817.133 of this document) (MRP, page 3-58). The backfilling and grading will proceed as follows:

- A. After the sealing of the portals and removal of all structures, a backhoe (Cat 235) will be brought to the upper portal.
- B. The backhoe will begin by reaching down over the fill bank and retrieving as such material as can be reached. This material will be placed on the terrace.
- C. A Cat (D-7) will work with the backhoe, taking the retrieved material and spreading and compacting it from the highwall outward to reach a configuration as shown on Plate 3-7a, Postmining Topography - Portal and Pad Areas.
- D. The mine yard will then be resloped to drain as shown on Plate 3-7a. A rock-lined natural drainage will be restored in this area since all diversions will be removed during the backfilling and regrading.
- E. The procedures, as noted above, will continue down the road with the backhoe and cat operating in conjunction to reclaim this area down to the permit boundary.
- F. Upon completion of backfilling and regrading during reclamation, the surface will be scarified to prevent slippage of the surface and promote root penetration. This will be accomplished by the ripper on the dozer and will be to a depth of two feet.

The same sequence of backfilling and grading will be done for the Southwest Lease area (page 3-38 of the MRP). The postmining topography is shown on Plate 3-7a.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.103 Backfilling and Grading: Covering Coal and Acid- and Toxic-forming Materials

Existing Environment and Applicant's Proposal

The applicant proposes to cover all exposed coal outcrops resulting from this operation with a minimum of three feet of incombustible material during the backfilling and grading operation. The incombustible material will consists of existing coal-free soil and rock from the minesite. This is outlined in Section 3.5.4 (MRP, page 3-60)

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.106 Regrading or Stabilizing Rills and Gullies

Existing Environment and Applicant's Proposal

The applicant states in Section 3.5.4.2, page 3-63a of the MRP, that if rills and gullies deeper than nine inches develop in regraded areas they "will be filled, graded or otherwise stabilized" and reseeded.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.111-.117 Revegetation

Existing Environment and Applicant's Proposal

Revegetation information relating to these performance standards are discussed in Section 3.4.5.3, 3.5.5, 3.5.6, 9.7 and 9.8 of the MRP.

The Gordon Creek #2 permit area contains 14 vegetation types. Two forest types (aspen woodlands and mixed coniferous forests), seven shrublands types (cherry thickets, willow thickets, oak shrublands, mixed mountain shrublands, manzanita shrublands, big sagebrush shrublands and bottomland sagebrush shrublands), one shrub/forest type (riparian community) and two grassland types (mountain grassland and wet sedge meadow). Of these, two have been disturbed by existing mining operations, the oak shrubland type and the mountain grassland type. No further disturbance is planned for the area.

Since much of the disturbance occurred prior to 1977, the exact nature of the disturbed vegetation is unknown. However, reference areas were selected to best represent the species composition, topography, soils and aspect of affected communities within the permit area. The reference areas are located within the permit area on sites which will not be disturbed throughout the life of the mine (see Plate 9-1, MRP).

Both reference communities were sampled for total vegetative cover, total ground cover, cover by species, productivity by life form and by species, shrub density and shrub height. Sample adequacy was achieved for all parameters with the exception of production on the oak shrubland type which met the State regulatory authority's maximum sample requirement of 40 samples.

The disturbance of areas associated with the Southwest Lease (approximately 7.5 acres) occurred subsequent to the Surface Mining Control and Reclamation Act of 1977. Therefore, baseline data were obtained for this area. Total vegetative cover, productivity by life-form and by species and woody plant density were adequately sampled (Southwest Lease, Table 9-6).

No threatened or endangered plant species were encountered during floristic surveys of the permit area (MRP, Section 9.4 and Southwest Lease, Section 9.4). According to the USFWS, only one species of concern (Hedysarum occidentale var. canone) may occur on the permit area (see October 21, 1983 Memorandum, USFWS to OSM, Denver). It is under review for possible listing in the future. Since no further disturbance is planned on the permit area, no effects on this species are expected.

The applicant has submitted a complete revegetation plan (Section 3.5.5, pages 3-66 to 3-77). The plan adequately addresses the schedule of revegetation, species and seeding or planting rates, planting methods and mulching techniques. All areas will be seeded with diverse species native to the area, capable of stabilizing soil and of the same seasonal variety as the existing vegetation. Introduced species are used only to provide erosion control or to enhance species diversity.

The applicant has committed to seeding during the first normal period of favorable planting conditions except where temporary erosion control is required.

An adequate monitoring and management program for the revegetated areas has been given. Plans for erosion control, weed control, initiating of grazing on reclaimed areas and methods to determine the success of revegetation are acceptable.

#### Compliance

The Gordon Creek #2 Mine site receives approximately 12-16 inches of precipitation annually. It is the regulatory authority's determination that, according to current state-of-the-art knowledge, this amount is sufficient for the establishment of species native to the area. Gordon Creek #2 Mine is also near (within two to three miles) Beaver Creek's Gordon Creek #3 and #6 Mines, which are scheduled for reclamation to begin in 1984. This will provide a prime area for testing the feasibility of reclamation and revegetation. The applicant complies with this section.

#### Stipulations

None.

#### UMC 817.121-.126 Subsidence Control

#### Existing Environment and Applicant's Proposal

There are no man-made structures above the mine either currently in use or of historical significance and, therefore, in need of protection from subsidence. The only renewable resources are of a hydrologic or biologic nature. Portions of Beaver Creek and several surface springs were mined under several years ago and monitoring results have shown no affect on hydrologic resources due to subsidence. Maximum subsidence for an average panel is predicted at 6.18 feet which includes pillaring in both seams (MRP, pages 3-49 to 3-53a).

A subsidence monitoring plan will be implemented which includes monitoring stations located above active mine panels and surveyed twice yearly, weather permitting. Mitigation measures, should a substantial water inflow occur, will include: attempts to seal off the inflow; increase monitoring efforts; pumping and cleaning of inflow water; replacement of lost water if indicated by monitoring.

#### Compliance

Since past pillaring has shown no obvious surface expression, it is expected this figure (6.18 ft) will be substantially less than predicted, if even measurable.

The applicant complies with this section.

#### Stipulations

None.

#### UMC 817.131 Cessation of Operations: Temporary

#### Existing Environment and Applicant's Proposal

The applicant has committed to submit to the regulatory authority a notice of intention to cease or abandon the operations in accordance with UMC 817.131 and to MSHA standards. This notice will be submitted whenever it is known that operations are to be temporarily ceased for more than 30 days (MRP, page 3-29).

#### Compliance

The applicant complies with this section.

#### Stipulations

None.

#### UMC 817.132 Cessation of Operations: Permanent

#### Existing Environment and Applicant's Proposal

Upon permanent cessation of operations, permanent reclamation will commence. Mine openings will be sealed, all surface equipment, structures and facilities associated with the operation will be removed, and all affected lands reclaimed. The schedule for permanent reclamation can be found in Section 3.5.7.1, page 3-78 of the MRP.

Compliance

Applicant complies with this section.

Stipulations

None.

UMC 817.133 Postmining Land-Use

Existing Environment and Applicant's Proposal

The land on which the #2 Mine is located has long been used for coal mining. Other than coal mining, this area has long been used for deer hunting, sightseeing, and hiking. There are no developed campgrounds within the area and none planned for the future (MRP, page 4-42).

Private landowners presently administer the lands in this area for limited livestock forage, wildlife habitat, watershed, dispersed recreation and coal mining. There are no range improvements on the area.

The postmining uses of the land will be the same as the pre-mining and present uses described above. In areas of surface disturbance, reclamation and revegetation will restore the area to a condition capable of supporting premining uses.

Compliance

Applicant complies with this section.

Stipulations

None.

UMC 817.150-.156 Roads: Class I

Existing Environment and Applicant's Proposal

The coal haul road is used for all access to and from the minesite. It is approximately 5,700 feet long. The road is bermed on the Bryner Canyon side until it enters the minesite area. This is a gravel-surfaced road sloped slightly toward the highwall side where a conveyance ditch is maintained to carry runoff to the culvert below. The road is regularly maintained to provide safe access for men and material to the mine as well as providing for safe, efficient coal haulage. The road joins the Gordon Creek County Road at the permit boundary. The overall grade is about eight percent.

The roads are, and will continue to be, maintained in such a manner that the approved design criteria are met throughout the life of the facility. This information is shown on Plate 3-2 and page 3-11 (Section 3.2.10) of the MRP.

The roads will be reclaimed upon termination of operations as outlined in the reclamation plan, Section 3.5.3 as well as in the reclamation schedule detailed in Section 3.5.7.1 (Gordon Creek #2 MRP, page 3-55 and 3-78).

#### Compliance

Applicant complies with this section.

#### Stipulations

None.

UMC 8F7.160-.166 Roads: Class II

#### Existing Environment and Applicant's Proposal

The mine access road is used for men and material access to the west portals and is approximately 530 feet long. This road is bermed for safety and runoff control. There is another access road that leads to the old east portals. The road is used less than once per day because the portals are still used for intake air. This road is 1,150 feet long. (This information is shown on Plates 3-1 and 3-2, page 3-11.) The Southwest Lease road (pages 3-8 to 3-10, Southwest Lease MRP) is approximately 1,200 feet long and leads to the new mine upper portal area from the lower mine area. The horizontal alignment is shown on Plate 3-2a. The road consists of two straight segments joined by a turn. This road is gravel surfaced, with a three foot high berm on the outside of the roadway. The mine access road and Southwest Lease road are, and will continue to be, maintained in such a manner that the approved design criteria are met throughout the life of the facility. The roads will be removed upon termination of operations as outlined in Section 3.5.3 and Section 3.5.7.1 (Southwest Lease MRP, page 3-37 and 3-52 and Gordon Creek #2 MRP, page 3-55 and 3-78).

#### Compliance

The applicant complies with this section.

#### Stipulations

None.

- 37 -

UMC 817.170-.176 Roads: Class III

Not applicable.

UMC 817.180 Other Transportation Facilities

Existing Environment and Applicant's Proposal

Coal is transported from the mine via a surface conveyor where it is discharged into the coal storage area. It is then loaded by front-end loader into trucks and hauled to the preparation plant at CV Spur. There are no railroads in the Gordon Creek #2 Mine area. The transportation facilities are shown on Plate 3-2, page 3-11 of the MRP.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.181 Support Facilities and Utility Installations

Existing Environment and Applicant's Proposal

The support facilities required to operate the underground mine are shown on Plate 3-1. The central facility includes an office, bathhouse, supply building and fan building. The project has a substation and receives its power from Utah Power & Light Company.

Compliance

The applicant complies with this section.

Stipulations

None.

59180