

0002

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**TECHNICAL ANALYSIS  
FIVE-YEAR PERMIT RENEWAL  
GORDON CREEK #2, #7 AND #8 MINES  
ACT/007/016**

**Beaver Creek Coal Company  
Carbon County, Utah  
August 28, 1989**

**UMC 785.19 Alluvial Valley Floors-(DW)**

**Existing Environment and Applicant's Proposal**

Beaver Creek, North Fork Gordon Creek, and Bryner Canyon (T13S, R8E, Section 17) encompass limited unconsolidated streamlaid deposits (Plate 6-1).

The valley floor along Beaver Creek and its tributary in T13S, R8E, Section 7 are incapable of supporting agricultural activities without proper drainage. Even with adequate drainage, agricultural development would be restricted to grasses and pasture because of the high elevations and short-growing seasons (page 7-128).

Agricultural developments are not found along Bryner Canyon, Beaver or Gordon creeks within the vicinity of the mines. The agricultural potential of the valley floors in the area is limited by the soil capability and the short-growing season (page 7-129).

Technical staff inspections of the mine site have not identified the presence of flood irrigation. Limited streamflow, poor or saturated soil conditions (Plate 8-1) and steep topography (Plate 7-4) indicate a low capability for the area to be flood irrigated. Moreover, the document entitled "Reconnaissance Maps to Assist in Identifying Alluvial Valley Floors, Central Utah" does not delineate potential alluvial valley floors within or adjacent to the permit area (Plate 1).

**Compliance**

Sufficient information about alluvial deposits and irrigation is available to determine as required by UMC 785.19(c)(2) that no alluvial valley floors exist.

The applicant is in compliance with this section.

**Stipulations**

None.

File in:

Refer to Record No. 0002 Date 8-28-89  
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For additional information

## UMC 817.11 Signs and Markers-(PGL)

### Existing Environment and Applicant's Proposal

Mine signs are described on pages 3-29 through 3-34. The signs are made of durable material, show the required information, will be maintained throughout the life of the facility, and will not be removed until after bond release. Examples of the signs are shown on Figures 3-2, 3-3, 3-4 and 3-5.

### Compliance

The applicant's proposal for signs and markers meets the requirements of this section.

The applicant is in compliance with this section.

### Stipulations

None.

## UMC 817.13-15 Casing and Sealing of Underground Openings-(RVS)

### Existing Environment and Applicant's Proposal

**Boreholes.** The applicant has drilled 25 coal exploration boreholes within and adjacent to the permit area (Table 6-2). Borehole locations have been identified on Plate 6-1.

All but one of the boreholes have been either entirely cemented or cased and surface plugged and cemented to total depth (Table 6-2). Borehole CCD-13 was removed during highwall construction and no longer exists (Table 6-2).

If future borehole monitoring occurs, the applicant will temporarily seal boreholes by installing a threaded cap at the top of the surface casing (page 6-13).

**Entries.** The applicant has committed to permanently sealing all mine entries following final abandonment (page 3-71). Seals will be constructed of a concrete block seal 25 to 50 feet in by the entryway (Figure 3-8). Entries will be backfilled to the seal, portal structures will be removed, and the exposed coal seam will be covered (page 3-71 and Figure 3-7). If a potential for mine water discharge becomes likely, the applicant will incorporate a portal seal design that includes a drainpipe (#8 Mine Amendment, page 3-27).

The applicant commits to install temporary seals consisting of chain link fence for entryways that are temporarily inactive (page 3-37).

## Compliance

The applicant's proposals for permanently sealing boreholes and entries are designed to prevent access and preclude toxic drainage from entering ground or surface waters as required by UMC 817.13 and UMC 817.15.

The applicant has provided adequate plans for temporarily sealing boreholes and inactive entries as required by UMC 817.14.

The applicant is in compliance with this section.

## Stipulations

None.

## UMC 817.22 Topsoil: Removal-(HS)

### Existing Environment and Applicant's Proposal

The Gordon Creek #2, #7, and #8 Mines are a combination of pre-Law (prior to the 1977 enactment of Public Law 95-87, the Surface Mining Control and Reclamation Act) and post-Law disturbance (Volume 1, page 3-3, #8 Mine Amendment page 3-2).

Approximately 9.2 acres of land (#2 Mine surface disturbance) were disturbed before enactment of Public Law 95-87. Topsoil was not salvaged from these areas, however, the applicant proposes to use substitute topsoil material (road and pad landfill) as a plant growth medium for reclamation of the #2 Mine (page 3-45). Revegetation trials on the proposed topsoil substitute material have been attempted and results are found in the 1987-1988 Annual Monitoring Report. Prior to backfilling and grading operations, random soil samples will be collected based on a 10m<sup>2</sup> grid over the entire disturbed area (page 8-27).

Topsoil and subsoil were separately removed and stockpiled from accessible areas (approximately 3.1 acres) of the #7 Mine portal area (page 3-46). Topsoil was removed and stockpiled from the entire #8 Mine portal area (#8 Mine Amendment, page 3-2).

Profile descriptions and chemical and physical analyses of the material salvaged from the #7 Mine and #8 Mine portal areas are located in Volume 3, Section 8 and #8 Mine Amendment, Section 8, respectively.

## Compliance

The applicant has proposed to use substitute topsoil material from the #2 Mine pad and road areas as a plant growth medium for final reclamation. Results of chemical and physical analyses, presented in Table 8-7, indicate favorable soil characteristics in all areas except for one sample location. Sample number 3 indicates a high sodium absorption ratio (SAR).

As discussed on page 8-27, within 90 days of reclamation additional soil samples will be taken in the vicinity of #3 sample location and the #2 Mine area. The applicant will begin in the location of #3 sample and proceed outward in four directions sampling every 10 feet until suitable SAR values are obtained. To further characterize the suitability of the substitute topsoil for the #2 Mine and determine the acid- and/or toxic-forming potential within the entire disturbed area, random soil samples will be collected and analyzed for the constituents outlined in the Division Guidelines for Management of Topsoil and Overburden, Table 6.

Interim revegetation efforts on the outslopes of the road and pad areas (proposed substitute topsoil material) of the #2 Mine have been moderately successful. This substantiates the suitability of the proposed substitute topsoil material.

Profile descriptions and chemical and physical analyses indicate no characteristics that would jeopardize reclamation success within the salvaged material.

The applicant is in compliance with this section.

## Stipulations

None.

## UMC 817.23 Topsoil: Storage-(HS)

### Existing Environment and Applicant's Proposal

Topsoil and subsoil were removed from approximately 4.0 acres (Volume 1, pages 3-64, and #8 Mine Amendment, page 8-8). Topsoil from the excavation of the #7 Mine portal area was placed adjacent (northwest) to the #2 Mine Substation. Subsoil from the #7 Mine portal area excavation was separately placed southwest of the Conveyor Transfer Building (Plate 3-1).

The applicant has protected the subsoil and topsoil stockpiles against wind and water erosion by revegetating the surface of the stockpiles and constructing an impermeable earthen berm around the stockpiles (page 3-46). Also, a silt fence has been installed adjacent to the highwall to prevent rocks and other material from contaminating the topsoil stockpile (site inspection of Division staff).

Volume estimates of suitable plant growth medium are located on pages 3-46, 3-83, 3-83.1, 8-27.

### Compliance

Removed topsoil and subsoil have been protected from wind and water erosion and placed within the permit area. Immediate redistribution of topsoil and subsoil is not practical because facilities will remain operational throughout the life of the mines.

The area where topsoil and subsoil has been stored does not pose any imminent danger for slope failure.

The reported volumes of suitable topsoil, subsoil, and the proposed substitute topsoil material are fragmented and contradictory. Allocation of sufficient volumes of topsoil, fill, etc., are essential so that all areas disturbed by mining activities can be properly reclaimed.

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

### Stipulation UMC 817.23-(1, 2)-(HS)

Within 30 days of permit approval the applicant must submit the following for inclusion in the PAP:

1. As-built surveys of the soil stockpiles to include: volume of material stockpiled, maximum and minimum height, slopes and all pertinent dimensions.
2. A topsoil mass balance table which includes the following: volumes of suitable topsoil to be redistributed; volumes of stockpiled material; disturbed acreage to be reclaimed; topsoil redistribution depths; and identification and volumes of material required to redistribute over each disturbed area.

## UMC 817.24 Topsoil Redistribution-(HS)

### Existing Environment and Applicant's Proposal

The applicant has committed to uniformly redistributing an average of 12 inches of stockpiled topsoil and subsoil over the #7 Mine and #8 Mine portal area disturbances (page 3-33). Soil will be redistributed parallel to the contour utilizing front-end loaders and scrapers. Soil will not be redistributed in areas that exceed 70 percent slope (page 3-83, Plate 3-1).

Existing fill material from the #2 Mine roads and pads, if proven to be suitable, will be used as a plant growth medium (page 3-83). In the event that soil analyses conducted prior to backfilling and grading operations indicate an acid- and/or toxic-forming potential, the applicant has committed to covering all acid- and/or toxic-forming materials with four feet of suitable non-acid and non-toxic forming materials (page 8-31).

Prior to redistribution of topsoil material, backfilled spoils will be ripped to loosen compacted zones (page 3-83). Material which is contaminated by oil and grease and/or more than 50 percent coal, will be buried on site (pages 3-45 and 8-31).

After topsoil redistribution and prior to seeding, areas of compaction will be deep-chiseled to a depth of six inches and cloddy surfaces will be pulverized with a disk and/or harrow.

To enhance microbial activity, wood fiber mulch (on steep slopes), straw or native hay mulch (on moderate slopes), will be blown on or mechanically incorporated into the surface at a rate of 2,000 lbs./acre (page 3-92).

The plant growth medium will be mechanically handled in such a way (track hoe, grouser, etc.) as to maximize surface roughness (page 3-84).

### Compliance

The reclamation plan for redistribution of topsoil to a uniform depth of 12 inches is adequate to support the postmining land use of grazing, wildlife use, recreation and watershed.

Existing disturbed landfill material, if demonstrated to be suitable (see discussion under UMC 817.22), will be prepared to promote favorable vegetation establishment.

The descriptions from the Soil Conservation Service Soil Survey for Carbon County descriptions indicate predisturbance soil conditions of a surface horizon high in organic matter (Mollic epipedon) and an underlying illuviation of clay (Argillic horizon). The depth of planned topsoil redistribution closely parallels predisturbance conditions.

Scarification of regraded spoils, disking and chiseling of redistributed topsoil should alleviate compaction and ensure good overburden/soil contact, thereby preventing potential slippage and creating a soil profile conducive to root penetration.

Crimped surface mulch, hydromulch, and tackifying agents should ensure adequate protection from wind and water erosion by raising the wind profile above the soil surface and acting as a barrier against raindrop impact.

The applicant is in compliance with this section.

#### Stipulations

None.

#### UMC 817.25 Nutrients and Soil Amendments-(HS)

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

Prior to seeding, randomized soil samples will be taken of the proposed substitute topsoil material and analyzed to determine fertilizer type and application rates (page 8-27).

Redistributed topsoil and subsoil will be sampled and analyzed prior to seeding. Lab analyses will be used to determine the need for application of commercial fertilizer (page 8-31).

#### Compliance

The applicant has committed to sampling redistributed topsoil to determine types and rates of fertilizer application.

The applicant is in compliance with this section.

#### Stipulations

None.

## UMC 817.41 Hydrologic Balance: General Requirements-(DW/RVS)

### Existing Environment and Applicant's Proposal

#### Ground Water-(RVS)

The applicant describes ground water as occurring under confined and unconfined conditions in the permit and adjacent areas (pages 7-2 through 7-7). Unconfined conditions occur within shallow alluvial deposits, whereas confined conditions are recognized at depth in the Blackhawk Formation and Star Point Sandstone (pages 7-4 and 7-7). Faults and fractures have produced water in the mine workings (page 7-7).

Jewkes Spring, designated 2-5-W, and Gunnison Homestead Spring, designated 2-6-W, are the only two springs occurring within the permit area. Jewkes Spring has an average flow of 112 gpm and Gunnison Homestead Spring has an average flow of 22 gpm (Annual Hydrologic Monitoring Reports for 1985, 1986, 1987 and 1988). The applicant states that these springs discharge from "a sandstone unit that probably has fairly large areal extent within the Blackhawk Formation" (page 7-8). The applicant currently monitors Jewkes Spring and Gunnison Homestead Spring monthly for flow and twice a year, during the late spring and early fall, for water quality (page 7-124). The 1985 seep and spring inventory did not reveal other measurable flows (personal communication with Dan Guy, BCCC, August 16, 1989).

Plate 7-1 indicates seven boreholes, within and adjacent to the permit area, encountered ground water. Flow is thought to occur from sandstone units and fractures in the Blackhawk Formation (Plate 7-1).

Mine inflow is insufficient to conduct underground mining operations. Surface water must be pumped from the Sweet's Canyon Pond to the underground workings (personal communication with Dan Guy, BCCC, August 16, 1989). The applicant has committed to monitor significant mine inflows (greater than one gpm), if encountered (page 7-53).

Water quality data for springs are given in Appendix 1A. These data indicate water quality is within state and federal standards.

#### Surface Water-(DW)

The area surrounding the Gordon Creek #2, #7 and #8 Mines is drained by tributaries to the Green and Colorado Rivers, principally Muddy Creek, Price, and the San Rafael Rivers. The mine lies near headwater tributaries to the Price River.

Water quality in the Price River and its tributaries is good at higher elevations (TDS is less than 250 mg/l). At lower elevations, below irrigation diversions, the water quality degrades (TDS increases to more than 6,000 mg/l). This degradation is caused by irrigation return flows and natural runoff from the Mancos Shale.

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 Canyon (see Plate 7-2).

Beaver Creek is a perennial stream that flows through the northern portion of the permit area. Perennial flow is maintained by a series of beaver ponds and two springs, Jewkes Spring and Gunnison Homestead Spring. Watershed area for Beaver Creek and its tributaries above the lease boundary is less than one square mile.

The general flow direction of Beaver Creek is northeast, toward the Price River (see Table 7-3 for flow data). Beaver Creek has been undermined, but subsidence-induced effects to either water quality or quantity have not been identified to date. An intensive monitoring program will identify any effects, should they arise (pages 7-56 and 7-57).

Bryner Canyon is a small basin of about one square mile in an area that is located almost entirely within the permit area. Bryner Canyon contains the mine facilities, and thus is the only stream that could be directly impacted by surface disturbance associated with mining. Flow is usually monitored at three locations during snowmelt or thunderstorm runoff (see Table 7-3).

The confluence of the Right and Left Forks Bryner Canyon is in the #2 Mine yard. The Right Fork is culverted through the disturbed area while the Left Fork is diverted around the disturbed area by means of a ditch. Two sedimentation ponds have been employed to control runoff, sediment loading and water quality degradation from migrating off site.

The Right Fork Bryner Canyon is an ephemeral stream that flows over the Sweet's Mine workings. The culvert to divert this water through the disturbed area has only conveyed water once. Surface runoff ponds behind the culvert and infiltrates directly into the ground before reaching the inlet.

The applicant believes that the infiltrating water is lost through fractures generated by the Sweet's Mine. However, there are no detectable surface fractures. It is assumed this water is transmitted through underground fractures and resurfaces downstream in the Gordon Creek drainage.

The North Fork Gordon Creek is the other principal stream found on the lease block. The drainage area above the permit area is nearly four square miles (see Table 7-2 for flow data). The stream generally loses flow from upper to lower reaches suggesting that the ground-water table is generally below the bottom of the channel.

### Compliance

#### Ground Water-(RVS)

The applicant has provided information about the occurrence, movement and quality of ground water that allows a determination of minimal change to the subsurface hydrologic balance. Moreover, the applicant has committed to an ongoing operational spring monitoring program and submitting data in the Annual Monitoring Report.

The applicant is in compliance with the ground-water portion of this section.

#### Surface Water-DW

Mining activities have been planned and are conducted to minimize changes to the prevailing hydrologic balance in both the permit and adjacent area. Implementation of sedimentation ponds, culverts, diversions, and alternative sedimentation control structures prevent long-term adverse changes.

The drainage through Bryner Canyon will be reclaimed to ensure a return to a suitable postmining land use. Undermining Beaver Creek has the potential to adversely affect the quantity of water in the stream. The mitigation plan described on page 3-64 will alleviate any impacts due to subsidence and/or surface fractures.

Drainage from the Right Fork Bryner Canyon which now ponds behind the #2 Mine yard and infiltrates will be re-established to ensure proper drainage following reclamation. This plan is described on page 7-133.

The applicant is in compliance with the surface-water portion of this section.

### Stipulations

None.

## UMC 817.42 Water Quality Standards and Effluent Limitations-(DW)

### Existing Environment and Applicant's Proposal

The North Fork Gordon Creek, including Bryner Canyon, has been designated as Class 3C and 4. Class 3C is defined as being protected for non-game fish and other aquatic life, and Class 4 is for agricultural uses (see Table 7-3a for standards).

Beaver Creek is classified as 1C, domestic use with prior treatment; 3A, cold water fisheries; and 4, agricultural (Table 7-3b lists the standards).

The surface water control plan includes capturing and treating all surface runoff which may have come in contact with areas disturbed by the surface mine facilities. Also, any surface runoff which may have come in contact with areas receiving transient coal dust is captured in sedimentation ponds for settling of suspended solids before being released.

Two sedimentation ponds exist on site. The sedimentation ponds are designed to work in a series to meet effluent limitations. Sedimentation Pond 7A treats water from the Left Fork Bryner Canyon and #7 Mine and #8 Mine portal areas. This water is then discharged to Sedimentation Pond #2 which also catches all runoff produced at the #2 Mine surface facilities. Water discharged from Sedimentation Pond #2 is subsequently discharged into Bryner Canyon under UPDES permit #UT0023124001.

The applicant currently has an on-going, permanent water monitoring program for springs, surface water courses and a UPDES discharge point. The majority of these locations have been monitored since 1977 on a monthly basis when weather permitted.

### Compliance

Surface drainage from disturbed areas are passed through two sedimentation ponds in series before leaving the permit area. These discharges are monitored under the UPDES permit.

Two small area exemptions (SAEs), located at Sweet's Canyon water truck fill-up pond and adjacent topsoil stockpile, along with the old fan portal area, are adequately treated without passing runoff through a sedimentation pond. The treatment consists of berms, vegetation and a small catch basin.

The water monitoring program is adequate to detect adverse changes in the water quality from the affected area.

Sedimentation ponds and other sediment control measures will be maintained until the disturbed area has been restored, the vegetation requirements have been met and the quality of untreated drainage from the disturbed area meets the applicable state and federal water quality standards for Gordon Creek (page 7-130).

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow, and Ephemeral Streams-(DW)

#### Existing Environment and Applicant's Proposal

Disturbed area runoff from the #8 Mine access road will be conveyed to the Left Fork Bryner Canyon drainage via the access road ditch as shown on Plate 7-1B. Two loose-rock check dams will be installed along the ditch. The designs are shown on page 7-131a.

A wet grout riprap channel will convey all runoff from the pad. Runoff will flow into a 36-inch cnp at the location of a 12-inch side culvert where a drop inlet box will be installed (#8 Mine Amendment, page 7-8).

The #7 Mine portal area receives runoff from the Left Fork Bryner Canyon. Drainage control consists of a combination of one-half culverts and full culverts. Plate 7-7 shows the location of the culverts and drainage system. The system is designed to minimize the siltation and subsequent erosion of these structures. A complete description of the system is found on pages 7-70 through 7-73. Flow is conveyed to Sedimentation Pond 7A.

The Right Fork Bryner Canyon is undisturbed by the mining operations (see Plate 7-5, Area A). Runoff is collected where the Right Fork enters the main canyon and is routed through the #7 Mine portal area in a 24-inch enclosed culvert. At this point, the runoff joins the emergency decant from Sedimentation Pond 7A and is transported below the area of disturbance.

The #2 Mine surface runoff is routed by a series of ditches and culverts to Sedimentation Pond #2. Runoff from the south slope of the mine area is collected in a ditch along the toe of the slope and conveyed to Sedimentation Pond #2.

A 24-inch culvert is used to carry the 10-year, 24-hour runoff peak flow from Sedimentation Pond 7A to Sedimentation Pond #2. This culvert connects the two ponds in a series.

The main stem of Bryner Canyon has been diverted around the Sweet's Canyon water truck fill-up pond by routing flows across the main access road through a 36-inch culvert, down a side diversion ditch for about 115 feet and back across the road through another 36-inch culvert (see pages 7-66 through 7-68).

### Compliance

Temporary diversions which have been implemented to divert runoff to and from sedimentation ponds and around the Sweet's Canyon water truck fill-up pond, have been designed and constructed to safely pass the peak flow from a 10-year, 24-hour precipitation event.

Loose-rock check dams, riprap, half round and full culverts prevent additional contributions of suspended solids to streamflow and runoff outside the permit area. Moreover, these structures are maintained to design specifications.

Once mining is completed, structures will be removed from the site and the earthwork/drainage portion of the reclamation plan will begin. During initial reclamation the diversions and culverts will be removed, the natural drainage channel will be restored, and the area will be recontoured to the final configuration (see Plate 3-7B and page 7-130). Riprap sizing criteria is deficient. Riprap was sized too small for 100-year, 24-hour design flows, channel dimensions and profiles. The culvert exit velocity nomograph used in the sizing is unacceptable.

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

### Stipulation UMC 817.43-(1)-(DW)

1. Within 60 days of permit approval, the applicant must submit for inclusion in the PAP, adequate riprap sizing and channel designs for reclamation of Bryner Canyon, including gradation and filter blanket requirements.

## UMC 817.44 Hydrologic Balance: Stream Channel Diversions-(DW)

### Existing Environment and Applicant's Proposal

A permanent diversion of North Fork Gordon Creek has been implemented to keep flows in the creek separate from the water in Sweet's Canyon water truck fill-up pond. A berm separates the diversion channel from the pond.

The channel was designed for a flow of 362 cubic feet per second, the peak flow from a 100-year, 24-hour precipitation event. A trapezoidal channel design was used that implements a riprapped drop structure which is shown as Figure 1, page 7-64 (page 7-60 through 7-66).

### Compliance

The diversion of North Fork Gordon Creek has been designed and constructed to remain stable and to prevent additional contributions of suspended solids to streamflow or to runoff outside the permit area during the life of the mine.

The channel is adequate to pass the peak runoff of a 100-year, 24-hour storm, but riprap channel protection is undersized. The riprap was designed for a 10-year, 24-hour event (peak flow = 39 cubic feet per second). The riprap must be sized for the 100-year, 24-hour event.

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

### Stipulation UMC 817.44-(1)-(DW)

1. Within 60 days of permit approval, the applicant must submit for inclusion in the PAP, proper riprap sizing, gradation, and filter blanket requirements for the permanent diversion of North Fork Gordon Creek at the Sweet's Canyon water truck fill-up pond. Installation of the riprap will take place during reclamation channel construction at the Gordon Creek #2, #7 and #8 Mines.

## UMC 817.45 Hydrologic Balance: Sediment Control Measures-(DW)

### Existing Environment and Applicant's Proposal

Disturbed area runoff, with the exception of the Sweet's Canyon water truck fill-up and old fan portal areas (both are SAEs), is routed via ditches, berms and culverts, around or through the disturbed areas to a series of sedimentation ponds where the water is adequately treated.

Design precautions taken to assure minimal contributions of sediment from the water conveyance system include riprap linings, half round and full culverts, trash racks, water bars, loose-rock check dams, straw bale dikes, and effective revegetation of disturbed areas, etc. (see pages 7-69 through 7-81).

### Compliance

Erosion control measures have been implemented to prevent to the extent possible additional contributions of sediment to streamflow or runoff outside the permit area.

Sediment is contained within the permit area by deposition into sedimentation ponds. Undisturbed area runoff above disturbance is either routed through a sedimentation pond, or is diverted around the site.

Additional erosion caused by the implementation of temporary diversions is alleviated by the use of riprap linings, half round and full culverts, loose rock check dams, straw bale dikes and effective revegetation of disturbed areas.

Erosion control at the two small area exemptions consists of berms, vegetation, and a small catch basin. The controls adequately treat all runoff produced in these areas.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.46-.47 Hydrologic Balance: Sedimentation Ponds and Discharge Structures-(DW)

#### Existing Environment and Applicant's Proposal

Two sedimentation ponds exist at the Gordon Creek #2, #7 and #8 Mines. The sedimentation ponds are designed to treat runoff produced from disturbed areas. The sedimentation ponds are designated 7A and #2 and were designed to function in series.

Sedimentation Pond 7A receives drainage from the Left Fork Bryner Canyon and the #7 Mine and #8 Mine portal areas. The primary outfall structure has been designed using the 10-year, 24-hour storm and is completely separate from the emergency spillway. This spillway is designed to allow the pond to be operated either in a full or empty mode. It consists of a vertical corrugated metal pipe riser with sized perforations to dewater the sedimentation pond to the designated sediment level. The top of the riser is open and conveys the peak flow from the 10-year, 24-hour storm.

The emergency spillway was designed using the 25-year, 24-hour event. This spillway routes flow from Sedimentation Pond 7A separate from the primary decant and discharges below the area of disturbance. The flow from the 25-year, 24-hour storm is combined with the runoff from the Right Fork Bryner Canyon at Manhole #1 at the base of Sedimentation Pond 7A (pages 7-76 through 7-77).

The design of Sedimentation Ponds 7A and #2 in series provides sufficient storage volume to contain 100 percent of the design runoff from a 10-year, 24-hour precipitation event and three years of sediment accumulation. Sediment accumulation was calculated using the Universal Soil Loss Equation (0.66 acre-feet). Water storage requirements total 3.34 acre-feet.

The primary and emergency discharge structures for Sedimentation Pond #2 consist of separate spillways to carry the 10-year, 24 hour and 25-year, 24-hour events, respectively. The primary spillway is designed to float on the water surface. This allows for discharge of the cleanest water from just below the surface of the pond. The emergency spillway separately conveys flows downstream below all disturbance (page 7-77 through 7-79).

### Compliance

Three years of sediment storage has been designed for both sedimentation ponds. Sedimentation ponds in series provide the required theoretical detention time (24 hours) for water inflow or runoff entering the pond from the 10-year, 24-hour design event.

Discharges meet and maintain all applicable effluent limitations.

The dewatering devices are nonclogging and have discharge rates which achieve and maintain the required 24-hour theoretical detention time. These devices are designed or located above the maximum three-year sediment accumulation elevation.

There will be no outflow through emergency spillways from a 10-year, 24-hour storm as long as sediment accumulations are kept under 60 percent of design elevations (page 7-121).

Emergency spillways will safely pass the runoff from a 25-year, 24-hour precipitation event. Sedimentation Pond 7A will pass the required 14 cubic feet per second, while Sedimentation Pond #2 will pass the required 7 cubic feet per second.

Both sedimentation ponds have been designed with a minimum of one foot of freeboard above the surface of the pond with the emergency spillway flows occurring at the design depth.

Each sedimentation pond was designed, constructed, and is inspected under the supervision of a registered professional engineer. Sedimentation ponds are surveyed quarterly to identify 60 percent cleanout levels (page 7-87).

Sedimentation ponds will remain functional until all disturbed areas have been backfilled, graded and reseeded and revegetation standards are met (pages 7-130 through 7-131).

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.48 Hydrologic Balance: Acid and Toxic-Forming Materials-(HS)

#### Existing Environment and Applicant's Proposal

The applicant has provided chemical analyses of roof, floor, and interburden materials (page 6-21). Underground development waste is disposed of in the mine or hauled to the coal processing waste bank at C. V. Spur Coal Processing and Loadout Facility (page 3-16). Analyses of the bank material is conducted annually for the purpose of determining the acid- and/or toxic-forming potential (C.V. Spur PAP, Chapter 3 and Annual Monitoring Report).

Analyses of the proposed substitute topsoil are located in Tables 8-3a and 8-7. Additionally, analyses will be conducted (pages 3-45 and 8-27) prior to backfilling and grading operations to characterize the acid- and/or toxic-forming potential and percent coal content of the disturbed landfill material.

#### Compliance

The applicant has committed to covering all acid- and/or toxic-forming materials and materials having greater than a 50 percent coal content with four feet of suitable fill material (pages 3-45 and 8-31).

Roof and floor analyses indicate low potential for acid- and/or toxic-formation from underground development waste. Preliminary analyses of the proposed substitute topsoil material indicate high SAR levels from the #3 sample site. Ninety days prior to reclamation, the applicant will determine the extent of elevated SAR levels as outlined on page 8-27. The sodic soil material and all other acid- and/or toxic-forming materials and materials having greater than a 50 percent coal content will be disposed of on site.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.49 Hydrologic Balance: Permanent and Temporary Impoundments-(DW)

#### Existing Environment and Applicant's Proposal

The Sweet's Canyon water truck fill-up pond is proposed to be left as a permanent structure after reclamation. It is the applicant's intention to turn the system over to the landowner upon completion of operations. The pond will provide water for stock and wildlife in accordance with postmining land use.

The present purpose of the pond is to provide a source of water for dust suppression on mine haul roads and for use in-mine.

Water stored in the pond amounts to approximately two acre-feet at any given time. Water rights for pond recharge are owned by the applicant. These rights will be transferred to the landowner along with the pond after final reclamation.

A complete discussion addressing the requirements of this section is found on pages 7-134 through 7-136.

#### Compliance

The pond does not meet the design criteria set forth by 30 CFR 77.216. Therefore, the requirements of paragraphs (a)(5) and (w) of this section are not applicable.

The applicant's plans for maintenance and revegetation meet the applicable parts of this section.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.50 Hydrologic Balance: Underground Mine Entry and Access Discharges-(RVS)

#### Existing Environment and Applicant's Proposal

Plate 6-5 indicates rocks dip toward the east and Plate 6-17 depicts this at approximately 8,000 feet.

Mine inflow is insufficient to support underground mining operations and surface water must be pumped to the underground workings (page 7-50).

Details of the permanent entry seals are given on page 3-71 and Figure 3-8.

If mine water discharges occur, the applicant has committed to monthly monitoring of flow and water quality (page 7-53). Moreover, the applicant states (page 7-53) that mine water may be treated in the sedimentation pond to meet effluent standards.

### Compliance

The applicant has demonstrated that entries to underground workings have been designed and constructed to prevent gravity discharge from the mine. In addition, the applicant has committed to monitoring and, if necessary, providing treatments for discharges.

The applicant is in compliance with this section.

### Stipulations

None.

## UMC 817.52 Surface and Ground Water Monitoring-(DW)

### Existing Environment and Applicant's Proposal

#### Ground Water

The applicant presently monitors two significant springs which supply Beaver Creek with the majority of base flow during non-snow melt or precipitation events.

No surface or in-mine drill holes are monitored and no substantial inflows have been encountered. The applicant commits to monitor any inflow with a point source and quantity of one gpm with a sustained flow over a 30-day period. Monitoring will be conducted on a monthly basis for flow and water quality for a one-year baseline period according to the Division's Water Monitoring Guidelines (page 7-53).

#### Surface Water

The stream monitoring program provides the basis to detect possible impacts of mining to surface waters.

Quarterly water quality and flow samples are collected at seven locations. This includes six stream locations above and below the mine, along with one UPDES regulated discharge (Sedimentation Pond #2) which is monitored monthly for flow, pH, TDS, TSS, iron, manganese, and oil and grease. Samples are analyzed for the parameters listed in Table 7-18.

The sampling program provides information on seasonal flow and water quality on ephemeral streams that have the potential to be affected by mine discharge and surface disturbance. Surface monitoring locations, sampling parameters, sampling frequencies, and the type of flow measuring device is found in Table 7-17.

Beaver Creek is a perennial stream which has been undermined. Because of this, the applicant is continually evaluating the flow for obvious changes caused by subsidence or surface fractures (pages 7-123 through 7-125).

## Compliance

### Ground Water

The applicant's ground water monitoring plan is adequate to measure the effects of underground coal mining on the quantity and quality of subsurface water. No substantial aquifer exists above or within portions of the permit area.

The mine is considered dry. Water must be pumped into the mine from Sweet's Canyon for use in the mining process (see the discussion under UMC 817.55). The applicant has committed to monitor any substantial flows encountered while mining.

Jewkes Springs and Gunnison Homestead Springs are monitored monthly for flow and biannually for operational parameters listed in the Division's Water Monitoring Guidelines.

### Surface Water

The applicant's surface water monitoring plan is adequate to measure water quantity and quality of discharges from the permit area and to detect any adverse changes. All sites are monitored quarterly for flow and the parameters listed on page 7-127 except for Sedimentation Pond #2 outfall which is sampled monthly for flow and parameters per UPDES permit requirements.

If an in-mine point source occurs within 500 feet horizontally from the Beaver Creek channel, and the flow is 30 percent or greater than baseline seasonal flows for two consecutive monthly readings, a mass balance investigation will be performed to determine if mining activities have affected the Beaver Creek flow (page 7-123). See pages 3-64 through 3-66 for the mitigation plan if disruption of flow in Beaver Creek is detected.

The applicant commits to notifying the Division within five days if analytical results indicate non-compliance with the UPDES permit or any applicable standards.

Quarterly reports will be submitted within 60 days following the end of the quarter. Annual reports will be submitted no later than March 31 of the following year.

The applicant is in compliance with this section.

#### Stipulations

None.

#### UMC 817.53 Hydrologic Balance: Transfer of Wells-(RVS)

#### Existing Environment and Applicant's Proposal

Information given in Table 6-2 shows that all boreholes have been plugged and abandoned.

#### Compliance

The applicant has indicated that no boreholes will be transferred for further use as water wells.

The applicant is in compliance with this section.

#### Stipulations

None.

#### UMC 817.55 Hydrologic Balance: Discharge of Water Into an Underground Mine-(DW)

#### Existing Environment and Applicant's Proposal

Water for use underground is pumped out of Sweet's Canyon water truck fill-up pond for use in-mine (page 7-60 and discussions under UMC 817.41).

### Compliance

The Gordon Creek #2, #7 and #8 Mines are dry. There is not enough ground water produced in-mine to use for dust suppression and other mining related activities. Water has not been and is not expected to be discharged.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.56 Hydrologic Balance: Postmining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments, and Treatment Facilities-(DW)

#### Existing Environment and Applicant's Proposal

The Sweet's Canyon water truck fill-up pond and diversion of North Fork Gordon Creek are inspected quarterly and maintained to meet specific design criteria, as needed. These activities continue through final reclamation.

If necessary, the pond will be upgraded to meet specific design criteria during reclamation.

### Compliance

The applicant meets the requirements of this section.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.57 Hydrologic Balance: Stream Buffer Zones-(DW)

#### Existing Environment and Applicant's Proposal

North Fork Gordon Creek falls under the biological community determined by paragraph (c) of this regulation. Sweet's Canyon water truck fill-up pad and pond are both within 100 feet of the stream (see discussion under UMC 817.49).

### Compliance

The applicant's use of drainage control structures and the successful vegetation of the pond's side slopes and face prevents mining- or erosion-related impacts from affecting the stream. Berms and a small catch basin have also been implemented and will further alleviate any detrimental effects. Riparian, livestock, and wildlife habitats were all improved when this pond was installed.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.59 Coal Recovery-(PGL)

#### Existing Environment and Applicant's Proposal

The Bureau of Land Management approved the Resource Recovery and Protection Plan (R2P2) for the Gordon Creek #2 Mine on March 29, 1984. Production at the #2 Mine involved the Castlegate "A" and Hiawatha coal seams. The #7 Mine also recovered reserves from the Castlegate "A" and Hiawatha coal seams. Production at the #8 Mine will be limited to the Castlegate "A" coal seam during the next three years. The lower Hiawatha coal seam may be mined in this area at a later time and access will be underground.

The overall recovery factor is 50 percent (page 3-27 and #8 Mine Amendment, pages 3-13 and 3-14).

### Compliance

The applicant mines coal under an approved R2P2.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.61-.68 Use of Explosives: General Requirements-(PGL)

#### Existing Environment and Applicant's Proposal

The applicant will not use any explosives on the surface at the Gordon Creek #2, #7 and #8 Mines. The applicant commits to be in compliance with all applicable federal and state laws for all underground blasting (page 3-36). Therefore, this section is not applicable.

**UMC 817.71-.74 Disposal of Underground Development Waste and  
Excess Spoil and Non-Acid and Non-Toxic Forming  
Coal Processing-(PGL)**

**Existing Environment and Applicant's Proposal**

The applicant disposes of all underground development waste in the mine or hauls it to the C. V. Spur Coal Processing and Loadout Facility for final disposal (page 3-16).

**Compliance**

The C. V. Spur Coal Processing and Loadout Facility is a permitted area for the final disposal of underground development waste. Disposal of development waste underground is an acceptable practice.

The applicant is in compliance with this section.

**Stipulations**

None.

**UMC 817.81-.88 Coal Processing Waste Bank-(PGL)**

**Existing Environment and Applicant's Proposal**

The applicant does not process any coal at this site. Therefore, this section is not applicable.

**UMC 817.89 Disposal of Non-Coal Wastes-(PGL)**

**Existing Environment and Applicant's Proposal**

The applicant temporarily stores trash in a dumpster within a fenced area on-site. Trash is hauled on an as-needed basis to the Carbon County Landfill (an approved landfill [page 3-21]).

**Compliance**

Noncoal wastes are disposed in an acceptable manner.

The applicant is in compliance with this section.

**Stipulations**

None.

## UMC 817.91-.93 Coal Processing Waste: Dams and Embankments-(PGL)

### Existing Environment and Applicant's Proposal

The applicant does not process any coal at this site. Therefore, this section is not applicable.

## UMC 817.95 Air Resources Protection-(PGL)

### Existing Environment and Applicant's Proposal

The applicant describes mitigation to control air pollutants, such as watering roads and water sprays on the coal conveyor (pages 3-57 through 3-59). Due to the low particulate emission measured at this mining operation, the Bureau of Air Quality did not require an air quality approval order.

### Compliance

The applicant's methods to control fugitive dust are acceptable.

The applicant is in compliance with this section.

### Stipulations

None.

## UMC 817.97 Protection of Fish, Wildlife, and Related Environmental Values-(WJM/BAS)

### Existing Environment and Applicant's Proposal

The Gordon Creek #2, #7 and #8 Mines permit area is classified into 12 vegetative types (page 9-5). Included are two forest types, seven shrubland types, one shrub/forest/riparian type, and two grassland types. Five types consisting of aspen/woodland, mixed conifer, oak shrubland, big sagebrush and mountain grassland account for about 90 percent of the permit area. Oak shrubland is the most extensive. These plant communities provide watershed, cover, and food for wildlife.

Tables 1 and 2 on page 10-85 provide a detailed listing of all wildlife inventoried on or suspected to inhabit the proposed permit area. Seasonal distribution of wildlife is also discussed. Information was provided by the Utah Division of Wildlife Resources.

One federally-listed threatened or endangered species of wildlife, the bald eagle, is suspected to inhabit areas adjoining the Gordon Creek #2, #7 and #8 Mines (Section 10.3.3.1). Habitat surrounding the permit area plays an important role for both golden and bald eagles (Section 10.1, Figure 10-11).

Deer seasonally inhabit both disturbed and undisturbed portions of the permit area. Although livestock drift fences have been installed, the mine area is readily accessible to wildlife. Seasonal use maps are shown on pages 10-22, 10-23, 10-27, and Figure 10-11.

Mitigation for loss of wildlife habitat will be accomplished by contemporaneous and final reclamation. The applicant will achieve reclamation goals by: (1) planting a diverse mixture of native grasses, forbs and woody species; (2) using seedling stock as well as seeds for trees and shrubs; (3) clumping shrub and tree species to create an edge effect; and (4) leaving islands of natural vegetation in newly disturbed areas (page 3-94, Section 3.5.5.6).

Raptor studies have documented nest status, use of surface facilities area, and powerline safety (pages 10-62, 10-64, 10-65, and 10-73).

Fish and wildlife impact mitigation includes employee awareness and training, traffic control, construction of surface facilities, fence design to provide wildlife access, contemporaneous reclamation, and monitoring programs (Tables 10-12 and 10-13).

Following mining, the applicant will implement revegetation methods designed to restore and enhance wildlife and environmental values on disturbed areas. The final revegetation plant mix includes herbaceous and woody species adapted to on-site conditions and of known value to wildlife for cover and forage (Section 10.3, page 3-86).

### Compliance

Coal has been mined continuously since 1969. A total of 17.58 acres have been disturbed.

Plant materials used for permanent revegetation are shown in Tables 3-2, 3-3 and 9-1. Plant species have been selected which provide nutrition and cover for wildlife and will enhance wildlife habitat after bond release.

Field surveys and literature searches did not identify the presence of threatened and endangered plant and animal species.

The applicant, with the assistance of the Division and the U.S. Fish and Wildlife Service, has already implemented a number of powerpole protection measures (pages 10.62 and 10.62-1). However, in consequence of the electrocution of two great-horned owls at the #2 Mine on July 31, 1989, additional protective measures will be required.

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

**Stipulation UMC 817.97--(1)--(WJM/BAS)**

1. Within 30 days of permit approval, the applicant must safeguard all powerpoles at the #2 Mine from raptor electrocution. Poles must be gapped (4 inch gap) at least 12 inches below the lowest crossarm and below transformer tanks. Perchguards must be installed on crossarms which provide less than 60 inches separation of conductors. Multiple perchguards or other forms of perch deterrents must be mounted on transformer tanks. Elevated perches, having at least a two-foot vertical rise above conductors, must be erected on all powerpoles.

**UMC 817.99 Slides and Other Damage-(PGL)**

**Existing Environment and Applicant's Proposal**

The applicant commits to notify the Division by the fastest available means any time a slide occurs which may have a potential adverse effect on public property, health, safety, or the environment (page 3-26).

**Compliance**

The applicant's commitment meets the requirements of this section.

The applicant is in compliance with this section.

**Stipulations**

None.

**UMC 817.100 Contemporaneous Reclamation-(WJM/BAS)**

**Existing Environment and Applicant's Proposal**

The applicant has committed to contemporaneous reclamation of all areas non-essential to mining operations (Section 3.5.1). These areas will be backfilled or graded, topsoiled, fertilized, seeded and mulched (Section 3.5.5).

Final reclamation will be conducted immediately after final site preparation and during the first normal period of favorable planting conditions (Section 3.5.5).

## Compliance

The applicant's plan for contemporaneous reclamation meets the requirements of this section.

The applicant is in compliance with this section.

## Stipulations

None.

## UMC 817.101 Backfilling and Grading-(PGL)

### Existing Environment and Applicant's Proposal

The #2 Mine was originally disturbed in late 1969. When this area was disturbed, no topsoil or other material was saved. The #7 Mine portal area was disturbed in 1983 and 1984. The #8 Mine portal area was disturbed in 1989.

It is the intent of the applicant to restore these areas to a topography suitable for wildlife habitat and livestock grazing (see discussions under UMC 817.133, pages 3-75 and #8 Mine Amendment, page 3-28). Reclamation will be conducted 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 much 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 3-7, 3-7a, and 3-7ba, Postmining Topography;
- 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; and

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 a ripper on the dozer to a depth of two feet.

Designated areas that will retain highwalls are shown on Plates 3-7, 3-7a, and 3-7b. The justification for retention of highwalls is described on page 3-77 and #8 Mine Amendment, page 3-30.

Thorough geologic and stability investigations were done at the #7 Mine and #8 Mine portal areas (#8 Mine Amendment, pages 3-3 through 3-8).

### Compliance

The applicant provides a backfilling and grading plan that will be suitable for the postmining land use. The applicant's request and justification for retention of highwalls is acceptable. An acceptable factor of safety was demonstrated for the backfilled areas.

The applicant is in compliance with this section.

### Stipulations

None.

## UMC 817.103 Backfilling and Grading: Covering Coal and Acid- and Toxic-Forming Materials-(HS)

### Existing Environment and Applicant's Proposal

The applicant commits to covering all exposed coal outcrops and all acid- and/or toxic-forming materials with a minimum of four feet of non-combustible, non-acid and non-toxic forming material (pages 3-76, 8-27 and 8-31).

Material which has been identified as highly sodic (see discussion under UMC 817.24) will be covered with four feet of non-acid and non-toxic forming material. Approximately three feet of cover will be comprised of fill (bank material spoil, etc.) and one foot of cover will be topsoil, subsoil and substitute topsoil material (page 3-76).

### Compliance

The applicant's commitments meet the requirements of this section.

The applicant is in compliance with this section.

Stipulations

None.

**UMC 817.106 Regrading or Stabilizing Rills and Gullies-(PGL)**

Existing Environment and Applicant's Proposal

The applicant commits to stabilize and reseed rills or gullies deeper than nine inches in regraded areas (page 3-78).

Compliance

The applicant's commitments meet the requirements of this section.

The applicant is in compliance with this section.

Stipulations

None.

**UMC 817.111 Revegetation: General Requirements-(WJM/BAS)**

Existing Environment and Applicant's Proposal

The applicant's temporary and final revegetation plans are shown in Sections 3.5.1 and 3.5.5, respectively. Proposed interim and final reclamation seed mixes for the #2 Mine and #7 Mine portal area are shown on Tables 3-2 and 3-3, respectively. The seed mix for the #8 Mine portal area is found on Table 9-1 (page 9-4). Level to moderate slopes will be drilled, and steep slopes will be hydroseeded (page 3-88).

Compliance

All plant species in the final revegetation seed mix and planting stock are compatible with postmining land uses and will provide suitable ground cover for erosion protection, wildlife habitat and livestock forage. All plant species are perennial except for yellow sweetclover, which is biennial. All plant species are capable of regeneration and plant succession.

The applicant is in compliance with this section.

Stipulations

None.

## **UMC 817.112 Revegetation: Use of Introduced Species-(WJM/BAS)**

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

The final revegetation seed mix for the #2 Mine and #7 Mine portal area contains one introduced species, cicer milkvetch. The temporary seed mix contains yellow sweetclover, cicer milkvetch, and pubescent wheatgrass (Tables 3-2 and 3-3). The #8 Mine portal area final seed mix contains yellow sweetcover (Table 9-1).

### **Compliance**

Yellow sweetclover is valued as a fast-growing, nitrogen-fixing plant. It plays a role in soil stabilization and micro-climate modification, promoting establishment of desirable perennial species.

Cicer milkvetch is desirable as a nitrogen-fixing plant. Pubescent wheatgrass was included in the seed mix because it establishes readily, assists in erosion control, and is compatible with postmining land uses.

The applicant is in compliance with this section.

### **Stipulations**

None.

## **UMC 817.113 Revegetation: Timing-(WJM/BAS)**

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

Seeding will take place in the fall. Containerized stock will be planted in early or late fall, depending on weather conditions (Sections 3.5.5.1 and 3.5.5.2).

### **Compliance**

The applicant meets the requirements of this section by proposing to seed in the fall immediately after final site preparation (page 3-88).

The applicant is in compliance with this section.

### **Stipulations**

None.

**UMC 817.114 Revegetation: Mulching and Other Soil Stabilizing Practices-(WJM/BAS)**

**Existing Environment and Applicant's Proposal**

Native hay or straw mulch will be applied at a rate of one ton/acre on level to moderately sloped areas. Mulch will be crimped with a crimper or a straight-set disk. On steep slopes, hydromulch and tackifier will be used. On severe sites, where erosion may become a serious problem, jute netting will be used to hold mulch and soil in place (Section 3.5.5.3).

**Compliance**

Mulching practices, rates of application, and method of anchoring meet the requirements of this section.

The applicant is in compliance with this section.

**Stipulations**

None.

**UMC 817.115 Revegetation: Grazing-(WJM/BAS)**

**Existing Environment and Applicant's Proposal**

No livestock grazing will be allowed on reclaimed areas until after bond release (page 3-93).

**Compliance**

The applicant's commitment to restrict grazing until bond release meets the requirements of this section.

The applicant is in compliance with this section.

**Stipulations**

None.

**UMC 817.116 Revegetation: Standards for Success-(WJM/BAS)**

**Existing Environment and Applicant's Proposal**

Revegetation success at the #2 Mine will be based on comparisons with approved reference areas (Section 9.2.3). The reference areas are not fenced, but livestock drift fences provide protection.

Baseline data will serve as the success standards for the #7 Mine and #8 Mine portal areas (page 9-44).

Revegetation monitoring will be conducted after reclamation as follows: (1) qualitative - years 2 and 3; (2) quantitative - years 2, 3, 5, 9 and 10; and (3) comparison to reference areas - years 9 and 10 (page 3-95.1).

### Compliance

Bond liability will continue for not less than 10 years.

Monitoring commitments are adequate to document progress toward realization of reclamation objectives.

The applicant has committed to manage reclaimed areas to rectify possible problems which may occur, such as severe erosion, excessive weed growth, failed revegetation establishment, or rodent damage.

Ground cover, woody plant density, and production shall be considered equal to their respective reference area counterparts, when there is 90 percent success at 90 percent statistical confidence (Section 3.5.5.2).

The applicant is in compliance with this section.

### Stipulations

None.

## **UMC 817.117 Revegetation: Tree and Shrub Stocking for Forest Land-(WJM/BAS)**

### Existing Environment and Applicant's Proposal

Surface ownership of the Gordon Creek #2, #7 and #8 Mines is mixed, consisting of fee land and land controlled by the federal government (Table 4-1).

Woody plant stocking level is a consideration because postmining land use includes wildlife habitat (Sections 3.5.5.6 and 10.5). The applicant proposes to plant a total of nine woody species. Woody plants will be seeded and planted as containerized stock. Shrub seeds will be sown at a rate of approximately 20 seeds/ft<sup>2</sup>. Plantings will provide an additional 660-900 stems per acre on north and south exposures, respectively. Along reclaimed channels, willow cuttings will be planted at a rate of 680 stems per acre (Section 3.5.5 and Table 3-3).

On the #8 Mine portal area, the applicant proposes to plant four tree and six shrub species, totalling 1,275 plants per acre. Along restored seep and channel areas, 100 each per acre of willow, mountain maple, and chokecherry will be planted (Table 9-1).

### Compliance

Rate of seeding and supplemental planting may be expected to achieve 90 percent of reference area stocking levels or other approved standards.

The applicant commits to supplemental replanting of woody species in the event density does not meet bond release standards.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.121-.126 Subsidence Control-(RVS)

#### Existing Environment and Applicant's Proposal

The Castlegate "A" coal seam is the primary mining target for this permit term (page 3-22). Mining of the underlying Hiawatha coal seam will occur following extraction of the Castlegate "A" coal seam (page 3-22). The applicant states (page 3-23) that room and pillar methods will be used to extract both seams.

Overburden thickness, within and adjacent to the permit area, ranges from approximately 100 to over 800 feet and encompasses the Blackhawk Formation (Plate 6-1).

The applicant identifies (page 3-60) Beaver Creek, Jewkes Spring and Gunnison Homestead Spring as the major renewable resources above mine workings. In addition, the applicant indicates (page 3-59) no surface facilities or structures occur over mine areas and therefore, no man-made structures will be impacted by mining-induced subsidence. The applicant provides plans for mitigating subsidence-induced material damage to surface lands (#8 Mine Amendment, pages 3-25 and 3-26).

The applicant commits to maintaining barrier pillars that are, at a minimum, 150 feet wide (page 3-24). Plates 3-3 and 3-4 indicate outcrop barrier pillars will be 200 feet in width.

The applicant estimates maximum vertical movement over areas of double seam mining to be 6.18 feet (page 3-64). Alternatively, maximum subsidence over areas of single seam mining is estimated to be 2.33 feet.

The applicant has been restricted to first mining beneath Beaver Creek (Special Condition No. 8, page 3-64). Pillars have been sized with adequate safety factors to provide protection to Beaver Creek (Appendix B). Mitigation plans have been developed in the event subsidence-induced impacts occur along Beaver Creek (page 3-68 and Appendix 6).

The applicant has provided a plan for subsidence monitoring (pages 3-66 through 3-68). Monitoring stations are located on the "Gordon Creek No. 2 Mine Map" and Plate 3-6. Monitoring will occur twice yearly while mining is occurring within 500 feet of a station. Thereafter, monitoring will occur once a year (pages 3-67 and 3-68).

The applicant has previously notified all owners of property within the area that may be impacted by subsidence (Annual Report for 1986 and #8 Mine Amendment, page 3-25).

#### Compliance

The applicant has provided information about mining methods, overburden thickness, and vertical movement that indicate activities have been planned and will be conducted to prevent subsidence from causing material damage (UMC 817.121). Moreover, the applicant has notified surface owners (UMC 817.122) and provides plans for surface owner protection (UMC 817.124). The applicant has provided adequate safety factors to prevent material damage and allow first mining beneath Beaver Creek (UMC 817.126).

The applicant is in compliance with this section.

#### Stipulations

None.

#### UMC 817.131 Cessation of Operations: Temporary-(PGL)

#### Existing Environment and Applicant's Proposal

The applicant commits to notify the Division in the event that operations are temporarily ceased for more than 30 days. The notification will include a Notice of Intent to Cease Operations (page 3-37).

#### Compliance

The applicant's commitment to notify the Division and submit a Notice of Intent to Cease Operations with all of the required information meets the requirements of this section.

The applicant is in compliance with this section.

Stipulations

None.

UMC 817.132 Cessation of Operations: Permanent-(PGL)

Existing Environment and Applicant's Proposal

The applicant commits to reclaim the mine site after all mining operations have ceased.

Compliance

The entire permit application package meets the requirements to reclaim the mine site.

The applicant is in compliance with this section.

Stipulations

None.

UMC 817.133 Postmining Land Use-(BAS/WJM)

Existing Environment and Applicant's Proposal

The land on which the Gordon Creek #2, #7 and #8 Mines is located has been used for coal mining, livestock grazing, deer hunting, sightseeing, and hiking (Section 4-4). There are no developed campgrounds within the area and none are planned for the future (Section 4.4.2).

The applicant does not own any fee land in the permit area (Section 4.3.3).

Postmining land uses will be the same as premining and present uses described above. In areas of surface disturbance, reclamation will restore the area to a condition capable of supporting premining uses (page 3-38).

Compliance

The applicant's proposed reclamation plan and protection measures are feasible and consistent with postmining land uses.

The applicant is in compliance with this section.

Stipulations

None.

## UMC 817.150-.156 Roads: Class I-(PGL)

### Existing Environment and Applicant's Proposal

The coal haul road is used for all access to and from the mine site. It is approximately 5,700 feet long and is bermed on the Bryner Canyon side until it enters the mine-site 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 personnel 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 above eight percent (page 3-17).

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 (Plate 3-2 and page 3-17).

The roads will be reclaimed upon termination of operations as outlined in the reclamation plan (page 3-7).

### Compliance

The Class I haul road meets the requirements of this section.

The applicant is in compliance with this section.

### Stipulations

None.

## UMC 817.160-.166 Roads: Class II-(PGL)

### Existing Environment and Applicant's Proposal

There are three access roads that are used at the Gordon Creek #2, #7 and #8 Mines. The upper bench access road is a short road (539 feet long) from the main #2 Mine portal to the west portals, and is used for personnel and materials access. The #7 Mine portal access road is approximately 1,200 feet long (Plate 3-2a and pages 3-9 through 3-14).

The #8 Mine portal access road switchbacks just beyond the #7 Mine portal fan (#8 Mine Amendment, Plate 3-4b and pages 3-9 through 3-9e).

Access roads will be gravel-surfaced and maintained throughout the life of the facility. All Class II roads will be reclaimed.

### Compliance

The design, construction, maintenance and reclamation of Class II roads meet the requirements of this section.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.170-.176 Roads: Class III-(PGL)

#### Existing Environment and Applicant's Proposal

There are no Class III roads. Therefore, this section is not applicable.

### UMC 817.180 Other Transportation Facilities-(PGL)

#### 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 C. V. Spur Coal Processing and Loadout Facility. The transportation facilities are shown on Plate 3-2 and described on pages 3-15 and 3-16. The conveyor will be maintained and then reclaimed at the end of mining.

### Compliance

The surface conveyor minimizes fugitive dust and sediment contributions to Gordon Creek and meets the requirements of this section.

The applicant is in compliance with this section.

### Stipulations

None.

### UMC 817.181 Support Facilities and Utility Installations-(PGL)

#### Existing Environment and Applicant's Proposal

The support facilities required to operate the underground mine are shown on Plate 3-1 and described on pages 3-16 and 3-17. The central facility includes an office, bathhouse, supply building, fan building and power substation.

The applicant commits to maintain the facilities and then reclaim them at the end of mining.

Compliance

The applicant's design, maintenance and reclamation of the support facilities meet the requirements of this section.

The applicant is in compliance with this section.

Stipulations

None.

UMC 828.00 Prime Farmland Investigation-(HS)

Existing Environment and Applicant's Proposal

The applicant asserts that there are no lands identified as prime farmland within the proposed permit area (page 8-12).

Compliance

On the basis of soil survey and field review of the lands within the permit area, there are no soil map(s) units that have been designated prime farmland by the Soil Conservation Service (SCS). Refer to the SCS letter June 16, 1980, from T. B. Hutchings, State Soils Scientist, regarding a negative prime farmland determination (page 8-14).

The applicant is in compliance with this section.

Stipulations

None.

ATTACHMENT 2  
CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT SUMMARY  
GORDON CREEK NO. 2 MINE

INTRODUCTION

The Gordon Creek No. 2 Mine is located north of Sweets Canyon and south of Beaver Creek, on the extreme north-eastern part of the Wasatch Plateau Coal field. Sweets Canyon is tributary to the North Fork of Gordon Creek (hereafter referred to as Gordon Creek). Beaver Creek and Sweets Canyon are perennial streams. Both Beaver and Gordon Creek flow into the Price River. There are three other principle surface water courses that are tributary to Gordon Creek, located adjacent to the mining area. These include two ephemeral streams: Bryner Canyon and Coal Canyon, and an intermittent stream: Consumer Canyon.

Approximately 50 to 70 percent of the stream flow for all of the streams occurs during the snowmelt runoff period. Summer precipitation does not usually produce high runoff except in localized areas. Average annual precipitation ranges from 25 inches in the valleys to over 35 inches on the ridges. Water in the headwaters of Gordon Creek is a calcium-bicarbonate type and is of generally good quality, with maximum concentrations of total dissolved solids (TDS) usually less than 500 milligrams per liter (mg/L). Downstream, out of the cumulative impact area (CIA), the water changes to a magnesium-sodium-calcium-sulfate type with TDS concentrations upward of 1,100 mg/L. This decrease in quality is a result of natural runoff and irrigation return flows off the Mancos Shale Formation. The shales of the Mancos are easily weathered, gypsiferous, sodium- and sulfate- rich marine shales. Irrigation return flows are the primary source of salts causing an acceleration of the natural leaching of the solutes in the soils. The Price River averages 239,000 tons of salt and 71,800 acre-feet of water per year, contributing only 0.66 percent of the flow of the Colorado River at Lee Ferry while Salt contribution to the Price River from irrigation is estimated to range from 15,000 to 170,000 tons per year. The salt loading from all anticipated mining is estimated to increase the baseleine salt load in Gordon Creek by 6.9 percent and in the Price River by only 0.1 percent.

GEOLOGIC SETTING

The lowermost strata of importance in the area in the Masuk Shale, the upper member of the Mancos Shale Formation, which outcrops approximately two miles downstream of the mining areas. Above the Masuk are the Star Point Sandstone; the Blackhawk Formation, including the Arberdeen Sandstone Tongue; the Castle Sandstone; and the Price River Formation. All are of Upper Cretaceous age.

The Masuk Shale grades upward into, and interfingers with, Star Point Sandstone, and is considered as the lower confining zone or aquitard for the Star Point. The Star Point consists of three predominant sandstone tongues, about 440 feet thick in the area, and interfingers with the Blackhawk Formation above. The sandstone tongues have generally poor hydraulic characteristics, except where enhanced by the localized faulting, fracturing and jointing that has occurred. The Blackhawk consists of about 900 feet of interbedded sandstone, siltstone and coal. The sandstones of the Blackhawk are predominantly paleo-channel deposit, pinches out from the east, just east of the permit area. The discontinuous nature of these channel sandstones make ground water movement through the Blackhawk somewhat irregular, resulting in perched aquifers within the channel sandstones. Springs and seeps are common in the area. Discharge varies considerably throughout the year as a result of limited recharge areas and proximity of the springs and seeps to the recharge zones.

The Gordon Creek area has three major fault zones ranging in displacements of a few inches to 600 feet. Two of these major zones trend north-south and the other zone trends northwest-southeast. In addition to the faults, there are several intrusive dikes crossing the permit area that vary in thickness from a few inches to 14 feet. Zones of coked coal occur adjacent to the dikes and have been observed to discharge limited quantities of water, indicating that the coked coal is more permeable than the adjacent dike or uncoked coal.

#### PAST, PRESENT AND ANTICIPATED MINING

Mining began in the North Fork of Gordon Creek in the early 1920's. Areas of unreclaimed land remain from these operations resulting in continuing accelerated sediment contribution to Gordon Creek. Past mines include the Blue Blaze, Consumers, National, Swisher and Sweet mines. Recently abandoned are the Gordon Creek No. 3 and No. 6 mines, which will be reclaimed under the Utah regulatory program.

All anticipated mining in the vicinity of the Gordon Creek No. 2 Mine includes existing and proposed mines in the Gordon Creek drainage for which specific resource reserve and protection plans have been filed. This includes the existing Gordon Creek No. 2 Mine, development of the Southwest Lease, and the C&W mine. The C&W Mine will be located in Consumers Canyon, and will mine coal from the Castle Gate A seam, between the abandoned Consumer Mine and National Mine. The life of the C&W Mine is about 10 years.

## DELINEATION OF THE CUMULATIVE IMPACT AREA

The surface water CIA only addresses the portal areas that contribute runoff to Gordon Creek. Beaver Creek receives no runoff from the disturbed areas of the mining operations and is therefore not considered. The lower limit of the impact area is delineated by the Mancos Shale. The high concentration of salt loading from the Mancos completely overshadows any loading of TDS from the anticipated mining operations. The ground-water CIA addresses areas in both the Gordon Creek and Beaver Creek basins.

### APPROACH

The location, quantity and quality of ground water within the mines in the CIA provides valuable insight into the ground water system. The Gordon Creek No. 3 was developed into the Hiawatha seam and considered dry until a 12 foot graben (down-dropped block) was encountered where water discharged at a rate up to 400 gpm. As the mine advanced, the flow rate decreased and dried up by the time retreat mining occurred through the graben.

The Gordon Creek No. 6 Mine was briefly developed into the Castle Gate "A" seam and abandoned due to unsafe roof conditions. The only water encountered within this mine issued from the paleo-channel sandstones exposed in the roof. The rate of flow was described as dripping with no measurable flow. The Gordon Creek No. 3 Mine had been previously developed below the No. 6 Mine and it is believed that the dewatering operations in the lower coal seam of the No. 3 Mine has a direct bearing on the lack of water encountered in the No. 6 Mine.

The Gordon Creek No. 2 Mine, in the Castle Gate "A" seam has been generally dry but has produced water from the channel sandstones in the roof and from faults. Ground water inflow has not been great enough to supply the needs of the mine and water has historically been pumped into the mine to supply the 10.2 gpm average requirement (water consumption during 1982 was 16.53 acre feet) of the mining equipment. Ground water inflow of 20 to 40 gpm (decreasing with time) occurred along a faulted zone while mining under Beaver Creek where there was 500 feet of overburden. The inflow was associated with the down-dropped side of the fault. In another case, significant flow occurred on the down-side of fault where the up-side was dry. All inflow rates into the mine decreased with time indicating that the water is derived primarily from storage.

The majority of the springs in the area are associated with the Blackhawk Formation. Little site-specific information exists concerning the flow characteristics, but based on the regional hydrogeologic framework, are assumed to be similar to other springs and seeps in the Blackhawk. The springs and seeps are believed to be either fault related, perched or associated with the outcropping of the paleo-channel sandstones.

Water moves preferentially in the more permeable channel sandstone strata and along faults to local points of surface discharge or downward to recharge the permeable strata below. Springs associated with faulted zones or alluvial deposits can yield greater volumes of water over longer periods of time due to the better hydrologic characteristics associated with these geologic features. Most mine inflows decrease in flow rate and eventually cease to flow, which indicates that the water is derived primarily from storage.

Ground-water discharge to surface water occurs from both springs, seeps and baseflow contribution in the alluvial aquifers. Baseflow contribution to the surface water system cannot be quantified with the available information, but it is estimated to be on the order of 5 to 7 cfs (cubic feet per second) for the North Fork of Gordon Creek based on September flow of 7 to 9 cfs in Sweets Canyon.

The monitoring programs established for the Gordon Creek Mines include flow rate, specific conductance (a measure of salinity), sulfate, iron, manganese, nitrate, chloride, oil and grease, total dissolved solids, and total suspended solids. Several records provided only water quality parameters with no flow rate measurements.

Because of the absence of long term hydrologic data, surface water and or ground-water modeling in Gordon Creek was not possible. Therefore, estimates of the impacts due to mining were projected based on estimated annual loading resulting from the mining operations. Annual load estimates were developed for total dissolved solids (TDS), total suspended solids (TSS), chloride and sulfate. Annual load estimates were developed for all anticipated mining in the CIA. Estimated annual load for each of the mines was summed together to estimate the annual load on Gordon Creek. Ground water quality was determined to not be affected by the mining operations, therefore only surface water quality is considered.

Annual load estimates were obtained by multiplying the known monthly concentration values of the water quality parameter by the known flow rate and converting to tons per year. Where data gaps existed, data was extrapolated from months with data. Estimated annual loads from above the portal areas were subtracted from estimated annual loads from below the portal areas to provide an estimate of the annual load from all anticipated mining.

Decreases in stream flow or spring flow resulting from mining may occur in one of two ways. First, the mine may progress into an area that is in hydraulic connection with a spring or stream and redirect the flow path of the ground water into the mine. This mechanism for causing mining impacts to spring or stream discharge is not significant with respect to this CHIA because the information available indicates that what little ground water had been encountered within mines in the area was derived from storage in localized strata. There has been no evidence to suggest, that within the CIA, that any faulted zones encountered in the mines are in direct connection with springs and streams. Apparently the ground-water flow observed discharging from springs and streams is a localized, shallow and near-surface system that has not been encountered in the mines.

The second mechanism that could most likely cause decreases in stream flow or spring flow is subsidence, which could theoretically be as much as 6 feet. The Office of Surface Mining (OSM) has determined by reviewing the history of subsidence in the area that subsidence effects have not been extensive in the area to date.

## RESULTS

### Water Quality Impacts

Predicted increases in TDS from all anticipated mining ranged from 110 tons per year for a low flow year to 260 tons per year for a high flow year. This compares with a baseline value of 6 and 76 tons upstream of the mines and 1800 tons downstream (estimated annual baseline load) for Gordon Creek in 1983 (a high flow year). The increase in TDS load in Gordon Creek is about 13 percent, this will not disrupt or prevent use of the stream water by current downstream users (primarily irrigation). Data indicates that TDS concentrations are almost always below 500 mg/L for monitoring stations below the mines and for mine discharge. The observed values for TDS concentration do not violate EPA or Utah water quality criteria. Because no water quality criteria are exceeded, no material damage or effects on downstream users, as a result of TDS loading, is expected.

Magnesium chloride has been applied to the haul road to reduce dust problems and reduce sediment contributions to the stream flow. This has resulted in only a slight increase in annual chloride load over background conditions, which are very low. Mean concentration was 7 mg/L in 1980 and 23 mg/L in 1981. Observed data show that chloride concentration at all monitoring sites was less than 50 mg/L, well below safe levels. No material damage or effects to downstream users is anticipated with respect to chloride. Magnesium concentration is minor in the CIA and has not been monitored, and therefore not discussed in the CHIA.

Predicted increases in sulfate loads ranged from 15 to 27 tons per year, essentially all from land-surface runoff rather than mine discharge. Observed data for all of the monitoring stations show that sulfate concentration was always less than 100 mg/L, which is below soft levels. No material damage is anticipated with respect to sulfate.

There were decreases in TSS loads at the No. 3 and 6 mines and increases at the No. 2 mine, resulting in a net change of zero. To estimate load from the anticipated mining, the suspended sediment production rates developed for the Mud Creek basin (Belina CHIA) were used for Gordon Creek. These values are high, as the ephemeral nature of the channels near the disturbed area will greatly reduce the sediment delivery ratio compared to the perennial streams involved in the Mud Creek area. No information was available to compare the predicted TSS load to that of the TSS load for Gordon Creek except for one year of TSS data in Gordon Creek near the Price River. The worst cast TSS load resulting from all anticipated mining is estimated to be 20 tons per year for low flow years and 150 tons per year for high flow years. The predicted TSS load from all anticipated mining would result in a maximum of two percent increase in annual TSS load for Gordon Creek near the Price River (outside the CIA, but represents a worst case scenario). Therefore, TSS load will not cause material damage or effects to downstream users.

#### Water Quantity Impacts

The Gordon Creek No. 2 mine does not plan to mine coal below or to the south of Bryner Canyon or underneath Sweets Canyon. Through analysis of subsidence history, it can be assumed that within a 350 foot overburden limit, subsidence effects will disrupt the continuity of the fault zone conduit that currently is responsible for the points of ground water discharge. Because fault zones collect ground water discharge from numerous strata along the length of the faulted zone, it is quite probable that faulted zones that are partially subsided will be only partially dewatered.

Two springs with water rights have been identified that might have a decrease in flow as a result of mining, one in Bryner Canyon and the other in Consumer Canyon.

A series of springs without water rights occur along the fault zone that extends up Consumers Canyon. It is likely that these springs will experience a partial decline flow, because that fault zone responsible for the flow may be affected by subsidence, thereby redirecting some of the flow away from these springs.

The applicant has satisfied the requirements to mitigate the impacts of possibly causing a decrease in flow rate to the springs discussed earlier, as a result of possible subsidence, in accordance with UMC Sec 783.17; 784.14(a); 784.20(c) 817.124(b); 817.126(a); and 817.133(a). Therefore the possible subsidence impacts are determined not to be significant.

There are no perennial streams that are expected to be affected by any anticipated mining (See Permit Condition No. 8). The intermittent flow in Consumers Canyon is likely to be intercepted by subsidence fractures. This combined with possible loss of spring flow supplying water to Consumers Canyon may result in diminishing the intermittent flow in Consumers Canyon. This effect will not be long lasting as the subsidence effects are generally self healing. The applicant has committed to restoring subsidence affected features by replacing affected water sources, in accordance with UMC 817.57 and 817.126. Permit condition number 8 address possible subsidence under perennial by requiring the applicant to demonstrate that impacts to the streams are not likely, and by providing complete mitigation plans for regulatory approval if subsidence should occur. These potential impacts are therefore determined to be not significant.

On a worse-case basis, if all the springs are dried up, together with the water consumption associated with the No. 2 and C&W Mines, it is predicted that a total of less than 37 gpm (60-acres-feet per year) will be lost from the Gordon Creek drainage. The 37 gpm represents only 1.2 to 1.6 percent of flow of the North Fork of Gordon Creek, on a worst-case basis. Since the applicant has committed to mitigate impacts affecting diminished flow in springs and seeps, then the loss of the Gordon Creek drainage is determined to be not significant.

#### FINDING

The Regulatory Authority concludes from the cumulative hydrologic impact assessment report and the technical assessment that increases in total dissolved solids (including chloride and sulfate) and total suspended solids will occur; however, these increases have been determined to not cause material damage to the surrounding hydrologic balance. In addition, two springs with water rights (Bryner and Consumer Canyon springs), and surface water flow in Consumers Canyon may have a diminution in flow, where the applicant has provided mitigating measures. OSM determines that the mining operation has been designed to prevent material damage to the hydrologic balance outside the proposed mine plan area for the life of the proposed mining operations.