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TECHNICAL ANALYSIS

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

July 6, 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 sedimention pond and pad area. The approval process was temporarily delayed on May 25, 1984 until the applicant 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 paragaph (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.

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 cryoborall; 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 newly developed 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^3 of topsoil, an additional 8,000 yd^3 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 yd^3/7.5 Acres = 12" 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. 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 are currently undergoing analysis at Utah State University.

The applicant is in compliance with this section when the following stipulation is accepted upon final approval.

Stipulation 817.21-.25-(1)-EH

1. If upon receipt and evaluation of the soil samples taken on June 20, 1984 the substitute material proves to be of poor quality, the applicant must submit, within 30 days of notification, plans that address section UMC 817.22. The applicant must be in compliance of section UMC 817.22 within 60 days of notification by the Division of the quality of the topsoil substitute.

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 monoclinal 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 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, 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.

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. An overview of the applicant's ability to meet water quality standards and effluent limitations is presented in a technical review of the applicable regulations.

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.

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 by July 31, 1984.

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. 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 committed in the February 23, 1984 letter from Beaver Creek Coal Company to undertaking, prior to June 30, 1984, a field investigation of bedrock levels in the Bryner Canyon disturbed and undisturbed diversions. Based on the results of the investigation, the applicant has committed to submitting 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 to be performed by the applicant prior to June 30, 1984, the applicant will submit design and installation measures, within 30 days of the study, 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, 3679 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 activites 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 gobbed 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 reseeding 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, Sectifon 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, particulary 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 Divison 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 suggested 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), greater instability would result from blasting and no known seeps or springs exist on these highwalls.

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 disturbnce 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 817.160-.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.

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.

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