

## FINDINGS DOCUMENT

Beaver Creek Coal Company  
Huntington #4 Mine  
ACT/015/004, Emery County, Utah

March 14, 1985

1. The plan and the permit application are accurate and complete and all requirements of the Surface Mining Control and Reclamation Act (the "Act"), and the approved Utah State Program have been complied with (786.19[a]).
2. The applicant proposes acceptable practices for the reclamation of disturbed lands. These practices have been shown to be effective in the short-term; there are no long-term reclamation records utilizing native species in the western United States. Nevertheless, the regulatory authority has determined that reclamation, as required by the Act, can be feasibly accomplished under the Mining and Reclamation Plan (MRP). Yards, roads and portal areas were dozed out of very steep rock and will be backfilled and compacted prior to redistribution of topsoil substitute material (see Technical Analysis [TA], (Section UMC 817.101). After backfilled areas are compacted, topsoil substitute material will be applied and these areas will be deeply scarified to reduce compaction in the rooting zone to assist revegetation efforts (UMC 786.19[b]). (See TA, Section UMC 817.21-.25 and 817.111-.117.)
3. The assessment of the probable cumulative impacts of all anticipated coal mining in the general area to the hydrologic balance has been made by the regulatory authority. The mining operation proposed under the application has been designed to prevent material damage to the hydrologic balance outside the permit area for the anticipated life of the mine (UMC 786.19[c] and UCA 40-10-11[2][c]). (See Cumulative Hydrologic Impact Analysis [CHIA] Section, attached to this Findings Document.)
4. The proposed permit area is:
  - A. Not included within an area designated unsuitable for underground coal mining operations. (See letter from Bureau of Land Management [BLM] to the Office of Surface Mining [OSM] dated October 25, 1983.)
  - B. Not within an area under study for designated lands unsuitable for underground coal mining operations. (See letter from BLM to OSM dated October 25, 1983.)
  - C. Not on any lands subject to the prohibitions or limitations of 30 CFR 761.11(a) (national parks, etc.), 761.11(f) (public buildings, etc.) and 761.11(g) (cemeteries). (See MRP, Section 4.4.2, pages 4-25, 26.)

- D. Within 100 feet of the outside right-of-way line of a public road, however, the mine was in operation prior to August 3, 1977 (UMC 761.11). (See MRP, Section 3.2, page 3-1.)
- E. Not within 300 feet of any occupied dwelling (UMC 786.19[d]). (See MRP, page 3-44.)
5. The regulatory authority's issuance of a permit is in compliance with the National Historic Preservation Act and implementing regulations (36 CFR 800) (UMC 786.19[e]). (See attached letter from SHPO dated July 15, 1983.)
6. The applicant has the legal right to enter and begin underground activities in the permit area through one Special Warranty Deed, two Warranty Deeds, two Federal Coal Leases, two Fee leases, two Special Use Permits and one Road Use Permit (UMC 786.19[f]). (See MRP, Section 4.3.4.)
7. The applicant has shown that prior violations of applicable law and regulations have been corrected (UMC 786.19[g]). (See MRP, Section 2.3.3, Table 2-3.) (Personal communications with Division of Oil, Gas and Mining [DOGM], Inspection and Enforcement section, and OSM, Albuquerque Field Office, January 16, 1985.)
8. Neither Beaver Creek Coal Company nor its parent company, Atlantic Richfield Company, are delinquent in payment of fees for the Abandoned Mine Reclamation Fund for its active mining operations (UMC 786.19[h]). (Personal communication, John Sender, OSM, Albuquerque, January 12, 1984 and April 19, 1984.)
9. The applicant does not control and has not controlled mining operations with a demonstrated pattern of willful violations of the Act of such nature, duration and with such resulting irreparable damage to the environment as to indicate an intent not to comply with the provisions of the Act (UMC 786.19[i]) (See MRP, Section 2.3.) (Personal communications with DOGM, Inspection and Enforcement section, and OSM, Albuquerque Field Office, January 16, 1985.)
10. Underground coal mining and reclamation operations to be performed under the permit will not be inconsistent with other such operations anticipated to be performed in areas adjacent to the proposed permit area (UMC 786.19[j]). (See MRP, Section 4, Volume 1.) The Crandall Canyon Mine lies immediately north of the Huntington #4 leases, and Utah Power & Light Company's Federal Leases (U-02437 and U-06039) lie immediately south. The latter are not being mined, nor are they within a distinct mine plan area to date.



## TECHNICAL ANALYSIS

Beaver Creek Coal Company  
Huntington #4 Mine  
ACT/015/004, Emery County, Utah

March 14, 1985

### Introduction

The Huntington Canyon #4 Mine, also called the Huntington #4 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 Mill Fork Canyon, tributary to Huntington Creek, approximately 12 road miles northwest of Huntington, Utah. The mine began production in early 1977 on areas disturbed by mining operations conducted during the 1940's. The mine started production in early 1977, was temporarily inactive in October 1978 and resumed full-time operation in March 1980. The mine was permanently closed November 1, 1984, when maximum coal recovery was achieved.

An application for a mining permit was received by the regulatory authority on March 20, 1981. An Apparent Completeness Review (ACR) was prepared and sent to the applicant on June 9, 1982. Beaver Creek Coal Company submitted their response to the ACR on June 20, 1983. The regulatory authority prepared a Determination of Completeness and Technical Deficiency Document (DOC/TD) which was sent to the applicant on August 1, 1983. Beaver Creek Coal Company responded to the latter on November 2, 1983, and the regulatory authority determined the Mining and Reclamation Plan (MRP) complete on December 20, 1983.

Existing surface facilities and roads encompass 12.5 acres of disturbance. Surface disturbance is located on a steep slope of primarily southerly exposure. Beaver Creek Coal Company intends to perform reclamation upon the 12.5 acres of disturbed lands used in the operation of the Huntington #4 Mine.

The Huntington #4 Mine is located in the upper Blind Canyon seam, approximately 80 to 100 feet above the lower Hiawatha seam. All mining was performed using the room-and-pillar method.

Surface ownership is 46 percent Federal and 54 percent fee. Mineral leases (coal ownership) are also 46 percent Federal and 54 percent fee. Total acreage is 1,320 acres. The Huntington #4 Mine, at full operation, employed about 53 people.

### Description of Existing Environment

The Huntington #4 Mine is located in Mill Fork Canyon, a tributary to lower Huntington Canyon Creek. This portion of the Huntington Canyon

watershed is characterized by steep, relatively narrow canyons which typically dissect the eastern edge of the Wasatch Plateau. Huntington Creek is a tributary to the Colorado River via the San Rafael and Green Rivers.

Vegetation in the vicinity of the mine consists primarily of pinyon-juniper associations on south-facing exposures and mixed conifer stands on northerly exposures, comprised of Douglas fir, spruce and white fir. Riparian areas occur along stream channels in canyon bottoms and locally in association with springs and seeps. At upper elevations of the Wasatch Plateau, predominant vegetation consists of aspen and Douglas fir forests interspersed among areas dominated by montane big sagebrush.

Economically and aesthetically important wildlife inhabiting the environs of the mine are mule deer, elk, cougar, black bear, coyote, snowshoe hare, golden eagle and a variety of raptors, gamebirds and songbirds. Huntington Creek is classified by the State as a Class III fishery, providing habitat for salmonid species, primarily brown and rainbow trout.

Predominant land-uses in the general area of the minesite are wildlife habitat, limited grazing land and recreation. From an industrial aspect, the historic use of the land has been and continues to be coal mining.

Streamflow in the Huntington Canyon watershed result primarily from snowmelt which constitutes about 65 percent of the annual discharge (Danielson et al., 1981). The snowmelt season typically occurs from April through July.

Mill Fork Canyon is oriented in primarily an east-west direction, with Mill Fork Creek flowing easterly into Huntington Creek. The stream in Mill Fork Canyon is intermittent; it was dry during the summer of 1977, but flowed at the mouth of Mill Fork Creek during the summers of 1978 and 1979, both years of above-normal precipitation (Danielson et al. 1981). The canyon is approximately paralleled on the north by Little Bear and Crandall Canyons and on the south by Rilda Canyon. The mine facilities are located at an elevation of approximately 7,400 to 7,800 feet and are on the south facing slope of the canyon.

The ground water system in the area of the Huntington #4 Mine is characterized by localized aquifers in the Castlegate Sandstone, apparent perched aquifer conditions in the upper Blackhawk Formation and a regional aquifer occurring in the underlying Star Point Sandstone and lower portion of the Blackhawk Formation. Danielson, et al. (1981), recognized the regional aquifer system and formally termed it the Star Point-Blackhawk aquifer (page 22). The varied distribution of faults and

fractures, impermeable shale beds and paleochannels contributes to a complex pattern of ground water flow within and adjacent to the permit area.

Ground water recharge appears to be largely associated with snowmelt rather than rainfall, based on deuterium studies performed by the U. S. Geological Survey (USGS) and Beaver Creek Coal Company. Recharge of the Star Point-Blackhawk aquifer is thought to primarily occur through a conduit system of faults and fractures. Zones of fracturing and faulting would allow water to pass through less permeable beds that normally would impede vertical flow (Danielson, et al. 1981).

Ground water discharge occurs at springs and seeps, a few of which occur near the Huntington #4 Mine lease area. In addition, base flow for perennial drainages is thought to be sustained by recharge from the Star Point-Blackhawk aquifer.

#### Reference

Danielson, T. W., ReMillond, M. D., and Fuller, R. H. 1981. Hydrology of the coal resource areas in the upper drainages of Huntington and Cottonwood Creeks, central Utah: U. S. Geological Survey Open File Report, 81-539, page 85.

#### UMC 785.19 Alluvial Valley Floors

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

Mill Fork Canyon lacks unconsolidated streamlaid deposits, current or historical flood irrigation or subirrigation and the capability to be flood irrigated. The applicant indicates no alluvial valley floors exist within and adjacent to the permit area (MRP, page 7-95).

##### Compliance

The applicant has provided sufficient information about alluvial deposits and irrigation (MRP, Section 7.3, pages 7-94 and 7-95, and Plate 6-1) for the Division to determine as required by UMC 785.19(c)(2) that no alluvial valley floors exist.

##### 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 Mill Fork Creek to prevent disturbance to this perennial drainage (MRP, Section 3.3.5.1). The one existing topsoil stockpile has been adequately marked. No explosives are used incident to surface activities (MRP Section 3.3.5.4).

### 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 holes within the permit and adjacent area have been identified as to location, elevation at the collar and extent of casing. All boreholes designated by the code MC and HCD (MRP, Table 2, page 6-3) have been either cemented entirely or cased and plugged with cement at the surface. Thirteen exploration boreholes designated DH were drilled during 1974-1976. Completion records for DH boreholes were not maintained (MRP, page 6-14). The applicant attempted to locate and inspect DH boreholes during 1981 and states that boreholes associated with identifiable drill sites were covered or naturally plugged (MRP, page 6-14).

The first phase of the reclamation activity following final abandonment of the operation will be to permanently seal mine portals. The final sealing of mine portals will be accomplished by installing a recessed concrete block seal 20 to 50 feet from the mouth of the portal (MRP, page 3-56). Seals will be constructed of a double solid concrete block wall with a pilaster in the center. The seal will be recessed a minimum of six inches into the floor, roof and ribs and shall be coated with mortar on one side. Pipes or vents will not be placed within the seal since the portal will be backfilled and pipes can deteriorate over long periods of time, allowing air to enter the mine and increasing the possibility of combustion. Since a portion of the mine slopes slightly towards the portals, seal design will accommodate mine inflows and a maximum hydrologic pressure of 30 psi. The area from the seal to the

mouth of the portal will be backfilled to minimize roof breakage. Portal structures will be removed and the exposed coal seam, including the former portal opening, will be covered during reclamation of the upper pad and highwall areas (Figure 3-6, MRP, page 3-57).

#### Compliance

MC and HCD boreholes have been adequately plugged with cement. Although the Division prefers cement to natural plugs, the applicant's inability to locate DH boreholes excludes initiating remedial procedures to excavate and install cement plugs. With regard to the above, the Division grants approval for the method of DH boreholes abandonment.

The applicant's methodology for permanently sealing mine portals adequately address the regulations. BLM has also reviewed the applicant's proposed methodology and inspected the site to assure the feasibility of implementation.

The applicant is in compliance with this section.

#### Stipulations

None.

#### UMC 817.21-.25 Topsoil

#### Existing Environment and Applicant's Proposal

Huntington #4 minesite is located at an elevation of between 7,400 and 7,800 feet on a southern exposure. The annual precipitation ranges from 12 to 20 inches and the frost free days range from 60 to 120. Mean annual temperature is 38° to 45° F.

Soil Resource Information is discussed in Volume 2, Section 8.3 of the MRP.

Soils in the area have evolved from the weathering of sandstone and shale on slopes ranging from nearly level to as steep as 90 percent. Three soil series were found to exist in the area; Patmos, Quigley and Podo. The Patmos and Podo series are Ustorthents and the Quigley is a Haploboroll. The A horizons range from as thin as two inches in the Podo to as thick as seven inches in the Quigley. Soil permeability is moderate to moderately rapid and the erosion hazard due to water is slight to high. The native vegetation is Salina wildrye, juniper, big sagebrush, rabbitbrush and pine.

Approximately 12.5 acres of land have been disturbed, the majority of which occurred prior to the enactment of Public Law 95-87. Therefore, except in the area of the sediment pond, no topsoil was removed and placed in storage for final reclamation. To alleviate the topsoil shortage the applicant has proposed to use the soil material that was sidecast during the construction of the mine, as a plant growth medium for final reclamation. Samples of the sidecast soil material were taken and chemical and physical analyses conducted. Based on these results (Table 8-4 of the MRP), the soil material was found to be suitable as a plant growth medium. In the area of the pumphouse and holding pond, the soil that is in place at the present time will be used for reclamation. No soil samples of this soil material have been taken at this time. During reclamation, the topsoil substitute will be retrieved by a backhoe and placed on the road and pad areas. A dozer (D-7 or equivalent) will be used to spread the soil material. The topsoil removed and saved during the construction of the sediment pond will be placed back on the sediment pond after it has been removed and graded. The area used for the pumphouse will be regraded and the in-situ soil material used for reclamation. After redistribution of the soil material, it will be deeply scarified to reduce compaction and additional soil samples will be taken to evaluate the need for N, P, K in preparation for reseeding, as per the revegetation plan (Section 3.5.4 of the MRP).

#### Compliance

The applicant is not in compliance at this time. Analysis of the soil material to be used for reclamation of the pumphouse and holding pond must be submitted before the applicant will meet the requirements of this section.

#### Stipulation 817.21-.25-(1)-EH

1. Soil analysis demonstrating the suitability of the soil material proposed for use in reclamation of the pumphouse must be submitted to the regulatory authority for approval no later than June 1, 1985.

#### UMC 817.41 Hydrologic Balance: General Requirements

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

Volume 2, pages 7-1 through 7-96, of the MRP contains the hydrologic information for the permit and surrounding areas.

Surface Waters. The applicant proposes to route disturbed area runoff into sedimentation ponds via a series of structures including ditches and culverts. The sedimentation pond system includes two ponds in series with the lower pond having a gravel dike for filtering pond

effluent. The effectiveness of the ponds is assessed by a sampling program which monitors effluent from the lower pond (MRP, Sections 3.4.3 and 7.2.3.1).

Undisturbed drainage is routed around the minesite by a series of ditches and culverts to prevent mixing of undisturbed and disturbed drainage (MRP, page 3-7a).

Ground Water. The applicant has mined the Blind Canyon seam, the upper seam, and developed rock tunnels into the Hiawatha seam, the lower seam, which directly overlies the Star Point Sandstone. Only perched water zones have been noted in the Blackhawk Formation (page 7-5, MRP).

The Star Point Sandstone and lower portion of the Blackhawk Formation form an important regional aquifer. Major sandstone units within this package of sediments are water-bearing and are separated by less permeable strata. Recharge to the Star Point-Blackhawk aquifer is thought to occur primarily through conduits in the form of faults and fractures. Significant faulting in the permit area may be the local source of recharge to the Star Point-Blackhawk aquifer as well as the source of recharge to the paleochannel sands in the Blackhawk Formation (Plate 6-1, MRP).

Little Bear Spring, an important municipal water supply for the city of Huntington, lies immediately north of the lease area. This spring issues from the Panther Sandstone Member, stratigraphically the lowest of the three Star Point Sandstone members, at about 350 feet below the Hiawatha seam. The applicant terminated mining activities prior to penetrating fault zones which may be the primary conduit supplying water to the spring.

#### Compliance

The applicant withdrew plans to mine into the fault zone. With the cessation of mining in the Huntington No. 4 Mine, there should be no impacts to Little Bear Spring.

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

The discussion of Water Quality Standards and Effluent Limitations can be found in Volume 2, Section 7 (pages 7-1 through 7-96) of the MRP. Other references addressed in this discussion are from Volume 1, Section 3 (pages 3-30, 3-58) of the MRP.

The applicant proposes to meet water quality effluent standards by routing all surface drainage from the disturbed area into a series of two sedimentation ponds. Mine water discharges are also routed into the sedimentation ponds (MRP, Section 3.4.3). The technical adequacy of the sediment pond system is discussed in Section UMC 817.46.

A NPDES permit has been obtained by the applicant for two discharge points at the minesite. Outfall 001 pertains to discharges from the cyclone overflow used as an intake for the water supply system for the mine. Outfall 002 pertains to the discharges from the lower sedimentation ponds (MRP, Section 3.4.3).

The applicant notes on page 3-58 of the MRP that the ponds will be the last structures removed at the minesite. Removal of the ponds will take place after revegetation of all other disturbed areas has been accomplished.

On page 3-30 of the MRP, the applicant notes that, pursuant to the on-going water quality monitoring program, should changes in water quality occur, the source of the problem will be identified and measures taken to correct any deficiencies.

#### Compliance

The measures proposed by the applicant are adequate based on the best technology currently available. The on-going water monitoring program will assess the effectiveness of the sediment control provided by the sedimentation ponds.

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

#### Existing Environment and Applicant's Proposal

The discussion of Diversions and Conveyance of Overland Flow, Shallow Ground Water Flow and Ephemeral Streams can be found in Volume 2, Section 7 (pages 7-1 through 7-96) of the MRP.

Diversion structures are located at the base of the highwall at the portal area. There are two separate structures, each diverting natural runoff to either side of the drainage in which the disturbed area is located. The diversions are temporary. They have been constructed by digging a trench along the base of the highwall and depositing the material in a compacted berm to the outside of the ditch (MRP, Section 702.3.1, page 7-78).

Approximately one half of the total discharge is intercepted and diverted by each of the diversion channels, and therefore, each channel must be capable of handling 4.2 cfs. To be conservative, a peak discharge of 5.0 cfs per channel was used in this analysis. The actual channels are not perfectly symmetrical; the highwall side is about 1:1 (H:V) and the berm side is about 2:1. For computation purposes, an average side slope of 1.5:1 was assumed. The channel bottom width is about 1.0 foot and the channel depth is about 1.5 feet and these values were, therefore, used in the analysis. The average slope of diversion A is 2.7 percent and that of diversion B is 1.7 percent. The channels are riprapped and the roughness coefficient was assumed to be 0.035 (MRP, page 7-80).

Energy dissipators are located at all discharge points from the diversion ditches and sedimentation ponds. In addition, energy dissipators are placed in the diversions at intervals of not less than 200 feet. These are in the form of small rock dikes or straw bales for sediment and erosion control. The discharges from the diversion ditches are onto a protective surface (i.e., conveyor belting or equivalent), and then into an area of rocks (or riprap) to dissipate the energy prior to allowing the drainage to run naturally. At the sedimentation ponds, overflows and channels are lined with riprap (see typical) to the point of final discharge into the ditch above the road (MRP, page 7-81).

Final reclamation includes removal of the diversion ditches by grading of the berm back into the trench. The entire yard will be reclaimed to the extent feasible and revegetated. Natural drainage will be restored to the extent practical.

Culverts. Drainage within the permit area is directed by diversions, open ditches and culverts. Undisturbed drainage areas are routed around the minesite by temporary diversions. Disturbed area drainage is directed to the sedimentation ponds by various culverts and ditches. These design characteristics and peak discharges are presented in Tables 7-16 and 7-19 on pages 7-68 and 7-83a of the Permit Application.

Reclamation of the disturbed area ditches is discussed on pages 3-62a and 3-63 of the MRP. Sediment control measures will consist of straw bale dikes placed at the lower edge of the reclaimed pad areas. All drainage from disturbed and reclaimed areas will still go into the sedimentation ponds until revegetation is established.

#### Compliance

The applicant has presented a feasible plan for diverting surface overland flow away from disturbed areas into Mill Fork Creek. The applicant also has presented calculations for certain diversion ditches and culverts within the disturbed area.

Based on the Sedimot model used by the regulatory authority, all diversion ditches and culverts prior to the March 16, 1984 submittal where deemed adequate to handle the peak flows from the 10-year, 24-hour peak flow. Following the March 16, 1984 submission, the applicant has recalculated peak flows for all the disturbed areas using a new rainfall value of 2.3 inches for the 10-year, 24-hour storm including disturbed area drainage shown on the sketch of Surface Disturbed Area Drainage (Figure 7-7).

The diversion ditch located between the outlet for the 36 inch culvert east of the fuel tank (Plate 3-1) and the sediment pond has several straw bale dikes in place. Maintenance of this portion of the diversion ditch is crucial to allow the function of these sediment controls.

The applicant is in compliance with this section.

#### Stipulations

None.

#### UMC 817.44 Hydrologic Balance: Stream Channel Diversions

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

Specifics of stream channel diversions in the mine plan area can be found in Section 7.2.3.1 of the MRP and the diversion of Mill Fork Creek which can be found in Appendix 8 of Volume II of the MRP.

The following discussion encompasses the applicant's attempt to address the requirements of UMC 817.44(c) and (d)(1)(2)(3) in the MRP. There are two areas involving reclamation of diversions. One is the main yard and portal areas and the other is Mill Fork Creek pumphouse and diversion. Reclamation of the main yard and portal will take place during final reclamation. This will be accomplished by grading the berm

back into the trench. The entire yard will be reclaimed to the extent feasible and planted. Natural drainage will be restored to the extent feasible and planted. The natural drainage through the main mine yard will be restored based on the following study found on page 3-58 of the MRP. "In the spring of 1985, when the area is accessible, cross-sections will be taken above and below the proposed restored drainage, and in a comparable, adjacent drainage. If these cross-sections indicate the proposed restored drainage is not adequate, the design will be adjusted to a size compatible with these drainages." The current proposed restored drainage is discussed on page 3-58A and 3-58B of MRP, but will be potentially altered based on the outcome of the study mentioned above.

#### Compliance

The applicant has agreed to implement a study to determine what an acceptable reclaimed channel will be for the disturbed ephemeral drainage which flows through the mine yard and portal areas. The applicant has agreed to implement this study based on the fact that the requirements of UMC 817.44(b)(2) dictate that the capacity of the channel itself should be at least equal to the capacity of the unmodified stream channel immediately upstream and downstream of the diversion.

The Mill Fork Creek diversion will be reclaimed in a fashion most environmentally suitable to achieve the minimum amount of disturbance to Mill Fork Creek. This will be achieved by leaving the concrete retaining wall in place and providing an upstream and downstream rock face to blend the structure into the environment, stabilize stream banks and minimize sediment loading.

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

#### Stipulation 817.44-(1)-TM

1. The applicant has proposed on page 3-58 of the MRP that, "In the spring of 1985, when the area is accessible, cross-sections will be taken above and below the proposed restored drainage, and in a comparable, adjacent drainage. If these cross-sections indicate the proposed restored drainage is not adequate, the design will be adjusted to a size compatible with this drainage."

The regulatory authority is willing to waive the requirements of UMC 817.44(B)(2) if the applicant can adequately demonstrate to the regulatory authority that these cross-sections represent a conclusive demonstration of comparable, adjacent drainage. The following parameters will have to be demonstrated in order to assess the comparability of the two watershed systems.

1. Similar drainage area and channel capacity.
2. Similar slopes and aspects.
3. Cross-sections must be located in an area which gives comparable channel configurations.
4. Natural armoring or riprap size must be noted, as well as natural energy dissipators (i.e., large boulders, log jams, drops and eddies, etc.) so they can be engineered into the new designs.

These requirements must be met during the site visit in the spring of 1985 and the applicant must submit within 30 days of this site visit adequate plans for the proposed stream channel reclamation plans. These plans must include the following engineering designs at a minimum:

1. Energy dissipators within the channel at crucial points, namely where flows come onto the upper pad and drop off the cliff area below the upper pad onto the lower pad.
2. A design flow and channel configuration criteria compatible with this stipulation and 817.44(d)(1) (2)(3).

#### UMC 817.45 Hydrologic Balance: Sediment Control Measures

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

The discussion of Sediment Control Measures can be found in Volume 2, Section 7 (pages 7-1 through 7-96) of the MRP.

Energy dissipators are located at all discharge points from diversion ditches and sedimentation ponds. In addition, energy dissipators are located in the diversions at intervals of not less than 200 feet and include small rock dikes or straw bales for sediment and erosion control. Discharge from the diversion ditches is directed onto a protective surface (i.e., conveyor belting or equivalent) and then into an area of rocks (or riprap) to dissipate the energy prior to allowing the drainage to run naturally. Overflows and channels leading to and from the sedimentation ponds are lined with riprap to the point of final discharge into the ditch above the road (MRP, Section 7.2.3.1, pages 7-81 and 7-83).

##### Compliance

The applicant is in compliance with this section.

##### Stipulations

None.

UMC 817.46 Hydrologic Balance: Sedimentation Ponds

Existing Environment and Applicant's Proposal

The discussion of Sediment Ponds can be found in Volume 2, Section 7 (pages 7-1 through 7-96) of the MRP.

The undisturbed and disturbed area of the Huntington #4 Mine is contained within a large, single drainage area. In order to minimize additional sediment loading to Mill Fork Creek, a major portion of this drainage is diverted before it reaches the disturbed area. Runoff from the disturbed area is routed into sedimentation structures located in the canyon bottom above Mill Fork Creek (MRP, Section 7.2.3.1, page 7-62).

The overall drainage of the area, including locations of the sediment structures, is depicted on Plate 7-6. Specifications are given below.

Sediment ponds are located below the coal stockpile loading area (See Plate 7-6.) The applicant states (page 7-63 of the MRP) that this site offers the most effective sedimentation control with the least amount of environmental disturbance.

The applicant has built two smaller ponds in a series to minimize environmental degradation and still obtain adequate storage. The upper pond functions as a holding and settling facility for disturbed area runoff. The lower pond filters, cleans and discharges underground mine water, as well as overflow from the upper pond in the event a storm exceeds the design. Surface drainage from the disturbed area passes into the upper pond and through a 12-inch culvert with an inverted inlet into the lower pond where it is filtered through a dike of coke breeze and slag and discharged to Mill Fork Creek as required by the NPDES permit (MRP, page 7-63).

To comply with requirements of the regulatory authority for the control of sedimentation as listed in the Underground Mining General Performance Standards, the ponds are constructed in a manner to facilitate the holding and settling of contaminated water from the minesite, as well as filtering and discharge of underground mine water. An overflow is provided in the event of a massive inflow of surface water exceeding the capacity of the ponds. The ponds are cleaned as necessary and the waste material placed in an approved disposal site (MRP, pages 7-63, 7-63a).

The construction of the ponds is per specifications of the State Engineer, U. S. Forest Service, Office of Surface Mining and the DOGM.

The following construction specifications (page 7-64 of the MRP) were followed:

1. In areas where any fill material was placed, the natural ground was removed for at least 12 inches below the base of the structure.
2. Compaction of all fill materials was at least 95 percent. Native material was used wherever practical. Fill was placed in lifts not exceeding 12 inches and was compacted prior to placement of the subsequent lift.
3. Riprap was placed on the water side of all outlets to prevent scouring. Inside slopes are 3:1 minimum.
4. Dams were constructed to overflow at least one foot below the top.
5. Overflows have a minimum depth of one foot and a minimum width of three feet. These are constructed (or lined) with at least one foot of riprap on all surfaces and discharge into an energy dissipator to prevent scouring.
6. A filter dike, composed of coke breeze and slag, is provided in the lower pond as a final filter for water prior to discharge.
7. All construction of sediment ponds was performed under the direction of a qualified professional.

Design rainfall of 2.3 inches for the 10-year, 24-hour event was determined from the "Precipitation Frequency Atlas of the Western United States" (NOAA Atlas 2, Volume IV - Utah, 1973) for the location of the Huntington #4 Mine. Corresponding rainfall depth for the 25-year, 24-hour event was estimated to be 2.9 inches. The Fletcher-Farmer rainfall distribution was used to determine the rainfall distribution. Total runoff from the 10-year, 24-hour rainfall is estimated as 1.23 ac-ft. An additional 0.18 ac-ft is retained to provide at least one year sediment storage for sediment yield from disturbed areas as estimated below (MRP, page 7-67).

The sedimentation ponds are inspected after each storm and the sediment is cleaned out as necessary. In no case is sediment allowed to build beyond the point of reducing the pond capacity below 1.23 ac-ft. Removed sediment is disposed of in the C. V. Spur refuse pile or other locations as approved by the regulatory authority (MRP, page 7-66).

The Universal Soil Loss Equation (USLE) was used to estimate sediment yield from disturbed areas. Sediment yield was calculated by estimating the erosion rate from disturbed subdrainage areas. All erosion was assumed to be delivered to and deposited in the pond (MRP, page 7-69).

Total sediment yield from disturbed areas is estimated to be 0.172 ac-ft per year (MRP, Section 7.2.3.2, page 7-72).

Ponds have a capacity of 1.45 ac-ft, sufficient to store the runoff from a 10-year, 24-hour event of 1.23 ac-ft plus one year sediment loss of 0.17 ac-ft. Since the excess capacity is only 0.05 ac-ft, both ponds will require regular maintenance to maintain sediment storage.

Spillways from both ponds are designed to pass the runoff from a 25-year, 24-hour precipitation event. Peak discharge from a 25-year, 24-hour precipitation event from the drainage above the ponds was determined using Sedimot II and the input parameters in Table 7-16. The peak discharge was determined to be 3.11 cfs (MRP, page 7-72).

A cross-section and profile of upper and lower pond spillways is provided in Plate 7-6 (MRP, page 7-73).

Design specifications are provided in Table 7-18. Velocities in both spillways exceed five ft/sec and would be erosive. Median riprap diameter of 15 inches is used to maintain stable spillways. Riprap of this size has a Manning's roughness coefficient of 0.04 and provides adequate protection for velocities in excess of 10 ft/sec (MRP, page 7-73).

Two water monitoring stations have been established at pond inlets and outlets (See water monitoring program for details.) (MRP, Section 7.2.6, page 7-89)

#### Compliance

The applicant complies with this section.

#### Stipulations

None.

UMC 817.47 Hydrologic Balance: Discharge Structures

Existing Environment and Applicant's Proposal

The discussion on Discharge Structures can be found in Volume 2, Section 7 (pages 7-1 through 7-96) of the MRP.

The discharges from the diversion structures are onto a protective surface (i.e., conveyor belting or equivalent) and then into an area of rocks (or riprap) to dissipate the energy prior to allowing the drainage to run naturally. At the sedimentation ponds, overflows and channels are lined with riprap (see typical) to the point of final discharge into the ditch above the road (MRP, Section 7.2.3.1, pages 7-81 and 7-83).

Overflows have a minimum depth of one foot and a minimum width of three feet. They are constructed (or lined) with at least one foot of riprap on all surfaces and discharge into an energy dissipator to prevent scouring (MRP, Section 7.2.3.1, page 7-64).

Compliance

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 Huntington #4 minesite include the two sediment ponds. These are covered in Section UMC 817.46 of this document. There are no permanent impoundments proposed at the Huntington #4 Mine.

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 on page 7-16 of the MRP regarding the Blind Canyon Seam that the mine has encountered "small amounts of water from sandstones in the roof" and that "occasionally, damp to wet floor conditions exist."

The Hiawatha Seam lies approximately 100 feet below the elevation of the Blind Canyon seam (MRP, Section 7.1.5) and was accessed via rock slopes from the Blind Canyon portal. (Plate 3-6 of the MRP).

Page 3-56 of the MRP contains the details of the permanent portal seals to be installed upon final reclamation. The seals are designed to withstand up to 30 psi of pressure to contain any in-mine water accumulation following cessation of mining.

Page 3-56a contains a commitment to monitor any discharge (if it should occur) and provide treatment, if necessary, to satisfy the applicable State and Federal effluent limitations during the permit term.

### Compliance

Based on the structure contour map (Plate 6-5), it appears that a portion of the workings in the Blind Canyon Seam would naturally drain from the existing portals. Upon reclamation, portal seals cannot guarantee that gravity discharges from the mine will not flow from other areas of the coal outcrop.

An evaluation of the portion of the workings which might potentially drain towards the portals along with the associated recharge area indicates that the probability of discharges from the workings is quite low. Based on the applicant's monitoring data to date, the only possible water quality concern associated with discharges from this mine would be increased total dissolved solids levels.

The applicant's proposal to monitor and provide treatment, if needed, for the permit term does not comply entirely with the requirements of this section. Any discharges which occur postmining must be sampled to assess if the effluent limitations of UMC 817.42 and all applicable State and Federal water quality standards are met.

### Stipulation 817.50-(1)-JW

1. The applicant shall sample on a quarterly basis until bond release any discharges from the underground workings which occur after mining. Sampling will assess if discharges are

in compliance with the effluent standards of UMC 817.42 and all other applicable State and Federal regulations. The applicant will provide treatment, if necessary, of any discharges to achieve compliance with applicable standards during the period of discharge.

UMC 817.52 Hydrologic Balance: Surface and Ground Water Monitoring

Existing Environment and Applicant's Proposal

The proposed surface water monitoring program includes sampling sites above and below the minesite in the Mill Fork Canyon drainage, at the inflow and outflow of the sedimentation pond system, one seep, and one spring site in the Little Bear Canyon drainage north of the Huntington #4 lease area (Plate 7-3 of the MRP).

Figure 7-9 (page 7-86) and Figure 7-10 (page 7-90) of the mine plan show the frequency of sampling for all proposed surface sampling sites. Page 7-91 shows the water quality parameters to be analyzed and field measurements to be taken for surface water monitoring.

The applicant's ground-water monitoring proposal involves sampling the previously noted seep and spring in Little Bear Canyon, north of the Huntington #4 lease area. Additionally, the applicant notes on page 7-21 of the MRP that one exploration drill hole has been drilled into the Star Point Sandstone which lies immediately below the Hiawatha Coal Seam. The Star Point Sandstone and the lower portion of the Blackhawk Formation are considered to be the host rock for the only regional aquifer in the area. Water level data from this exploration hole were obtained over an eight month period. The applicant has also committed to a depth of water study on this aquifer prior to mining the Hiawatha Seam northwest of a line between drill holes DH-9 and MC-4-3 (page 7-23 of the MRP).

Compliance

The applicant's proposal for surface water monitoring adequately addresses the requirements of the regulations. The location of Stations 4-4-W and 4-5-W are favorable for assessing the impacts of reclamation activities at the minesite. The location and frequency of all stations should not be changed for postmining monitoring.

The applicant's ground water monitoring proposal of the seep and spring in Little Bear Canyon is adequate to assess impacts of mining on the only significant ground water resource in the immediate area.

The applicant is in compliance with this section.

Stipulations

None.

UMC 817.53 Hydrologic Balance: Transfer of Wells

Existing Environment and Applicant's Proposal

A listing of all drill holes on the Huntington #4 lease area is contained in Table 6-2, page 6-13 of the MRP. Drill hole MC-4-1 appears to be the only hole presently open. It is utilized for water level measurements and was drilled from within the Blind Canyon Seam workings.

Compliance

Because the only open drill hole will be inaccessible after retreat mining of the Blind Canyon Seam, the applicant could not transfer drill hole MC-4-1 for use as a water well. The applicant complies with this section.

Stipulations

None.

UMC 817.54 Hydrologic Balance: (UCA 40-10-29[2]) Water Rights Replacement

Existing Environment and Applicant's Proposal

Appendix I of the MRP contains an agreement between Huntington City and Swisher Coal Company, Beaver Creek Coal Company's predecessor. The agreement commits the Company to replace the water supply from Little Bear Spring, an important municipal water supply, if mining activities impact the spring.

Page 3-27 of the mine plan notes that the coal company would replace water impacted by mining with its shares of water in Huntington Creek.

Appendix 4 contains a stock certificate for 800 shares of water in the Huntington Cleveland Irrigation Company. The certificate is issued to Hardy Coal Company. Table 7-8 of the MRP lists filed water rights in and around the Huntington #4 minesite. Plate 7-7 shows the locations of the water rights listed in Table 7-8.

## Compliance

The applicant has permanently terminated all mining activities in both the Blind Canyon and Hiawatha coal seams. Plates 3-5 and 3-6 indicate the mining in the Blind Canyon seam stopped well short of the fault system which may feed the Little Bear Spring and the mining in the Hiawatha seam never developed beyond the initial entries. The following analysis was developed prior to permanent abandonment and is still applicable insofar as postmining may result in possible, though not probable ground-water impacts.

The North Emery Water Users Association has expressed concern that mining activities at the Huntington #4 Mine may impact one of three springs located in Rilda Canyon, due south of the Huntington #4 lease area. These springs are an important culinary water supply for North Emery County. The West Appa Rilda Canyon Mine Permit Application contains information using Very Low Frequency Electromagnetic Analysis (VLFEM) which was used to identify a north-south trending lineament intersecting the North Spring area. This is thought to be a fracture system acting as a supply conduit for the North Spring in Rilda Canyon.

The VLFEM analysis is limited in that only two transects were run in Rilda Canyon. Further, the Hiawatha Seam outcrops in Mill Fork Canyon. If the north-south trending lineament was hydrologically active directly under the Hiawatha Seam, the effects of the lineament in acting as a flow conduit would be apparent in Mill Fork Canyon. No effects of the north-south trending lineament are apparent in Mill Fork Canyon. Therefore, until further data reveals more conclusively that the north-south lineament in Rilda Canyon is hydrologically active up into the Huntington #4 lease area, no mitigation measures are recommended.

The applicant has provided a list of filed water rights for the Huntington #4 Mine area. Those rights which may be potentially impacted by mining are shown on Table 7-8 (page 7-20 of the MRP) with the acre-foot allotment. Using the information from Table 7-8, the 800 shares of Huntington-Cleveland Irrigation Company owned by Beaver Creek Coal Company and the average discharge rate for Little Bear Spring shown on page 7-34 of the MRP, the following analysis was generated:

Total water rights which could be impacted:

12.99 ac-ft (Table 7-8 of the MRP)
477.82 ac-ft (Little Bear Spring)
<hr/>
490.81 ac-ft

Less water rights held by Beaver Creek Coal Company for replacement:

$$\frac{264.00 \text{ ac-ft}}{226.81 \text{ ac-ft}} = \text{Net Deficit}$$

The applicant's proposal to replace water rights impacted by mining with 800 shares of Huntington-Cleveland Irrigation Company water rights will address approximately 54 percent of the total existing rights which could be impacted. It is unlikely that 100 percent of the existing water rights would be impacted. Ninety-seven percent (97%) of the existing water rights are composed of the flow from Little Bear Spring (477.8 ac-ft of 490.8 ac-ft total). Should Little Bear Spring be totally diminished by mining activities, the existing 800 shares of Huntington-Cleveland Irrigation Company water would not be enough to replace the flow from Little Bear Spring. However, the written agreement (Appendix 1) binds the coal company to replacement of water for Little Bear Spring even if the spring was totally interrupted.

To assure that the replacement water is without legal complication as to ownership, the applicant must show that the 800 shares of Huntington-Cleveland Irrigation Company issued to Hardy Coal Company have been legally transferred or assigned to Beaver Creek Coal Company.

Stipulation 817.54-(1)-JW

1. The applicant shall provide, within 60 days of permit approval, documentation of assignment or transfer of 800 shares in the Huntington-Cleveland Irrigation Company from the Hardy Coal Company to Beaver Creek Coal Company.

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 for the upper pad depicted on Plate 7-4 of the MRP shows that surface drainage will be conveyed away from portal entries.

Compliance

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

The applicant notes (MRP, Section 3.5.2.3, page 3-58) that sedimentation ponds, dams and diversions will be disposed of during reclamation. No permanent hydrologic structures are planned for the Huntington #4 Mine.

Compliance

The applicant has not provided a specific timetable for removal of these temporary structures during reclamation. The ponds will be left in place until the reclaimed surface facility area is revegetated.

The applicant complies with this section.

Stipulations

None.

UMC 817.57 Hydrologic Balance: Stream Buffer Zones

Existing Environment and Applicant's Proposal

Page 3-28 of the MRP notes that a buffer zone is established between the northern portion of the haul road near the sediment ponds and the Mill Fork stream channel. Road maintenance and snow removal operations were the primary activities which occur within this zone. The applicant commits to blading snow to the north of the road (away from the stream) and to conducting all road maintenance activities in a manner that directs material away from the stream side. On page 3-28a (MRP), the applicant commits to remove snow or other accumulations of material bladed to the north of the road in the buffer zone to an approved storage or disposal area as soon as practicable. The approved storage locations are shown on Plate 3-1a. Sediment control for the storage areas will be straw bale dikes.

The applicant has also agreed to conduct monthly analysis of total suspended solids levels at Stations 4-4-W and 4-5-W to determine the adequacy of the sediment control measures that have been proposed (page 7-91, MRP).

## Compliance

The applicant's establishment of a stream buffer zone is somewhat inconsistent in that a 100 foot zone is not actually in place. Mining activities are within 100 feet of Mill Fork Creek.

Based on benthic invertebrate data in the U. S. Geological Survey Open File Report 81-539, a biological community as defined in UMC 817.57(c) is present in Mill Fork Creek.

The sediment contributions from the haul road which enter the Mill Fork stream are a significant environmental concern. Site visits in the early spring of 1983 showed that snow removal operations generate large amounts of earth material which is frequently placed in or just adjacent to the stream channel.

An analysis of total suspended solids (TSS) for the period March 1982 through July 1983 shows a pattern of significant sharp increases in total suspended sediments between Stations 4-4-W and 4-5-W (both on Mill Fork Creek). This concurs with on-site observations of sediment loading from snow removal operations.

The applicant's proposal for snow removal and road maintenance activities within the stream buffer zone is adequate to address this concern. The on-going evaluation of the total suspended solid levels at Stations 4-4-W and 4-5-W to be made by the applicant on a monthly basis will determine if the measures proposed are working adequately. If TSS levels between Stations 4-4-W and 4-5-W show increases of greater than 200 mg/l which can most likely be attributed to mining activities, then additional sediment control measures will be proposed, approved and implemented by the applicant (page 7-91, MRP).

The Division, pursuant to UMC 817.57(a)(1) and (2) approves the applicant's proposal to conduct underground coal mining activities within 100 feet of Mill Fork Creek. However, with the initiation of reclamation activities in 1985, little road use or snow removal is anticipated.

The applicant is in compliance with this section based on the applicant's commitment on page 7-91 of the MRP.

## Stipulations

None.

UMC 817.59 Coal Recovery

Existing Environment and Applicant's Proposal

The Huntington #4 Mine produced coal from the Blind Canyon Seam and the Hiawatha Seam using room-and-pillar methods that were consistent with the best technology currently available. Recovery within the room-and-pillar panels was approximately 75 percent to 78 percent, with an overall recovery factor (including barriers) estimated at 50 percent, (page 3-15 of the MRP).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.61-.68 Use of Explosives

Existing Environment and Applicant's Proposal

No blasting is employed at this site as outlined in Section 3.3.5.4 of the MRP.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.71-.74 Disposal of Excess Spoil and Underground Development  
Waste: General Requirements; Valley Fills; Head-of-  
Hollow Fills; Durable Rock Fills

Existing Environment and Applicant's Proposal

All development waste was disposed of in underground "gob" areas which consist of entries and cross-cuts no longer needed for the operation of the mine. No development waste was stored on the surface at this operation as stated in Section 3.3 of the MRP.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.81-.88 Coal Processing Waste: Banks

Existing Environment and Applicant's Proposal

There were no coal processing facilities planned for use at the Huntington #4 Mine. All raw coal will be hauled from the site as stated in Section 3.3 of the MRP.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.89 Disposal of Noncoal Waste

Existing Environment and Applicant's Proposal

Noncoal waste is temporarily stored in steel dumpsters and hauled, by contractor, to the approved Carbon County Landfill on an as-needed basis (MRP Section 3.3).

Compliance

The applicant complies with this section.

Stipulations

None.

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

Existing Environment and Applicant's Proposal

The applicant did not construct any dams or embankments constructed of coal processing waste or to impound coal processing waste. The coal was transported to Beaver Creek Coal Company's C. V. Spur Preparation Plant 35 miles away (MRP, Section 3.3).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.95 Air Resources Protection

Existing Environment and Applicant's Proposal

Fugitive dust emissions from traffic over unpaved road surfaces are controlled through water sprays, chemical suppressants and reduced vehicular speed (25 mph in Mill Creek Canyon). Neither the Utah Bureau of Air Quality nor the Environmental Protection Agency has established any air quality monitoring requirements for the area of the Huntington #4 Mine and no air quality monitoring by the applicant is planned (MRP Sections 3.4.7.2 and 11.2.2).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.97 Fish, Wildlife and Other Related Environmental Values

Existing Environment and Applicant's Proposal

The Fish and Wildlife Resource Information for the Huntington #4 Mine area is discussed in Chapter 10 of the MRP.

A wide variety of wildlife species utilize the highly variable habitats within and adjacent to the permit area. Economically important and high interest species which potentially inhabit the area include mule deer, elk, moose, beaver, bobcat, coyote, mountain lion, snowshoe hare, fox and flying squirrel. Twenty-nine 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 red-tailed hawks, sharp-shinned hawks, American kestrels, great horned owls and golden eagles have been located on-site (MRP, Section 10.3.2.4). Gamebirds include blue grouse, ruffed grouse and mourning doves.

Of the 22 species of migratory birds of high Federal interest listed by the U. S. Fish & Wildlife Service (USFWS) for the Uintah-Southwestern Utah Coal Production Region, nine are actually or potentially present on the permit area. These are the bald eagle, golden eagle, peregrine falcon, band-tailed pigeon, Cooper's hawk, flammulated owl, prairie falcon, Williamson's sapsucker, black swift and western bluebird. One active golden eagle nest has been found on the permit area (letter from USFWS to OSM dated September 30, 1983).

The major aquatic habitats within the permit area are Mill Fork and Little Bear Creeks. All surface facilities are within Mill Fork Canyon. Based on benthic macroinvertebrate and aquatic habitat surveys conducted by the operator as well as data provided by the Utah Division of Wildlife Resources (UDWR), neither creek supports game or nongame fish and both lack sufficient flow in most years to provide spawning sites (MRP, Section 10.3.2.1). However, these streams probably contribute some invertebrate food items and a small amount of surface flow to Huntington Creek, an important fishery in the region.

The most important aspect of these streams is their contribution to riparian habitat for wildlife. Approximately 1.4 acres of riparian vegetation exists on the lease area (MRP, Table 9-1). Of this, .03 acres have been disturbed (Appendix 8, page 1). This habitat type is listed by UDWR as high priority due to availability of water and compositional diversity of the plant community. Other high priority areas include seeps and springs, as well as cliffs which afford nesting sites for many species of raptorial birds.

Habitats in and around the Huntington #4 permit area include areas of high priority summer range and crucial-critical winter range for both deer and elk (MRP, Figure 10-6, 10-7). No specific elk calving or deer fawning areas have been identified in the study area. A portion of the study area provides moose winter range, but field studies indicate that preferred habitat is quite limited (MRP, Section 10.3.3.1).

Listed threatened and endangered species potentially present in the study area are the American peregrine falcon, arctic peregrine falcon and the bald eagle. None of these species have been observed on the area and are not likely to occur because habitats in the area are marginal (MRP, Section 10.3.3.1).

Beaver Creek Coal Company has committed to avoiding important habitats such as riparian areas, and has committed to not using persistent pesticides and to preventing fires (MRP, Sections 10.5.1

and 3.3.5). Also, employee awareness programs inform mine personnel of sensitive periods or habitats, such as deer fawning seasons and areas, critical winter ranges, etc., to minimize impacts to wildlife (MRP, Section 10.5.5.1).

Fencing will be designed to allow passage of wildlife without entanglement or disturbance to migratory patterns, and mule deer roadkills along the Mill Creek access road and the Huntington Canyon road are monitored by Beaver Creek personnel (MRP, Section 10.5.5.1).

The operator has committed to reporting any observations of threatened and endangered species not previously reported on the permit area to the regulatory authority, UDWR and the USFWS. Active nests and nest trees, if located, will not be disturbed (MRP, Sections 10.5.1.2 and 10.7).

Habitat loss or deterioration of the Mill Fork aquatic ecosystem has been limited by the establishment of a 100 foot buffer zone adjacent to the stream where possible (see TA, Section UMC 817.57) and constructing sediment ponds to protect the stream from an increased sediment load from the mine-affected areas. In addition, monthly inspections of sediment load in Mill Fork are conducted (MRP, Section 10.7).

During the first suitable planting season following mining, the applicant will implement permanent revegetation methods designed to restore and enhance wildlife habitat on disturbed areas. The revegetation planting mixture includes herbaceous and woody species that are adapted to on-site conditions and are of known value to wildlife for cover, forage or both (MRP, Section 3.5; Appendix 8, Attachment A).

Beaver Creek Coal Company will conduct a wildlife monitoring program throughout the operational life of the Huntington Canyon #4 Mine. The monitoring program will utilize the services of a full-time environmental specialist and, as necessary, professional consultants to evaluate the ongoing success of operational mitigation measures, ensure that threatened or endangered species and sensitive or critical use areas remain undisturbed by future activities, deal with any unforeseen difficulties which might arise, and participate in reclamation efforts upon completion of the project (MRP, Section 10.7).

#### Compliance

The Huntington #4 Mine has been in operation since 1977. The surface disturbance and associated loss of wildlife habitat has already occurred. No additional surface disturbances are planned.

Therefore, the mitigation and management plans focus on minimizing impacts related to continued mining activities and returning the site to suitable habitat after cessation of mining (MRP, Section 10.5).

In an effort to characterize the fish and wildlife resources and assess potential impacts, the applicant has conducted numerous surveys on the permit area as well as a thorough literature search of the UDWR files and other publications on the distribution and status of vertebrates in the study region.

Surveys to determine the presence of any critical habitat of a threatened or endangered species, any plant or animal listed as threatened or endangered or any bald or golden eagle have been conducted. Three golden eagle nests have been located on the permit area (letter from USFWS to OSM dated September 30, 1983). Two nests are old and one was active in 1982 (MRP, Figure 10-8a). The company has committed to mitigate impacts to nests from subsidence by replacing the nests, establishment of alternative nest sites or other site-specific measures agreed upon between the USFWS and Beaver Creek Coal Company (MRP, page 10-67a).

A commitment to report any threatened and endangered species observed on the permit area during operations has been made.

The potential raptor electrocution hazard posed by existing powerline pole configurations on-site has been determined by USFWS to not require corrective modification as long as raptor mortality continues not to occur (letter from USFWS to DOGM dated October 9, 1981) and no additional powerlines are proposed for construction (MRP, Section 3.2.13); instead, powerlines will be removed during reclamation.

The applicant has committed to protect and avoid habitats of high value for fish and wildlife including riparian areas, seeps and springs, fawning areas, critical winter areas, etc. (MRP, Section 3.4.6.2). If seeps and springs are adversely impacted by subsidence, efforts to restore or replace lost water will be made. This will be accomplished by attempting to reopen the previous flow area or by dedicating water rights to develop an alternative source (MRP, Section 10.5.1.1).

If monitoring indicates that mule deer roadkills are a problem, the company has committed to consult with UDWR for mitigation measures (Section 10.7). Adequate plans for permanent revegetation of the site have been provided (MRP, Section 3.5; Appendix 8) and determined adequate (see TA, Section UMC 817.111-.117). Species to be used for revegetation have been selected based on nutritional value and cover for fish and wildlife and ability to support and enhance fish and wildlife habitat after bond release. Plants will be grouped in a manner which optimizes edge effect.

Stipulations

None.

UMC 817.99 Slides and Other Damage

Existing Environment and Applicant's Proposal

The applicant has committed to notify the Division at any time a slide occurs which may have a potential adverse affect on public property, health, safety and environment in Section 3.3.2.5 of the MRP and abide by appropriate mitigation measures as required by the Division.

Compliance

Applicant complies with this section.

Stipulations

None.

UMC 817.100 Contemporaneous Reclamation

Existing Environment and Applicant's Proposal

The applicant has committed to contemporaneous reclamation of disturbed areas as they become available (MRP, Section 3.5.1). Areas will be backfilled, graded, topsoiled and revegetated to acceptable reclamation standards established by environmental baseline studies (see TA, Section UMC 817.111-.117).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.101 Backfilling and Grading: General Requirements

Existing Environment and Applicant's Proposal

The yards, roads, and portal areas were dozed out of very steep rocky canyon walls in the 1940's. The area will be smoothed and contoured to be compatible with postmining land uses (as described in UMC 817.133 of the TA), and available topsoil will be respread

over the area to ensure the success of the revegetation. This is outlined in Section 3.5.3 of the MRP, with the time schedule found in Section 3.5.6.1.

In general, the backfilling and regrading will proceed as follows:

- a. After sealing of the portals and removal of all structures, a backhoe (Cat 235 or larger) will be brought to the upper portal.
- b. The backhoe will reach down over the fill bank, retrieve material, and place it on the terrace.
- c. A cat (D-7 or larger) will work with the backhoe, taking the retrieved material and spreading and compacting it from the highwall outward to reach the configuration as shown on Plate 3-8, Postmining Topography. Compaction of 90 percent or greater will be accomplished by spreading the material in lifts not to exceed 15 inches and tracking over it with a dozer.
- d. The upper pad will be sloped to drain to the center. A rock-lined natural drainage will be restored in this area since all diversions will have been removed during the backfilling and regrading.
- e. The procedure will continue down the upper road with the backhoe and cat operating in conjunction to reclaim this area to the property line.
- f. From the coal storage area to the lower pad (including the lower road) and drainfield area, a similar method of reclamation will be employed.

Plate 3-8 locates proposed "retained" highwalls on the south-facing slope of the canyons. Cliffs and rock exposures are common on the south-facing slopes in this area. The "retained" highwalls are compatible in height and length to existing cliffs in the area and have a Static Safety Factor (SSF) of 3.00 for dry conditions and 2.73 for saturated conditions (MRP, page 3-64b). The structural composition is consistent with pre-existing cliffs in the surrounding terrain, the cliff units in the coal bearing Blackhawk Formation.

Final graded areas will have a safety factor of 2.20 for dry conditions and 1.65 for saturated conditions (page 3-64e of the MRP). The embankment material will be placed in maximum 36-inch lifts and compacted to 90 percent.

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

All exposed coal outcrops will be covered with incombustible material during the backfilling and grading operation as outlined in Section 3.5.3 of the MRP.

This is not a processing facility and, therefore, toxic-forming materials or acid-producing materials are not produced or require disposal. All clean-up will be done before soil placement as stated in Section 3.5.6.1 (time schedule for reclamation).

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.106 Regrading and Stabilizing of Rills and Gullies

Existing Environment and Applicant's Proposal

Rills or gullies deeper than nine inches in regraded areas will be filled, graded or otherwise stabilized and reseeded. Rills and gullies less than nine inches deep as specified by the regulatory authority will be stabilized and the area reseeded and replanted if the rills or gullies are disruptive to the approved postmining land-use. This final configuration is shown on Plate 3-8 of the MRP. Rills and gullies are described in Section 3.5.3.2 of the MRP.

Compliance

The applicant complies with this section.

Stipulations

None.

Existing Environment and Applicant's Proposal

The Huntington Canyon #4 Mine lease area is generally located within the pinyon-juniper vegetation zone as described by Cronquist, et al (1972). The elevation ranges from approximately 7,200 feet to 9,580 feet. Precipitation varies with elevation and ranges from approximately 15 to 20 inches annually, with 60 to 70 percent occurring as snow during the months of October through May.

Eight vegetation types are delineated on the permit area (MRP, Plate 9-1). These include aspen woodland, mixed coniferous forest, burned mixed coniferous forest, pinyon-juniper-curlleaf mountain mahogany woodland, manzanita shrubland, big sagebrush shrubland, riparian and mountain grassland. The pinyon-juniper-curlleaf mountain mahogany woodland and riparian communities occur in the area of disturbance.

No threatened or endangered plant species were encountered during floristic surveys of the permit area. According to the USFWS, only one species of concern (Hedysarum occidentale var. canone) may occur on the permit area (USFWS memorandum to OSM, Denver, October 21, 1983). It is under review for possible listing in the future.

As described in Section 9.2.3 of the MRP, a pinyon-juniper-mountain mahogany reference area was selected and permanently marked. It was selected as representative of the topography, soils, aspect and species composition of the majority of the disturbed area. The reference area is one hectare in area and is located within the permit area on a site which will not be disturbed during the life of the mine. The Soil Conservation Service (SCS) has determined that the established reference area is in good condition. If this condition deteriorates to a poor classification, the applicant will implement management techniques to attain at least fair conditions. Management plans will be developed in consultation with the U. S. Forest Service (USFS) and SCS.

The reference area was sampled for total vegetation cover, cover by bare soil, cover by litter and rock, cover by species, productivity and tree and shrub density. Sample adequacy or minimum sample size was attained for all parameters (Table 9-6, page 9-22 of the MRP).

The applicant has proposed to use the riparian area 100 m upstream and downstream of the disturbance as a reference comparison area (MRP, Appendix 8). This is acceptable due to the small amount of disturbance associated with the mining operation (.03 acre) and the limited amount of surrounding riparian vegetation.

## Compliance

The applicant has presented a revegetation plan in Section 9.7 of the MRP which describes procedures and planting mixtures for reclamation of temporarily disturbed areas and those pinyon-juniper-curlleaf mountain mahogany areas disturbed for the life of the mine. Seeding of grasses and forbs as well as planting of shrub seedlings will occur during the first desirable planting season after final grading, either during the spring (March 15-June 15) or fall (September 15-November 15).

The planting mixture for final revegetation of the pinyon-juniper-curlleaf mountain mahogany vegetation type consists primarily of native grasses, forbs and shrubs (Tables 3-1 and 3-2 of the MRP). Fairway crested wheatgrass (included at the request of the land managing agency; letter from Reed Christensen, Forest Supervisor, U. S. Forest Service, to the Division dated October 30, 1981) and cicer milkvetch are the only introduced species included. The seed mixtures will be spread either by hand or machine, depending on site conditions.

A variety of synthetic and organic mulches will be used, dependent on site conditions. Organic mulches will be applied at a rate ranging from 1,500 - 2,500 pounds per acre. Synthetic devices will be installed according to the manufacturer's recommendations (Section 3.5.4.3 of the MRP).

A complete revegetation plan for the riparian area which includes a suitable seed mixture, dates of planting, methods of mulching and plans for monitoring is presented in Appendix 8 of the MRP.

Final reclaimed areas will be monitored at least every two years following plant establishment until bond release. A detailed monitoring plan which includes revegetation success standards is presented in Section 3.5.5 of the MRP.

The final reclaimed area, the reference area and the riparian comparison area will be sampled for cover, woody plant density and species composition during each monitoring period. Production will be sampled and compared on the pinyon-juniper reclaimed and reference areas. Sampling techniques are discussed in Section 3.5.5 of the MRP. Since comparison of production is not necessary on areas to be developed for fish and wildlife management (UMC 817.116 [b][3][iv]), no production sampling will be implemented on the riparian area.

The Huntington #4 minesite receives approximately 15 to 20 inches of precipitation annually. This amount is sufficient for the establishment of many of the species native to the area. The introduced species, Fairway crested wheatgrass and cicer milkvetch, applied in the rates provided, are valuable to control erosion, and as wildlife forage. One plant species, Hedysarum occidentale var. canone, under review for possible listing as threatened or endangered, may be present on the permit area according to USFWS. However, no populations have been identified (MRP, Table 9-7).

The applicant complies with this section.

Stipulations 817.111-.117-(1, 2, 3)-SC

1. Within 15 days of permit approval, the operator must revise the permanent seed mixture for the riparian area by including at least two forb species. The species must meet all the requirements of this section and UMC 817.97.
2. Within 15 days of permit approval, the operator must revise the tree seedling stocking rate for the pinyon-juniper-mountain mahogany vegetation type (Table 3-2) by replacing the pinyon and juniper seedlings with an equal number of seedlings of woody shrub species native to the area. The species must meet all the requirements of this section and UMC 817.97.
3. Before any site redisturbance occurs, the permittee must conduct a survey, under the supervision of the regulatory authority, of the areas to be redisturbed. The survey shall identify and record locations of individuals and populations of Hedysarum occidentale var. canone (canyon sweetvetch). If canyon sweetvetch is found in portions of the permit area to be redisturbed, the permittee must develop and submit a mitigation plan for regulatory authority approval and after approval implement this plan before redisturbance occurs.

UMC 817.121-.126 Subsidence Control

Existing Environment and Applicant's Proposal

As discussed on page 3-44 of the MRP, 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. Due to the steep topography, lack of water and poor access, the U. S. Forest Service (USFS) has classified most of the land under their jurisdiction above the mine as nonrange. The only significant ground water resource, the Star Point Sandstone, is located

stratigraphically below the coal seams being mined. Yearly surface inspections since 1979 have disclosed no surface manifestations of subsidence.

Beaver Creek Coal Company is presently following a monitoring plan established under an August 27, 1979 Cooperative Agreement with the Manti-LaSal National Forest, USFS, U. S. Department of Agriculture (see MRP, Figure 3-5). A photogrammetric monitoring program, as opposed to a subsidence monitoring survey net, was initiated at the insistence of the USFS to minimize the surface disturbance associated with subsidence monitoring. This includes an on-the-ground visual inspection which will be performed twice each year and will assess the condition of the surface above all underground mine workings and areas that may be affected by subsidence.

#### Compliance

The extraction technologies described in Sections 3.3.1 and 3.4.8.2 of the MRP adequately comply with UMC 817.121(a). Further, the operator has complied with certain provisions of UMC 817.121(b) by including a survey of renewable resource lands (Section 3.4.8.1 of the MRP) and discussing estimated subsidence impacts and a subsidence monitoring plan (Sections 3.4.8.2 - 3.4.8.4 of the MRP).

The Huntington #4 MRP addresses public notice of the mining schedule (UMC 817.122) and surface owner protection (UMC 817.124[b]) in Section 3.4.8.3, page 3-47.

The specific content and temporal framework for submittal of an annual subsidence report (UMC 817.121[b]) is discussed in Section 3.4.8.4, page 3.5.

The applicant is in compliance with these sections.

#### Stipulations

None.

UMC 817.132 Cessation of Operations: Permanent

#### Existing Environment and Applicant's Proposal

Permanent cessation of operations occurred on November 1, 1984, final reclamation will commence spring 1985. Mine openings will be sealed, all surface equipment, structures and facilities associated with the operation will be removed, and all affected lands reclaimed (MRP, Section 3.5.2). The schedule for permanent reclamation can be found in Section 3.5.6.1.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.133 Postmining Land Use

Existing Environment and Applicant's Proposal

The land on which the #4 Mine is located has long been used for coal mining. This canyon has supported three (3) underground operations in the past with the present surface facilities located in exactly the same area as one of these, the old Leamaster Mine, which operated nearly 25 years ago. Other than coal mining, this area has been used for deer hunting, sightseeing and hiking. There are no developed campgrounds within the area and none planned for the future (Section 4.4.2 of the MRP).

The USFS presently administers the lands in this area for livestock forage, wildlife habitat, watershed, dispersed recreation and coal mining. The USFS has, however, determined that the majority of the acreage on the lease tract is classified as nonrange and is not used for grazing because of slope, accessibility, rock outcrops, timber, scarcity of grazeable vegetation and lack of water. There are no range improvements within the permit area (Section 4.4.2 of the MRP).

The postmining uses of the land will be the same as the premining and present uses described above (Section 4.5 of the MRP). Mining operations have ceased, and the disturbed areas will be reclaimed and the land will once again support its principle premining uses (i.e., deer habitat, hunting, sightseeing, watershed and hiking).

Restoration of the area will be achieved by regrading the yards, reclaiming the roads and portal areas to a practical degree, planting all disturbed areas and monitoring the revegetation effort to achieve success standards, as discussed under UMC 817.111-.117 of this document.

Compliance

The applicant complies with this section.

Stipulations

None.

UMC 817.150-.157 Roads: Class I

Existing Environment and Applicant's Proposal

The coal haul road is approximately 900 feet inside the permit boundary and connects to the U. S. Forest Service (USFS) road in Mill Fork Canyon. The Mill Fork Road is controlled by the USFS and Beaver Creek Coal operates on this road under a Road Use Permit with the USFS. This lower haul road is sloped to the inside ditch (24" X 12" minimum) and is equipped with a guardrail, rather than a berm, on the outside to maintain adequate road width for haul trucks. Road drainage is passed through a culvert and directed to the sedimentation pond. (See MRP Plates 3-2a and 7-5 for the road cross-section and ditch details.)

Design of drainage controls along this road were specified by the USFS engineers in 1976 and this road has been constructed and maintained in accordance with their specifications. Details on the design, maintenance and use of this road are provided in the MRP, Appendix 6 - Road Use Permit/ Specifications on Mill Fork Road. The road is gravel surfaced and watered as necessary for dust control.

Compliance

The Division concurs that the coal haul road is a public road as outlined in "The Public Roads Criteria for Coal Haulage and Access Roads" memorandum as approved February 24, 1984 by Division Director, Dianne R. Nielson. The applicant complies with this section.

Stipulations

None.

UMC 817.160 Roads: Class II

Applicant's Proposal and Existing Environment

The mine access road was used for men and materials access to the minesite. The road is approximately 4,800 feet long. This road was built in the 1940's and upgraded in 1976-1977 to bring it to its present grade and alignment. The majority of the road lies above the massive Star Point Sandstone, and ongoing inspections of the road fill slopes have indicated no instability. There has been no evidence of creep, slippage or other failures due to instability. This road is gravel-surfaced and maintained regularly to provide safe access of men and materials to the minesite. This road has restricted access due to a gate. Plate 3-2A of the MRP outlines the typical road width and gradient.

BOND

Beaver Creek Coal Company  
Huntington #4 Mine  
ACT/015/004, Emery County, Utah

February 5, 1985

Reclamation Summary

A. Seal Portals	\$ 10,500.00
B. Remove Structures	33,738.66
C. Soil Placement	98,224.80
D. Seedbed Material Handling	5,642.16
E. Reseeding & Fertilizing (not including containerized stock)	8,850.00
F. Mulching	4,375.00
G. Protective Fencing	18,300.00
H. Restoration of Natural Drainage	12,247.80
I. Sedimentation Pond Site	7,024.20
J. Maintenance & Monitoring	11,840.00
K. Foreman Supervising	25,080.00
	<u>SUBTOTAL</u>
	\$235,822.62
	10% Contingency
	<u>23,582.26</u>
	<u>\$259,404.88</u>
	(1985 dollars)

1986 - \$276,992  
1987 - \$295,773  
1988 - \$315,826  
1989 - \$337,239  
1990 - \$360,104

Cost of Equipment

1. Loader - 950B (2 1/2 cy bucket) = \$ 75.50/hr + \$15.80 OP cost/hr =  
\$91.30/hr x 1.1 = \$100.43  
Operator = \$ 28.45/hr  
\$128.88/hr = \$1,031/day
2. Crane - Groves RT-580  
20 T = \$ 69.08/hr + \$13.60 OP cost/hr = \$82.68  
x 1.1 = \$90.95  
Operator = \$ 29.10/hr  
\$120.05/hr = \$960.40/day
3. Truck and Operator - \$66.82 (including OP cost + 1.1 factor) + \$22.45/hr =  
\$89.27/hr = \$714/day
4. Cat D-7G = \$ 905.00/day + \$170.40 (OP cost) = \$1,075.40 x 1.1 = \$1,182.94  
Operator = \$ 227.60/day  
\$1,410.54/day

5. Backhoe (Cat 235) = \$1,440.00/day + \$263.60/day (OP cost) =  
\$1,703.60 x 1.1 = \$1,873.96

Operator = \$ 227.60/day  
\$2,101.56/day

6. Operator Equipment (medium) = \$28.45/hr = \$227.60/day

Average Helper = \$21.75/hr = \$174/day

Foreman = \$31.35/hr = \$250.80/day

Crane Equipment Operator = \$29.10/hr = \$232.80/day

Cost of chain link from Means is \$6.10/lf (page 100 - 1985 Site Work Cost Index).

Detailed Timetable for Completion of Major Reclamation Processes

The following schedule of reclamation will be initiated within 90 days (weather permitting) of final abandonment of the mining operation:

	<u>Cumulative Time</u>
1. Seal Portals - 1 week	1 week
2. Remove Structures - 5 weeks	6 weeks
3. Soil Placement (Backfilling & Grading)	
A. Upper Pad - 2 weeks	8 weeks
B. Upper Road - 4 weeks	12 weeks
C. Coal Storage Pad, Lower Pad & Drainfield - 1 week	13 weeks
4. Seedbed Material Handling - 1 week	14 weeks
5. Reseeding & Fertilizing - 1 week	15 weeks
6. Mulching - 2 weeks	17 weeks
7. Protective Fencing - 2 weeks	19 weeks
8. Restoration of Natural Drainage - 1 week	20 weeks

The above reclamation tasks will therefore be completed within 20 weeks following the start of reclamation activities.

Removal and reclamation of sediment ponds will occur after revegetation is established on the reclaimed lands above the ponds. Regrading of the pond areas will take approximately two days.

Reclamation Cost Estimate

A. Seal Portals

3 seals x \$3,500/seal (AMR costs) = \$10,500.00

TOTAL

\$10,500.00

B. Remove Structures

Fan

Labor - 2 men x \$174/day x 2 days = \$ 696.00

Equipment (hauling)-1 truck +  
operator x 4 hrs x \$89.27/hr = 357.08

Crane - RT-580 20T Crane  
+ operator at \$120.05/hr. x 2 hrs = 240.10

SUBTOTAL

\$1,293.18

Block Building & Tank

Labor - 2 men x \$174/day x 3 days = \$1,044.00

Equipment (hauling) - 1 truck  
+ operator x 8 hrs x \$89.27/hr = 714.16

Loader + operator @ 4 hrs x  
\$128.88/hr = 515.52

SUBTOTAL

\$2,273.68

Chute and Conveyor

3 men x \$174/day x 4 days = \$2,088.00

Equipment (hauling) - 1 truck  
+ operator x 32 hrs x \$89.27/hr = 2,856.64

1 loader + operator x 16 hrs x  
\$128.88/hr = 2,062.08

SUBTOTAL

\$7,006.72

Sub-Station

\*(includes powerline removal)

Labor - 2 men x \$174/day x 4 days =	\$1,392.00
Hauling - 1 truck + operator x 16 hrs x \$89.27/hr =	1,428.32
Loader + operator x 4 hr x \$128.88 =	<u>515.52</u>
SUBTOTAL	\$3,335.84

Bathhouses

Labor - 2 men x \$174/day x 3 days =	\$1,044.00
Equipment (Hauling) - 1 truck + operator x 12 hrs x \$89.27/hr =	1,071.24
Loader - 4 hrs x \$128.88/hr + operator =	<u>515.52</u>
SUB TOTAL	\$2,630.76

Lower Water Tank & House

Labor - 2 men x \$174/day x 2 days =	696.00
Equipment (Hauling) - 1 truck + operator x 8 hrs x \$89.27/hr =	714.16
Loader - 4 hrs x \$128.88/hr + operator =	<u>515.52</u>
SUBTOTAL	\$1,925.68

Creek Water System (includes pumphouse removal)

Labor - 2 men x \$174/day x 1 day =	\$348.00
Equipment (Hauling) - 1 truck + operator x 4 hrs x \$89.27/hr =	<u>357.08</u>
SUBTOTAL	\$705.08

\*Powerline consists of four poles and wire between upper and lower substations. Incoming lines and poles belong to Utah Power & Light Company.

B.H. Water Tank & Water System

Labor - 2 men x \$174/day x 3 days =	\$1,044.00
Equipment (Hauling) - 1 truck + operator x 16 hrs x \$89.27/hr =	1,428.32
Loader - 4 hrs x \$128.88/hr + operator =	<u>515.52</u>
----- SUBTOTAL	\$2,987.84

Upper Pad Bridge

Labor - 2 men x \$174/day x 1 day =	\$ 348.00
Equipment (Hauling) - 1 truck + operator x 4 hrs x \$89.27/hr =	\$ 357.08
Loader - 4 hrs x \$128.88/hr + operator =	<u>\$ 515.52</u>
----- SUBTOTAL	\$1,220.60

Sewer System

Labor - 2 men x \$174/day x 2 days =	\$ 696.00
Backhoe + operator - \$2,101.56/day x 2 days =	\$4,203.12
Equipment (Hauling) - 1 truck + operator x 8 hrs x \$89.27/hr =	<u>\$ 714.16</u>
----- SUBTOTAL	\$5,613.28

Trailers (2)

Labor - 2 men x \$174/day x 2 days =	\$ 696.00
Equipment (Hauling) - 1 truck + operator x 16 hrs x \$89.27/hr =	<u>\$1,428.32</u>
----- SUBTOTAL	\$2,124.32

Clean-up

Labor - 2 men x \$174/day x 4 days = \$1,392.00

Equipment (Hauling) - 1 truck  
+ operator x 8 hrs x \$89.27/hr = 714.16

Loader - 4 hrs x \$128.88/hr  
+ operator = 515.52

SUBTOTAL \$2,621.68

TOTAL

\$33,738.66

C. Soil Placement (Backfilling & Grading)

Upper Pad & Diversions (5.35 ac)

Backhoe + operator x \$2,101.56/day  
x 10 days = \$21,015.60

Cat + operator x \$1,410.54/days  
x 10 days = 14,105.40

SUBTOTAL \$35,121.00

Upper Road (2.58 ac.)

Backhoe + operator x \$2,101.56/day  
x 20 days = \$42,031.20

Coal Storage Pad (2.47 ac)

Backhoe + operator x \$2,101.56/day  
x 3 days = \$ 6,304.68

Cat + operator x \$1,410.54/days  
x 3 days = 4,231.62

SUBTOTAL \$10,536.30

Lower Pad (1.37 ac)

Backhoe + operator x \$2,101.56/day  
x 2 days = \$4,203.12

Cat + operator x \$1,410.54/days  
x 2 days = 2,821.08

SUBTOTAL \$7,024.20

Drainfield Pad (.052 ac)

Backhoe + operator x \$2,101.56/day  
x 1 day = \$2,101.56

Cat + operator x \$1,410.54/days  
x 1 day = 1,410.54

SUBTOTAL \$3,512.10

TOTAL \$98,224.80

D. Seedbed Material Handling (12.5 ac)

Cat/Ripper + operator x \$1,410.54/day  
x 2 days = \$2,821.08

Cat/Disk + operator x \$1,410.54/day  
x 2 days = 2,821.08

TOTAL \$5,642.16

E. Reseeding & Fertilizing (12.5 ac)

Hydroseeder, Operator & Driver -  
\$700/ac x 12.5 ac = \$8,850.00

Seed = \$569.75/acre  
Labor = 100.00/acre  
Fertilizer = 30.00/acre  
\$699.75

Cuttings for Riparian habitat -  
(labor and cuttings) = \$100.00

F. Mulching (12.5 ac)

Hydromulcher, Operator & Driver -  
\$350/ac x 12.5 ac = \$4,375.00

G. Protective Fencing (12.5 ac)

6 feet high x 3,000 linear feet  
x \$6.10/linear foot installed = \$18,300.00

H. Restoration of Natural Drainage (includes Creek Pump area)

Equipment - Backhoe + operator x \$2,101.56/day x 5 days =	\$10,507.80
Labor - 2 men x \$174/day x 5 days =	<u>1,740.00</u>

TOTAL \$12,247.80

I. Sedimentation Pond Site (0.22 ac)

Backhoe + operator x \$2,101.56/day x 2 days =	\$4,203.12
Cat + operator x \$1,410.54/day x 2 days =	<u>2,821.08</u>

TOTAL \$7,024.20

J. Maintenance Monitoring

\$11,840/yr (including vegetative, hydrologic, and rills and gullies)	\$11,840.00
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K. Foreman Supervising

\$1,254/week for 20 weeks	\$25,080.00
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1. Labor rates are from the 1984 Means Construction Cost Data.
2. Operating costs are from the Rental Rate Bluebook.
3. Seed costs are from Native Plants Incorporated.
4. Inflate at 6.8 percent annually. Used preceding three years of Means Historical Cost Index.
- 5.\* Machine productivity:
  - A. Backhoe - .75 acres/day on pads.
  - B. Backhoe - 240 feet/day on roads.
  - C. Cat - .75 acres/day on pads.
6. Reclamation costs and 12.4 acre reseeding area includes USFS Special Use Permit areas at the Creek Pump and Sediment Ponds.
7. Machine cycle time is not considered since cut/fill work is in same area. (No haulage required.)

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	Pounds of PLS/ac (Broadcast or Hydroseed) Permanent	Cost/lb PLS	Cost
<hr/>			
<u>Grass and Forb Species</u>			
Fairway crested wheatgrass ( <u>Agropyron cristatum</u> )	1	\$ 1.00	\$ 1.00
Bluebunch wheatgrass ( <u>A. spicatum</u> )	5	\$ 7.50	\$ 37.50
Streambank wheatgrass ( <u>A. riparium</u> )	4		
Slender wheatgrass ( <u>A. trachycaulum</u> )	4	\$ 2.55	\$ 10.20
Indian ricegrass ( <u>Oryzopsis hymenoides</u> )	2	\$ 8.15	\$ 16.30
Mountain brome ( <u>Bromus marginatus</u> )	3	\$ 3.50	\$ 10.50
Cicer Milkvetch ( <u>Astragalus cicer</u> )	4	\$ 4.20	\$ 16.80
Palmer penstemon ( <u>Penstemon palmerii</u> )	3	\$35.00	\$105.00
Silky lupine ( <u>Lupinus sericeus</u> )	<u>2</u>	<u>\$70.00</u>	<u>\$140.00</u>
TOTAL	28		\$337.30

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<u>STRATIFIED SHRUBS</u>	<u>Pounds of PLS/ac</u> <u>(Broadcast or Hydroseed)</u>		<u>Cost/lb</u>	
	<u>Permanent</u>		<u>PLS</u>	<u>Cost</u>
Curl-leaf mountain mahogany ( <u>Cercocarpus ledifolius</u> )	.5		\$40.00	\$ 20.00
Utah serviceberry ( <u>Amelanchier [utahensis]</u> <u>alnifolia</u> )	.5		\$62.85	\$ 31.42
Rubber rabbitbrush ( <u>Chrysothamnus nauseosus</u> var. <u>albicaulis</u> )	.5		\$68.00	\$ 34.00
Oregon grape ( <u>Mahonia repens</u> )	.5		\$78.50	\$ 39.25
TOTAL	2.0			\$124.67
<u>Relatively Low-Growing Shrubs</u>				
Rubber rabbitbrush ( <u>Chrysothamnus nauseosus</u> var. <u>albicaulis</u> )	.5		\$68.00	\$ 34.00
Snowberry ( <u>Symphoricarpos oreophilus</u> )	.5		\$55.00	\$ 27.50
Antelope bitterbrush ( <u>Purshia tridentata</u> )	.5		\$14.00	\$ 7.00
Oregon grape ( <u>Mahonia repens</u> )	.5		\$78.50	\$ 39.25
TOTAL	2.0			\$107.75

Grasses and Forbs	\$337.30
Stratified Shrubs	\$124.67
Relatively Low Growing Shrubs	\$107.75
TOTAL	\$569.72

RIPARIAN AREA

Grasses (seed)

Agropyron trachycaulum Kentucky Bluegrass \$2.90/lb 11 lbs PLS = \$62.76

<u>Scientific Name</u>	<u>Common Name</u>	<u>PLS</u>	<u>Lbs/Acre</u>	
<u>Agropyron smithii</u>	Western wheatgrass	\$ 2.90/lb	3	= \$ 8.70
<u>Agropyron trachycaulum</u>	Slender wheatgrass	\$ 3.35/lb	2	= \$ 6.70
<u>Bromus carinatur</u>	Mountain brome	\$ 3.00/lb	2	= \$ 6.00
<u>Carex spp.</u>	Sedge	\$20.00/lb	2	= \$40.00
<u>Poa pratensis</u>	Kentucky bluegrass	\$ .68/lb	2	= \$ 1.36
			11# PLS	\$62.76

Trees and Shrubs

<u>Mohonia repens</u>	Creeping Oregon Grape	\$78.50/lb	.25	=
<u>Rosa woodii</u>	Woods rose	\$22.00/lb	.5	=
<u>Rubus idaeus sachalinensis</u>	American red raspberry	NA	.25	=
<u>Salix rigida</u>	Yellow (Watson) Willow	NA	.25	=

(Cuttings on three foot centers along channel and pond)

1.25# PLS

TOTAL SEED \$12.25# PLS per acre