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TECHNICAL ANALYSIS

HIAWATHA MINES COMPLEX

I - INTRODUCTION

United States Fuel Company (U.S. Fuel), a wholly owned subsidiary of Sharon Steel Corporation, submitted a permit application to the Utah Division of Oil, Gas, and Mining (UDOGM) and the Office of Surface Mining (OSM) on March 23, 1981 in order to bring its Hiawatha Mines Complex into compliance with the permanent Utah State Program for the next 5 years of mining. This original submittal, updated through February 4, 1985, along with the apparent completeness review (ACR) response (June 14, 1983) and numerous applicant responses to determination of adequacy letters (DOAs), comprise the permit application package (PAP) for the Hiawatha Mines Complex. The Hiawatha Mines Complex consists of the King 4, 5, and 6 Mines and coal handling and processing facilities adjacent to the town of Hiawatha. The following technical analysis (TA) evaluates this permit application package (UT-0006). In addition to providing the application requirements for a Utah coal mining permit, the PAP includes the information required for the Secretary of the Interior to make a decision on U.S. Fuel's mining plan for its Hiawatha Mines Complex.

The Hiawatha Complex is located on the east side of the Wasatch Plateau in central Utah, about 15 miles southwest of Price, in Carbon and Emery Counties (Figure 1). U.S. Fuel controls, through private and Federal leases, 19,211 surface acres that comprise the Hiawatha Mines Complex. Of that total, only 12,605 acres are included in this action. Of this area, approximately 5,726 acres (approximately 30 percent) of coal are held by U.S. Fuel in the form of leases with the Federal government.

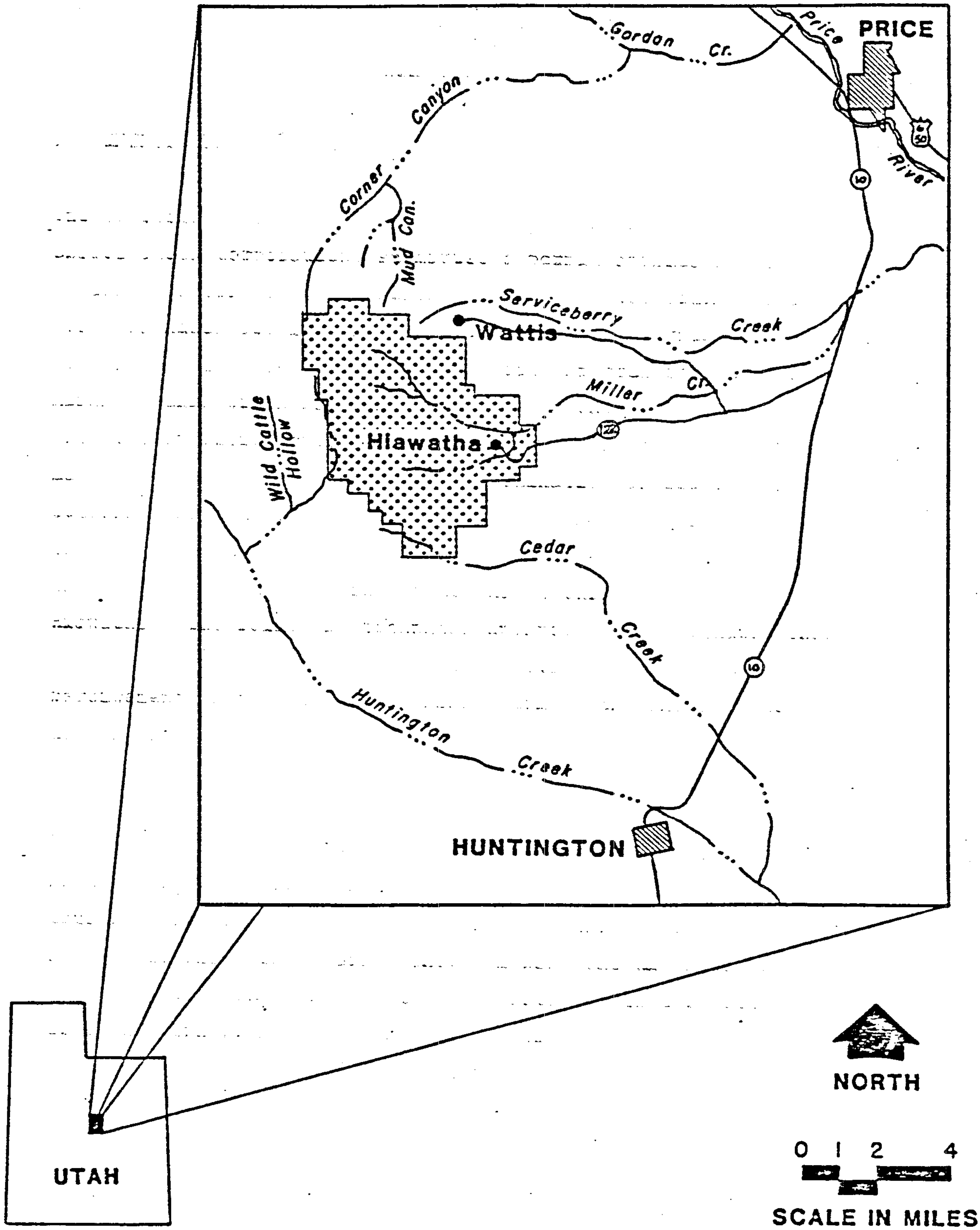

Figure 1
AREA MAP
HIAWATHA MINES COMPLEX

The leases involved are: SL-025431 (2,370.26 acres), SL-069985 (2,356.09 acres, and the combined leases U-058261 and U-026583 (1,000 acres). Only portions of those Federal leases, as identified on Figure 2, will be mined within the scope of this permit. The SMCRA permit area includes 12,605 surface acres in T.15S., R.7E., SLM, sections 13, 24, 25, 36; T.15A., R.8E., SLM, sections 17-21, 26-35; T.16S., R.8E., SLM, sections 3-6, 8, and 9. Federal coal leases within the permit area total 2,543 acres and comprise the mining plan area. All four Federal leases are involved in the mining plan area. Federal leases SL-025431 and SL-069985 also extend beyond the current mining plan area into the life-of-mine area. The remainder of the coal in the permit area and the life-of-mine area (9,833 acres) is owned by U.S. Fuel. The applicant does not own coal rights in approximately 3,650 acres in the permit area. The surface is owned by U.S. Fuel and the subsurface is controlled by the Bureau of Land Management. However, coal resources are not present within these areas (PAP Exhibits VI - 1 and 2). This permitting action does not include redevelopment of the Mohrland area (King 7 and 8) to the south of the SMCRA permit area; however, a proposed unit train loadout adjacent to the town of Hiawatha is part of this permitting action. Unless otherwise indicated, all references in this TA are to the Utah Regulations Pertaining to the Surface Effects of Underground Coal Mining Activities (UMC 700 et seq. and UMC 800 et seq.).

The Hiawatha Mines Complex is a consolidation of the original King, Hiawatha, Black Hawk and Mohrland mines, which began mining coal in the early 1900's. U.S. Fuel was organized in 1915 and began operation in 1916 when it took over the properties of the Consolidated Fuel Company, Castle Valley Coal Company, and Black Hawk Coal Company, all of which are located within the current permit area boundary. The current five-year permit application applies to three underground mines (King 4, 5, and 6) which are existing operations. Mining will remove coal from the A (King 4, 5, and 6), B (King 4 and 5), and Hiawatha (King 6) seams of the Blackhawk Formation.

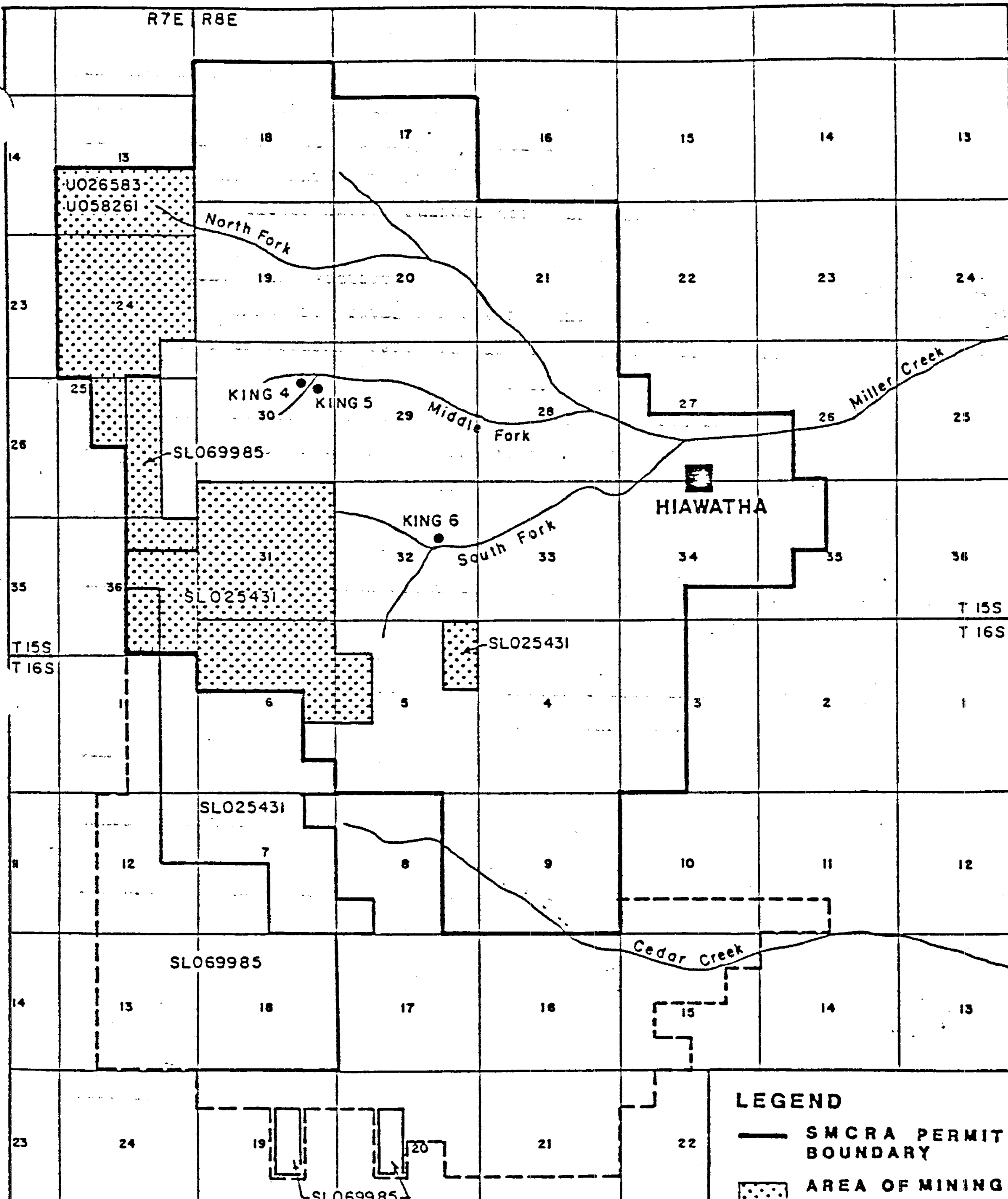

Figure 2
HIAWATHA MINES COMPLEX

Approval of both the SMCRA permit by OSM and the mining plan by the Secretary would provide for mining at the Hiawatha Mines Complex through the year 1989 at a maximum rate of 1.76 million tons per year. U.S. Fuel currently ships all coal from the Hiawatha Complex by rail to an electric generation plant in Nevada and military facilities in the northwestern United States. U.S. Fuel currently employs approximately 281 people at the Hiawatha Mines Complex. Employment would increase to 500 during the period of maximum production (1989).

The environmental assessment (EA) on the mining plan which accompanies this TA was prepared pursuant to the National Environmental Policy Act (NEPA). The EA and TA frequently reference one another.

II - DESCRIPTION OF THE EXISTING ENVIRONMENT

Topography and Geology

The Hiawatha Complex is located on the east side of the Wasatch Plateau, at elevations ranging from 6,750 to 9,600 feet, in an area characterized by steep canyons and high plateaus. Miller and Cedar Creeks drain the permit area.

Geology is the principal factor controlling the occurrence and availability of ground water in the vicinity of the Hiawatha Mines Complex. Portals for the Hiawatha Complex lie at the base of an erosional escarpment that forms the eastern face of the Wasatch Plateau. The Wasatch Plateau is a high, broad, flat area dissected by numerous streams. The high plateaus of Utah, which include the Wasatch Plateau, are thought to be a transition zone containing geologic structures common to both the Colorado Plateau Province to the east and the Basin and Range Province to the west. The mine complex is located in the Wasatch Plateau Coal Field. Coal outcrops appear in the canyon walls and along the cliffs. Rock types in the region are late Cretaceous and Tertiary in age and are generally representative of continental and/or transitional sediments. Marine sediments occur below the sequence and are on the valley floors east of the escarpment.

Structurally, the region is not very complex. Strata are fairly flat with dips to the south (sometimes slightly southeast or southwest) at 1 to 3 degrees. Locally, near faults, the dip increases to about 20 degrees.

The Pleasant Valley Fault Zone cuts across the western portion of the study area. It runs from north of Scofield Reservoir to south of Huntington Creek. The Pleasant Valley Fault Zone is 3 to 5 miles wide and displacement is generally between a few feet and 100 feet, although greater displacement occurs locally (Doelling, 1972).

Several localized fault systems have been identified to be associated with the Pleasant Valley Fault. One of these faults of local interest in the study area is the Bear Canyon Fault. The Bear Canyon Fault marks the western limit of mining at the Hiawatha Mines Complex, and it has a displacement of up to 250 feet.

Members of the Mancos Shale, Mesaverde Group, and Wasatch Group all outcrop in the study area. From bottom to top, the geologic units are Masuk Shale (a member of the Mancos Shale), Star Point Sandstone, Blackhawk Formation, Price River Formation, and North Horn Formation (a member of the Wasatch Group). The Star Point Sandstone, Blackhawk Formation, and Price River Formation are members of the Mesaverde Group. Mineable coal seams are located in the lower half of the Blackhawk Formation. Six coal beds have been identified in the Blackhawk Formation in the area of the Hiawatha complex. Four of these seams are thick enough to be economically mined at this time (Hiawatha, A, B, and Upper seams). U.S. Fuel has mined all but the Upper seam.

Climate and Air Quality

The climate of the Hiawatha Mines Complex area is typical of canyon areas of central Utah. Summer temperatures range from 40° to 95° F while winter temperatures average around 25° F. The average annual precipitation is 12 inches. Winds in the mine plan area are affected by the area's topography, although general wind directions over a broader region are from the north-northeast in the winter and the south-southwest in the summer.

Central Utah is primarily rural with some light or dispersed industrial activity. Existing air quality is generally excellent, although high total suspended particulate values result from travel on unpaved roads. Carbon monoxide, ozone, lead, and hydrocarbons are generally not monitored in the region, but it is reported that they are within the National Ambient Air Quality Standards (NAAQS) (BLM 1983).

Hydrology

In the vicinity of the Hiawatha Mines Complex, the Wasatch Plateau is dissected by two drainage systems, Miller Creek and Cedar Creek. The drainage area for Miller Creek, above the confluence with Serviceberry Creek, is about 29,700 acres. Streamflow in Miller Creek is perennial below the confluence with the North Fork of Miller Creek. The left fork of the North Fork of Miller Creek is diverted into an abandoned workings of the Hiawatha No. 2 Mine which contains an underground water storage reservoir. This reservoir provides water for the town of Hiawatha, the mine workings and the coal processing plant. Cedar Creek is also a perennial stream with a drainage area of approximately 5,300 acres. Cedar Creek receives approximately 1 cubic foot per second (cfs) of discharge from the inactive Mohrland portal to the south of the Hiawatha Mines Complex.

Ground water in the region around the Hiawatha Mines Complex is recharged principally by direct infiltration of precipitation in the higher plateau, infiltration from perennial streams that flow down gradient to Mancos Shale lowlands, and, to a limited extent, by infiltration in outcrops.

Contact with the Bear Canyon Fault at several points in old mine workings has resulted in large flows of water and accounts for most of the mine water presently discharged from the inactive Mohrland portal. One water-producing contact with the fault which is accessible in the King 4 Mine is presently used for fire protection and dust suppression in that mine. Generally, mine water flows southerly, away from active mining, and is discharged by gravity flow at the inactive Mohrland portal. Some of this water is diverted for culinary and industrial use at Hiawatha, and the remainder flows into Cedar Creek. No other mine discharge or dewatering activities are anticipated by U.S. Fuel.

The data contained in the spring inventory (DOA response November 7, 1984, Volume 1, Part 783.15) indicated more than 75 percent of the seeps and springs found during the survey issue from formations located stratigraphically above the coal-bearing Blackhawk Formation. More than half of the seeps and springs were found issuing from the North Horn Formation occupying the ridges in the western portion of the permit area. Flow rates from springs issuing from these upper formations tend to vary between about 2 and 8 gallons per minute (gpm).

Approximately one-fifth of the seepage points found during the survey are located in the Blackhawk Formation. Flow rates at these points tend to be minimal, with seepage issuing predominantly at the interface between sandstone and shale lenses. Usage is also minimal as a result of the low flow rate and the general inaccessibility of the seeps.

Water Supply

Mine water is used by U.S. Fuel for: 1) fire protection and dust suppression in King 4; 2) the coal processing plant; and 3) by the town of Hiawatha for culinary purposes. Approximately 786,000 gallons per day (gpd) is used by the plant; the town uses approximately 30,000 gpd from the system. These uses are covered by water rights claimed by U.S. Fuel for 4,758 gpm (3,746 gpm in surface-water rights and 1,012 gpm in ground-water rights). Mine water discharge from the inactive Mohrland portal is regulated under National Pollutant Discharge Elimination System (NPDES) permit UT-0023094. Water supply information on the area surrounding the Hiawatha Mines Complex is provided in the cumulative hydrologic impact assessment (CHIA), prepared by OSM.

Water is piped to the town of Hiawatha and the processing plant from the mines. Water is diverted into the mine on the North Fork of Miller Creek. This water together with the water intercepted in the mine is stored in the mined out section of the abandoned Hiawatha No. 2 Mine. Maximum storage volume in this underground reservoir is about 120 milliom gallons (368 acre-feet). Four bulkheads, constructed in 1951, are used to contain the water within the old mine workings. Only about 60 million gallons (194 acre-feet) are normally stored in this reservoir. The bulkheads are accessible, however, the underground "pumping system" is not.

Water in excess of that used in the mining operation is routed south through the mine workings by gravity. There is a 125,000 gallon (0.4 acre-feet) underground concrete storage tank and a discharge pipe associated with the King No. 3 Mine, but most of the ground water in the mine is conveyed south to the Mohrland portal where it is collected and piped to the town of Hiawatha. Water volume in excess of the capacity of the pipe is discharged into Cedar Creek. At Hiawatha there are four water storage tanks with a combined capacity of 245,000 gallons (0.75 acre-feet). Water is treated and then stored in a 40,000 gallon (0.1 acre-feet) tank 5A near the preparation plant.

Water Quality

Water in the mine is of good quality, with an average total dissolved solids concentration of about 700 mg/1. Surface water on the top of the Wasatch Plateau has a low total dissolved solids (TDS) concentration usually less than 400 milligrams per liter (mg/1) and a low total suspended sediment (TSS) concentration, usually less than 30 mg/1. Concentrations of dissolved sodium and chloride are usually less than 15 mg/1. The predominant dissolved chemical constituents are calcium and bicarbonate. Water quality during snowmelt runoff tends to be a calcium carbonate type and water quality from ground water discharge tends to have higher concentrations of magnesium and sulfate. Values of pH were fairly constant, ranging from 7.6 to 8.1.

The Utah State Board of Health has established water-quality standards to protect against controllable pollution to beneficial uses of water. For the Miller Creek basin, the pertinent water-quality standards are for nongame fish (Class 3c) and irrigation of crops and watering (Class 4) (Utah State Board of Health, 1978).

TDS levels exceed the water quality-standard for irrigation use immediately below some of the active mine areas, but the effects are diluted by surface water from undisturbed areas. TDS concentrations are within the water quality standards before water in Miller Creek flows out of the Hiawatha Mines Complex permit area. TDS increases by about two-fold when comparing above mining stations and below mining stations.

Dissolved constituents continue to increase in Miller Creek as water flows across the marine Mancos Shale. At the junction of Miller Creek and Utah Highway 10 (about 10 miles east of the permit area) TDS concentrations average more than 3,200 mg/1, and the dominant dissolved chemical constituent is sulfate (Mundorff, 1972). Again, the only parameter to exceed pertinent water-quality standards is TDS.

The sodium adsorption ratio (SAR) for the headwater areas is low. For the headwater areas of the Miller Creek and Cedar Creek drainages, the SAR is less than 0.5. At the base of the plateau, the SAR values are usually between 0.8 and 2.00 In the Mancos Shale, the SAR values range between 1.0 and 4.0. Snowmelt flow usually has a lower SAR value, but as sodium increases during low flow periods in streams crossing the Mancos Shale, the SAR also increases.

Both SAR and TDS combine to become a hazard for irrigation water. All of the water in the study area exhibits a low sodium hazard for snowmelt flows, but Miller Creek at Utah Highway 10 shows a medium sodium hazard during low flow periods. This increase in TDS and SAR as streams cross the Mancos Shale is a natural nonpoint source of pollution.

Soils

Within the proposed permit area the dominant soils at elevations of 7,000 to 8,500 feet have cool temperatures regimes and are moist except for significant periods during the growing season. Slopes generally range from 30 to 60 percent and at times exceed 70 percent. Soils within the proposed permit area generally are cobbly loam in texture and are derived from a variety of sedimentary rock. Some have organically rich surface horizons. The lighter colored soils have significant accumulations of carbonates in the subsoil.

Below 7,000 feet, the soils have moderate temperature regimes and are usually dry during the growing season. Slopes are generally less than 30 percent. Most of these soils are loam to cobbly loam in texture and have developed from alluvium and mass wasting derived from a variety of sedimentary rocks. Many of these soils have accumulations of carbonates in the subsoil. Vegetative production within and adjacent to the Hiawatha Mines Complex is limited by the lack of available moisture during the growing season. Natural sediment production is high.

Very little topsoil has been salvaged for reclamation purposes because the majority of disturbance occurred prior to the enactment of SMCRA. Instead, soil will be borrowed from areas below 7,000 feet in elevation for reclamation at the coal waste disposal sites and portal areas above 8,000 feet. The borrow areas will yield sufficient material to reclaim previously disturbed areas as well as the borrow areas themselves.

Vegetation

The U.S. Fuel SMCRA permit area includes 12,605 acres and incorporates a large diversity of elevation, topography, aspect, temperature, and moisture conditions. As a result, a large number of plant community types have developed. Ten vegetation types have been identified and mapped within the permit area. The ten types are: (1) mixed conifer forest (41.1 percent); (2) pinyon-juniper woodland (15.4 percent); (3) mixed conifer-aspen forest (13.9 percent); (4) mountain brush (11.8 percent); (5) high elevation sagebrush-grassland (7.2 percent); (6) grassland (5.5 percent); (7) sagebrush (1.8 percent); (8) aspen (1.8 percent); (9) riparian woodlands (1.4 percent); and, (10) barren land (0.1 percent). As these characteristics indicate, the basic vegetation of the permit area is forests and shrublands. Conifer, mixed conifer-aspen, and aspen stands occur at high and intermediate elevations on northern exposures, while pinyon-juniper, sagebrush, and mountain brush stands generally occur at lower mountain and foothill elevations with southern or western exposures. Riparian woodlands are confined to narrow corridors flanking Miller Creek and it's tributaries.

Of the 12,605 acres in the permit area, approximately 435 acres of vegetation have been lost or disturbed by past, as well as current, mining activities. Past mining activities were concentrated in the stream valleys and lower mountain slopes. Consequently, only mixed conifer, mountain brush, sage brush, pinyon-juniper woodlands, and riparian woodlands were affected. Future reclamation activities will disturb an additional 46 acres of pinyon-juniper woodlands as substitute topsoil sources are used. There are no known occurrences of threatened or endangered plant species or designated critical habitats for such species in the permit area.

Wildlife and Fisheries

The mine permit area occurs in the Transition and Canadian life zones and provides habitat for approximately 234 species of wildlife, including 6 amphibian species, 18 reptilian species, 139 bird species, and 71 mammal species.

Miller Creek and Cedar Creek drainages are the major perennial stream systems present. However, neither drainage supports fish populations. Cedar Creek supports an aquatic invertebrate community. There is no information on the existence of aquatic life in Miller Creek.

The permit area contains approximately 8,305 acres of critical deer and elk winter range, 3,335 acres of high-priority deer and elk summer range, and 1,017 acres of high-priority elk winter range. Some of these areas overlap within the permit area. Past and current mining activities have affected the critical and high-priority deer and elk winter ranges.

Springs and seeps are scattered throughout the area and provide an important habitat feature for many wildlife species. Riparian habitats are restricted to the narrow floodplains of major streams like Miller and Cedar Creeks. Riparian woodlands constitute about 1.4 percent of the permit area.

The golden eagle, great horned owl, and sparrow hawk are probably the most common raptors in the permit area. No known active nest or roost sites are present. The bald eagle and American peregrine falcon may occasionally visit the area. There are no known occurrences of threatened or endangered species or designated critical habitats present in the permit area.

Land Use

Land uses in the permit area include mining, logging, livestock grazing, wildlife habitat, watershed, oil and gas exploration, and recreation. Most of these uses have existed since early in the 20th century and are expected to be maintained without disruption by continued mining at the Hiawatha Complex.

Cultural Resources

The cultural resources of the Hiawatha Mines Complex impact areas have been partially inventoried. To date, no historic or archaeological sites have been recorded within the permit area. The applicant has agreed to provide an historical background study of the town of Hiawatha and to complete a pedestrian inventory of proposed direct impact areas associated with the processing plant, waste disposal sites, and substitute topsoil locations. The applicant has proposed measures to ensure that no adverse effects to any significant cultural sites which may be located within the permit area will occur as a result of mining operations. The Utah State Historic Preservation Office (SHPO) has concurred with OSM's finding of no adverse effect for the project in a letter to OSM dated July 9, 1984.

Transportation

The permit area is accessible from Utah Highway 122, County Road 338, and existing paved haul roads up the Middle Fork and the South Fork of Miller Creek. The town of Hiawatha is the terminal point of Utah Highway 122 and the lower portions of the haul roads also receive use by the public. The haul roads also provide access to water diversion, storage and service facilities for potable water for the town of Hiawatha and the coal processing plant. Coal which is mined is hauled by truck to the processing plant site at the town of Hiawatha. There the coal is loaded on rail cars for shipment by the Utah Railroad.

Four roads are currently used at the Hiawatha Mines Complex. All four roads were built prior to the passage of SMCRA by U.S. Fuel or their predecessor. Three of the roads parallel the forks of Miller Creek to active coal mining operations and the fourth goes south to the inactive coal mining operations along Cedar Creek.

The roads up the Middle Fork and South Fork of Miller Creek are paved Class I roads used to haul coal to the preparation plant. The road up the North Fork of Miller Creek is a Class III dirt road used for maintenance of a ventilation portal and a water diversion. The fourth road is an unpaved county road between Hiawatha and the Mohrland portal. Carbon County allows U.S. Fuel to maintain the road through an informal agreement. Emery County maintains their part of the road.

Socioeconomics

The Hiawatha Mines Complex straddles the Carbon-Emery County line in central Utah in the midst of an area commonly referred to as "Coal Country" or "Castle Country". Coal mining has occurred in the vicinity of the Hiawatha Complex since the late 1890's. Today, the entire region is linked to mining and energy resource development. The 1980 population of the two counties was about 33,650, a 62 percent increase over 1970. Most of this growth was a result of the renewed energy development. In 1983, nearly one-third of the total employment in the two counties was involved in the mining, transportation and utilities sectors.

The nearby town of Hiawatha, owned by U.S. Fuel, was developed during World War I. The current population is about 200. At one time. the town's population reached nearly 1,500, but in the mid-1950's and 1960's the population declined to about 150, in response to the diminished national importance of coal as an energy source.

All housing and land in the town is owned by U.S. Fuel and rented to residents. At least one member of a household must be employed by U.S. Fuel in order to rent a dwelling in the town. Of the 68 homes and 10 mobile home spaces in Hiawatha, 8 to 10 are vacant. A report issued by the Southeast Utah Association of Local Governments (SEUALG) on housing stock in Hiawatha indicated that, in 1981, 19 percent were rated "acceptable", 74 percent were "deficient", and 17 percent were "deteriorating." The company has indicated that there are no plans to undertake additional residential or commercial construction in the town (ACR response, 1981), therefore, it is unlikely that the quality or quantity of housing stock in Hiawatha will improve over the next 30 years.

Residency information for the current workforce reveals that 24 percent reside in Hiawatha while 46 percent live in the Price area. Of the remaining 30 percent, 18 percent live in other communities in Carbon and Emery Counties, with the place of residence not known for 12 percent of the workforce.

The prospects for the town of Hiawatha through the year 2014 (life-of-mine) depend on the operation of the Hiawatha Mines Complex. Approximately 80 percent of the town's budget ($35,000) is provided by property taxes on the mine's $1.8 million assessed valuation. Once reclamation occurs, the tax base will significantly diminish. The majority of public services are provided by U.S. Fuel.

The postmining future of Hiawatha is dependent on U.S. Fuel. The company could destroy the town, maintain the town, or divest itself of the property. Even with either of the last two possibilities, the town's remote location from other job opportunities and public and commercial services would probably result in population declines and eventual abandonment.

III - SUMMARY OF THE OPERATIONS AND RECLAMATION PLAN

Because of poor market conditions, only the King 4 Mine is currently producing coal at approximately 700,000 tons per year. U.S. Fuel has utilized the room-and-pillar method with both full and partial extraction, depending on roof characteristics. Longwall mining is proposed for part of King 5.

King 4 and 5 Mines share the same surface facilities in the Middle Fork of Miller Creek and were opened in 1974 and 1978 respectively. From the loading facility, coal is hauled 3 miles to the processing plant in Hiawatha. The access corridor from the town of Hiawatha to the Middle Fork facilities contains a Class I haul road and a powerline. The applicant may propose to build an overload conveyor system from the mine to the processing plant; however, this proposal is not included within this permit action.

Facilities for the King 6 Mine are located in the South Fork of Miller Creek mine yard. Coal is transported by an overload conveyor approximately 2,400 feet from the mine mouth down South Fork Canyon to a coal stockpile where it is loaded onto trucks and hauled 3 miles to the processing plant.

The processing plant, built in 1938, is located immediately north of the town of Hiawatha. It has the capacity to wash, size, and thermal dry 400 tons of coal per hour. Slurry discharged from the plant is channeled through a froth flotation resin recovery process. The slurry is then discharged into impoundments constructed of coal washing refuse material where it is stored, allowed to dry, and eventually reclaimed for shipment to coal markets. The applicant has filed notice of intent with the Utah Bureau of Air Quality to construct and operate a new unit train loadout facility adjacent to the existing preparation plant at the town of Hiawatha. The planned capacity of the facility is one million tons of washed coal per year. Washed coal will be transported on covered belt conveyors to two new storage piles at the railroad siding and then re-hauled by covered conveyor into the new rail car loading facility. An additional third storage pile will be used for reclaimed coal slurry which will be blended with the processed coal and included in the rail shipments. In order to accommodate the unit train loadout system, a portion of State Highway 122 and County Road 338 must be relocated. The applicant proposes to build an overpass for the train, thereby allowing uninterrupted movement of vehicles to and from the town of Hiawatha.

The applicant proposes to continue to operate the underground water-supply reservoir. The existing and long-term stability of the underground reservoir, during operation of the mine has been demonstrated in a response dated January 23, 1985. The proposed retention of the water system, during operations, can be approved if the applicant accepts a permit condition to physically inspect the three remaining seals on an annual basis.

The existing 8' X 20' breakout in the left fork of the South Fork will be plugged upon completion of mining and reclamation by hand, since there is no access to the portal area. All other areas affected by surface operations will be backfilled, stabilized and graded within two years following the cessation of mining (year 2014). Diversion ditches, berms, and sediment ponds will be maintained until that time. Some disturbed areas will be returned to the approximate original contour as shown on PAP Exhibit III-11 for the Middle Fork yard, while others, as shown on PAP Exhibit III-12a for the South Fork yard will be left as currently graded to prevent erosion, assist plant growth, and provide better access for wildlife and livestock. Cut and fill terraces will be used where flatter slopes are not possible. Revegetation will follow backfilling, grading, and replacement of topsoil using seed mixes recommended by UDOGM. Seeding will be accomplished by hydroseeding, drilling, and broadcast/raking and mulch will be used.

IV - LEGAL, FINANCIAL, AND COMPLIANCE INFORMATION UMC 782.13, 782.14, 82.15, 782.16, 782.17, 782.18, 782.19, AND 782.21.

UMC 782.13 IDENTIFICATION OF INTERESTS

Information required by this rule is provided in the original submittal (Volume I, Chapter II, pages 11-2 to II-5) and the DOA response (Volume I, Chapter II). The applicant is in compliance with UMC 782.13.

UMC 782.14 COMPLIANCE INFORMATION

Information required by this rule is provided in the original submittal (Volume I, Chapter II, pages II-6 to II-7). The applicant is in compliance with UMC 782.14.

UMC 782.15 RIGHT-OF-ENTRY AND OPERATION INFORMATION

Information required by this rule is provided in the original submittal (Volume Exhibits I, Chapter II, page II-8) and the DOA response (Volume I, Chapter II). The applicant is in compliance with UMC 782.15.

UMC 782.16 RELATIONSHIP TO AREAS DESIGNATED UNSUITABLE FOR MINING

Information required by this rule is provided in the original submittal (Volume I, Chapter II, page II-9) and the DOA response (Volume I, Chapter II). The applicant is in compliance with UMC 782.16.

UMC 782.17 PERMIT TERM INFORMATION

Information in permit term is provided in the original submittal (Volume I, Chapter II, page II-10) and the DOA response (Volume I, Chapter II). The applicant is in compliance with UMC 782.17.

UMC 782.18 PERSONAL INJURY AND PROPERTY DAMAGE INSURANCE INFORMATION

The applicant has provided evidence of insurance coverage which complies with the requirements of UMC 806.14 in its DOA response (Volume I, Chapter II, pages 3 and 4).

UMC 782.19 IDENTIFICATION OF OTHER LICENSES AND PERMITS

The applicant has provided information on its other licenses and permits in the original submittal (Volume I, Chapter II, page II-13) and the DOA response (Volume I, Chapter II).

The applicant proposes to modify a coal refuse pile (MSHA I.D. No. 1211-UT.9.0007) in order to construct the coal loadout conveyor system. The technical data submitted by U.S. Fuel concerning the design of the structures and foundations for the unit train loadout facility is considered adequate for review by the Mine Safety and Health Administration (MSHA). Approval by MSHA must be obtained prior to initiating construction.

UMC 782.20 IDENTIFICATION OF LOCATION OF PUBLIC OFFICE FOR FILING OF APPLICATION

The public offices where the application has been filed are listed in the original submittal (Volume I, Chapter II, page II-14). The applicant is in compliance with UMC 782.20.

UMC 782.21 NEWSPAPER ADVERTISEMENT AND PROOF OF PUBLICATION

Information on the required newspaper advertisement and proof of publication are provided in the original submittal (Volume I, Chapter II, page II-15) and the DOA response for all parts of the operation except the proposed unit train loadout. UDOGM published a public notice regarding the proposed unit train loadout and relocation of State Highway 122 and County Road 338 in accordance with UMC 786.11(5), 761.12(d), and 784.18. The applicant is in compliance with UMC 782.21.

V - LAND USE - UMC 783.22, 784.15, AND 817.133

Information on land use for the proposed permit area is located in the original submittal (Volume I, Chapter IV), the July 1983 ACR response (Chapter VI), and the DOA response (Volume I, page 85). The applicant is in compliance with UMC 783.22.

VI - CULTURAL AND HISTORIC RESOURCES - UMC 761.11(a)(3), 783.12(b), AND 784.17

Cultural and historical resources information is presented in Volume I, Chapter V, of the original submittal, in the ACR response, and the January and February 1984 DOA responses.

At present, no archaeological or historical sites are known to exist within proposed direct impact (ground surface disturbance) areas in the permit area. However, the applicant has committed to complete the following studies which are or may be necessary to assess the effect of the proposed mining on the cultural environment:

- Historical background survey of the town of Hiawatha and archaeological assessment of the processing plant and waste disposal sites;

- Cultural resources inventory of substitute topsoil locations (Exhibit VII - 4A);

- Additional cultural resources studies as may be determined necessary in the future by OSM, UDOGM, and/or the Utah SHPO to assess the effects of subsidence on cultural sites in the areas over the underground workings.

On the basis of the information submitted by the applicant, and the following condition, OSM requested SHPO concurrence with a Finding of No Adverse Effect. The SHPO has provided this concurrence in a letter dated July 9, 1984. The proposed operation will be in compliance with the requirements of UMC 761.11(a)(3), 783.12(b), and 784.17. The following condition is included a a requirement of this permitting action.

Condition No. 1

The permittee shall ensure that prior to initiation of any new ground disturbance (e.g., additional topsoil borrow areas, access to topsoil borrow areas, expansion of existing coal refuse piles, etc.), OSM, UDOGM, and the SHPO are consulted concerning the need for a cultural resources inventory of the impact area. If an inventory is required, the operator shall ensure that all cultural resources are properly evaluated in terms of National Register of Historic Places eligibility criteria. Where a significant site will be affected by mining, the permittee will consult with OSM, UDOGM, and the SHPO to develop and implement appropriate impact mitigation measures according to a mutually agreed upon schedule.

VII - GEOLOGY - UMC 783.13 AND 783.14

The description of geology can be found in the PAP in Volume II, Chapter VI, and in the volume containing the 1983 ACR Response, Chapter VI. The description of geology provided in the previously mentioned volumes of the PAP defines the geologic strata down to the lowest aquifer that may be affected by mining (i.e. the Star Point Sandstone). In addition, the primary geologic structure in the area, the Bear Canyon Fault, is also thoroughly discussed. The description of geology is sufficient to support the description of ground-water resources in UMC 783.15 (See Chapter IX.) Therefore, the PAP is in compliance with UMC 783.13 and 783.14 with regard to geology in the vicinity of the Hiawatha Mines Complex.

VIII - HYDROLOGIC BALANCE: SURFACE WATER - UMC 783.16, 784.16, AND 784.22

UMC 783.16 SURFACE WATER INFORMATION

Baseline surface-water information is provided in the original submittal (Volume II, Chapter VII, pages VII-9 through VII-16) and the ACR and DOA responses. This information has been determined to be complete.

Completeness was evaluated with regard to section UMC 783.16 and 783.24(g) (Maps: Cross-sections, Maps, and Plans). Compliance was determined as it relates to the technical adequacy of surface water, section UMC 817.52 (Hydrologic Balance: Surface-and Ground-Water Monitoring) and 817.54 (Hydrologic Balance: Water Rights and Replacement).

Surface-water monitoring data have been collected since June 1978 for seven stations. The applicant expanded the surface-water monitoring network to include an additional six stations. The applicant committed to making these six additional stations become a permanent part of the surface-water monitoring program in the November 1983 DOA response.

According to the applicant's existing surface-water monitoring program, water quantity and quality are monitored once a month when accessible. Water quality is currently being sampled under two analytical schedules: a comprehensive analytical schedule for the month of August (See Table VII-7 Volume II.) and an abbreviated analytical schedule for all other months (See Table VII-3, Volume II.)

In addition to the surface-water monitoring program, the Hiawatha Mines Complex has eight sedimentation ponds, three mine water discharge points, and a discharge for the town's excess water all under the NPDES monitoring system.

U. S. Fuels has agreed to follow surface-water monitoring procedures established by UDOGM. The surface-water monitoring program includes monthly monitoring during the period from April through October according to an abbreviated analytical schedule (i.e. sodium, calcium, magnesium, potassium, sulfate, bicarbonate, carbonate, chloride, total dissolved solids, total suspended solids, pH, field specific electrical conductance, field temperature, and stream flow). Twice a year (snowmelt and low flow) the full scale of water quality parameters will be analyzed (i.e., aluminum, cadmium, boron, chromium, lead, mercury, molybdenum, nickel, ammonia, phosphate, and sulfide).

U.S. Fuel proposed a modification to their surface-water monitoring program (DOA response of March 16, 1984). In that proposal, U.S. Fuel requested reduction of the current monthly monitoring to quarterly monitoring. U.S. Fuel argues that these changes are justified because there have been no significant changes or variations in the monitoring results and that the major water quality problem in the basin is salt production rather than heavy metals.

OSM agrees that dissolved salts and suspended sediment are major water quality concerns. In the CHIA for Miller Creek, OSM has documented an increase in dissolved salts and suspended sediment due to coal mining activities. The increases do not exceed water-quality standards established by the Utah State Board of Health; therefore, are not to the level of material damage, and U.S. Fuel has designed their mining and reclamation plan to minimize impacts on the hydrologic balance. However, quarterly monitoring will not be sufficient to provide the necessary data to analyze these changes in water quality; therefore, Condition No. 2 is necessary.

U.S. Fuel has accepted OSM's and UDOGM's required analytical schedule which does not include total and dissolved iron, alkalinity, and oil and grease. Analyses in the Miller Creek CHIA documented that dissolved iron is naturally high throughout the study area, and the dissolved iron and oil and grease concentration are sometimes higher below the mine disturbance than above it. The CHIA concluded that more long-term data are needed for dissolved iron and oil and grease. Therefore, dissolved iron and oil and grease must be included in the routine sampling analytical schedule (See Condition No. 2.)

In previous correspondence (letter dated July 23, 1981), the Manti-LaSal National Forest requested that U.S. Fuel include alkalinity in the Hiawatha Mines Complex water monitoring program. Therefore, alkalinity must be included in the surface water monitoring program. (See Condition No. 2.)

U.S. Fuel also proposed to delete radioactivity (gross alpha and gross beta). This is acceptable because radioactivity has not been found to be a problem either at the Hiawatha Mines Complex or for the Wasatch Plateau Coal Field.

U.S. Fuel has committed to sampling a suite of heavy metal and other parameters in the comprehensive analytical schedule. These parameters are aluminum, cadmium, boron, chromium, copper, lead, mercury, molybdenum, nickel, ammonia, phosphate, and sulfide. The dissolved constituent of all of these parameters will be measured. U.S. Fuel needs to commit to monitoring using the comprehensive analytical schedule twice a year (snowmelt and low flow) and to performing the abbreviated schedule monthly from April through October. (See Condition No. 2.)

All of the records from the surface-water monitoring program indicate that surface-water monitoring is being conducted according to the existing plan. Modification of the surface-water monitoring program as proposed by U.S. Fuel should not reduce the quality of the monitoring data if Condition No. 2 is followed. Therefore, U.S. Fuel will be in compliance with UMC 817.52(b) for the Hiawatha Mines Complex with the following condition. In addition, U.S. Fuel is in compliance with UMC 783.16, 784.16, 894.22, 783.24(g), 817.52, and 817.54.

Condition No. 2

Within sixty (60) days of the effective date of this permit, the permittee must submit a revised surface-water monitoring program to include alkalinity, dissolved iron, and oil and grease. Streams will be monitored monthly during the period of April through October in accordance with UDOGM's abbreviated sampling analytical schedule. Measurements of turbidity may be substituted for the measurement of total suspended solids following the development of an adequate site-specific relationship between the two parameters. Twice per year, the full suite of water-quality parameters will be analyzed using the comprehensive analytical schedule developed by UDOGM.

The samples can correspond to one of the monthly high flows (May or June) and the low flow (September or October). Flow measurement will be taken at the same time that any water quality samples are taken. The data collected shall be sent to UDOGM on a quarterly basis and may be incorporated into the data reports required by Condition 2. The annual report shall contain a summary of the quantity data and analytical interpretations. In addition, the applicant must submit a postmining surface-water monitoring program to include, in addition to the current stations, water-monitoring stations immediately upstream of all existing sedimentation ponds and will measure flow, rate, specific conductance, and total suspended solids for all runoff producing events.

UMC 784.16 RECLAMATION PLAN: PONDS, IMPOUNDMENTS, BANKS, DAMS, AND EMBANKMENTS

(b)(1) Sedimentation Ponds

The Hiawatha Mines Complex currently contains eight sedimentation ponds (see Figure 9). Most of these ponds were constructed in 1978 or 1979 to achieve on-the-ground compliance with the drainage and sediment control rules and regulations of OSM's interim regulatory program. Approval of the sedimentation ponds for the Middle Fork portal yard, South Fork portal yard, and upper coal storage yard was given by OSM and UDOGM on May 30, 1980. Approval of the ponds was given by Utah Water Pollution Control Board in August 1979. The sediment control structures for the coal pile/truck loadout area on the South Fork were reviewed by OSM and UDOGM during the analysis in conjunction with the reopening of King No. 6 Mine (approved July 15, 1981). Review and approval of the other sedimentation ponds were deferred for later review. U.S. Fuel also proposes using three sedimentation ponds to control sediment from the postmining topsoil borrow areas (A, B, C, and D).

All sedimentation ponds were analyzed during this review for compliance with UMC 817.45 (Hydrologic Balance: Sediment Control Measures); 817.46 (Hydrologic Balance: Sedimentation Ponds); 817.47 (Hydrologic Balance: Discharge Structures); 817.56 (Hydrologic Balance: Postmining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments, and Treatment Facilities); and, 817.57 (Hydrologic Balance: Stream Buffer Zones).

Information used in the review was obtained primarily from four studies: Vaughn Hansen Associates (1978), Rollins, Brown and Gunnel, Inc. (1979), U.S. Fuel (1980), and a series of correspondence from U.S. Fuel dated February 1979 through July 1979 for a sedimentation pond associated with reconstruction of Slurry Pond No. 1. Other studies were provided by the applicant in their DOA responses of November 1983 and July 1984 for sedimentation ponds associated with topsoil borrow areas A, B, C, and D. Sediment removal, pond maintenance, and pond inspection procedures are presented in the ACR response (Volume 1, Chapter III, pages III-14A and III-29A).

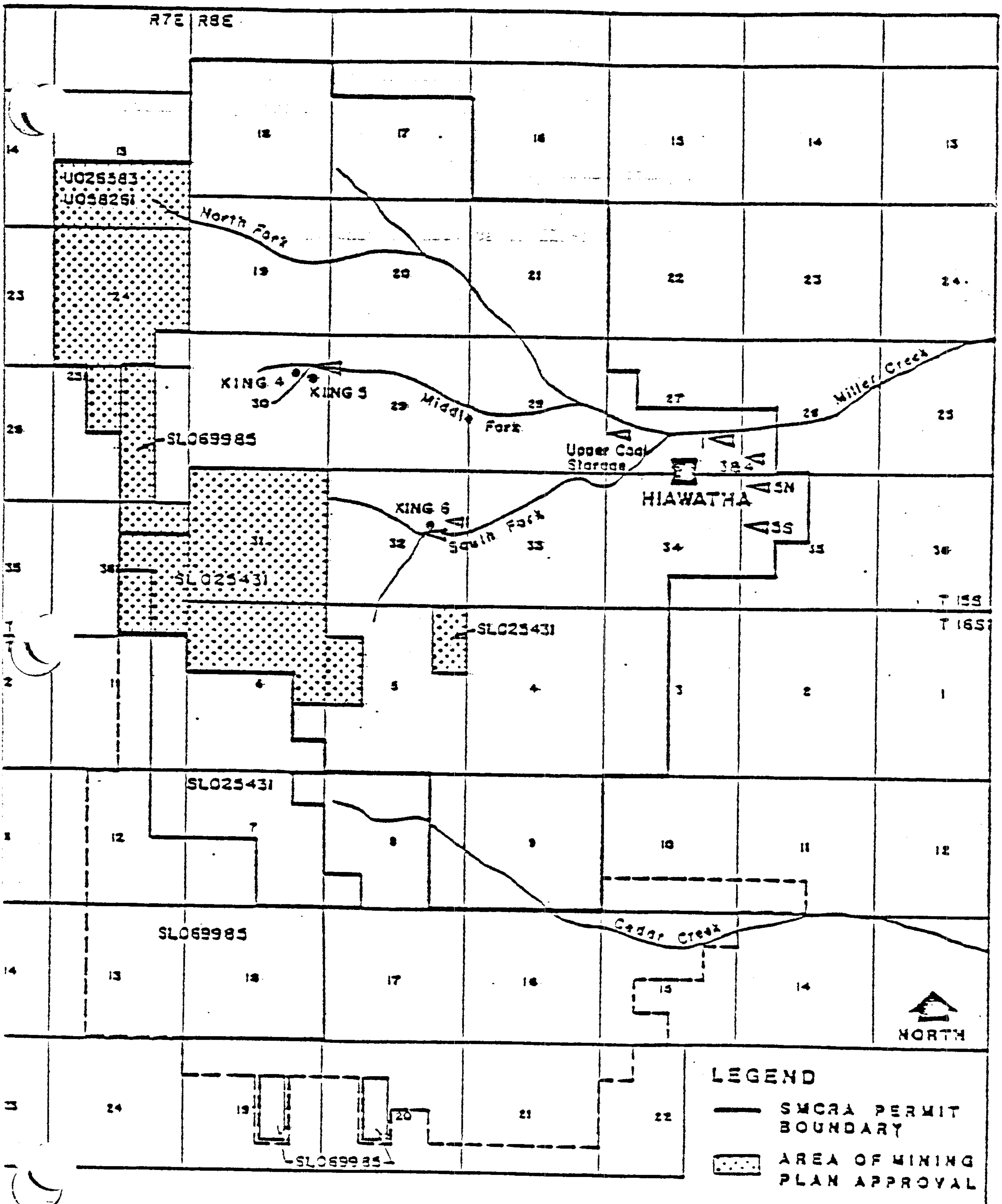

Figure 9
HIAWATHA MINES COMPLEX
EXISTING SEDIMENTATION PONDS

Runoff and sediment volume estimates were made by the applicant using acceptable methods and were checked by OSM for accuracy using the SEDIMOT program. There was agreement between the results cited by the applicant and those of the SEDIMOT program; therefore, the runoff and sediment volume estimates are acceptable.

The runoff and sediment volumes estimated in the Vaughn Hansen Associates study (1978) were different from the corresponding estimates in the Rollins, Brown and Gunnel study (1979). The Vaughn Hansen study consistently required a larger pond size because of higher runoff and sediment volume estimates. This discrepancy was pointed out in a letter from Sharon Steel to UDOGM dated October 28, 1981. It appears that the Vaughn Hansen study designed the sedimentation ponds for a larger disturbed area and a higher sediment contribution per disturbed area. The higher sediment volume per disturbed area was required under the interim program regulations but was revised to a lower sediment volume per disturbed area in the permanent program regulations. The Rollins, Brown and Gunnel report simply used the more current regulations to design the sedimentation ponds.

Pond designs for top width, embankment slopes, relative elevations of the principal and emergency spillways, sizing of the principal and emergency spillways, sediment removal, bank stabilization, erosion control, and inspection procedures, were evaluated as they relate to 817.46 and 817.47 and were found to be in compliance for all existing and proposed sedimentation ponds. Four special cases were identified that need to be discussed in more detail.

All of the sedimentation ponds and sediment control structures needed during this permit term are already in place. Since the original design submittal, however, there have been over 18 minor changes to these ponds and structures. All of the sedimentation ponds and sediment control structures are affected. Because of the number and complexity of these modifications, it has become increasingly difficult to identify the on-the-ground sediment control plan in the PAP. To aid inspectors and future reviewers, and to comply with the appropriate regulation, condition No. 3 is necessary.

Condition No. 3

Within ninety (90) days of the effective date of this permit, the permittee will submit to the regulatory authority current as-built designs, certified by a professional registered engineer, for all sedimentation ponds, sediment traps, and sediment control structures. Separate design packages should be submitted for each pond, trap and structure. Each package must contain, at a minimum, the following four maps:

1) A drainage area map (scale 1"=2000') showing the contributing area for the pond and any drainages that are conveyed through or under the disturbed area;

2) Plan view of the disturbed area (scale 1"=200') showing topography, location of ponds, other sediment control structures, culverts, and ditches. Culverts and ditches should be labelled and referenced;

3) Cross-section of sedimentation pond (or other sediment control structure) (scale 1'=50') showing side slope, sediment storage level, runoff storage level, elevation of principal spillway, elevation of emergency spillway and elevation of top of the pond; and,

4) Plan view of sedimentation pond (scale 1"=50').

U.S. Fuel was in error in sizing the pond. Their submittal stated that the pond was 900 feet by 300 feet by 35 feet using 1 foot of freeboard. Performance standards for coal processing waste dams and embankments (UMC 817.93) require that these ponds have at least 3 feet of freeboard. Therefore, the active storage volume is 6.2 acre-feet.

The seepage rate of the slurry pond is sufficient to allow for the daily wastewater from the preparation plant without any cumulative storage (letter of February 29, 1984). Therefore, the only concern is whether the volume of voids in the waste rock can be used as storage for surface runoff.

When in use, the slurry ponds have standing water in them, which indicates that the voids in the waste rock are filled with water.

Therefore, the only available storage is the 6.2 acre-feet of active storage. This storage volume is sufficient for runoff from the disturbed area and wastewater from the processing plant, but not enough to contain the design event from the undisturbed areas. Therefore, Condition No. 4 is necessary for future long-term use of Slurry Pond 5A. U.S. Fuel is not currently using Slurry Pond 5A.

The third special case deals with reclamation of portal area ponds. Sedimentation ponds for King Mine Nos. 4, 5, and 6 will be removed when the portal areas are reclaimed. Removal of the ponds will be in the summer when stream flow is low and chances of increasing the suspended sediment load are minimal. Prior to removal of the ponds, a series of three sediment traps measuring approximately 15 feet square and five feet deep, will be constructed below the existing sedimentation pond. The traps will be left in place after mining to minimize disturbance.

The applicant proposes to leave the existing sedimentation ponds for the preparation plant, slurry ponds, and coal refuse embankments in place until the revegetation requirements are met and drainage entering the pond meets effluent limitations.

Condition No.4

Within sixty (60) days of the effective date of this permit, the permittee must submit to the regulatory authority a revised plan demonstrating adequate runoff storage for Slurry Pond 5A. Slurry Pond 5A is not to be used to contain runoff from the undisturbed areas flowing through culverts Nos. 2 and 12 until a revised plan is submitted and approved by the regulatory authority.

Exhibit III-3 shows an equipment storage yard about 500 feet east of Slurry Pond 5 North. Information was submitted on May 17, 1984, (p. 85) that adequately describes acceptable sediment control for the equipment storage yard for both during and after mining. Sediment control will be achieved by berms and a silt fence.

The applicant has constructed a small (about 1 acre) ventilation pad on the right fork of the North Fork of Miller Creek. (See Figure 9.) Because of the small area of disturbance, a small area exemption was allowed (UMC 817.42 (a)(3)), and the applicant is using straw bales to control sediment from the area. This is in compliance with UMC 817.42 and 817.45.

Slurry Pond 5 will receive the runoff from the proposed unit train loadout. All drainage and sediment control facilities for the proposed unit train loadout are existing and are in compliance if Conditions No. 3 and 4 are met.

A small ventilation breakout currently exists in the South Fork of Miller Creek. The breakout was excavated from within the mine and surface disturbance associated with the breakout is only about 300 square feet (DOA response, May 17, 1984, p. 55). Access to the site by vehicular traffic is impossible without causing significant damage to the surface. Because of the remoteness and small size of the disturbed area, no sediment control measures are required. The applicant has proposed to build a berm to aid in sedimentation control during reclamation of the portal area (9/84 submittal).

Two of the existing sedimentation ponds, the upper coal storage yard pond and the sedimentation pond associated with Slurry Pond No. 1, are within 100 feet of Miller Creek. Miller Creek is a perennial stream. In order to project the worst case, it is assumed that Miller Creek contains a biological community, but data from the surface-water monitoring reports do not indicate that any adverse effects on water quantity or quality are associated with these two ponds. In addition to the existing ponds, two other sedimentation ponds will be within the Miller Creek buffer zone. These ponds are associated with the postmining topsoil borrow areas A, B, and C. Because the topsoil will be removed from these areas before the sediment ponds will be built, initial sediment control will be achieved through use of straw bales. This will be adequate since U.S. Fuel has committed to building the sediment ponds during the first construction season following disturbance (DOA response, July 17, 1984, p. 43) and to maintain a 50-foot buffer zone (DOA Response, July 17, 1984, pp. 46 and 47). The 50-foot buffer zone will insure that all disturbance is outside of the 100-year flood plain (response to Nov-N84-4-8-8, No. 1, July, 1984). Therefore, the applicant is in compliance with UMC 817.57.

The North Fork diversion has been proposed and approved by UDOGM on October 21, 1984, as a permanent structure. The applicant has provided the required information necessary to approve the retention of this structure as a postmining land use feature in accordance with UMC 817.133 and 817.49.

In summary, with Conditions No. 3 and 4, the applicant will be in compliance with UMC 817.42, 817.45, 817.46, 817.47, 817.49, and 817.57.

UMC 784.22 DIVERSIONS

Each of the portal pads, the upper coal storage yard, the preparation plant area, and the slurry pond areas have small, overland flow, temporary diversions associated with them. Information on these diverions is presented in the original submittal, Chapter VII, and in "Surface Hydrology and Culvert Adequacy of the Hiawatha and Mohrland, Utah, Areas" (Vaughn Hansen Associates, 1978). Information on the design of these diversions is presented in Chapter XII, Exhibit III-1A, and Exhibit III-4A, respectively. Additional information on the permanent stream diversion adjacent to Slurry Pond No. 1 is presented in a letter from U.S. Fuel to UDOGM dated February 20, 1979. Information on the reclamation of the Middle Fork and South Fork diversions is presented on Exhibit III-11, III-12A, and III-12A1.

Miller Creek and its tributaries are diverted from a point adjacent to Slurry Pond No. 1, from under the portal pad for the King No. 4 and 5 Mines (Middle Fork), and from under the sedimentation pond for the King No. 6 Mine (South Fork). Only the diversion adjacent to Slurry Pond No. 1 is a permanent diversion. The other stream diversions will be reclaimed when the portal pad area(s) are reclaimed.

Some of the surface-water flows of the left fork of the North Fork of Miller Creek have been diverted into the underground mine workings. This subject is discussed in Chapter XII, UMC 817.55.

The PAP is complete and technically adequate in regard to UMC 784.22. Compliance has been evaluated as it applies to UMC 817.43 (Hydrologic Balance: Diversions and conveyance of Overland Flow, Shallow Ground Water Flow, and Ephemeral Streams), 817.44 (Hydrologic Balance: Stream Channel Diversions), 817.47 (Hydrologic Balance: Discharge Structures), and 817.56 (Hydrologic Balance: Postmining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments, and Treatment Facilities). All temporary overland flow diversions were checked by OSM to ensure adequate flow capacity, freeboard, and erosion control.

Since the approval of the ditches (letter from UDOGM dated May 30, 1980), the Hiawatha Mines Complex has received three inspection violations for breached diversion ditches (NOV Nos. 82-2-10-1, 83-4-2, and 83-4-9-2). All of these violations were terminated and no proceedings were initiated.

Miller Creek was diverted into a new channel adjacent to Slurry Pond No. 1 in 1979. The original slurry pond embankment was too steep, and to make room for the flatter embankment slopes the creek was moved approximately 50 to 150 feet to the north. The permanent diversion length is approximately 600 feet, about 10 feet short of the natural channel length. The diversion channel was designed to safely carry the runoff resulting from the 100-year, 24-hour storm (letter from U.S. Fuel dated March 19, 1979), and UDOGM stipulated that the channel be riprapped for the entire length of the diversion to protect against erosion (letter from UDOGM dated March 29, 1979). U.S. Fuel has received a notice of violation on May 11, 1984, (N84-4-8-8, No. 1) for not riprapping the entire length of the diversion. The applicant has submitted plans which have been approved, and will commence work in spring, 1985.

Temporary diversions have been constructed for the Middle and South Forks of Miller Creek. The Middle Fork diversion conveys the undisturbed drainage under the portal yard and sedimentation pond for the King No. 4 and 5 Mines and the South Fork diversion conveys the undisturbed drainage under the upper sedimentation pond at the King No. 6 Mine. Both culverts are adequately sized for the runoff from the 50-year, 6-hour precipitation event. Reclamation of these channels will occur at the time of reclamation of the portals. Both reclaimed channels are adequately sized to safely convey the runoff resulting from the 100-year, 24-hour precipitation event. The applicant's calculations were checked by OSM using the SEDIMOT model. Both reclaimed channels were checked for erosion control, longitudinal stream profiles, and channel cross-sections.

Six temporary diversions will be constructed to channel drainage associated with the postmining topsoil borrow areas. All diversions are adequately sized for the runoff resulting from 1-year, 24-hour precipitation event. The applicant's calculations were checked by OSM and the designs are in compliance with UMC 817.43.

In summary, all diversion ditches, temporary or permanent, are currently in compliance with UMC 784.22, 817.43, 817.44, 817.47, and 817.56. The applicant is not in compliance with UMC 817.44 with regard to the permanent diversion on Miller Creek until the abatement of NOV 84-4-8-8, No. 1 is completed.

IX - HYDROLOGIC BALANCE - GROUND WATER - UMC 783.13 AND 783.15

The ground water resources in the permit and adjacent area of the Hiawatha Mines Complex are described in the following parts of the PAP:

1. Original submittal, Volume II Chapter VII;
2. DOA response, Volume I, Part 783-15 and 784.14; and
3. DOA response, 16 March 1984.

The description of ground-water resources in the sources mentioned above has been reviewed and has been found to be complete and technically adequate. The information from these sources has been used to define the ground-water flow system as part of the CHIA.

The most significant ground-water resources that may be affected by the Hiawatha Mines Complex include:

1. springs in hydraulic connection with the Bear Canyon Fault where the fault has been intercepted by the mine; and
2. springs overlying the Hiawatha Mines Complex in areas where mine subsidence may reach the surface.

A spring inventory has been provided in the PAP (DOA response, November 7, 1983, part 783.15) in both tabular and map form. In addition, spring monitoring has occurred at 10 spring locations twice annually (spring and fall) beginning in 1979. Other ground-water well information includes a discussion of water inflow to the Hiawatha Mines Complex, which has been minimal except for the flows as great as 100 to 200 gpm that were encountered at the Bear Canyon Fault. The PAP is in compliance with UMC 783.13 and 783.15.

X - ALLUVIAL VALLEY FLOORS - UMC 785.19 AND 822

The applicant has delineated the extent of areas meeting the alluvial valley floor (AVF) geomorphic criteria in the permit and adjacent area of the Hiawatha Mines Complex (Exhibit VI-7). The valleys of Cedar Creek and Miller Creek are the only valleys meeting the geomorphic criteria. There is no history of flood irrigation activities in the Cedar Creek or Miller Creek valleys in the vicinity of the Hiawatha Mines Complex, although irrigation is practiced approximately two miles downstream from the Hiawatha Mines. The PAP discusses the difference between the valley floor characteristics of the lower irrigated area and the upper valley. The upper valley is narrow, has steep slopes (10 to 15 percent), cobbly soils, and is of limited areal extent (50 to 100 feet wide and up to 10 acres in size) (DOA letter response, Volume I, page 93). There is no precedent for developing irrigation agricultural activities in areas similar to the upper valleys of Cedar and Miller Creeks for a 30 mile radius around the Hiawatha Mines Complex; therefore, it is concluded that the valleys of Cedar Creek and Miller Creek are AVFs in their lower reaches (i.e., approximately 2 miles downstream from the Hiawatha Mines Complex). However, in close proximity to the mines, the valley bottoms are not suitable for developing flood irrigation.

Regarding subirrigation agricultural activities, test pits installed on representative terrace areas in the valleys of Cedar Creek and Miller Creek (that meet the AVF geomorphic criteria), revealed that on-site vegetation is subirrigated. However, the vegetation present on these terraces is not agriculturally useful (permit application, Volume I, page 94 and Table IX-7). It is, therefore, concluded that subirrigated agricultural activities are not occurring on the valleys of Cedar and Miller Creeks.

Based on the preceding discussion, it is concluded that the valleys of Cedar Creek and Miller Creek in the vicinity of the Hiawatha Mines Complex are not AVFs. The PAP has provided adequate information to make the AVF determinations mandated by UMC 785.19 and the PAP is, therefore, in compliance with this action.

The PAP also provides a surface-water and ground-water monitoring program that will document the preservation of the essential hydrologic function of flood irrigation both during and after mining for the AVFs downstream from the Hiawatha Mines Complex. (See Chapter XII of this TA, Part UMC 817.52.)

XI - WATER RIGHTS AND REPLACEMENT - UMC 783.17, 817.53, AND 817.54

Chapter XII (Part UMC 787.14) discusses the applicant's assessment of probable hydrologic consequences of the proposed mining. The following commitment by the applicant is adequate to deal with all potentially affected water sources identified as part of the probable hydrologic consequences.

In Volume I of the DOA responses (pages 23 and 23A) the applicant has identified the following alternate means to replace existing water sources that may be interrupted:

1. Transfer water rights using U.S. Fuel's available water rights; (See Volume I, Appendix VII-5.)

2. Collect spring flow at a remote location and pipe water to the vicinity of the lost water sources;

3. Install a guzzler (and possibly truck the water to the site); and/or

4. Develop a surface-water retention pond.

The applicant's commitment to replace affected sources of water using the procedures described above is considered adequate to find compliance with UMC 783.17 and 817.54.

The applicant does not propose to transfer any wells to any other surface owner. Therefore, UMC 817.53 is not applicable.

XII - PROBABLE HYDROLOGIC CONSEQUENCES OF MINING - UMC 784.14, 817.50, 817.55, AND 817.52

UMC 784.14 RECLAMATION PLAN: PROTECTION OF THE HYDROLOGIC BALANCE

Surface Water

Information to describe water rights and measures to minimize the disturbance to the hydrologic balance are presented in Chapter VII of the original submittal and the ACR and DOA responses. This information is determined to be complete regarding surface water.

Compliance was evaluated with respect to UMC 817.41 (Hydrologic Balance: General Requirements), 817.42 (Hydrologic Balance: Water Quality Standards and Effluent Limitations), 817.48 (Hydrologic Balance: Acid-Forming or Toxic-forming Materials), and 817.54 (Hydrologic Balance: Water Rights and Replacement).

Bath houses and associated sewage drain fields are used at both the King No. 4, 5, and 6 Mines. No problems, either related to water quality or to use, have been identified with either septic drain field. Location and size of the septic drain fields are shown on Exhibits III-1A and III-4A.

Surface-water rights are discussed in the November 1983 DOA response (pages 23 through 32). U.S. Fuel has sufficient water rights to satisfy their demands for mine water on both Miller Creek and Cedar Creek. There will be interbasin diversions of water both into and out of Miller Creek and Cedar Creek, but neither the probable hydrologic consequences (PHC) completed by the operator nor the CHIA by OSM have identified any adverse impacts to surface-water quantity. Therefore, the applicant is in compliance with UMC 817.54.

Water-quality analyses of standing water in the slurry ponds indicate that the slurry pond water quality is similar to the surface-water quality. In addition, the data indicated that neither the surface water nor the slurry pond water is acidic or in violation of pertinent water-quality standards for Miller Creek. Therefore, the Hiawatha Mines Complex is in compliance with UMC 817.48.

Sanitary sewage from the town of Hiawatha is discharged into culvert no. 2 and conveyed to slurry pond 5. Slurry pond 5 then acts as a large leach field. The situation was identified in a 1978 surface hydrology study (Vaughn Hansen Associates, 1978) and a recent inspection by UDOGM confirmed its presence (Inspection Memo from Dave Lof, UDOGM, dated July 5, 1984). The town of Hiawatha has a permit from the Utah State Health Department to dispose of the sewage in this fashion. OSM's analysis for the surface-water monitoring program has not documented any health threat as a result of this sewage discharge. Therefore, the sewage discharge is in compliance with UMC 817.41 and 817.42.

All of the sedimentation ponds have gated valves on the principal spillways. The NPDES self monitoring reports show that none of the sedimentation ponds have ever discharged. Ponds for the King No. 4, 5, and 6 Mines will be removed and replaced by sediment traps. Therefore, sediment contribution outside of the permit area will be minimized.

Mine water discharges from three points: Mohrland portal, Hiawatha overflow tank, and King No. 4 Mine. The NPDES self-monitoring reports show that, with an occasional exception of total dissolved solids and oil and grease, the mine discharge water is in compliance with the effluent limitations. EPA has determined that this situation does not constitute significant noncompliance (EPA internal memorandum, March 23, 1984).

In summary, runoff and sediment control facilities at the Hiawatha Mines Complex are designed to minimize impacts on the hydrologic balance both during and after mining. The applicant is in compliance with UMC 817.41, 817.42, 817.48, and 817.54.

Ground Water

The probable hydrologic consequences with respect to ground-water resources in the area adjacent to the Hiawatha Mines Complex is presented in the following parts of the PAP:

- Volume II, Chapter VII, part 7.1.7;
- ACR response, Chapter VII;
- DOA response, November 7, 1983, Volume 1, part UMC 784.14; and
- DOA response, March 15, 1984, Attachment No. 2.

Mining at the Hiawatha Mines Complex has had unknown previous impacts to the ground-water resources in the area. In 1972, the most significant ground water inflow to the Hiawatha Mines occurred when mining tapped into ground water moving along the Bear Canyon Fault. At the present time flow from the fault continuously yields 100 gpm. This water is discharged at the Mohrland portal and is conveyed in part to the town of Hiawatha for their domestic water supply. The remaining water is discharged to Cedar Creek. It is apparent that the Bear Canyon Fault is acting as a conduit for ground water flow in the vicinity of the Hiawatha Mines Complex. Numerous springs issue from the Bear Canyon Fault where the stratigraphically lower Star Point Sandstone has been fractured. It is unknown what the hydraulic connection is between the ground water that currently discharges from the faulted Blackhawk Formation and the lower, fractured Star Point Sandstone. No effects of mining have been observed at down gradient springs when they were studied several years after the interception of Bear Canyon Fault water in the Hiawatha Mines. This is interpreted to mean that the discharge of ground water from the Bear Canyon Fault is at a steady state discharge with respect to the surrounding ground water systems. Therefore, because the Hiawatha Mines Complex will not be mining near the Bear Canyon Fault over the remaining life-of-mine, there will be no additional impacts to surrounding hydrologic resources associated with the fault.

By comparison, only 25 gpm of ground water inflow occurs in the remainder of the extensive Hiawatha King No. 6 Mine for four isolated points in the mine. The range of ground water inflow varies from 3 gpm to 7 gpm. This is considered to be a relatively dry mine (with the exception of the Bear Canyon Fault) that has encountered isolated, more permeable zones in the Blackhawk Formation. With the discontinuous nature of the more permeable zones in the Blackhawk Formation, it is doubtful if the ground water inflow in the mine is in strong hydraulic connection with other hydrologic resources in the area.

The subsidence effects of the Hiawatha Mines Complex are predicted to be the primary mechanism that will cause additional impact to ground water resources in the permit and adjacent areas. The applicant has developed several assumptions in order to support the projection of springs that may experience declines in flow as a result of mine subsidence:

- Only those areas where pillars will be removed are expected to subside;
- Subsidence fractures may reach the surface within an angle of draw of 70 degrees of the mine;
- Surface subsidence effects will be limited to fully extracted areas beneath the Blackhawk Formation, Castlegate Sandstone, and Price River Formation;
- No diversion of spring flow is expected as a result of subsidence effects to the North Horn Formation; and
- Subsidence effects will be limited by the Bear Canyon Fault to the west of the Hiawatha Mines Complex.

Based on these assumptions, the applicant provided a map showing the extent of projected surface subsidence and springs with water rights. (See Exhibit VII-1c in the DOA response, updated January 9, 1984.) In addition, seeps and springs within the subsidence zone can be determined from Exhibit VII-1D in the DOA response, updated January 9, 1984. Therefore, subsidence effects are projected for the area in which coal will be fully extracted and the area within the 70 degree angle of draw that occurs stratigraphically below the contact of the North Horn-Price River Formation contact. Within this zone, three springs with water rights may be impacted (Water rights 91-103, 91-104, and 91-1633). Two of these springs (91-103 and 91-104) have water rights belonging to U.S. Fuel for domestic use which are not currently used. Water rights in the third spring belong to the U.S. Forest Service. It is not possible to determine the amount of flow of these springs because the water right for each of the potentially affected springs is accumulated with several other nearby springs.

Several other small springs also occur within the zone that may be affected by subsidence (see Exhibit VII-1D in the DOA response, updated January 9, 1984). These springs do no have water rights associated with them, although the water sources are used for stock and wildlife watering. The total number of springs within the subsidence zone is 11, which includes the 3 springs having water rights. The cumulative flow of the springs is approximately 24 gpm (DOA response, January 1984, p. 80).

Please refer to Part UMC 817.54 in Chapter XI of this TA for the discussion of alternate sources of water available to replace the USFS water right that may be affected. Alternate sources of water have been identified and the applicant has committed to replace all affected water supplies.

The PAP also discusses the potential impacts of mine subsidence in relation to overlying streams. Subsidence in the North Horn Formation is predicted to be very gradual, with no abrupt changes in slope. For this reason, erosional instability in the North Horn Formation is not expected to change noticeably. For the Price River and Castlegate Sandstone Formations, subsidence effects are predicted to be abrupt with changes in elevation of approximately 3 feet. The slopes and stream channels representative of these potential subsidence areas are, however, quite rocky with abundant competent rock ledges. Therefore, conditions of erosional instability are not expected in relation to mine subsidence in the Price River or Castlegate Sandstone Formations.

Data obtained from mines in the region suggest that subsidence will affect streamflow quantity only in those areas where surface cracks develop. In areas experiencing trough subsidence, no streamflow impacts have been documented to date. As a result, those areas on the ridge of Gentry Mountain and within Gentry Hollow that are subjected to subsidence should not experience any changes in streamflow attributable to mining. Well-defined streamflow does not exist along Gentry Mountain. Stream channels that cross the upper, west-facing slopes of Gentry Hollow are ephemeral. Streamflow that is generated in these areas originates within and flows in the area of potential subsidence only across outcrops of the North Horn Formation (subject only to subtle trough subsidence and not cracking). Hence, no impacts are expected to occur to streamflow crossing the ridges of Gentry Mountain and the upper slopes of Gentry Hollow.

Potential impacts to streamflow resulting from subsidence should be limited to the Miller Creek watershed where streams cross formations that are stratigraphically lower than the North Horn Formation. The results of the spring inventory conducted in the permit and adjacent areas in October 1983 indicate that baseflow within the zone of potential subsidence in the Miller Creek watershed is about 7 gpm in the north branch of the North Fork of Miller Creek, 12 gpm in the south branch of the North Fork of Miller Creek, 16 gpm in the Middle Fork of Miller Creek, and 6 gpm in the South Fork of Miller Creek. This baseflow originates as springs issuing from the North Horn Formation and the Castlegate Sandstone. Only minor seepage issues from the Price River Formation within the potential subsidence zone of the Miller Creek watershed.

Losses of streamflow may result by interception of the stream channel by a subsidence crack (which may occur downstream from source springs issuing either from the North Horn Formation or the Castlegate Sandstone). Potential losses to baseflow from subsidence will occur only in the North Fork of Miller Creek. Available data indicate that natural seepage into the stream channels depletes the spring flow above the monitoring stations in the other forks of Miller Creek. The maximum potential impact to streamflow above the mines will be a depletion of 19 gpm in the North Fork of Miller Creek. It should be noted that the senior water rights for streamflow in both branches of the North Fork of Miller Creek are owned by U.S. Fuel.

The control of mine discharges is discussed under Part UMC 817.50 in this chapter. The PAP is in compliance with regard to UMC 784.14.

UMC 817.50 HYDROLOGIC BALANCE: UNDERGROUND MINE ENTRY AND ACCESS DISCHARGES, UMC 817.55 HYDROLOGIC BALANCE: DISCHARGE OF WATER INTO AN UNDERGROUND MINE, AND 786.21 CRITERIA FOR PERMIT APPROVAL OR DENIAL: EXISTING STRUCTURES

At the present time water from the North Fork of Miller Creek is diverted into the Hiawatha No. 2 Mine (DOA response updated January 9, 1984, Exhibit III-17). This water is conveyed via underground workings into a reservoir in the Hiawatha No. 2 Mine, with a storage capacity of 120,000,000 gallons (368 acre-feet). Discharge from the mine is regulated by pressure valves in bulkheads located in the Middle Fork Miller Creek. In addition, water is piped across the Middle Fork drainage into the Hiawatha No. 1 Mine. This water is conveyed through underground workings to the South Fork portals. At this location, water is piped from the mine to the town of Hiawatha and to the coal processing plant. This water is considered a secondary source of culinary water for the town. The coal processing plant utilizes approximately 786,000 gpd while the town uses 30,000 gpd from the water system.

The primary source of culinary water for the town of Hiawatha is combined ground water discharge from the Bear Canyon Fault/North Fork Miller Creek water conveyed through the mine workings that is discharged from the Mohrland portal in Cedar Canyon. This water is piped from the mine outlet to the town. Excess water is discharged to Cedar Creek.

The volume of water stored in the underground reservoir in June, 1984, was 34,000,000 gallons (about 104 acre-feet). The U.S. Mine Safety and Health Administration (MSHA) was requested by OSM to review the safety aspects of the underground dam according to UMC 786.21 and UMC 817.55(g) which requires MSHA concurrence for the underground impoundment. MSHA responded with a list of deficiencies on January 26, and May 2, 1984. A meeting was held between all interested parties on June 8, 1984, during which it was agreed to reduce the water level in the mine below the fourth bulkhead and drill the bulkhead to determine the as-built specifications on the 3 remaining bulkheads. The applicant submitted a plan on June 15, 1984 to address MSHA and OSM's concerns the plan proposes to: 1) reduce the reservoir capacity to 15,000,000 gallons until the analysis of the bulkheads is completed; 2) remove the uppermost seal and perform the appropriate stability analysis of the structure; and 3) provide a plan to maintaining a maximum storage limit in the reservoir of 24,000,000 gallons. The removed bulkhead will not be replaced and the entry will be chained or fenced to prevent access. This will limit the storage volume of the reservoir to 24,000,000 gallons (about 73.6 acre-feet).

OSM and MSHA reviewed the June 15 plan and agreed that the plan was generally consistent with what was agreed upon at the June 8 meeting. The applicant has proposed using the underground water supply systen (diversion, bulkheads, piping network) during operation at the Hiawatha Mine. OSM has determined, based upon core data submitted on January 23, 1985, that the long-term stability of the structures can be assured. UMC 817.49(3) requires adequate safety and access to the impounded water be provided for water users. The bulkheads and diversion are accessible; however, the majority of the undergound plumbing system (pipes, valves, connections) are not. UMC 817.50(b)(iii) requires consistent maintenance of the water facility.

OSM has reviewed the test results and the computations for the curved bulkheads in the Hiawatha coal mine for the underground water storage in the mined out coal mine. The core test results confirm the calculations that the installation is safe with a safety factor of over two. The testing reveals a safe installation, with construction in the early 1950s. This report presents the physical conditions that exist within the coal mine in relation to the underground water storage. The report presents detailed tests with computations that reflect the actual field conditions resulting in a safety factor of over two. The report indicated some deterioration of one of the bulkheads resulting apparently from the freezing and thawing cycles occurring in this particular area of the mine. Periodic monitoring of each closure structure is necessary to make certain that deterioration does not cause failure. This inspection should be on an annual basis with a certified report to the RA.

Condition No. 5

Within ninety (90) days of the effective date of this permit, the permittee must submit to the RA a plan for a physical inspection of each seal impounding the underground reservoir and a contingency plan if inspections identify a possibility of failure. Starting in 1985, each curved bulkhead must be inspected at least annually using the following as a minimum:

1) Photo monitor each curved bulkhead abutment using permanent picture points and camera mounts;

2) Establish a survey net to monitor horizontal and vertical movement at several selected points in and around each bulkhead. This net should be to second order survey accuracy; and,

3) Establish a bulkhead leakage monitoring system that measures the water flow through each bulkhead and any areas in between these bulkheads to measure leakage. This escaping water must be less than .25 gallons of water per bulkhead per 24 hour period. This item must be monitored monthly.

With acceptance of Condition No. 5, the applicant is in compliance with UMC 817.55(g).

UMC 817.52 HYDROLOGIC BALANCE: GROUND WATER MONITORING

The ground-water monitoring program associated with the Hiawatha Mines Complex can be found in the original submittal, (Volume II, Chapter VII, page VII-7 and VII-8); the DOA response updated January 9, 1984, (Volume I, pages 131 and 132 and Attachment No. 4).

The applicant has committed to conduct an in-mine ground water monitoring program (DOA response, July 20, 1984, pg. 131F); however, revisions are necessary in order to conform to the recently developed OSM/UDOGM guidelines. Condition No. 7 defines the requirements of the in-mine ground water monitoring program.

No wells are available to monitor changes in ground water resources. Springs are monitored instead to indicate if mining impacts are occurring. At the present time 10 springs (Springs SP-1 to SP-10; See Map M02 in the DOA response updated January 9, 1984.) are monitored twice annually at low flow and high flow. Spring water quality samples are proposed to be analyzed for a list of parameters including temperature, specific conductance, total dissolved solids, and the major cations and anions. The applicant also proposes to delete monitoring springs SP-3, SP-7, and SP-10. Springs SP-11, SP-12, and SP-13 (i.e. springs 15-8-19-2, 15-8-30-4, and 15-8-31-4, respectively, on Exhibit VII-1D in the DOA response updated January 9, 1984) are proposed as replacement monitoring springs because the applicant feels they are more representative of springs that may be affected by mining.

The OSM Cumulative Hydrologic Impact Assessment (CHIA) concludes that previous mining adjacent to the water bearing Bear Canyon Fault has already had a maximum impact on water resources associated with the fault zone. These impacts occurred years ago and remain quantified, and there is no point in monitoring springs associated with the fault when maximum impacts have already occurred; therefore, springs SP-3, SP-7 and SP-10 can be deleted from the monitoring program as proposed by U.S. Fuel.

Subsidence is considered the mechanism most likely to affect flow to springs. The assumption has been made in the PAP (DOA response updated January 9, 1984, Volume I, page 74) that subsidence will only occur in areas within the angle of draw of workings that will be fully extracted. The maximum extent of potential subsidence is delinated on Exhibit VII-1C (DOA response updated January 9, 1984). Within this zone it is possible that some spring flow may be diminished or dry up as a result of mine subsidence. While the 10 springs proposed to be monitored by the applicant (i.e., SP-1, SP-2, SP-4, SP-5, SP-6, SP-8, SP-9, SP-11, SP-12, and SP-13) represent the variability of springs issuing from the potentially affected geologic sources, it is also likely that very localized ground water flow paths may be responsible for individual springs. In other words, local ground water flow systems that are not related to areally extensive flow systems may be disrupted by subsidence fractures.

Because the effects of mining cannot be documented totally by monitoring the 10 springs, and because it is not practical to monitor all springs (See Exhibit VII-1D, in the PAP.), it is reasonable to require that in addition to the 10 springs that U.S. Fuel has committed to monitor, the most important springs in the subsidence zone should also be monitored. To meet this requirement, U.S. Fuel must also monitor the sole spring with water rights (not belonging to U.S. Fuel) in the area and located within the subsidence zone as depicted on Exhibit VII-1C. The water right (91-1633) belongs to the USFS and is used for stock watering. U.S. Fuel was required to adopt this monitoring plan in January and March 1984, but has not included this spring to date.

OSM and UDOGM are developing an agreement concerning the ground water monitoring program that will be implemented at Utah coal mines. U.S Fuel must also change their spring monitoring program to agree with the new ground water monitoring guidelines. It should be noted that this request was previously made by U.S. Fuel in the February 13, 1984 letter.

With acceptance of Conditions No. 6 and 7 the application will be in compliance with UMC 817.52.

Condition No. 6

Within sixty (60) days of the effective date of this permit, the permittee must revise and submit to the regulatory authority for approval a revised spring monitoring schedule. U.S. Fuel must include in its monitoring program the USFS spring (Water Right 91-1633).

Condition No. 7

Within sixty (60) days of the effective date of this permit, the permittee shall revise the in-mine ground water monitoring program in consultation with UDOGM. This monitoring program shall be submitted to the regulatory authority for final approval.

XIII CLIMATOLOGICAL INFORMATION AND AIR RESOURCES - UMC 783.18 AND 784.26

UMC 783.18 CLIMATOLOGICAL INFORMATION AND AIR RESOURCES

The applicant was not requested by the regulatory authority to provide information on the climate or air resources of the permit area. Therefore, the applicant is in compliance with UMC 783.18.

UMC 784.26 AIR POLLUTION CONTROL PLAN

The applicant has filed a notice of intent to construct a unit train loadout facility on May 10, 1984, with the Utah Bureau of Air Quality, which was approved July 23, 1984. The applicant was not required by UDOGM or Utah Department of Health to develop an air pollution control plan. The applicant is, therefore, in compliance with UMC 784.26.

XIV - TOPSOIL - UMC 783.21, 784.13(b)(3 and 4), AND 817.21 THROUGH .25

UMC 784.13(b)(4) and UMC 817.21 - TOPSOIL: GENERAL REQUIREMENTS

The applicant has provided results of chemical and physical analyses for topsoil, subsoil, and substitute topsoil (topsoil/subsoil/overburden mixtures) for disturbed areas to be reclaimed. The document and page number where information on sampling methodologies and analytical results are listed by area of disturbance in the table below. Chemical and physical data for soils prior to disturbance exist only for the new portal breakout area in the Middle Fork of Miller Creek and borrow areas A, B, C, and D.

Disturbance Area	Sampling Methodologies	Analytical Results
North Fork area[1]	DOA response, Vol. I, pp. 125A-129	DOA response, Vol. I, Table VIII-1
Middle Fork area		
Portals	DOA response, Vol. I, pp. 47-48	DOA response, Vol. I, Table VIII-9
Breakout	DOA response, Vol. I, pp. 47, 140	DOA response, Vol. I, Table VIII-14
South Fork area		
Portal	DOA response, Vol. I, pp. 47-47A, 54-55	DOA response, Vol. I, Table VIII-9
Conveyor/Load-out sediment pond[2]	ACR response, Chap. VIII, Table VIII-1 and Bio/West report	ACR response, Chap. VII, Bio/West report
Preparation plant area		
Coal refuse area	DOA response, Vol. I, pp. 125A-129	DOA response, Vol. I, Tables VIII-1, VIII-2
Nonrefuse area	---	DOA response, Vol. I, Table VIII-21
Slurry ponds		
Topsoil[1] Subsoil/substrate	DOA response, Vol. I, pp. 125A-129	DOA response, Vol. I, Table VIII-1
Pond No.1		
Sampling 1	DOA response, Vol. I, p. 134	DOA response, Vol. I, Tables VIII-11&12
Sampling 2	15 March 1984 DOA response, Attachment 1	---
Pond No. 3	DOA response, Vol. I, p. 134	DOA response Vol. I, Tables VIII-11, VIII-12, VIII-13
Pond No. 4	DOA response, Vol. I, p. 134	DOA response Vol. I, Tables VIII-11&12
Pond No. 5	DOA response, Vol. I, p. 134	DOA response, Vol. I, Tables VIII-11&12

Borrow areas		
Area A	DOA response, Vol. I, pp. 125A-129	DOA response, Vol. I, Table VIII-1
Equipment storage yard addition	---	---
Area B	DOA response, Vol. I, pp. 101-102, 125c-129	DOA response, Vol. I, Table VIII-20
Area C	DOA response, Vol. I, pp. 101-102, 125c-129	DOA response, Vol. I, Table VIII-20
Area D	DOA response, Vol. I, pp. 125c-129	DOA response, Vol. I, Table VIII-1

1 Sources of substitute topsoil are materials from borrow areas A, B, C, and/or D.

2 Additional 806 cubic yards to be obtained from borrow area A.

There is an existing ventilation breakout on the South Fork of Miller Creek. The breakout measures 8' x 20' with a total disturbance of 300 square feet. The portal was constructed from within the mine, hence, there is no access from the outside. There is a two-tracked jeep road leading partially up the canyon that was constructed prior to SMCRA and is rarely used. The applicant proposes to seal the portal from within the mine. Prior to sealing, a berm will be built for erosion control and the small pad seeding by hand broadcasting. OSM and UDOGM concur that it would be more environmentally damaging to construct a road to the portal for reclamation, therefore the applicant's proposal is acceptable.

Site-specific soil quality information is not presented in the PAP for existing disturbed areas in the nonrefuse portion of the preparation plant area or the equipment storage yard adjacent to borrow area A confirming that soil material is suitable for reclamation purposes. Analyses should include soil pH, EC, SAR, and texture. The applicant should conduct additional sampling to demonstrate that the projected quantity and quality of soil is available. Therefore, the PAP is not in full compliance with UMC 784. 13(b)(4) and UMC 817.21 and 22. The applicant's acceptance of Condition Numbers 8 and 9 will be necessary to confirm compliance with these regulations.

Condition No. 8

Within ninety (90) days of the effective date of this permit, the permittee must provide results of sampling to a minimum of seven feet and laboratory analyses of soil from the equipment storage yard confirming that the projected quantity and quality of soil are accurate.

Condition No. 9

Within ninety (90) days of the effective date of this permit, the permittee must provide the results of sampling and laboratory analysis of the soils in the nonrefuse portion of the preparation plant area to insure that a minimum of 18 inches of suitable subsoil material is available for redistribution after backfilling and grading.

UMC 784.13(b)(4) and UMC 817.22 TOPSOIL: REMOVAL

The applicant has provided adequate information detailing the timing of topsoil salvage, the materials to be removed, and the area of topsoil salvage for the new breakout portals in the Middle Fork of Miller Creek. This information is presented in the ACR response, Chapter VIII, p. VIII-1 and DOA response, Volume I, page 140.

The applicant has also provided information detailing the sources and characteristics of substitute topsoil material. The document and page number where information on the composition, areal extent, and available volume of material are listed by disturbed area requiring substitute topsoil in the table below. Refer to UMC 784.13(b)(4) and UMC 817.21 Topsoil: General Requirements in this TA for location of chemical and physical analytical results.

Area	Composition	Areal Extent and Available Volume
North Fork area	DOA response, Vol. I, pp. 54 and 125C-129	DOA response, Vol. I, p. 40A and Vol. III, Exhibit VIII-4A
Middle Fork area Portal	DOA response, Vol. I, pp. 47-47A	DOA response, Vol. I, p. 47A and Vol. III, Exhibit IX-3B
South Fork area Portal	DOA response, Vol. I, pp. 54-55A	DOA response, Vol. I, pp. 55-55A and Volume III, Exhibit IX-4A
Conveyor/load-out sediment pond[2]	ACR response, Chap. VIII, Bio/West report	DOA response, Vol. I, p. 55A and Vol. III, Exhibit VIII-4
Preparation plant area coal refuse area	DOA response, Vol. I, pp. 40A and 125C-129	DOA response, Vol. I, p. 40A and Vol. III, Exhibit VIII-4A.1
Non-refuse area		
Railroad underpass	DOA reponse, Vol. I, pp. 131-132	No map but DOA response, Vol. I, pp. 131-132

Preparation plant	DOA response, Vol. I, pp. 55A-56 and 125A-129	DOA response, Vol. I, pp. 40A-42 and Vol. III, Exhibit VIII-4A
Slurry ponds		
Substitute topsoil	DOA response, Vol. I, pp. 55A-56, 125-129 133-136	DOA response, Vol. I, pp. 40A-42 and Vol. III Exhibit VIII-4A
Substitute subsoil	DOA response, Vol. I, pp. 133-136	DOA response, Vol. I, p. 136 and Vol. II Exhibit III-3
Borrow areas A, B, C, D	DOA response, Vol. I, pp. 101-102, 125C-129	DOA response, Vol. I, pp. 42-44 and Vol. III, Exhibit VIII-4A.1

In addition, the applicant has committed to conducting field trials to test the suitability of substitute topsoil materials to be used in reclamation. Description of study designs, schedule, and monitoring program are provided for the coal refuse areas, substitute topsoil borrow sites, mining pads and portals and areas of associated disturbance, and riparian areas to be disturbed. The applicant has proposed monitoring field trial studies for ten years (DOA response, Volume 1, pp. 104-125B).

Required information is not presented in the PAP for the nonrefuse portion of the preparation plant area. Therefore, the PAP is not in compliance with UMC 784.13 and UMC 817.22. The applicant's acceptance of Condition No. 9 will be necessary to confirm compliance with these regulations.

UMC 784.13(b)(4) and UMC 817.23 TOPSOIL: STORAGE

The applicant has provided adequate information detailing the need for topsoil storage, the selection of stockpile locations, and the protection of proposed and current topsoil stockpiles for all disturbed areas except the nonrefuse portion of the Hiawatha preparation plant area. The document and page number where pertinent information is presented are listed by stockpile location (area of disturbance) in the table below.

Disturbance Area	Stockpile Locations	Protective Measures
Middle Fork area		
Current stockpile	DOA response, Vol. III Exhibit VIII-4	DOA response, Vol. I, p. 131A
Proposed stockpile	DOA response, Vol. III, Exhibit VIII-4	DOA response, Vol. I, pp. 47 and 140
South Fork area		
Lambs trailer	DOA response, Vol. III, Exhibit VIII-4	ACR response, Chap. VIII, p. VIII-2 and Bio/West report
Equipment storage yard	DOA response, Vol. III, Exhibit III-3	DOA response, Vol. I, p. 56A
Preparation plant		
Non-refuse area	9/84 submittal	9/84 submittal
Borrow areas	DOA response, Vol. III, Exhibit VIII-4A.1	N/A
Access/haul road corridors	9/84 submittal	9/84 submittal
Pond No. 5	9/84 submittal	DOA response, Vol. I, pp. 131-132

The PAP does not demonstrate compliance with UMC 784.13(b)(4) and UMC 817.23 because of the lack of information specific to the nonrefuse portion of the preparation plant area, borrow areas, and slurry pond No. 5 topsoil stockpile. Applicant acceptance of Condition No. 10 will be necessary to achieve compliance with these regulations.

Condition No. 10

Within ninety (90) days of the effective date of this permit, the permittee must provide the location (exhibit), and proposed protective measures to be used for any and all substitute topsoil stockpiles in the nonrefuse portion of the preparation plant area.

UMC 784.13(b)(4) and UMC 817.24 TOPSOIL: REDISTIBUTION

The applicant has provided information on regraded surface preparation and topsoil redistribution requirements including achievements of stable, uniform thickness, prevention of excess compaction, and protection from erosion. The document and page number where this information appears is listed by area of disturbance in the table below.

Disturbance Area	Surface Preparation	Redistribution Requirements
North Fork area	DOA response, Vol. I, p. 54	DOA response, Vol. I, p. 54
Middle Fork area		
Portals	DOA reponse, Vol. I, p. 47A	DOA response, Vol. I, p. 47A
Breakout	DOA response, Vol. I, pp. 47A and 141	DOA response, Vol. I, pp. 47A and 141
South Fork area		
Portal	DOA response, Vol. I, p. 55	DOA response, Vol. I, p. 55
Conveyor/load-out/sediment pond	ACR response, Chap. VIII, Bio/West report	ACR response, Chap. VIII, Bio/West report
Preparation plant area		
Coal refuse area	DOA response, Vol. I, pp. 56-56A	DOA response, Vol. I, pp. 56-56A, 131A, p. 136
Nonrefuse area	DOA response, Vol. I, pp. 56-56A	DOA response, Vol. I, pp. 56-56A, 131- no depth 136
Slurry ponds	DOA response, Vol. I, p. 134	DOA response, Vol. I, pp. 136, 131A, 136
Borrow areas		
Area A (equipment storage pond)	DOA response, Vol. I, pp. 41-42	DOA response, Vol. I, pp. 41-42
Areas B and C	DOA response, Vol. I, p. 42A	DOA response, Vol. I, P. 42A
Area D	DOA response, Vol. I, p. 43	DOA response, Vol. I, pp. 42B-43
Access/haul roads	9/84 submittal	9/84 submittal

The PAP is in compliance with UMC 784.13(b)(4) and UMC 817.24

UMC 784.13(b)(4) and UMC 817.25 TOPSOIL: NUTRIENTS AND SOIL AMENDMENTS

The applicant has provided either rates of fertilizer application or a commitment to sample and test for rates of fertilizer application for all areas of disturbance except for the areas indicated below. The document and page number where information on fertilization requirements is listed are presented by area of disturbance in the table below.

Disturbance Area	Nutrients and Soil Amendments Information
North Fork area	DOA response, Volume I, page 43
Middle Fork area	DOA response, Volume I, pages 47-47A
South Fork area	
Portal	DOA response, Volume I, page 55
Conveyor/load-out/sediment pond	ACR response, Chapter VIII, Bio/West report
Preparation plant area	
Coal refuse area	
Borrow A and D materials	DOA response, Vol. I, p. 136, Table VIII-7
Borrow B and C materials	DOA response, Vol. I, p. 136
Nonrefuse area	—
Slurry ponds	
Borrow A and D materials	DOA response, Vol. I, p. 136, Table VIII-7
Borrow B and C materials	DOA response, Vol. I, p. 136

Borrow areas

Area A Equipment storage yard	DOA response, Vol. I, p. 42, Table VIII-3 —
Area B	DOA response, Vol. I, p. 42, Table VIII-3a
Area C	DOA response, Vol. I, p. 42A, Table VIII-3A
Area D	DOA response, Vol. I, pp. 43-44, Table VIII-4

The PAP is in compliance with UMC 784.13(b)(4) and UMC 817.25.

XV - VEGETATION RESOURCES - UMC 783.19, 784.13(b)(5), and 817.111-817.117

Information regarding existing vegetation resources and the applicant's proposed revegetation plan are found in the following sections of the PAP.

Section	Date of Submission	Pages
Vegetation Resources:		
Vol. III, Chapter IX	March 1981	1-80
Vol. III, Exhibits	March 1981	IX-1 to IX-4
ACR response, Chapter IX Section 783.19	July 1983	
Vol. I, Chapter III	March 1981	III-31
Vol. III, Exhibits, Response to DOA	November 1983	IX-1 and IX-1A
	February 1984	IX-2A IX-3A and IX-3B IX-4A to IX-4C
Revegetation Plan:		
Vol. I, Chapter III	March 1981	III-35 to III-47
Vol. III, Exhibits, Response to DOA	November 1983	IX-5
Response to ACR, Section 783.13(5)	July 1983	III-31A to III-46
Response to ACR, Attachment 1	July 1983	
Response to ACR, Attachment 2	July 1983	

No threatened or endangered plant species occur in the proposed permit area and no Federally-designated critical habitats are present (ACR response, Chapter IX, Section UMC 783.19). The U.S. Fish and Wildlife Service (USFWS) did not list any plant species in its biological assessment of August 13, 1984, for the Hiawatha Mines Complex.

Ten vegetation types have been mapped within the permit area as described in Chapter II of this TA. The species composition of these vegetation types are presented in Chapter IX of the ACR response. Exhibits, submitted as Volume III, DOA responses dated November 7, 1983, February 13, 1984, and March 16, 1984, provide a suitable vegetation map of the permit area and the locations of all sampling and reference areas. The appropriate exhibits are IX-1; IX-1A, IX-2A, and IX-3A; IX-3B; and IX-4A to IX-4C. Table X-2, page 89A, presents the disturbed acreage by community type.

The mining complex has disturbed a total of 435 acres of vegetation within the present permit area. Proposed reclamation activities within the permit area will disturb an additional 46 acres of vegetation for substitute topsoil borrow areas, for a total of 481 acres of disturbance. The types of plant communities and the quantities that have been and will be affected are presented in the table below.

Summary of Vegetation Losses at the Hiawatha Mines Complex by Vegetation Type

Vegetation Type	Total Acres Disturbed	Percent of Total Disturbance
Pinyon-juniper	391	81.3
Mountain brush	35	7.3
Sagebrush	25	5.2
Mixed conifer	15	3.1
Riparian wood	15	3.1
Total	481	100.0

Twelve reference areas of 1.03 acres each have been established (ACR response, Chapter IX, p. 3). Nine of these reference areas were established in the present permit area and three were located outside the mine permit area along Cedar Creek (DOA response, February 13, 1984, Exhibit IX-1). At least one reference area has been established for each vegetation type that has been or will be disturbed. Sampling adequacy was achieved for cover, productivity, and woody plant density (ACR response, Chapter IX, Appendix B) at the required confidence and precision levels. However, concerns have been raised as to the sampling adequacy of the reference areas relating to the Division of Oil, Gas and Mining's minimum for similarity indices. The company must during the next growing season, in 1985, resample all reference areas and redefine the similarity of each reference area to the vegetation type it represents. The company must satisfy Condition No. 11 to be in compliance.

Condition No. 11

The permittee shall by October 1, 1985, submit the necessary data collected during 1985, that reevaluates the similarity indices for all vegetation reference areas. Discussions evaluating the new data and how it relates to the vegetation type must also be provided.

The revegetation plan contains technically adequate plans for mulching (proposed rate of one ton per acre, DOA response, p. 119), fertilizer applications (DOA response, Section UMC 784.13(a)pp. 41-44), seed mixtures and rates for broadcast methods (DOA response, Tables IX-1 to IX-4), tree and shrub planting densities and spatial arrangements (DOA response, updated January 9, 1984, pp. 62), and criteria for demonstrating successful revegetation (DOA response, p. 63, updated January 9, 1984). A technically sound field trial design is presented for testing seed mixtures, soil depths, fertilizer types and application rates, and mulching rates (DOA response, updated January 9, 1984, pp. 103-125). The results of these field trials will be used to modify, if necessary, the approaches now described in the PAP.

During the PAP review process, concerns were raised about the suitability of the refuse pile substrates to support future plant growth. Some of the laboratory data indicated a marginal suitability of some chemical and physical properties (e.g., water holding capacity and fertility) of the substrates for sustaining plant growth equivalent to the reference areas. Such concerns were recognized by the applicant and formed the basis for designing the field trial experiments. It has been demonstrated that the substrate materials have the potential capability of supporting some plant growth.

The applicant has proposed a 6-inch cover of substitute soil materials over the coal refuse area. OSM and UDOGM found this to be unacceptable until successful reclamation is demonstrated by the field trials. The applicant revised its reclamation plans and field trial designs to test for 6, 12, and 16 inches of substitute soil cover over the coal refuse area (PAP, DOA response p. 40A, Volume I). There is an adequate volume of soil material in borrow area A, B, C, and D to cover the refuse area with 16 inches of substitute material. The bond has been calculated to reclaim the refuse area with 16 inches of substitute material (see TA Appendix B). The applicant intends to demonstrate that 6 inches is sufficient for successful reclamation. When this is demonstrated through the field trials, the bond may be reduced.

Whether the substrates will actually support the proposed revegetation mixtures at suitable production levels remains to be demonstrated by the field trials. Modifications in the proposed substitute topsoil depths, fertilizer rates and types, seed mixtures, and mulching rates may be required as a result of the field trial results. The applicant has recognized that these potential effects may result and has committed to incorporating the findings into a modified revegetation plan, as necessary, to achieve revegetation success equivalent to the reference areas.

XVI - FISH AND WILDLIFE RESOURCES - UMC 784.21 AND UMC 817.97

Information regarding fish and wildlife resources and the applicant's fish and wildlife protection plan are found in the following sections of the PAP.

Section	Date of Submission	Pages
Fish and Wildlife Resource Data		
Vol. III, Chapter X	March 1981	1-46
Vol. III, Chapter X Appendix A	March 1981	1-68
Response to ACR Comments Section 784.21	July 1983	6A-6C
Response to ACR Comments Chapter X, Appendix D	July 1983	1-17
Fish and Wildlife Plan		
Vol. I, Chapter III	March 1981	32
Vol. III, Chapter X Appendix B	March 1981	1-22
Vol. III, Response to DOA	November 1983	Exhibits X-1, X-2, and X-3A
Vol. I, Response to DOA Section 784.21	January 1984	85-90
Vol. I, Response to DOA Section 817.97	January 1984	132-133
Vol. III, Response to DOA	November 1983	Exhibit X-4

No threatened or endangered fish or wildlife species occur on the proposed permit area and no Federally-designated critical habitats are present (original submittal, Volume III, Chapter X). However, in a letter to OSM (January 16, 1984), the USFWS identified concern with all Utah mines utilizing and potentially depleting water from the Upper Colorado River system. The agency has identified the need to analyze the impacts of the depletions of water from the river as habitats for the Colorado squawfish and humpback chub. The USFWS feels there is a need for those who deplete the source to contribute to the conservation program designed to compensate for the loss of water from the system. The USFWS currently assesses a one-time fee of $15 per acre/foot to each water user depleting the source. The USFWS provided a biological assessment and Section 7 consultation opinion for the Hiawatha Mines Complex in a letter dated August 13, 1984.

OSM's CHIA concludes, based on the applicant's estimate of evaporative losses and other information collected from nearby mines, that U.S. Fuel depletes approximately 26 acre/feet per year of water. Based on this figure, the applicant would be obligated to contribute a one-time fee of $388 to USFWS study program.

The company must commit to Condition No. 12 in order to comply with regulations protecting threatened and endangered species.

<u>Condition No. 12</u>

As a condition of the U.S. Fish and Wildlife Service's Windy Gap analysis for impacts to threatened and endangered species, the permittee shall, within thirty (30) days of the effective date of this permit, implement the mitigation measures identified in the USFWS letter dated August 13, 1984, and submit proof of such compliance to the regulatory authority.

The bald eagle, American peregrine falcon, and arctic peregrine falcon occur sporadically in the local area but do not nest in the permit area. The permit area has been designated as having substantial value for the bald eagle and American peregrine falcon by the UDWR (original submittal Volume III, Chapter X) and of limited value for the arctic peregrine falcon. The golden eagle is commonly observed in the permit area. A nest site survey (ACR response, Appendix D) conducted within a 0.5 km radius of the disturbance areas revealed no golden eagle nesting activity.

The design and construction of power transmission and distribution lines have been reviewed by the USFWS and have been found acceptable to protect raptors (letter dated March 5, 1984, from UDOGM). The applicant has also committed to designing future power transmission and distribution lines in a manner that protects raptors (PAP, DOA response April 13, 1984, Vol. 1, page 89).

Fish and wildlife issues that developed during the numerous reviews of the PAP include the need for: (1) inventory of raptors and species of high Federal interest; (2) riparian habitat protection and restoration plan; (3) mitigation plan for wildlife habitat, especially big game; (4) survey of electric transmission lines to meet raptor protection standards; (5) survey of springs and seeps and their wildlife use; (6) adequate design of King No. 6 conveyor to allow big game passage; (7) the postmining reclamation of haul roads; and (8) consultation with the USFWS on the presence of threatened and endangered species in the mine permit area. The PAP has provided technically adequate information and/or plans for all of the issues above.

In response to concerns raised about the status of raptors, a raptor survey was conducted in 1983. The results were reported as Appendix D of Chapter X in the ACR response dated July 1983. It was reasonably concluded that mining did not represent a significant hazard to raptors.

The USFWS conducted a survey of electric transmission and distribution lines at the Hiawatha Mines Complex during August 1981 and recommended no structural modifications because existing lines did not represent a hazard to raptors (letter dated October 9, 1981).

Concern was expressed about the protection and restoration of disturbed riparian habitat and/or the riparian zones (OSM ACR dated November 8, 1982; UDOGM ACR dated November 8, 1982). The applicant subsequently committed to: (1) restoring disturbed riparian habitat (about 10.5 acres); (2) establishing one acre of new riparian vegetation in the Middle Fork of Miller Creek to mitigate for the net loss of riparian habitat that was disturbed within the town of Hiawatha and that cannot be reclaimed; (3) establishing a riparian habitat buffer zone 100 feet wide; and (4) contacting the appropriate regulatory agency prior to any future disturbance of riparian habitat. The proposed species mixture, buffer zone width, and approach for restoring riparian habitat are appropriate for creating a diverse, self-sustaining, and native community type.

A survey of springs and seeps was conducted, and use by wildlife species, principally deer, was noted (ACR response, UMC 783.15). Using the worst-case assumptions that subsidence would induce reduction in spring and seep flows, U.S. Fuel estimated that a maximum of 11 springs and seeps would be affected. The cumulative flow of these springs and seeps is approximately 24 gpm (DOA response, January 1984, p. 80). U.S. Fuel has committed to providing replacement water sources for wildlife for springs and seeps that are affected by subsidence (DOA response, p. 63). This commitment is considered adequate for compliance with UMC 817.97.

Blockage of mule deer movements by the proposed King No. 6 conveyor system became an important concern of UDOGM (letter dated July 15, 1981, and letter dated July 30, 1981). The applicant provided the required engineering plans and modifications of the conveyor system to accommodate deer passage. The modified conveyor system was approved by the UDWR as representing no barrier to deer movement (letter dated April 19, 1983). The conveyor system complies with UMC 784.21 and 817.97.

The vagueness of the proposed wildlife mitigation measures and the quantity of wildlife habitat that would be affected by mining operations were issues constantly raised by OSM, USFWS, UDWR and UDOGM during PAP reviews. Big game habitat restoration was an especially frequent concern. The mining permit area includes critical deer and elk winter range (8,305 acres), high-priority elk winter range (1,017 acres), and high-priority deer and elk summer range (3,335 acres). Some of these areas within the permit area overlap. Mining activities in the Miller Creek and Cedar Creek drainages have affected critical deer and elk winter range, while development of the town of Hiawatha, the processing plant, and waste disposal sites have affected high-priority deer and elk winter ranges. The total area of disturbance is 481 acres. Wildlife habitat mitigation will be accomplished by restoring the plant community that was present before mining began. Revegetation success will be determined by comparisons with reference areas.

Regarding the development and commitment to specific wildlife mitigation measures, the PAP contains 14 measures that are considered to constitute adequate wildlife mitigation. These include commitments to (1) revegetate disturbed areas to approximate pre-mining conditions; (2) establish riparian habitat buffer zones; (3) replace lost springs/seeps with an alternate water source in the form of a guzzler or retention pond; (4) conduct a wildlife education program; (5) enforce poaching regulations; (6) reduce highway speed limits; (7) design any future conveyor systems to allow deer passage; (8) restore big game habitats to original or better conditions; (9) notify UDWR of raptor nests and to conduct surveys in areas of future disturbance; (10) avoid disturbance to aspen, conifer, and mixed aspen-conifer stands; (11) supply water to BLM habitat improvement projects; (12) report discovery of snake and bear dens to UDWR; (13) clear all pesticide use with UDWR and UDOGM; and (14) reclaim all future temporary exploration roads and prevent public access. These commitments are considered appropriate and satisfactory wildlife mitigation that comply with the intent of UMC 784.21 and UMC 817.97.

XVII - PRIME FARMLAND - UMC 783.27, 784.17 and 823

The PAP (DOA response, Volume I, pp. 93-103) states that the permit area of the Hiawatha Mines Complex contains no lands suitable for flood irrigation because of steep slopes (10 to 15 percent), cobbly soils, and limited size of stream terrace deposits. In addition, the U.S. Soil Conservation Service has provided a letter (ACR response, January 17, 1983, Appendix VIII-1) documenting that there are no prime farmlands in the vicinity of the Hiawatha Mines Complex. The PAP is in compliance with UMC 783.27. UMC 785.17 and UMC 823 do not apply since no prime farmlands will be affected.

XVIII - EXPLOSIVES - UMC 784.23(b)(9) AND 817.61 THROUGH .68

The applicant has identified the location of the existing explosives storage structure on Exhibit III-14 and has stated that no surface use of explosives has been made for the past two years, nor is there any anticipated use of explosives. The applicant is in compliance with these regulations.

XIX - OPERATION DESCRIPTION - UMC 784.11 and 784.12

The applicant has provided in the original submittal, Volume I, Chapter III, a description of the mining procedures, techniques, equipment and facilities as well as annual planned production of coal. Also involved are detailed descriptions of the construction, use, and reclamation of slurry and sedimentation ponds; disposal of spoil, mine, and noncoal wastes; and disposal of waste water generated by the mining operations. The applicant has also provided a description of the proposed unit train loadout and its operation in supplemental material submitted on July 11, 1984 and September 7, 1984. The application is in compliance with the provisions of UMC 784.11 and 784.12.

XX - BACKFILLING AND GRADING - UMC 784.13(b)(93), 817.101, 817.72, 817.73 and 817.74

A plan for the backfilling, compaction, and grading of existing mine portals, work yards, sedimentation ponds, and roads has been presented in the original submittal, Volume I, Chapter III. Contour maps and cross sections showing the anticipated final surface configuration have been included for these areas. Plans have been included for the restoration of the existing haul and mine access roads in the North Fork of Miller Creek, Middle Fork of Miller Creek, and South Fork of Miller Creek.

XXI - COAL PROCESSING WASTE AND NON-COAL PROCESSING WASTE - UMC 784.13(b)(6), (b)(7), 784.16(c) AND (d), 784.19, 784.25, 817.71, 817.93, AND 817.103

The applicant has provided information which addresses the issues of handling and disposal of debris (noncoal), acid-forming and toxic-forming materials, and materials constituting a fire hazard, including contingency plans to preclude sustained combustion. A plan for noncoal waste storage and disposal is presented in the ACR response, Chapter III, and August 13, and November 3, 1981, letters from the applicant to UDOGM. The applicant has committed to the burial of acid-forming and toxic-forming materials beneath four feet of the best available nonacid-forming and nontoxic-forming materials (ACR response, Chapter III, page III-52). The applicant has also indicated that no acid-forming or toxic-forming materials occur in any of the disturbed areas, based on data provided in the DOA response, Volume I, pages 133-137. The disposal of combustible materials (coal refuse) is also discussed in the DOA response, Volume I, pages 133-137. Contingency plans for precluding sustained combustion of these materials are presented in the original submittal, Chapter XII, and May 24, 1976, letter from the applicant to MSHA.

The plan for noncoal waste disposal has been approved by UDOGM (ACR response, Chapter III, February 10, 1982 letter). The handling and disposal of potentially combustible materials (slurry pond embankment refuse materials) is in compliance with 817.103 (DOA response, August 17, 1984, Volume I, page 136). The plan for precluding sustained combustion of combustible materials has been approved by MSHA (June 30, 1976 letter). Therefore, the PAP is in compliance with UMC 817.13(b)(7), UMC 817.89, and 817.103.

UMC 784.16(d) and (e) RECLAMATION PLAN: PONDS, IMPOUNDMENTS, BANKS, DAMS, AND EMBANKMENTS

The applicant has provided information addressing coal processing waste banks, dams, and embankments in the original submittal, Volume IV, Chapter XII, and page 133 of the DOA response. MSHA has approved the plans for all currrently active impoundments (Numbers 1, 4, 5 North, and 5 South). Revisions to Slurry Pond No. 1 was approved by OSM in March 1979.

Compliance was determined in regard to UMC 817.81 through 817.85 (Coal Processing Waste Banks), UMC 817.86 and 817.87 (Coal Processing Waste: Burning), and UMC 817.91 through 817.93 (Coal Processing Waste). UDOGM approved the design of the slurry ponds without a subdrainage system because the ponds are already built and have been shown to have a static safety factor of greater than 1.5.

UMC 784.19 and 817.71 UNDERGROUND DEVELOPMENT WASTE

Information concerning the description and disposal of underground development waste is provided in the ACR response (page III-34A) and in plans submitted to UDOGM dated August 13, 1981 and November 1981. U.S. Fuel has a demonstrated history of producing minimal amounts of underground development waste. The waste that has been produced has been associated with portal entries or vent shafts and in each case the waste has been used in the construction of mine pads. U.S. Fuel's past history of not producing coal process waste and the reclamation plan for mine pads discussed under UMC 784.13 are considered to be an adequate demonstration of compliance with 784.19. The application is in compliance with UMC 817.71 through 817.74.

UMC 784.25 RETURN OF COAL PROCESSING WASTE TO ABANDONED UNDERGROUND WORKINGS

U.S. Fuel does not propose to backfill any coal processing waste to abandoned underground workings. Therefore, UMC 784.25 is not applicable.

XXII - MINE FACILITIES, COAL HANDLING STRUCTURES, AND SUPPORT FACILITIES - UMC 784.11, 784.12, 784.16(a)(2) AND (a)(3), 817.181

Chapter III of the original submittal, paragraphs 3.5.1 through 3.5.4, Tables III-2, III-3, III-6 through III-9, Plate III-1, Exhibits III-1A through 4B, and supplemental submittals dated May 11, 1984 and July 11, 1984 (unit train loadout) describe the existing and proposed mine facilities and surface support facilities. All facilities conform to the requirements of the regulations.

XXIII - ROADS - UMC 784.18, 784.24, and 817.150 THROUGH 817.180 UMC 817.50 THROUGH 817.155 and UMC 817.171 THROUGH 817.175

Descriptions of the existing roads in the North, Middle and South Forks of Miller Creek canyons are contained in the original submittal, Chapter III, and designs of the South Fork Road are contained in Chapter XIII, paragraph 13.2. Culvert spacing for the Middle Fork Road was submitted in 1978 (Vaughn Hansen, 1978) and approved in a letter from OSM dated May 30, 1980. U.S. Fuel recently received a notice of violation (N84-4-8-8, No. 8) for not having adequate drainage and erosion control on the Middle Fork road. The applicant submitted a report (dated August 17, 1984) in response to this notice of violation and showed that the culvert spacing and sizing was adequate and committed to check dams, flexible discharge pipes, and riprap for erosion control. The violation has been terminated (phone conversation with Mr. David Lof, August 29, 1984); however, the applicant is still submitting information requested by UDOGM.

During the review of the King No. 6 Mine, OSM and UDOGM stipulated (Nos. 7-81-7 and 7-81-8) compliance for the South Fork haul road. The applicant has submitted this information (documented in letter from UDOGM dated July 3, 1982), and the applicant has committed to a road maintenance plan (letter dated June 7, 1984, and the PAP, Chapter XIII, and Exhibits XIII, 1-3E (updated May, 1984), for both the Middle Fork and South Fork haul roads. Therefore, with approval of the final abatement plans for the Middle Fork road, the applicant will be in compliance with UMC 817.151, 817.152, 187.153, 817.154, and 817.155.

Currently, there are no Class II roads in the permit area. Therefore, UMC 817.160-166 are not applicable.

One Class III road is in the permit area. This road was constructed prior to SMCRA, but it is currently being used to service a ventilation portal and a diversion dam on the North Fork of Miller Creek. The road design (letter of August 7, 1979) was approved by OSM (letter dated March 21, 1980), and the maintenance plan (letter of June 7, 1984) has been reviewed by OSM and found to be in compliance. Therefore, the applicant is in compliance with UMC 817.170, 817.171, 817.172, 817.173, 817.174, and 817.175.

A stream crossing will be necessary when soil salvage activities are initiated in Area D. A stream crossing exists at the present time and is scheduled to be used during salvage activities. It is not known what the condition of the crossing will be or if it will be sufficient to handle the traffic in an environmentally safe manner. Therefore, the applicant must agree to contact the regulatory authority, prior to initiating salvage, to determine if crossing is adequate. The applicant must satisfy Condition No. 13 to be in compliance.

Condition No. 13

Prior to initiating soil salvage activities in Area D borrow area or developing the existing access road through the adjacent riparian zone, the permittee shall consult with the regulatory authority to determine whether any design changes are required due to changes in the condition of the stream crossing. At such time, at a minimum, the disturbance to established riparian vegetation, topsoil salvages, the need for temporary culverts, and spillage into the perennial stream shall be considered.

UMC 784.18 RELOCATION/USE OF PUBLIC ROADS

The applicant proposes to relocate a portion of State Highway 122 and County road 338 in order to build an overpass for the unit train system. The overpass will allow for uninterrupted traffic flow to and from the town of Hiawatha. The Utah Department of Transporation approved the relocation in a letter to the applicant dated May 17, 1984. As required by UMC 761.12(d), UDOGM published public notice of the proposed relocation in the Price, Utah, Sun Advocate. No requests for a public hearing were received. The applicant is in compliance with UMC 784.18 and UMC 761.12(d).

UMC 817.156, 817.166, and 817.176 - ROADS RESTORATION

The existing haul roads in the Middle Fork and South Fork canyons qualify as Class I roads. The North Fork access road and the borrow areas access/haul roads qualify as Class III roads. There are no Class II roads currently existing or proposed. Reclamation of all roads will be accomplished by using plans submitted as part of Chapter 3 of the PAP. All road material will be removed, the roads will then be backfilled and seeded.

The PAP is in compliance with 817.156, 817.166 and 817.176.

UMC 817.180 OTHER TRANSPORATION FACILITIES AND 817.181 SUPPORT FACILITIES AND UTILITY INSTALLATIONS

With regard to the transporation facilities associated with the unit train loadout, designs have been provided as required by these regulations. The applicant proposes to modify an existing coal refuse pile to build the conveyor structure, which requires approval from MSHA.

XXIV - BONDING - UMC 805 and 806

Bonding to cover the reclamation of the Hiawatha Mines Complex was determined to be $5,600,000 (see Appendix B of this TA). These costs are shown below:

Hiawatha facilities area	$ 2,451,000
South Fork area	293,000
Middle Fork area	306,000
North Fork area	11,000
Roads to the facilities	134,000
Borrow areas	147,000
Maintenance	84,400
Total	$ 3,426,000

Additional costs:

Supervision:

One person full time for a year - $31.33/hr X 2080 hr = $65,000
Contingency:

15% of the above total = $514,000
Escalation:

6.78% compounded annually for five year permit term (rate currently used by UDOGM) = $1,330,000

Bond amount = $5,600,000

These bonding estimates were developed by OSM using information provided in the PAP and independent estimates developed by OSM. Upon submittal of a bond to cover reclamation costs of $5,600,000.00 prior to permit issuance, the applicant will be in compliance with this section.

XXV - SEALING OF DRILLED HOLES AND UNDERGROUND OPENINGS - UMC 817.14 AND 784.13(b)(8)

The applicant has described and furnished details of the methods proposed for sealing mine portal openings and other openings as part of the reclamation plan (original submittal, Volume I, Chapter III). The applicant is in compliance with UMC 817.14 and 784.13 (b)(8).

XXVI - SUBSIDENCE - UMC 817.126 AND 784.20

The applicant has presented data on the monitoring and effects of subsidence and the control of any resulting subsidence in the original submittal (Volume I, Chapter III, p. 33, and 65-83). The probability of subsidence under a variety of mining conditions has been assessed and provisions for mitigating the effects of subsidence to the environment have been developed. For a discussion of subsidence effects to streams, refer to Chapter XII, Part 784.14 of this TA. No perennial streams will be affected by subsidence. The applicant has complied with the requirements of UMC 817.126 and 784.20.

XXVII - SPECIAL CATEGORIES OF MINING OTHER THAN ALLUVIAL VALLEY FLOORS AND PRIME FARMLAND - UMC 827 and UMC 828

All support facilities associated with the Hiawatha Mines Complex are located within the permit area. Therefore, UMC 827 is not applicable.

No in situ processing of coal is proposed at the Hiawatha Mines Complex. For this reason, UMC 828 is not applicable.

XXVIII - MISCELLANEOUS COMPLIANCE

UMC 817.49 SLIDES AND OTHER DAMAGE

The applicant has committed to notifying UDOGM and the U.S. Forest Service should a slide occur which may have a potential adverse effect on life or public property (DOA response, Volume I, pg. 133 July 20, 1984).

UMC 817.100 CONTEMPORANEOUS RECLAMATION

The applicant has conducted interim revegetaion on areas of disturbance including topsoil stockpiles, fill slopes, cut slopes, and sediment pond outslopes. The documents and page numbers where information is presented are the DOA response (Volume I, page 133; Volume II, Exhibits III-12B and III-4B; Volume III, Exhibits IX-4A and IX-4B) and the ACR response (Chapter III, page III-31D and 31E). The applicant is in compliance with this regulation.

UMC 817.106 REGRADING OR STABILIZING RILLS AND GULLIES

The applicant has committed to fill, grade, reseed, and stabilize all rills and gullies deeper than 9 inches (ACR response, Chapter III, p. III-53); therefore, the PAP is in compliance with UMC 817.106.

UMC 817.11 SIGNS AND MARKERS

Personal communication with David Lof (UDOGM inspector for the Hiawatha Mines Complex) on March 21, 1984, indicated that the applicant is in compliance with UMC 817.11.

UMC 784.13(b)(9) COMPLIANCE WITH CLEAN AIR AND CLEAN WATER ACTS

The applicant has a current NPDES permit (UT 0023094) from the Environmental Protection Agency (EPA). The applicant had no outstanding violations on that permit as of March 13, 1984, and, therefore, is regarded as being in compliance with the Clean Water Act by the EPA, UDOGM, and Utah Department of Health.

The Utah Department of Health has not required an air quality control plan for the Hiawatha Mines Complex but does maintain a systematic inspection program for the mines. The applicant is, therefore, considered to be in compliance with the Clean Air Act (personal communication Lynn Menlove, Utah Department of Health, March 20, 1984). The applicant filed a notice of intent to build a unit train loadout facility with the Utah Department of Health, Bureau of Air Quality. It was approved on July 23, 1984. The applicant remains in compliance with the Clean Air Act.

UMC 786.11 PUBLIC NOTICES OF FILING OF PERMIT APPLICATIONS

Information on the required newspaper advertisment and proof of publication are provided in the original submittal (Volume I, Chapter II, p. II-15) and the DOA response (Volume I, Chapter II, UMC 782.21). UDOGM published a public notice of the proposed unit train loadout and road relocation for the railroad overpass in accordance with UMC 784.16 and UMC 761.12(d) (see page 25 of this TA). The applicant is in compliance with UMC 786.11.

APPENDIX A

EXECUTIVE SUMMARY

Under the Surface Mining Control and Reclamation Act of 1977 (PL 94-87), the regulatory authority is required to perform a cumulative hydrologic impact assessment (CHIA) before approving any application to mine. This report assesses the cumulative hydrologic impact of the Hiawatha Mine Complex and all other anticipated mining in the area.

The Hiawatha Mines Complex is located about 14 miles southwest of Price, Utah. The hydrologic system associated with the Hiawatha Mines Complex may interact with the Star Point Mines Complex, both in terms of surface and ground water resources. Therefore, both mines are considered to be within the cumulative impact area for the Hiawatha Mines Complex. Surface disturbances associated with the current mining at the Hiawatha Mines and the Star Point Mines Complexes occur in the Miller Creek watershed. Future mining at the Hiawatha Mines Complex will disturb additional lands in the Cedar Creek watershed.

Because affected watersheds and ground water systems differ in areal extent, the surface and ground water cumulative impact areas (CIAs) have different but overlapping boundaries. The surface water CIA includes Miller Creek to the confluence of Serviceberry Creek and Cedar Creek to the Mohrland loadout. The ground water CIA includes the area over the underground mine workings for the Hiawatha Mines Complex and the Star Point Mines Complex.

Previous studies have documented that the major hydrologic impacts associated with underground coal mining in the area are related to changes in ground water quantity and surface water quality. The levels of impacts on ground water quality are low. Impacts to ground water quantity are usually associated with consumptive use of ground water for dust control and losses resulting from evaporation caused by mine ventilation. Consumptive uses of ground water are regulated by the Utah State Engineer, since they are associated with water rights.

Changes in surface water quality are usually associated with increases in dissolved salts and suspended sediment. Increases in dissolved salt content in the surface water system occur through three mechanisms:

1. Ground water that recharges the surface streams has a naturally higher TDS content than the receiving waters. The major source of TDS increases are associated with ground water discharges from Mancos Shale.

2. Ground water that discharges from underground coal mines frequently has a higher TDS content than the receiving waters. Increases in TDS load will vary, depending on the length of time water contacts the coal seams and dust control measures implemented at the mine.

3. Leaching of salts from freshly disturbed surface mining operations and coal stockpiles results in increases in TDS content to the local ground water which usually recharges the surface water system.

This study defines the magnitude and duration of changes in ground water quantity and surface water quality. Data were obtained from the mining and reclamation plans of those mines in the CIA and from research studies in the area. There was sufficient information from the mine discharge data and description of mine geology to define the probable impacts on ground water quantity with a moderate level of confidence.

Impacts on surface water quality were studied for both Miller Creek and Cedar Creek. There were sufficient data to analyze the impacts on Cedar Creek and Miller Creek above the town of Hiawatha with a moderate level of confidence. However, there was not the same level of information on Serviceberry Creek and Miller Creek below the town of Hiawatha. For these reaches, the lack of data and the heavy influences of the Mancos Shale made prediction of impacts very difficult, and the level of confidence in the results is low to moderate.

The level of confidence in the results can be raised by providing more long-term hydrologic data. The water monitoring programs for the mines in the cumulative impact area may provide these data over time.

Results of the analyses indicate that underground coal mining will not cause a significant transbasin diversion of water from the historic discharge point of the Huntington Creek basin to the Miller Creek basin. This is based on the assumption that the Mohrland Portal will continue to be used as the discharge point for the Hiawatha Mines Complex.

Current mining in the CIA consumptively uses approximately 160 acre-feet per year (100 gallons per minute (gpm)). Total projected consumptive use will be between this level and about 230 acre-feet per year (145 gpm), depending on the ventilation requirements and production levels achieved in the future. All of the water consumptively used is owned by the coal operators through a combination of surface and underground water rights.

Historic mining through the Bear Canyon Fault has produced a significant amount of long-term discharge (100 to 200 gpm) to the mine. Maximum ground water discharge from the cumulative impact area is projected at about 1,900 acre-feet per year (1,170 gpm). All of the discharge will be from the Hiawatha Mines Complex.

Historic mining may have diverted some ground water from the Bear Canyon Fault into the underground mine workings at the Hiawatha Mines Complex. Ground water inflow to the Hiawatha Mines Complex was more than 500 gpm in 1972 and this diversion of ground water may have altered the flow patterns c [illegible] ciated with the Bear Canyon Fault. However, it [illegible] the level of impacts because there are no histor[illegible] springs. The rate of ground water flow into the [illegible] has been steady for the past several years, wi[illegible] from the Bear Canyon Fault. With the exception [illegible] s, all future mining will leave a barrier of unmined coal along the fault. In the vicinity of the Star Point Mines the fault has been dry. Therefore, no additional impacts are associated with diverting ground water flows from the Bear Canyon Fault.

Bear
Cyn Fault
100-200gpm

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The only ground water discharges from mines in the CIA occur from the Hiawatha Mines Complex. Mixing of the ground water with surface water increases the concentration of total dissolved solids (TDS) in the receiving streams.

TDS concentrations in surface water below the coal mining activities are higher than above the coal mining activities. TDS increases are associated with increases in sulfate, chloride, magnesium and sodium concentrations. Current TDS levels do not exceed any set or recommended water quality criteria for the current water uses. Future mining will cause an additional increase in TDS concentration, but this level will also be below the set and recommended water quality criteria. TDS loads (i.e., concentration multiplied by flow rate) are approximately 900 tons per year from nonpoint sources associated with existing mining operations on Miller Creek. Because no new surface disturbances are proposed, the TDS load should not increase in the future. There is no active surface mining operation on Cedar Creek, but an increase of 180 tons per year from nonpoint sources is projected in relation to future mining operations on Cedar Creek.

Water chemistry of surface waters in the CIA naturally change from a calcium carbonate type to a magnesium sulfate type as streams traverse the Blackhawk Formation and the Mancos Shales. Mancos Shales have significant impact on the water quality of streams traversing them. TDS concentrations of streams on the Mancos Shales are as much as 100 times the TDS levels of streams on top of the Wasatch Plateau. Most of these increases are natural and are probably caused by ground water flowing through the formation, leaching available salts from the marine shales, and discharging into the surface waters. Impacts resulting from the surface facilities associated with mining in the CIA are overshadowed by the degradation of water quality from streams traversing the Mancos Shales.

Sulfate levels are presently below established water quality standards, and if projected estimates of sulfate increases are accurate, surface disturbances associated with the King 7 and 8 Mines will cause about a two-fold increase in sulfate concentrations. Projected sulfate concentrations will remain below water quality standards.

Total suspended sediment (TSS) concentrations are also higher downstream from surface facilities associated with mining. Most of the increased suspended sediment naturally settles out before Miller or Cedar Creek leaves the permit area because of relatively flat stream gradients.

The OSM Surface Water Model was used to route the known water quantity and quality of Miller Creek (at the town of Hiawatha) and of Serviceberry Creek (near the town of Wattis) to the confluence of the two creeks. According to the results of the model, the TDS concentration below the confluence of Serviceberry Creek and Miller Creek will exceed the water quality standard for irrigation use during the middle and late summer months. Most of the TDS concentration is caused by Serviceberry Creek traversing the Mancos Shale, however.

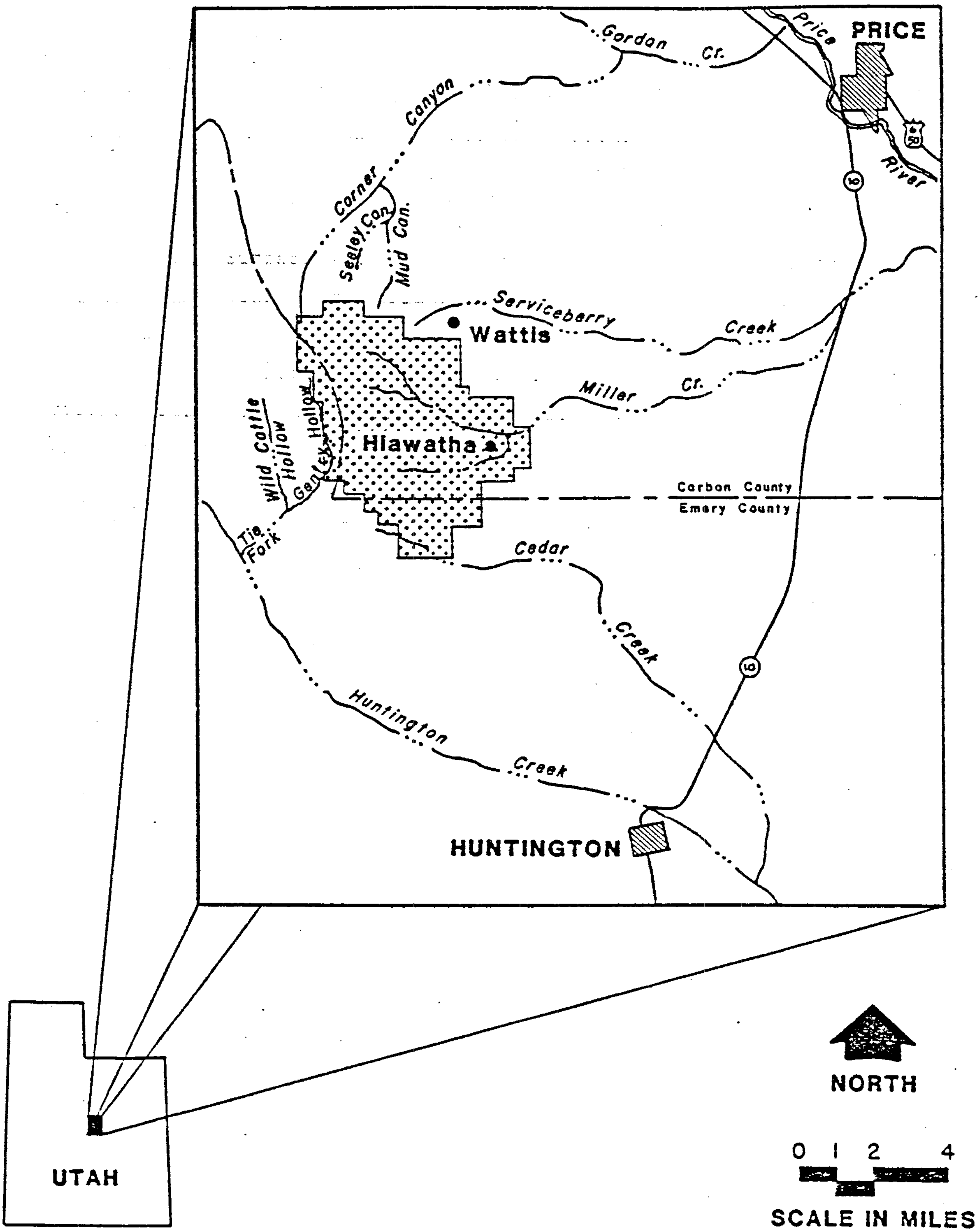

FIGURE 1

LOCATION OF STUDY AREA

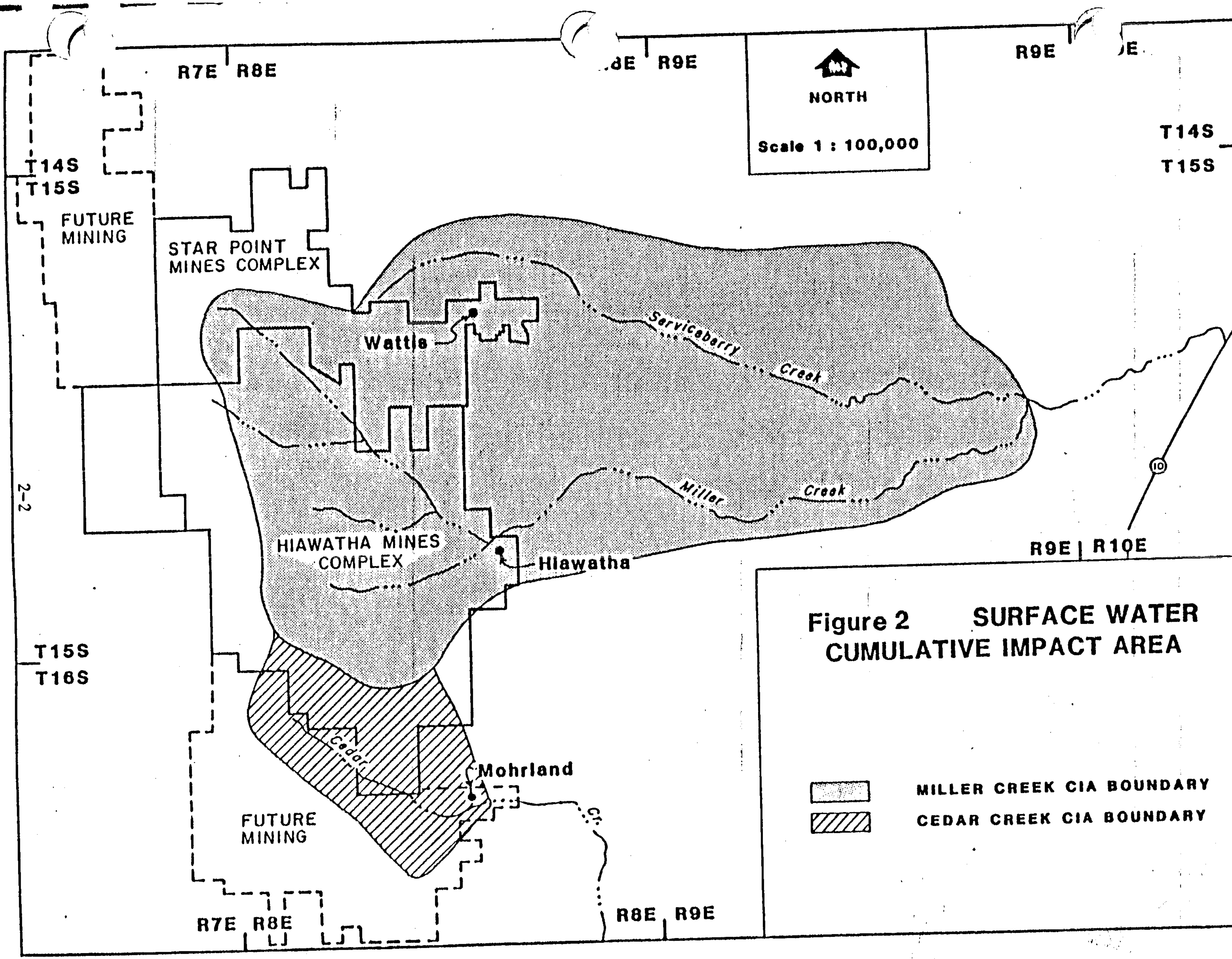

Figure 2 SURFACE WATER CUMULATIVE IMPACT AREA

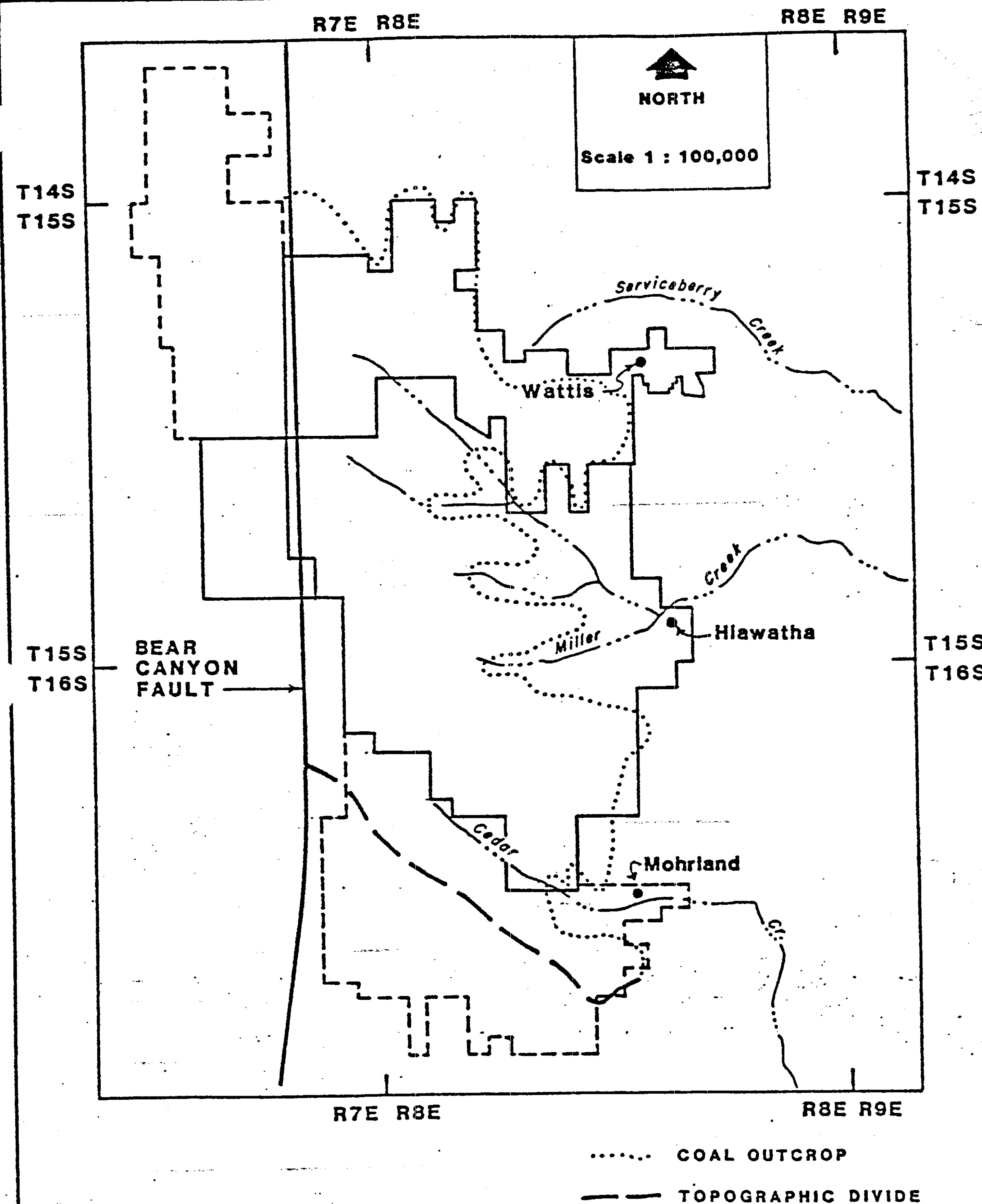

Figure 3 GROUND WATER CUMULATIVE IMPACT AREA

TECHNICAL ANALYSIS

HIAWATHA MINES COMPLEX

I - INTRODUCTION

United States Fuel Company (U.S. Fuel), a wholly owned subsidiary of Sharon Steel Corporation, submitted a permit application to the Utah Division of Oil, Gas, and Mining (UDOGM) and the Office of Surface Mining (OSM) on March 23, 1981 in order to bring its Hiawatha Mines Complex into compliance with the permanent Utah State Program for the next 5 years of mining. This original submittal, updated through February 4, 1985, along with the apparent completeness review (ACR) response (June 14, 1983) and numerous applicant responses to determination of adequacy letters (DOAs), comprise the permit application package (PAP) for the Hiawatha Mines Complex. The Hiawatha Mines Complex consists of the King 4, 5, and 6 Mines and coal handling and processing facilities adjacent to the town of Hiawatha. The following technical analysis (TA) evaluates this permit application package (UT-0006). In addition to providing the application requirements for a Utah coal mining permit, the PAP includes the information required for the Secretary of the Interior to make a decision on U.S. Fuel's mining plan for its Hiawatha Mines Complex.

The Hiawatha Complex is located on the east side of the Wasatch Plateau in central Utah, about 15 miles southwest of Price, in Carbon and Emery Counties (Figure 1). U.S. Fuel controls, through private and Federal leases, 19,211 surface acres that comprise the Hiawatha Mines Complex. Of that total, only 12,605 acres are included in this action. Of this area, approximately 5,726 acres (approximately 30 percent) of coal are held by U.S. Fuel in the form of leases with the Federal government.

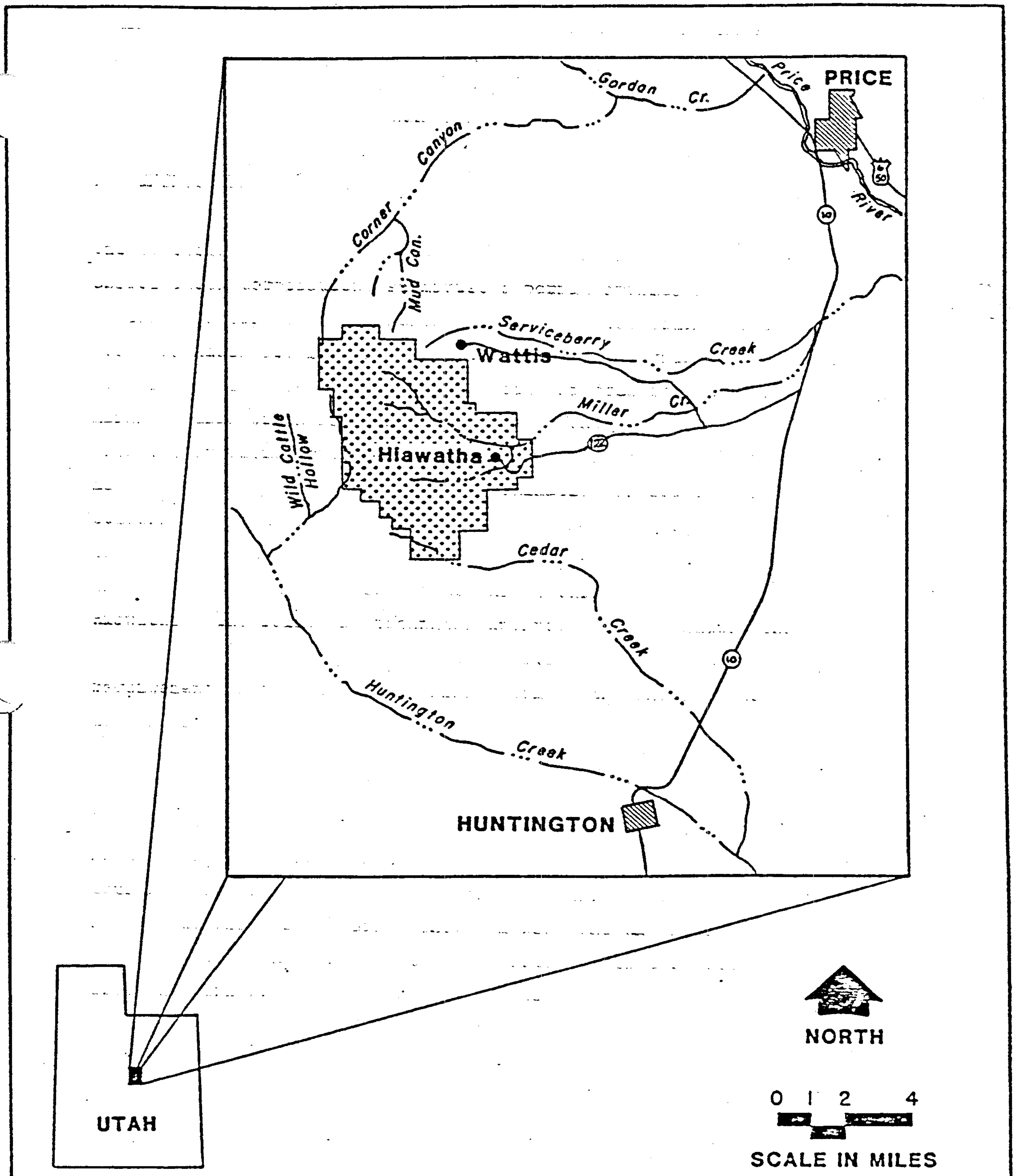

Figure 1
AREA MAP
HIAWATHA MINES COMPLEX

The leases involved are: SL-025431 (2,370.26 acres), SL-069985 (2,356.09 acres, and the combined leases U-058261 and U-026583 (1,000 acres). Only portions of those Federal leases, as identified on Figure 2, will be mined within the scope of this permit. The SMCRA permit area includes 12,605 surface acres in T.15S., R.7E., SLM, sections 13, 24, 25, 36; T.15A., R.8E., SLM, sections 17-21, 26-35; T.16S., R.8E., SLM, sections 3-6, 8, and 9. Federal coal leases within the permit area total 2,543 acres and comprise the mining plan area. All four Federal leases are involved in the mining plan area. Federal leases SL-025431 and SL-069985 also extend beyond the current mining plan area into the life-of-mine area. The remainder of the coal in the permit area and the life-of-mine area (9,833 acres) is owned by U.S. Fuel. The applicant does not own coal rights in approximately 3,650 acres in the permit area. The surface is owned by U.S. Fuel and the subsurface is controlled by the Bureau of Land Management. However, coal resources are not present within these areas (PAP Exhibits VI - 1 and 2). This permitting action does not include redevelopment of the Mohrland area (King 7 and 8) to the south of the SMCRA permit area; however, a proposed unit train loadout adjacent to the town of Hiawatha is part of this permitting action. Unless otherwise indicated, all references in this TA are to the Utah Regulations Pertaining to the Surface Effects of Underground Coal Mining Activities (UMC 700 et seq. and UMC 800 et seq.).

The Hiawatha Mines Complex is a consolidation of the original King, Hiawatha, Black Hawk and Mohrland mines, which began mining coal in the early 1900's. U.S. Fuel was organized in 1915 and began operation in 1916 when it took over the properties of the Consolidated Fuel Company, Castle Valley Coal Company, and Black Hawk Coal Company, all of which are located within the current permit area boundary. The current five-year permit application applies to three underground mines (King 4, 5, and 6) which are existing operations. Mining will remove coal from the A (King 4, 5, and 6), B (King 4 and 5), and Hiawatha (King 6) seams of the Blackhawk Formation.

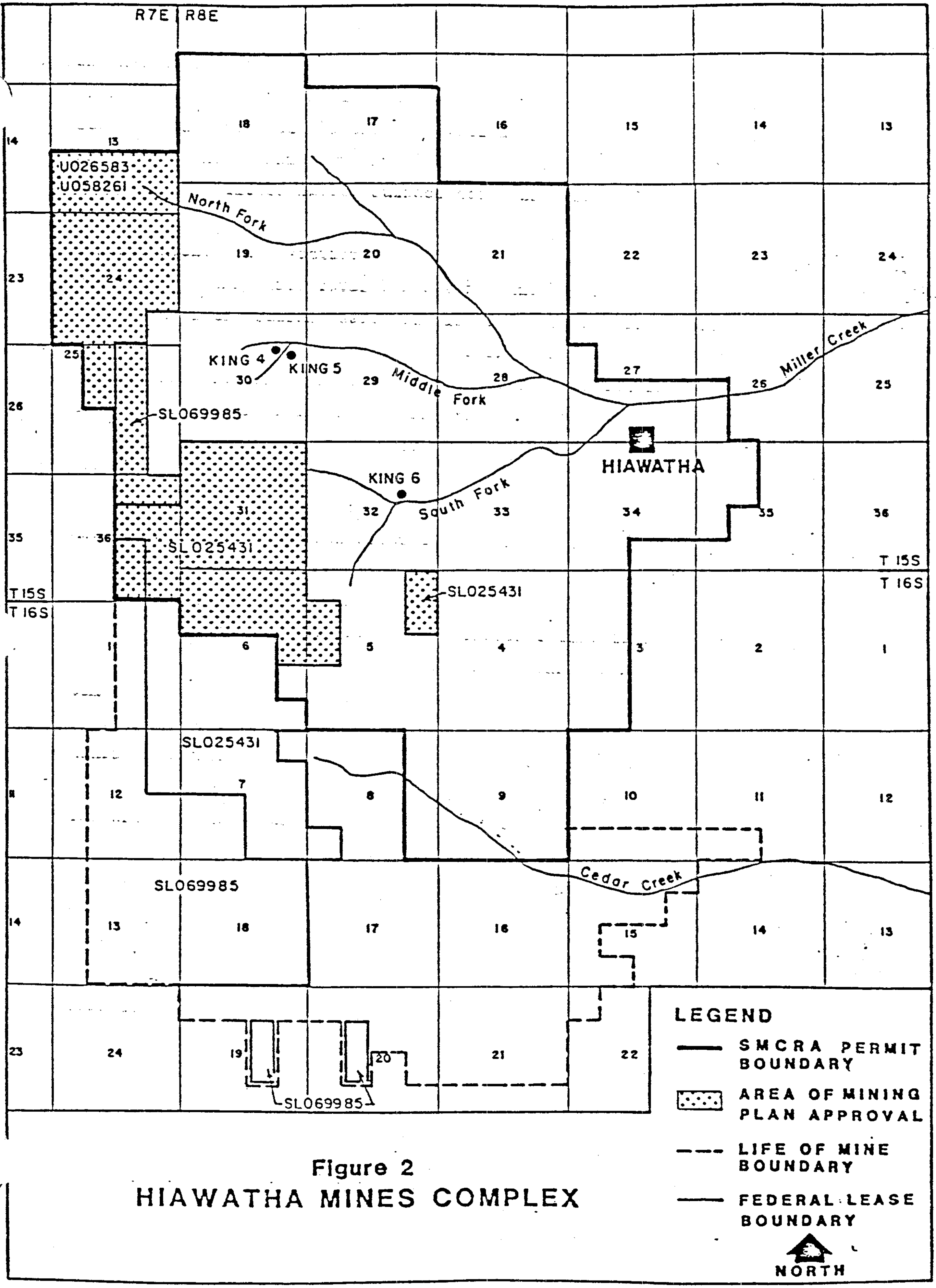

Figure 2
HIAWATHA MINES COMPLEX

Approval of both the SMCRA permit by OSM and the mining plan by the Secretary would provide for mining at the Hiawatha Mines Complex through the year 1989 at a maximum rate of 1.76 million tons per year. U.S. Fuel currently ships all coal from the Hiawatha Complex by rail to an electric generation plant in Nevada and military facilities in the northwestern United States. U.S. Fuel currently employs approximately 281 people at the Hiawatha Mines Complex. Employment would increase to 500 during the period of maximum production (1989).

The environmental assessment (EA) on the mining plan which accompanies this TA was prepared pursuant to the National Environmental Policy Act (NEPA). The EA and TA frequently reference one another.

II - DESCRIPTION OF THE EXISTING ENVIRONMENT

Topography and Geology

The Hiawatha Complex is located on the east side of the Wasatch Plateau, at elevations ranging from 6,750 to 9,600 feet, in an area characterized by steep canyons and high plateaus. Miller and Cedar Creeks drain the permit area.

Geology is the principal factor controlling the occurrence and availability of ground water in the vicinity of the Hiawatha Mines Complex. Portals for the Hiawatha Complex lie at the base of an erosional escarpment that forms the eastern face of the Wasatch Plateau. The Wasatch Plateau is a high, broad, flat area dissected by numerous streams. The high plateaus of Utah, which include the Wasatch Plateau, are thought to be a transition zone containing geologic structures common to both the Colorado Plateau Province to the east and the Basin and Range Province to the west. The mine complex is located in the Wasatch Plateau Coal Field. Coal outcrops appear in the canyon walls and along the cliffs. Rock types in the region are late Cretaceous and Tertiary in age and are generally representative of continental and/or transitional sediments. Marine sediments occur below the sequence and are on the valley floors east of the escarpment.

Structurally, the region is not very complex. Strata are fairly flat with dips to the south (sometimes slightly southeast or southwest) at 1 to 3 degrees. Locally, near faults, the dip increases to about 20 degrees.

The Pleasant Valley Fault Zone cuts across the western portion of the study area. It runs from north of Scofield Reservoir to south of Huntington Creek. The Pleasant Valley Fault Zone is 3 to 5 miles wide and displacement is generally between a few feet and 100 feet, although greater displacement occurs locally (Doelling, 1972).

Several localized fault systems have been identified to be associated with the Pleasant Valley Fault. One of these faults of local interest in the study area is the Bear Canyon Fault. The Bear Canyon Fault marks the western limit of mining at the Hiawatha Mines Complex, and it has a displacement of up to 250 feet.

Members of the Mancos Shale, Mesaverde Group, and Wasatch Group all outcrop in the study area. From bottom to top, the geologic units are Masuk Shale (a member of the Mancos Shale), Star Point Sandstone, Blackhawk Formation, Price River Formation, and North Horn Formation (a member of the Wasatch Group). The Star Point Sandstone, Blackhawk Formation, and Price River Formation are members of the Mesaverde Group. Mineable coal seams are located in the lower half of the Blackhawk Formation. Six coal beds have been identified in the Blackhawk Formation in the area of the Hiawatha complex. Four of these seams are thick enough to be economically mined at this time (Hiawatha, A, B, and Upper seams). U.S. Fuel has mined all but the Upper seam.

Climate and Air Quality

The climate of the Hiawatha Mines Complex area is typical of canyon areas of central Utah. Summer temperatures range from 40° to 95° F while winter temperatures average around 25° F. The average annual precipitation is 12 inches. Winds in the mine plan area are affected by the area's topography, although general wind directions over a broader region are from the north-northeast in the winter and the south-southwest in the summer.

Central Utah is primarily rural with some light or dispersed industrial activity. Existing air quality is generally excellent, although high total suspended particulate values result from travel on unpaved roads. Carbon monoxide, ozone, lead, and hydrocarbons are generally not monitored in the region, but it is reported that they are within the National Ambient Air Quality Standards (NAAQS) (BLM 1983).

Hydrology

In the vicinity of the Hiawatha Mines Complex, the Wasatch Plateau is dissected by two drainage systems, Miller Creek and Cedar Creek. The drainage area for Miller Creek, above the confluence with Serviceberry Creek, is about 29,700 acres. Streamflow in Miller Creek is perennial below the confluence with the North Fork of Miller Creek. The left fork of the North Fork of Miller Creek is diverted into an abandoned workings of the Hiawatha No. 2 Mine which contains an underground water storage reservoir. This reservoir provides water for the town of Hiawatha, the mine workings and the coal processing plant. Cedar Creek is also a perennial stream with a drainage area of approximately 5,300 acres. Cedar Creek receives approximately 1 cubic foot per second (cfs) of discharge from the inactive Mohrland portal to the south of the Hiawatha Mines Complex.

Ground water in the region around the Hiawatha Mines Complex is recharged principally by direct infiltration of precipitation in the higher plateau, infiltration from perennial streams that flow down gradient to Mancos Shale lowlands, and, to a limited extent, by infiltration in outcrops.

Contact with the Bear Canyon Fault at several points in old mine workings has resulted in large flows of water and accounts for most of the mine water presently discharged from the inactive Mohrland portal. One water-producing contact with the fault which is accessible in the King 4 Mine is presently used for fire protection and dust suppression in that mine. Generally, mine water flows southerly, away from active mining, and is discharged by gravity flow at the inactive Mohrland portal. Some of this water is diverted for culinary and industrial use at Hiawatha, and the remainder flows into Cedar Creek. No other mine discharge or dewatering activities are anticipated by U.S. Fuel.

The data contained in the spring inventory (DOA response November 7, 1984, Volume 1, Part 783.15) indicated more than 75 percent of the seeps and springs found during the survey issue from formations located stratigraphically above the coal-bearing Blackhawk Formation. More than half of the seeps and springs were found issuing from the North Horn Formation occupying the ridges in the western portion of the permit area. Flow rates from springs issuing from these upper formations tend to vary between about 2 and 8 gallons per minute (gpm).

Approximately one-fifth of the seepage points found during the survey are located in the Blackhawk Formation. Flow rates at these points tend to be minimal, with seepage issuing predominantly at the interface between sandstone and shale lenses. Usage is also minimal as a result of the low flow rate and the general inaccessibility of the seeps.

Water Supply

Mine water is used by U.S. Fuel for: 1) fire protection and dust suppression in King 4; 2) the coal processing plant; and 3) by the town of Hiawatha for culinary purposes. Approximately 786,000 gallons per day (gpd) is used by the plant; the town uses approximately 30,000 gpd from the system. These uses are covered by water rights claimed by U.S. Fuel for 4,758 gpm (3,746 gpm in surface-water rights and 1,012 gpm in ground-water rights). Mine water discharge from the inactive Mohrland portal is regulated under National Pollutant Discharge Elimination System (NPDES) permit UT-0023094. Water supply information on the area surrounding the Hiawatha Mines Complex is provided in the cumulative hydrologic impact assessment (CHIA), prepared by OSM.

Water is piped to the town of Hiawatha and the processing plant from the mines. Water is diverted into the mine on the North Fork of Miller Creek. This water together with the water intercepted in the mine is stored in the mined out section of the abandoned Hiawatha No. 2 Mine. Maximum storage volume in this underground reservoir is about 120 milliom gallons (368 acre-feet). Four bulkheads, constructed in 1951, are used to contain the water within the old mine workings. Only about 60 million gallons (194 acre-feet) are normally stored in this reservoir. The bulkheads are accessible, however, the underground "pumping system" is not.

Water in excess of that used in the mining operation is routed south through the mine workings by gravity. There is a 125,000 gallon (0.4 acre-feet) underground concrete storage tank and a discharge pipe associated with the King No. 3 Mine, but most of the ground water in the mine is conveyed south to the Mohrland portal where it is collected and piped to the town of Hiawatha. Water volume in excess of the capacity of the pipe is discharged into Cedar Creek. At Hiawatha there are four water storage tanks with a combined capacity of 245,000 gallons (0.75 acre-feet). Water is treated and then stored in a 40,000 gallon (0.1 acre-feet) tank 5A near the preparation plant.

Water Quality

Water in the mine is of good quality, with an average total dissolved solids concentration of about 700 mg/l. Surface water on the top of the Wasatch Plateau has a low total dissolved solids (TDS) concentration usually less than 400 milligrams per liter (mg/l) and a low total suspended sediment (TSS) concentration, usually less than 30 mg/l. Concentrations of dissolved sodium and chloride are usually less than 15 mg/l. The predominant dissolved chemical constituents are calcium and bicarbonate. Water quality during snowmelt runoff tends to be a calcium carbonate type and water quality from ground water discharge tends to have higher concentrations of magnesium and sulfate. Values of pH were fairly constant, ranging from 7.6 to 8.1.

The Utah State Board of Health has established water-quality standards to protect against controllable pollution to beneficial uses of water. For the Miller Creek basin, the pertinent water-quality standards are for nongame fish (Class 3c) and irrigation of crops and watering (Class 4) (Utah State Board of Health, 1978).

TDS levels exceed the water quality-standard for irrigation use immediately below some of the active mine areas, but the effects are diluted by surface water from undisturbed areas. TDS concentrations are within the water quality standards before water in Miller Creek flows out of the Hiawatha Mines Complex permit area. TDS increases by about two-fold when comparing above mining stations and below mining stations.

Dissolved constituents continue to increase in Miller Creek as water flows across the marine Mancos Shale. At the junction of Miller Creek and Utah Highway 10 (about 10 miles east of the permit area) TDS concentrations average more than 3,200 mg/l, and the dominant dissolved chemical constituent is sulfate (Mundorff, 1972). Again, the only parameter to exceed pertinent water-quality standards is TDS.

The sodium adsorption ratio (SAR) for the headwater areas is low. For the headwater areas of the Miller Creek and Cedar Creek drainages, the SAR is less than 0.5. At the base of the plateau, the SAR values are usually between 0.8 and 2.00 In the Mancos Shale, the SAR values range between 1.0 and 4.0. Snowmelt flow usually has a lower SAR value, but as sodium increases during low flow periods in streams crossing the Mancos Shale, the SAR also increases.

Both SAR and TDS combine to become a hazard for irrigation water. All of the water in the study area exhibits a low sodium hazard for snowmelt flows, but Miller Creek at Utah Highway 10 shows a medium sodium hazard during low flow periods. This increase in TDS and SAR as streams cross the Mancos Shale is a natural nonpoint source of pollution.

Soils

Within the proposed permit area the dominant soils at elevations of 7,000 to 8,500 feet have cool temperatures regimes and are moist except for significant periods during the growing season. Slopes generally range from 30 to 60 percent and at times exceed 70 percent. Soils within the proposed permit area generally are cobbly loam in texture and are derived from a variety of sedimentary rock. Some have organically rich surface horizons. The lighter colored soils have significant accumulations of carbonates in the subsoil.

Below 7,000 feet, the soils have moderate temperature regimes and are usually dry during the growing season. Slopes are generally less than 30 percent. Most of these soils are loam to cobbly loam in texture and have developed from alluvium and mass wasting derived from a variety of sedimentary rocks. Many of these soils have accumulations of carbonates in the subsoil. Vegetative production within and adjacent to the Hiawatha Mines Complex is limited by the lack of available moisture during the growing season. Natural sediment production is high.

Very little topsoil has been salvaged for reclamation purposes because the majority of disturbance occurred prior to the enactment of SMCRA. Instead, soil will be borrowed from areas below 7,000 feet in elevation for reclamation at the coal waste disposal sites and portal areas above 8,000 feet. The borrow areas will yield sufficient material to reclaim previously disturbed areas as well as the borrow areas themselves.

Vegetation

The U.S. Fuel SMCRA permit area includes 12,605 acres and incorporates a large diversity of elevation, topography, aspect, temperature, and moisture conditions. As a result, a large number of plant community types have developed. Ten vegetation types have been identified and mapped within the permit area. The ten types are: (1) mixed conifer forest (41.1 percent); (2) pinyon-juniper woodland (15.4 percent); (3) mixed conifer-aspen forest (13.9 percent); (4) mountain brush (11.8 percent); (5) high elevation sagebrush-grassland (7.2 percent); (6) grassland (5.5 percent); (7) sagebrush (1.8 percent); (8) aspen (1.8 percent); (9) riparian woodlands (1.4 percent); and, (10) barren land (0.1 percent). As these characteristics indicate, the basic vegetation of the permit area is forests and shrublands. Conifer, mixed conifer-aspen, and aspen stands occur at high and intermediate elevations on northern exposures, while pinyon-juniper, sagebrush, and mountain brush stands generally occur at lower mountain and foothill elevations with southern or western exposures. Riparian woodlands are confined to narrow corridors flanking Miller Creek and it's tributaries.

Of the 12,605 acres in the permit area, approximately 435 acres of vegetation have been lost or disturbed by past, as well as current, mining activities. Past mining activities were concentrated in the stream valleys and lower mountain slopes. Consequently, only mixed conifer, mountain brush, sage brush, pinyon-juniper woodlands, and riparian woodlands were affected. Future reclamation activities will disturb an additional 46 acres of pinyon-juniper woodlands as substitute topsoil sources are used. There are no known occurrences of threatened or endangered plant species or designated critical habitats for such species in the permit area.

Wildlife and Fisheries

The mine permit area occurs in the Transition and Canadian life zones and provides habitat for approximately 234 species of wildlife, including 6 amphibian species, 18 reptilian species, 139 bird species, and 71 mammal species.

Miller Creek and Cedar Creek drainages are the major perennial stream systems present. However, neither drainage supports fish populations. Cedar Creek supports an aquatic invertebrate community. There is no information on the existence of aquatic life in Miller Creek.

The permit area contains approximately 8,305 acres of critical deer and elk winter range, 3,335 acres of high-priority deer and elk summer range, and 1,017 acres of high-priority elk winter range. Some of these areas overlap within the permit area. Past and current mining activities have affected the critical and high-priority deer and elk winter ranges.

Springs and seeps are scattered throughout the area and provide an important habitat feature for many wildlife species. Riparian habitats are restricted to the narrow floodplains of major streams like Miller and Cedar Creeks. Riparian woodlands constitute about 1.4 percent of the permit area.

The golden eagle, great horned owl, and sparrow hawk are probably the most common raptors in the permit area. No known active nest or roost sites are present. The bald eagle and American peregrine falcon may occasionally visit the area. There are no known occurrences of threatened or endangered species or designated critical habitats present in the permit area.

Land Use

Land uses in the permit area include mining, logging, livestock grazing, wildlife habitat, watershed, oil and gas exploration, and recreation. Most of these uses have existed since early in the 20th century and are expected to be maintained without disruption by continued mining at the Hiawatha Complex.

Cultural Resources

The cultural resources of the Hiawatha Mines Complex impact areas have been partially inventoried. To date, no historic or archaeological sites have been recorded within the permit area. The applicant has agreed to provide an historical background study of the town of Hiawatha and to complete a pedestrian inventory of proposed direct impact areas associated with the processing plant, waste disposal sites, and substitute topsoil locations. The applicant has proposed measures to ensure that no adverse effects to any significant cultural sites which may be located within the permit area will occur as a result of mining operations. The Utah State Historic Preservation Office (SHPO) has concurred with OSM's finding of no adverse effect for the project in a letter to OSM dated July 9, 1984.

Transportation

The permit area is accessible from Utah Highway 122, County Road 338, and existing paved haul roads up the Middle Fork and the South Fork of Miller Creek. The town of Hiawatha is the terminal point of Utah Highway 122 and the lower portions of the haul roads also receive use by the public. The haul roads also provide access to water diversion, storage and service facilities for potable water for the town of Hiawatha and the coal processing plant. Coal which is mined is hauled by truck to the processing plant site at the town of Hiawatha. There the coal is loaded on rail cars for shipment by the Utah Railroad.

Four roads are currently used at the Hiawatha Mines Complex. All four roads were built prior to the passage of SMCRA by U.S. Fuel or their predecessor. Three of the roads parallel the forks of Miller Creek to active coal mining operations and the fourth goes south to the inactive coal mining operations along Cedar Creek.

The roads up the Middle Fork and South Fork of Miller Creek are paved Class I roads used to haul coal to the preparation plant. The road up the North Fork of Miller Creek is a Class III dirt road used for maintenance of a ventilation portal and a water diversion. The fourth road is an unpaved county road between Hiawatha and the Mohrland portal. Carbon County allows U.S. Fuel to maintain the road through an informal agreement. Emery County maintains their part of the road.

Socioeconomics

The Hiawatha Mines Complex straddles the Carbon-Emery County line in central Utah in the midst of an area commonly referred to as "Coal Country" or "Castle Country". Coal mining has occurred in the vicinity of the Hiawatha Complex since the late 1890's. Today, the entire region is linked to mining and energy resource development. The 1980 population of the two counties was about 33,650, a 62 percent increase over 1970. Most of this growth was a result of the renewed energy development. In 1983, nearly one-third of the total employment in the two counties was involved in the mining, transportation and utilities sectors.

The nearby town of Hiawatha, owned by U.S. Fuel, was developed during World War I. The current population is about 200. At one time. the town's population reached nearly 1,500, but in the mid-1950's and 1960's the population declined to about 150, in response to the diminished national importance of coal as an energy source.

All housing and land in the town is owned by U.S. Fuel and rented to residents. At least one member of a household must be employed by U.S. Fuel in order to rent a dwelling in the town. Of the 68 homes and 10 mobile home spaces in Hiawatha, 8 to 10 are vacant. A report issued by the Southeast Utah Association of Local Governments (SEUALG) on housing stock in Hiawatha indicated that, in 1981, 19 percent were rated "acceptable", 74 percent were "deficient", and 17 percent were "deteriorating." The company has indicated that there are no plans to undertake additional residential or commercial construction in the town (ACR response, 1981), therefore, it is unlikely that the quality or quantity of housing stock in Hiawatha will improve over the next 30 years.

Residency information for the current workforce reveals that 24 percent reside in Hiawatha while 46 percent live in the Price area. Of the remaining 30 percent, 18 percent live in other communities in Carbon and Emery Counties, with the place of residence not known for 12 percent of the workforce.

The prospects for the town of Hiawatha through the year 2014 (life-of-mine) depend on the operation of the Hiawatha Mines Complex. Approximately 80 percent of the town's budget ($35,000) is provided by property taxes on the mine's $1.8 million assessed valuation. Once reclamation occurs, the tax base will significantly diminish. The majority of public services are provided by U.S. Fuel.

The postmining future of Hiawatha is dependent on U.S. Fuel. The company could destroy the town, maintain the town, or divest itself of the property. Even with either of the last two possibilities, the town's remote location from other job opportunities and public and commercial services would probably result in population declines and eventual abandonment.

III - SUMMARY OF THE OPERATIONS AND RECLAMATION PLAN

Because of poor market conditions, only the King 4 Mine is currently producing coal at approximately 700,000 tons per year. U.S. Fuel has utilized the room-and-pillar method with both full and partial extraction, depending on roof characteristics. Longwall mining is proposed for part of King 5.

King 4 and 5 Mines share the same surface facilities in the Middle Fork of Miller Creek and were opened in 1974 and 1978 respectively. From the loading facility, coal is hauled 3 miles to the processing plant in Hiawatha. The access corridor from the town of Hiawatha to the Middle Fork facilities contains a Class I haul road and a powerline. The applicant may propose to build an overload conveyor system from the mine to the processing plant; however, this proposal is not included within this permit action.

Facilities for the King 6 Mine are located in the South Fork of Miller Creek mine yard. Coal is transported by an overload conveyor approximately 2,400 feet from the mine mouth down South Fork Canyon to a coal stockpile where it is loaded onto trucks and hauled 3 miles to the processing plant.

The processing plant, built in 1938, is located immediately north of the town of Hiawatha. It has the capacity to wash, size, and thermal dry 400 tons of coal per hour. Slurry discharged from the plant is channeled through a froth flotation resin recovery process. The slurry is then discharged into impoundments constructed of coal washing refuse material where it is stored, allowed to dry, and eventually reclaimed for shipment to coal markets. The applicant has filed notice of intent with the Utah Bureau of Air Quality to construct and operate a new unit train loadout facility adjacent to the existing preparation plant at the town of Hiawatha. The planned capacity of the facility is one million tons of washed coal per year. Washed coal will be transported on covered belt conveyors to two new storage piles at the railroad siding and then re-hauled by covered conveyor into the new rail car loading facility. An additional third storage pile will be used for reclaimed coal slurry which will be blended with the processed coal and included in the rail shipments. In order to accommodate the unit train loadout system, a portion of State Highway 122 and County Road 338 must be relocated. The applicant proposes to build an overpass for the train, thereby allowing uninterrupted movement of vehicles to and from the town of Hiawatha.

The applicant proposes to continue to operate the underground water-supply reservoir. The existing and long-term stability of the underground reservoir, during operation of the mine has been demonstrated in a response dated January 23, 1985. The proposed retention of the water system, during operations, can be approved if the applicant accepts a permit condition to physically inspect the three remaining seals on an annual basis.

The existing 8' X 20' breakout in the left fork of the South Fork will be plugged upon completion of mining and reclamation by hand, since there is no access to the portal area. All other areas affected by surface operations will be backfilled, stabilized and graded within two years following the cessation of mining (year 2014). Diversion ditches, berms, and sediment ponds will be maintained until that time. Some disturbed areas will be returned to the approximate original contour as shown on PAP Exhibit III-11 for the Middle Fork yard, while others, as shown on PAP Exhibit III-12a for the South Fork yard will be left as currently graded to prevent erosion, assist plant growth, and provide better access for wildlife and livestock. Cut and fill terraces will be used where flatter slopes are not possible. Revegetation will follow backfilling, grading, and replacement of topsoil using seed mixes recommended by UDOGM. Seeding will be accomplished by hydroseeding, drilling, and broadcast/raking and mulch will be used.

IV - LEGAL, FINANCIAL, AND COMPLIANCE INFORMATION UMC 782.13, 782.14, 82.15, 782.16, 782.17, 782.18, 782.19, AND 782.21.

UMC 782.13 IDENTIFICATION OF INTERESTS

Information required by this rule is provided in the original submittal (Volume I, Chapter II, pages 11-2 to II-5) and the DOA response (Volume I, Chapter II). The applicant is in compliance with UMC 782.13.

UMC 782.14 COMPLIANCE INFORMATION

Information required by this rule is provided in the original submittal (Volume I, Chapter II, pages II-6 to II-7). The applicant is in compliance with UMC 782.14.

UMC 782.15 RIGHT-OF-ENTRY AND OPERATION INFORMATION

Information required by this rule is provided in the original submittal (Volume Exhibits I, Chapter II, page II-8) and the DOA response (Volume I, Chapter II). The applicant is in compliance with UMC 782.15.

UMC 782.16 RELATIONSHIP TO AREAS DESIGNATED UNSUITABLE FOR MINING

Information required by this rule is provided in the original submittal (Volume I, Chapter II, page II-9) and the DOA response (Volume I, Chapter II). The applicant is in compliance with UMC 782.16.

UMC 782.17 PERMIT TERM INFORMATION

Information in permit term is provided in the original submittal (Volume I, Chapter II, page II-10) and the DOA response (Volume I, Chapter II). The applicant is in compliance with UMC 782.17.

UMC 782.18 PERSONAL INJURY AND PROPERTY DAMAGE INSURANCE INFORMATION

The applicant has provided evidence of insurance coverage which complies with the requirements of UMC 806.14 in its DOA response (Volume I, Chapter II, pages 3 and 4).

UMC 782.19 IDENTIFICATION OF OTHER LICENSES AND PERMITS

The applicant has provided information on its other licenses and permits in the original submittal (Volume I, Chapter II, page II-13) and the DOA response (Volume I, Chapter II).

The applicant proposes to modify a coal refuse pile (MSHA I.D. No. 1211-UT.9.0007) in order to construct the coal loadout conveyor system. The technical data submitted by U.S. Fuel concerning the design of the structures and foundations for the unit train loadout facility is considered adequate for review by the Mine Safety and Health Administration (MSHA). Approval by MSHA must be obtained prior to initiating construction.

UMC 782.20 IDENTIFICATION OF LOCATION OF PUBLIC OFFICE FOR FILING OF APPLICATION

The public offices where the application has been filed are listed in the original submittal (Volume I, Chapter II, page II-14). The applicant is in compliance with UMC 782.20.

UMC 782.21 NEWSPAPER ADVERTISEMENT AND PROOF OF PUBLICATION

Information on the required newspaper advertisement and proof of publication are provided in the original submittal (Volume I, Chapter II, page II-15) and the DOA response for all parts of the operation except the proposed unit train loadout. UDOGM published a public notice regarding the proposed unit train loadout and relocation of State Highway 122 and County Road 338 in accordance with UMC 786.11(5), 761.12(d), and 784.18. The applicant is in compliance with UMC 782.21.

V - LAND USE - UMC 783.22, 784.15, AND 817.133

Information on land use for the proposed permit area is located in the original submittal (Volume I, Chapter IV), the July 1983 ACR response (Chapter VI), and the DOA response (Volume I, page 85). The applicant is in compliance with UMC 783.22.

VI - CULTURAL AND HISTORIC RESOURCES - UMC 761.11(a)(3), 783.12(b), AND 784.17

Cultural and historical resources information is presented in Volume I, Chapter V, of the original submittal, in the ACR response, and the January and February 1984 DOA responses.

At present, no archaeological or historical sites are known to exist within proposed direct impact (ground surface disturbance) areas in the permit area. However, the applicant has committed to complete the following studies which are or may be necessary to assess the effect of the proposed mining on the cultural environment:

- Historical background survey of the town of Hiawatha and archaeological assessment of the processing plant and waste disposal sites;

- Cultural resources inventory of substitute topsoil locations (Exhibit VII - 4A);

- Additional cultural resources studies as may be determined necessary in the future by OSM, UDOGM, and/or the Utah SHPO to assess the effects of subsidence on cultural sites in the areas over the underground workings.

On the basis of the information submitted by the applicant, and the following condition, OSM requested SHPO concurrence with a Finding of No Adverse Effect. The SHPO has provided this concurrence in a letter dated July 9, 1984. The proposed operation will be in compliance with the requirements of UMC 761.11(a)(3), 783.12(b), and 784.17. The following condition is included a a requirement of this permitting action.

Condition No. 1

The permittee shall ensure that prior to initiation of any new ground disturbance (e.g., additional topsoil borrow areas, access to topsoil borrow areas, expansion of existing coal refuse piles, etc.), OSM, UDOGM, and the SHPO are consulted concerning the need for a cultural resources inventory of the impact area. If an inventory is required, the operator shall ensure that all cultural resources are properly evaluated in terms of National Register of Historic Places eligibility criteria. Where a significant site will be affected by mining, the permittee will consult with OSM, UDOGM, and the SHPO to develop and implement appropriate impact mitigation measures according to a mutually agreed upon schedule.

VII - GEOLOGY - UMC 783.13 AND 783.14

The description of geology can be found in the PAP in Volume II, Chapter VI, and in the volume containing the 1983 ACR Response, Chapter VI. The description of geology provided in the previously mentioned volumes of the PAP defines the geologic strata down to the lowest aquifer that may be affected by mining (i.e. the Star Point Sandstone). In addition, the primary geologic structure in the area, the Bear Canyon Fault, is also thoroughly discussed. The description of geology is sufficient to support the description of ground-water resources in UMC 783.15 (See Chapter IX.) Therefore, the PAP is in compliance with UMC 783.13 and 783.14 with regard to geology in the vicinity of the Hiawatha Mines Complex.

VIII - HYDROLOGIC BALANCE: SURFACE WATER - UMC 783.16, 784.16, AND 784.22

UMC 783.16 SURFACE WATER INFORMATION

Baseline surface-water information is provided in the original submittal (Volume II, Chapter VII, pages VII-9 through VII-16) and the ACR and DOA responses. This information has been determined to be complete.

Completeness was evaluated with regard to section UMC 783.16 and 783.24(g) (Maps: Cross-sections, Maps, and Plans). Compliance was determined as it relates to the technical adequacy of surface water, section UMC 817.52 (Hydrologic Balance: Surface-and Ground-Water Monitoring) and 817.54 (Hydrologic Balance: Water Rights and Replacement).

Surface-water monitoring data have been collected since June 1978 for seven stations. The applicant expanded the surface-water monitoring network to include an additional six stations. The applicant committed to making these six additional stations become a permanent part of the surface-water monitoring program in the November 1983 DOA response.

According to the applicant's existing surface-water monitoring program, water quantity and quality are monitored once a month when accessible. Water quality is currently being sampled under two analytical schedules: a comprehensive analytical schedule for the month of August (See Table VII-7 Volume II.) and an abbreviated analytical schedule for all other months (See Table VII-3, Volume II.)

In addition to the surface-water monitoring program, the Hiawatha Mines Complex has eight sedimentation ponds, three mine water discharge points, and a discharge for the town's excess water all under the NPDES monitoring system.

U. S. Fuels has agreed to follow surface-water monitoring procedures established by UDOGM. The surface-water monitoring program includes monthly monitoring during the period from April through October according to an abbreviated analytical schedule (i.e. sodium, calcium, magnesium, potassium, sulfate, bicarbonate, carbonate, chloride, total dissolved solids, total suspended solids, pH, field specific electrical conductance, field temperature, and stream flow). Twice a year (snowmelt and low flow) the full scale of water quality parameters will be analyzed (i.e., aluminum, cadmium, boron, chromium, lead, mercury, molybdenum, nickel, ammonia, phosphate, and sulfide).

U.S. Fuel proposed a modification to their surface-water monitoring program (DOA response of March 16, 1984). In that proposal, U.S. Fuel requested reduction of the current monthly monitoring to quarterly monitoring. U.S. Fuel argues that these changes are justified because there have been no significant changes or variations in the monitoring results and that the major water quality problem in the basin is salt production rather than heavy metals.

OSM agrees that dissolved salts and suspended sediment are major water quality concerns. In the CHIA for Miller Creek, OSM has documented an increase in dissolved salts and suspended sediment due to coal mining activities. The increases do not exceed water-quality standards established by the Utah State Board of Health; therefore, are not to the level of material damage, and U.S. Fuel has designed their mining and reclamation plan to minimize impacts on the hydrologic balance. However, quarterly monitoring will not be sufficient to provide the necessary data to analyze these changes in water quality; therefore, Condition No. 2 is necessary.

U.S. Fuel has accepted OSM's and UDOGM's required analytical schedule which does not include total and dissolved iron, alkalinity, and oil and grease. Analyses in the Miller Creek CHIA documented that dissolved iron is naturally high throughout the study area, and the dissolved iron and oil and grease concentration are sometimes higher below the mine disturbance than above it. The CHIA concluded that more long-term data are needed for dissolved iron and oil and grease. Therefore, dissolved iron and oil and grease must be included in the routine sampling analytical schedule (See Condition No. 2.)

In previous correspondence (letter dated July 23, 1981), the Manti-LaSal National Forest requested that U.S. Fuel include alkalinity in the Hiawatha Mines Complex water monitoring program. Therefore, alkalinity must be included in the surface water monitoring program. (See Condition No. 2.)

U.S. Fuel also proposed to delete radioactivity (gross alpha and gross beta). This is acceptable because radioactivity has not been found to be a problem either at the Hiawatha Mines Complex or for the Wasatch Plateau Coal Field.

U.S. Fuel has committed to sampling a suite of heavy metal and other parameters in the comprehensive analytical schedule. These parameters are aluminum, cadmium, boron, chromium, copper, lead, mercury, molybdenum, nickel, ammonia, phosphate, and sulfide. The dissolved constituent of all of these parameters will be measured. U.S. Fuel needs to commit to monitoring using the comprehensive analytical schedule twice a year (snowmelt and low flow) and to performing the abbreviated schedule monthly from April through October. (See Condition No. 2.)

All of the records from the surface-water monitoring program indicate that surface-water monitoring is being conducted according to the existing plan. Modification of the surface-water monitoring program as proposed by U.S. Fuel should not reduce the quality of the monitoring data if Condition No. 2 is followed. Therefore, U.S. Fuel will be in compliance with UMC 817.52(b) for the Hiawatha Mines Complex with the following condition. In addition, U.S. Fuel is in compliance with UMC 783.16, 784.16, 894.22, 783.24(g), 817.52, and 817.54.

Condition No. 2

Within sixty (60) days of the effective date of this permit, the permittee must submit a revised surface-water monitoring program to include alkalinity, dissolved iron, and oil and grease. Streams will be monitored monthly during the period of April through October in accordance with UDOGM's abbreviated sampling analytical schedule. Measurements of turbidity may be substituted for the measurement of total suspended solids following the development of an adequate site-specific relationship between the two parameters. Twice per year, the full suite of water-quality parameters will be analyzed using the comprehensive analytical schedule developed by UDOGM.

The samples can correspond to one of the monthly high flows (May or June) and the low flow (September or October). Flow measurement will be taken at the same time that any water quality samples are taken. The data collected shall be sent to UDOGM on a quarterly basis and may be incorporated into the data reports required by Condition 2. The annual report shall contain a summary of the quantity data and analytical interpretations. In addition, the applicant must submit a postmining surface-water monitoring program to include, in addition to the current stations, water-monitoring stations immediately upstream of all existing sedimentation ponds and will measure flow, rate, specific conductance, and total suspended solids for all runoff producing events.

UMC 784.16 RECLAMATION PLAN: PONDS, IMPOUNDMENTS, BANKS, DAMS, AND EMBANKMENTS

(b)(1) Sedimentation Ponds

The Hiawatha Mines Complex currently contains eight sedimentation ponds (see Figure 9). Most of these ponds were constructed in 1978 or 1979 to achieve on-the-ground compliance with the drainage and sediment control rules and regulations of OSM's interim regulatory program. Approval of the sedimentation ponds for the Middle Fork portal yard, South Fork portal yard, and upper coal storage yard was given by OSM and UDOGM on May 30, 1980. Approval of the ponds was given by Utah Water Pollution Control Board in August 1979. The sediment control structures for the coal pile/truck loadout area on the South Fork were reviewed by OSM and UDOGM during the analysis in conjunction with the reopening of King No. 6 Mine (approved July 15, 1981). Review and approval of the other sedimentation ponds were deferred for later review. U.S. Fuel also proposes using three sedimentation ponds to control sediment from the postmining topsoil borrow areas (A, B, C, and D).

All sedimentation ponds were analyzed during this review for compliance with UMC 817.45 (Hydrologic Balance: Sediment Control Measures); 817.46 (Hydrologic Balance: Sedimentation Ponds); 817.47 (Hydrologic Balance: Discharge Structures); 817.56 (Hydrologic Balance: Postmining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments, and Treatment Facilities); and, 817.57 (Hydrologic Balance: Stream Buffer Zones).

Information used in the review was obtained primarily from four studies: Vaughn Hansen Associates (1978), Rollins, Brown and Gunnel, Inc. (1979), U.S. Fuel (1980), and a series of correspondence from U.S. Fuel dated February 1979 through July 1979 for a sedimentation pond associated with reconstruction of Slurry Pond No. 1. Other studies were provided by the applicant in their DOA responses of November 1983 and July 1984 for sedimentation ponds associated with topsoil borrow areas A, B, C, and D. Sediment removal, pond maintenance, and pond inspection procedures are presented in the ACR response (Volume 1, Chapter III, pages III-14A and III-29A).

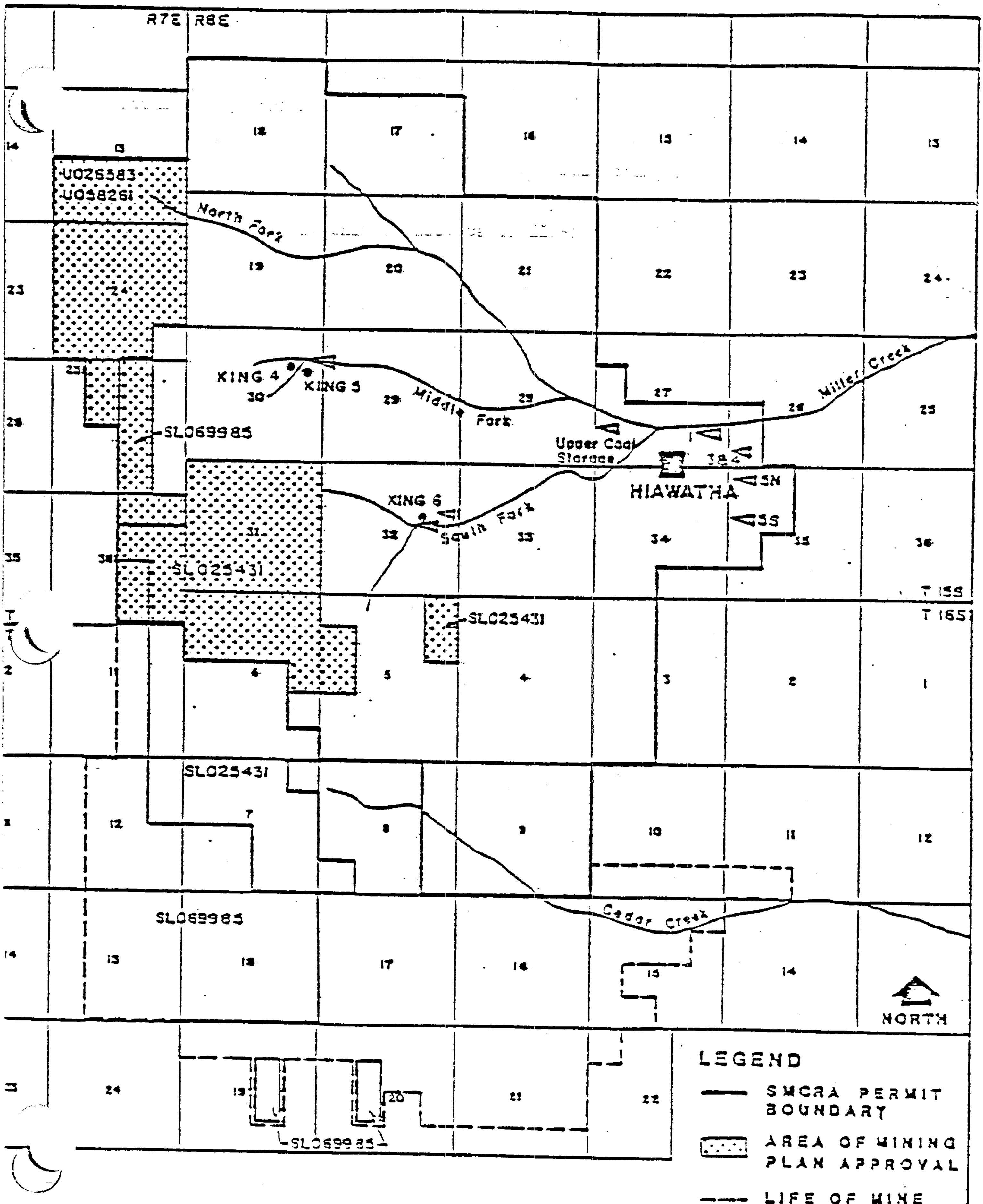

Figure 9
HIAWATHA MINES COMPLEX

Runoff and sediment volume estimates were made by the applicant using acceptable methods and were checked by OSM for accuracy using the SEDIMOT program. There was agreement between the results cited by the applicant and those of the SEDIMOT program; therefore, the runoff and sediment volume estimates are acceptable.

The runoff and sediment volumes estimated in the Vaughn Hansen Associates study (1978) were different from the corresponding estimates in the Rollins, Brown and Gunnel study (1979). The Vaughn Hansen study consistently required a larger pond size because of higher runoff and sediment volume estimates. This discrepancy was pointed out in a letter from Sharon Steel to UDOGM dated October 28, 1981. It appears that the Vaughn Hansen study designed the sedimentation ponds for a larger disturbed area and a higher sediment contribution per disturbed area. The higher sediment volume per disturbed area was required under the interim program regulations but was revised to a lower sediment volume per disturbed area in the permanent program regulations. The Rollins, Brown and Gunnel report simply used the more current regulations to design the sedimentation ponds.

Pond designs for top width, embankment slopes, relative elevations of the principal and emergency spillways, sizing of the principal and emergency spillways, sediment removal, bank stabilization, erosion control, and inspection procedures, were evaluated as they relate to 817.46 and 817.47 and were found to be in compliance for all existing and proposed sedimentation ponds. Four special cases were identified that need to be discussed in more detail.

All of the sedimentation ponds and sediment control structures needed during this permit term are already in place. Since the original design submittal, however, there have been over 18 minor changes to these ponds and structures. All of the sedimentation ponds and sediment control structures are affected. Because of the number and complexity of these modifications, it has become increasingly difficult to identify the on-the-ground sediment control plan in the PAP. To aid inspectors and future reviewers, and to comply with the appropriate regulation, condition No. 3 is necessary.

Condition No. 3

Within ninety (90) days of the effective date of this permit, the permittee will submit to the regulatory authority current as-built designs, certified by a professional registered engineer, for all sedimentation ponds, sediment traps, and sediment control structures. Separate design packages should be submitted for each pond, trap and structure. Each package must contain, at a minimum, the following four maps:

1) A drainage area map (scale 1"=2000') showing the contributing area for the pond and any drainages that are conveyed through or under the disturbed area;

2) Plan view of the disturbed area (scale 1"=200') showing topography, location of ponds, other sediment control structures, culverts, and ditches. Culverts and ditches should be labelled and referenced;

3) Cross-section of sedimentation pond (or other sediment control structure) (scale 1'=50') showing side slope, sediment storage level, runoff storage level, elevation of principal spillway, elevation of emergency spillway and elevation of top of the pond; and,

4) Plan view of sedimentation pond (scale 1"=50').

U.S. Fuel was in error in sizing the pond. Their submittal stated that the pond was 900 feet by 300 feet by 35 feet using 1 foot of freeboard. Performance standards for coal processing waste dams and embankments (UMC 817.93) require that these ponds have at least 3 feet of freeboard. Therefore, the active storage volume is 6.2 acre-feet.

The seepage rate of the slurry pond is sufficient to allow for the daily wastewater from the preparation plant without any cumulative storage (letter of February 29, 1984). Therefore, the only concern is whether the volume of voids in the waste rock can be used as storage for surface runoff.

When in use, the slurry ponds have standing water in them, which indicates that the voids in the waste rock are filled with water.

Therefore, the only available storage is the 6.2 acre-feet of active storage. This storage volume is sufficient for runoff from the disturbed area and wastewater from the processing plant, but not enough to contain the design event from the undisturbed areas. Therefore, Condition No. 4 is necessary for future long-term use of Slurry Pond 5A. U.S. Fuel is not currently using Slurry Pond 5A.

The third special case deals with reclamation of portal area ponds. Sedimentation ponds for King Mine Nos. 4, 5, and 6 will be removed when the portal areas are reclaimed. Removal of the ponds will be in the summer when stream flow is low and chances of increasing the suspended sediment load are minimal. Prior to removal of the ponds, a series of three sediment traps measuring approximately 15 feet square and five feet deep, will be constructed below the existing sedimentation pond. The traps will be left in place after mining to minimize disturbance.

The applicant proposes to leave the existing sedimentation ponds for the preparation plant, slurry ponds, and coal refuse embankments in place until the revegetation requirements are met and drainage entering the pond meets effluent limitations.

Condition No.4

Within sixty (60) days of the effective date of this permit, the permittee must submit to the regulatory authority a revised plan demonstrating adequate runoff storage for Slurry Pond 5A. Slurry Pond 5A is not to be used to contain runoff from the undisturbed areas flowing through culverts Nos. 2 and 12 until a revised plan is submitted and approved by the regulatory authority.

Exhibit III-3 shows an equipment storage yard about 500 feet east of Slurry Pond 5 North. Information was submitted on May 17, 1984, (p. 85) that adequately describes acceptable sediment control for the equipment storage yard for both during and after mining. Sediment control will be achieved by berms and a silt fence.

The applicant has constructed a small (about 1 acre) ventilation pad on the right fork of the North Fork of Miller Creek. (See Figure 9.) Because of the small area of disturbance, a small area exemption was allowed (UMC 817.42 (a)(3)), and the applicant is using straw bales to control sediment from the area. This is in compliance with UMC 817.42 and 817.45.

Slurry Pond 5 will receive the runoff from the proposed unit train loadout. All drainage and sediment control facilities for the proposed unit train loadout are existing and are in compliance if Conditions No. 3 and 4 are met.

A small ventilation breakout currently exists in the South Fork of Miller Creek. The breakout was excavated from within the mine and surface disturbance associated with the breakout is only about 300 square feet (DOA response, May 17, 1984, p. 55). Access to the site by vehicular traffic is impossible without causing significant damage to the surface. Because of the remoteness and small size of the disturbed area, no sediment control measures are required. The applicant has proposed to build a berm to aid in sedimentation control during reclamation of the portal area (9/84 submittal).

Two of the existing sedimentation ponds, the upper coal storage yard pond and the sedimentation pond associated with Slurry Pond No. 1, are within 100 feet of Miller Creek. Miller Creek is a perennial stream. In order to project the worst case, it is assumed that Miller Creek contains a biological community, but data from the surface-water monitoring reports do not indicate that any adverse effects on water quantity or quality are associated with these two ponds. In addition to the existing ponds, two other sedimentation ponds will be within the Miller Creek buffer zone. These ponds are associated with the postmining topsoil borrow areas A, B, and C. Because the topsoil will be removed from these areas before the sediment ponds will be built, initial sediment control will be achieved through use of straw bales. This will be adequate since U.S. Fuel has committed to building the sediment ponds during the first construction season following disturbance (DOA response, July 17, 1984, p. 43) and to maintain a 50-foot buffer zone (DOA Response, July 17, 1984, pp. 46 and 47). The 50-foot buffer zone will insure that all disturbance is outside of the 100-year flood plain (response to Nov-N84-4-8-8, No. 1, July, 1984). Therefore, the applicant is in compliance with UMC 817.57.

The North Fork diversion has been proposed and approved by UDOGM on October 21, 1984, as a permanent structure. The applicant has provided the required information necessary to approve the retention of this structure as a postmining land use feature in accordance with UMC 817.133 and 817.49.

In summary, with Conditions No. 3 and 4, the applicant will be in compliance with UMC 817.42, 817.45, 817.46, 817.47, 817.49, and 817.57.

UMC 784.22 DIVERSIONS

Each of the portal pads, the upper coal storage yard, the preparation plant area, and the slurry pond areas have small, overland flow, temporary diversions associated with them. Information on these diverions is presented in the original submittal, Chapter VII, and in "Surface Hydrology and Culvert Adequacy of the Hiawatha and Mohrland, Utah, Areas" (Vaughn Hansen Associates, 1978). Information on the design of these diversions is presented in Chapter XII, Exhibit III-1A, and Exhibit III-4A, respectively. Additional information on the permanent stream diversion adjacent to Slurry Pond No. 1 is presented in a letter from U.S. Fuel to UDOGM dated February 20, 1979. Information on the reclamation of the Middle Fork and South Fork diversions is presented on Exhibit III-11, III-12A, and III-12A1.

Miller Creek and its tributaries are diverted from a point adjacent to Slurry Pond No. 1, from under the portal pad for the King No. 4 and 5 Mines (Middle Fork), and from under the sedimentation pond for the King No. 6 Mine (South Fork). Only the diversion adjacent to Slurry Pond No. 1 is a permanent diversion. The other stream diversions will be reclaimed when the portal pad area(s) are reclaimed.

Some of the surface-water flows of the left fork of the North Fork of Miller Creek have been diverted into the underground mine workings. This subject is discussed in Chapter XII, UMC 817.55.

The PAP is complete and technically adequate in regard to UMC 784.22. Compliance has been evaluated as it applies to UMC 817.43 (Hydrologic Balance: Diversions and conveyance of Overland Flow, Shallow Ground Water Flow, and Ephemeral Streams), 817.44 (Hydrologic Balance: Stream Channel Diversions), 817.47 (Hydrologic Balance: Discharge Structures), and 817.56 (Hydrologic Balance: Postmining Rehabilitation of Sedimentation Ponds, Diversions, Impoundments, and Treatment Facilities). All temporary overland flow diversions were checked by OSM to ensure adequate flow capacity, freeboard, and erosion control.

Since the approval of the ditches (letter from UDOGM dated May 30, 1980), the Hiawatha Mines Complex has received three inspection violations for breached diversion ditches (NOV Nos. 82-2-10-1, 83-4-2, and 83-4-9-2). All of these violations were terminated and no proceedings were initiated.

Miller Creek was diverted into a new channel adjacent to Slurry Pond No. 1 in 1979. The original slurry pond embankment was too steep, and to make room for the flatter embankment slopes the creek was moved approximately 50 to 150 feet to the north. The permanent diversion length is approximately 600 feet, about 10 feet short of the natural channel length. The diversion channel was designed to safely carry the runoff resulting from the 100-year, 24-hour storm (letter from U.S. Fuel dated March 19, 1979), and UDOGM stipulated that the channel be riprapped for the entire length of the diversion to protect against erosion (letter from UDOGM dated March 29, 1979). U.S. Fuel has received a notice of violation on May 11, 1984, (N84-4-8-8, No. 1) for not riprapping the entire length of the diversion. The applicant has submitted plans which have been approved, and will commence work in spring, 1985.

Temporary diversions have been constructed for the Middle and South Forks of Miller Creek. The Middle Fork diversion conveys the undisturbed drainage under the portal yard and sedimentation pond for the King No. 4 and 5 Mines and the South Fork diversion conveys the undisturbed drainage under the upper sedimentation pond at the King No. 6 Mine. Both culverts are adequately sized for the runoff from the 50-year, 6-hour precipitation event. Reclamation of these channels will occur at the time of reclamation of the portals. Both reclaimed channels are adequately sized to safely convey the runoff resulting from the 100-year, 24-hour precipitation event. The applicant's calculations were checked by OSM using the SEDIMOT model. Both reclaimed channels were checked for erosion control, longitudinal stream profiles, and channel cross-sections.

Six temporary diversions will be constructed to channel drainage associated with the postmining topsoil borrow areas. All diversions are adequately sized for the runoff resulting from 1-year, 24-hour precipitation event. The applicant's calculations were checked by OSM and the designs are in compliance with UMC 817.43.

In summary, all diversion ditches, temporary or permanent, are currently in compliance with UMC 784.22, 817.43, 817.44, 817.47, and 817.56. The applicant is not in compliance with UMC 817.44 with regard to the permanent diversion on Miller Creek until the abatement of NOV 84-4-8-8, No. 1 is completed.

IX - HYDROLOGIC BALANCE - GROUND WATER - UMC 783.13 AND 783.15

The ground water resources in the permit and adjacent area of the Hiawatha Mines Complex are described in the following parts of the PAP:

1. Original submittal, Volume II Chapter VII;
2. DOA response, Volume I, Part 783-15 and 784.14; and
3. DOA response, 16 March 1984.

The description of ground-water resources in the sources mentioned above has been reviewed and has been found to be complete and technically adequate. The information from these sources has been used to define the ground-water flow system as part of the CHIA.

The most significant ground-water resources that may be affected by the Hiawatha Mines Complex include:

1. springs in hydraulic connection with the Bear Canyon Fault where the fault has been intercepted by the mine; and
2. springs overlying the Hiawatha Mines Complex in areas where mine subsidence may reach the surface.

A spring inventory has been provided in the PAP (DOA response, November 7, 1983, part 783.15) in both tabular and map form. In addition, spring monitoring has occurred at 10 spring locations twice annually (spring and fall) beginning in 1979. Other ground-water well information includes a discussion of water inflow to the Hiawatha Mines Complex, which has been minimal except for the flows as great as 100 to 200 gpm that were encountered at the Bear Canyon Fault. The PAP is in compliance with UMC 783.13 and 783.15.

X - ALLUVIAL VALLEY FLOORS - UMC 785.19 AND 822

The applicant has delineated the extent of areas meeting the alluvial valley floor (AVF) geomorphic criteria in the permit and adjacent area of the Hiawatha Mines Complex (Exhibit VI-7). The valleys of Cedar Creek and Miller Creek are the only valleys meeting the geomorphic criteria. There is no history of flood irrigation activities in the Cedar Creek or Miller Creek valleys in the vicinity of the Hiawatha Mines Complex, although irrigation is practiced approximately two miles downstream from the Hiawatha Mines. The PAP discusses the difference between the valley floor characteristics of the lower irrigated area and the upper valley. The upper valley is narrow, has steep slopes (10 to 15 percent), cobbly soils, and is of limited areal extent (50 to 100 feet wide and up to 10 acres in size) (DOA letter response, Volume I, page 93). There is no precedent for developing irrigation agricultural activities in areas similar to the upper valleys of Cedar and Miller Creeks for a 30 mile radius around the Hiawatha Mines Complex; therefore, it is concluded that the valleys of Cedar Creek and Miller Creek are AVFs in their lower reaches (i.e., approximately 2 miles downstream from the Hiawatha Mines Complex). However, in close proximity to the mines, the valley bottoms are not suitable for developing flood irrigation.

Regarding subirrigation agricultural activities, test pits installed on representative terrace areas in the valleys of Cedar Creek and Miller Creek (that meet the AVF geomorphic criteria), revealed that on-site vegetation is subirrigated. However, the vegetation present on these terraces is not agriculturally useful (permit application, Volume I, page 94 and Table IX-7). It is, therefore, concluded that subirrigated agricultural activities are not occurring on the valleys of Cedar and Miller Creeks.

Based on the preceding discussion, it is concluded that the valleys of Cedar Creek and Miller Creek in the vicinity of the Hiawatha Mines Complex are not AVFs. The PAP has provided adequate information to make the AVF determinations mandated by UMC 785.19 and the PAP is, therefore, in compliance with this action.

The PAP also provides a surface-water and ground-water monitoring program that will document the preservation of the essential hydrologic function of flood irrigation both during and after mining for the AVFs downstream from the Hiawatha Mines Complex. (See Chapter XII of this TA, Part UMC 817.52.)

XI - WATER RIGHTS AND REPLACEMENT - UMC 783.17, 817.53, AND 817.54

Chapter XII (Part UMC 787.14) discusses the applicant's assessment of probable hydrologic consequences of the proposed mining. The following commitment by the applicant is adequate to deal with all potentially affected water sources identified as part of the probable hydrologic consequences.

In Volume I of the DOA responses (pages 23 and 23A) the applicant has identified the following alternate means to replace existing water sources that may be interrupted:

1. Transfer water rights using U.S. Fuel's available water rights; (See Volume I, Appendix VII-5.)

2. Collect spring flow at a remote location and pipe water to the vicinity of the lost water sources;

3. Install a guzzler (and possibly truck the water to the site); and/or

4. Develop a surface-water retention pond.

The applicant's commitment to replace affected sources of water using the procedures described above is considered adequate to find compliance with UMC 783.17 and 817.54.

The applicant does not propose to transfer any wells to any other surface owner. Therefore, UMC 817.53 is not applicable.

XII - PROBABLE HYDROLOGIC CONSEQUENCES OF MINING - UMC 784.14, 817.50, 817.55, AND 817.52

UMC 784.14 RECLAMATION PLAN: PROTECTION OF THE HYDROLOGIC BALANCE

Surface Water

Information to describe water rights and measures to minimize the disturbance to the hydrologic balance are presented in Chapter VII of the original submittal and the ACR and DOA responses. This information is determined to be complete regarding surface water.

Compliance was evaluated with respect to UMC 817.41 (Hydrologic Balance: General Requirements), 817.42 (Hydrologic Balance: Water Quality Standards and Effluent Limitations), 817.48 (Hydrologic Balance: Acid-Forming or Toxic-forming Materials), and 817.54 (Hydrologic Balance: Water Rights and Replacement).

Bath houses and associated sewage drain fields are used at both the King No. 4, 5, and 6 Mines. No problems, either related to water quality or to use, have been identified with either septic drain field. Location and size of the septic drain fields are shown on Exhibits III-1A and III-4A.

Surface-water rights are discussed in the November 1983 DOA response (pages 23 through 32). U.S. Fuel has sufficient water rights to satisfy their demands for mine water on both Miller Creek and Cedar Creek. There will be interbasin diversions of water both into and out of Miller Creek and Cedar Creek, but neither the probable hydrologic consequences (PHC) completed by the operator nor the CHIA by OSM have identified any adverse impacts to surface-water quantity. Therefore, the applicant is in compliance with UMC 817.54.

Water-quality analyses of standing water in the slurry ponds indicate that the slurry pond water quality is similar to the surface-water quality. In addition, the data indicated that neither the surface water nor the slurry pond water is acidic or in violation of pertinent water-quality standards for Miller Creek. Therefore, the Hiawatha Mines Complex is in compliance with UMC 817.48.

Sanitary sewage from the town of Hiawatha is discharged into culvert no. 2 and conveyed to slurry pond 5. Slurry pond 5 then acts as a large leach field. The situation was identified in a 1978 surface hydrology study (Vaughn Hansen Associates, 1978) and a recent inspection by UDOGM confirmed its presence (Inspection Memo from Dave Lof, UDOGM, dated July 5, 1984). The town of Hiawatha has a permit from the Utah State Health Department to dispose of the sewage in this fashion. OSM's analysis for the surface-water monitoring program has not documented any health threat as a result of this sewage discharge. Therefore, the sewage discharge is in compliance with UMC 817.41 and 817.42.

All of the sedimentation ponds have gated valves on the principal spillways. The NPDES self monitoring reports show that none of the sedimentation ponds have ever discharged. Ponds for the King No. 4, 5, and 6 Mines will be removed and replaced by sediment traps. Therefore, sediment contribution outside of the permit area will be minimized.

Mine water discharges from three points: Mohrland portal, Hiawatha overflow tank, and King No. 4 Mine. The NPDES self-monitoring reports show that, with an occasional exception of total dissolved solids and oil and grease, the mine discharge water is in compliance with the effluent limitations. EPA has determined that this situation does not constitute significant noncompliance (EPA internal memorandum, March 23, 1984).

In summary, runoff and sediment control facilities at the Hiawatha Mines Complex are designed to minimize impacts on the hydrologic balance both during and after mining. The applicant is in compliance with UMC 817.41, 817.42, 817.48, and 817.54.

Ground Water

The probable hydrologic consequences with respect to ground-water resources in the area adjacent to the Hiawatha Mines Complex is presented in the following parts of the PAP:

- Volume II, Chapter VII, part 7.1.7;
- ACR response, Chapter VII;
- DOA response, November 7, 1983, Volume 1, part UMC 784.14; and
- DOA response, March 15, 1984, Attachment No. 2.

Mining at the Hiawatha Mines Complex has had unknown previous impacts to the ground-water resources in the area. In 1972, the most significant ground water inflow to the Hiawatha Mines occurred when mining tapped into ground water moving along the Bear Canyon Fault. At the present time flow from the fault continuously yields 100 gpm. This water is discharged at the Mohrland portal and is conveyed in part to the town of Hiawatha for their domestic water supply. The remaining water is discharged to Cedar Creek. It is apparent that the Bear Canyon Fault is acting as a conduit for ground water flow in the vicinity of the Hiawatha Mines Complex. Numerous springs issue from the Bear Canyon Fault where the stratigraphically lower Star Point Sandstone has been fractured. It is unknown what the hydraulic connection is between the ground water that currently discharges from the faulted Blackhawk Formation and the lower, fractured Star Point Sandstone. No effects of mining have been observed at down gradient springs when they were studied several years after the interception of Bear Canyon Fault water in the Hiawatha Mines. This is interpreted to mean that the discharge of ground water from the Bear Canyon Fault is at a steady state discharge with respect to the surrounding ground water systems. Therefore, because the Hiawatha Mines Complex will not be mining near the Bear Canyon Fault over the remaining life-of-mine, there will be no additional impacts to surrounding hydrologic resources associated with the fault.

By comparison, only 25 gpm of ground water inflow occurs in the remainder of the extensive Hiawatha King No. 6 Mine for four isolated points in the mine. The range of ground water inflow varies from 3 gpm to 7 gpm. This is considered to be a relatively dry mine (with the exception of the Bear Canyon Fault) that has encountered isolated, more permeable zones in the Blackhawk Formation. With the discontinuous nature of the more permeable zones in the Blackhawk Formation, it is doubtful if the ground water inflow in the mine is in strong hydraulic connection with other hydrologic resources in the area.

The subsidence effects of the Hiawatha Mines Complex are predicted to be the primary mechanism that will cause additional impact to ground water resources in the permit and adjacent areas. The applicant has developed several assumptions in order to support the projection of springs that may experience declines in flow as a result of mine subsidence:

- Only those areas where pillars will be removed are expected to subside;
- Subsidence fractures may reach the surface within an angle of draw of 70 degrees of the mine;
- Surface subsidence effects will be limited to fully extracted areas beneath the Blackhawk Formation, Castlegate Sandstone, and Price River Formation;
- No diversion of spring flow is expected as a result of subsidence effects to the North Horn Formation; and
- Subsidence effects will be limited by the Bear Canyon Fault to the west of the Hiawatha Mines Complex.

Based on these assumptions, the applicant provided a map showing the extent of projected surface subsidence and springs with water rights. (See Exhibit VII-1c in the DOA response, updated January 9, 1984.) In addition, seeps and springs within the subsidence zone can be determined from Exhibit VII-1D in the DOA response, updated January 9, 1984. Therefore, subsidence effects are projected for the area in which coal will be fully extracted and the area within the 70 degree angle of draw that occurs stratigraphically below the contact of the North Horn-Price River Formation contact. Within this zone, three springs with water rights may be impacted (Water rights 91-103, 91-104, and 91-1633). Two of these springs (91-103 and 91-104) have water rights belonging to U.S. Fuel for domestic use which are not currently used. Water rights in the third spring belong to the U.S. Forest Service. It is not possible to determine the amount of flow of these springs because the water right for each of the potentially affected springs is accumulated with several other nearby springs.

Several other small springs also occur within the zone that may be affected by subsidence (see Exhibit VII-1D in the DOA response, updated January 9, 1984). These springs do no have water rights associated with them, although the water sources are used for stock and wildlife watering. The total number of springs within the subsidence zone is 11, which includes the 3 springs having water rights. The cumulative flow of the springs is approximately 24 gpm (DOA response, January 1984, p. 80).

Please refer to Part UMC 817.54 in Chapter XI of this TA for the discussion of alternate sources of water available to replace the USFS water right that may be affected. Alternate sources of water have been identified and the applicant has committed to replace all affected water supplies.

The PAP also discusses the potential impacts of mine subsidence in relation to overlying streams. Subsidence in the North Horn Formation is predicted to be very gradual, with no abrupt changes in slope. For this reason, erosional instability in the North Horn Formation is not expected to change noticeably. For the Price River and Castlegate Sandstone Formations, subsidence effects are predicted to be abrupt with changes in elevation of approximately 3 feet. The slopes and stream channels representative of these potential subsidence areas are, however, quite rocky with abundant competent rock ledges. Therefore, conditions of erosional instability are not expected in relation to mine subsidence in the Price River or Castlegate Sandstone Formations.

Data obtained from mines in the region suggest that subsidence will affect streamflow quantity only in those areas where surface cracks develop. In areas experiencing trough subsidence, no streamflow impacts have been documented to date. As a result, those areas on the ridge of Gentry Mountain and within Gentry Hollow that are subjected to subsidence should not experience any changes in streamflow attributable to mining. Well-defined streamflow does not exist along Gentry Mountain. Stream channels that cross the upper, west-facing slopes of Gentry Hollow are ephemeral. Streamflow that is generated in these areas originates within and flows in the area of potential subsidence only across outcrops of the North Horn Formation (subject only to subtle trough subsidence and not cracking). Hence, no impacts are expected to occur to streamflow crossing the ridges of Gentry Mountain and the upper slopes of Gentry Hollow.

Potential impacts to streamflow resulting from subsidence should be limited to the Miller Creek watershed where streams cross formations that are stratigraphically lower than the North Horn Formation. The results of the spring inventory conducted in the permit and adjacent areas in October 1983 indicate that baseflow within the zone of potential subsidence in the Miller Creek watershed is about 7 gpm in the north branch of the North Fork of Miller Creek, 12 gpm in the south branch of the North Fork of Miller Creek, 16 gpm in the Middle Fork of Miller Creek, and 6 gpm in the South Fork of Miller Creek. This baseflow originates as springs issuing from the North Horn Formation and the Castlegate Sandstone. Only minor seepage issues from the Price River Formation within the potential subsidence zone of the Miller Creek watershed.

Losses of streamflow may result by interception of the stream channel by a subsidence crack (which may occur downstream from source springs issuing either from the North Horn Formation or the Castlegate Sandstone). Potential losses to baseflow from subsidence will occur only in the North Fork of Miller Creek. Available data indicate that natural seepage into the stream channels depletes the spring flow above the monitoring stations in the other forks of Miller Creek. The maximum potential impact to streamflow above the mines will be a depletion of 19 gpm in the North Fork of Miller Creek. It should be noted that the senior water rights for streamflow in both branches of the North Fork of Miller Creek are owned by U.S. Fuel.

The control of mine discharges is discussed under Part UMC 817.50 in this chapter. The PAP is in compliance with regard to UMC 784.14.

UMC 817.50 HYDROLOGIC BALANCE: UNDERGROUND MINE ENTRY AND ACCESS DISCHARGES, UMC 817.55 HYDROLOGIC BALANCE: DISCHARGE OF WATER INTO AN UNDERGROUND MINE, AND 786.21 CRITERIA FOR PERMIT APPROVAL OR DENIAL: EXISTING STRUCTURES

At the present time water from the North Fork of Miller Creek is diverted into the Hiawatha No. 2 Mine (DOA response updated January 9, 1984, Exhibit III-17). This water is conveyed via underground workings into a reservoir in the Hiawatha No. 2 Mine, with a storage capacity of 120,000,000 gallons (368 acre-feet). Discharge from the mine is regulated by pressure valves in bulkheads located in the Middle Fork Miller Creek. In addition, water is piped across the Middle Fork drainage into the Hiawatha No. 1 Mine. This water is conveyed through underground workings to the South Fork portals. At this location, water is piped from the mine to the town of Hiawatha and to the coal processing plant. This water is considered a secondary source of culinary water for the town. The coal processing plant utilizes approximately 786,000 gpd while the town uses 30,000 gpd from the water system.

The primary source of culinary water for the town of Hiawatha is combined ground water discharge from the Bear Canyon Fault/North Fork Miller Creek water conveyed through the mine workings that is discharged from the Mohrland portal in Cedar Canyon. This water is piped from the mine outlet to the town. Excess water is discharged to Cedar Creek.

The volume of water stored in the underground reservoir in June, 1984, was 34,000,000 gallons (about 104 acre-feet). The U.S. Mine Safety and Health Administration (MSHA) was requested by OSM to review the safety aspects of the underground dam according to UMC 786.21 and UMC 817.55(g) which requires MSHA concurrence for the underground impoundment. MSHA responded with a list of deficiencies on January 26, and May 2, 1984. A meeting was held between all interested parties on June 8, 1984, during which it was agreed to reduce the water level in the mine below the fourth bulkhead and drill the bulkhead to determine the as-built specifications on the 3 remaining bulkheads. The applicant submitted a plan on June 15, 1984 to address MSHA and OSM's concerns the plan proposes to: 1) reduce the reservoir capacity to 15,000,000 gallons until the analysis of the bulkheads is completed; 2) remove the uppermost seal and perform the appropriate stability analysis of the structure; and 3) provide a plan to maintaining a maximum storage limit in the reservoir of 24,000,000 gallons. The removed bulkhead will not be replaced and the entry will be chained or fenced to prevent access. This will limit the storage volume of the reservoir to 24,000,000 gallons (about 73.6 acre-feet).

OSM and MSHA reviewed the June 15 plan and agreed that the plan was generally consistent with what was agreed upon at the June 8 meeting. The applicant has proposed using the underground water supply system (diversion, bulkheads, piping network) during operation at the Hiawatha Mine. OSM has determined, based upon core data submitted on January 23, 1985, that the long-term stability of the structures can be assured. UMC 817.49(3) requires adequate safety and access to the impounded water be provided for water users. The bulkheads and diversion are accessible; however, the majority of the undergound plumbing system (pipes, valves, connections) are not. UMC 817.50(b)(iii) requires consistent maintenance of the water facility.

OSM has reviewed the test results and the computations for the curved bulkheads in the Hiawatha coal mine for the underground water storage in the mined out coal mine. The core test results confirm the calculations that the installation is safe with a safety factor of over two. The testing reveals a safe installation, with construction in the early 1950s. This report presents the physical conditions that exist within the coal mine in relation to the underground water storage. The report presents detailed tests with computations that reflect the actual field conditions resulting in a safety factor of over two. The report indicated some deterioration of one of the bulkheads resulting apparently from the freezing and thawing cycles occurring in this particular area of the mine. Periodic monitoring of each closure structure is necessary to make certain that deterioration does not cause failure. This inspection should be on an annual basis with a certified report to the RA.

Condition No. 5

Within ninety (90) days of the effective date of this permit, the permittee must submit to the RA a plan for a physical inspection of each seal impounding the underground reservoir and a contingency plan if inspections identify a possibility of failure. Starting in 1985, each curved bulkhead must be inspected at least annually using the following as a minimum:

1) Photo monitor each curved bulkhead abutment using permanent picture points and camera mounts;

2) Establish a survey net to monitor horizontal and vertical movement at several selected points in and around each bulkhead. This net should be to second order survey accuracy; and,

3) Establish a bulkhead leakage monitoring system that measures the water flow through each bulkhead and any areas in between these bulkheads to measure leakage. This escaping water must be less than .25 gallons of water per bulkhead per 24 hour period. This item must be monitored monthly.

With acceptance of Condition No. 5, the applicant is in compliance with UMC 817.55(g).

UMC 817.52 HYDROLOGIC BALANCE: GROUND WATER MONITORING

The ground-water monitoring program associated with the Hiawatha Mines Complex can be found in the original submittal, (Volume II, Chapter VII, page VII-7 and VII-8); the DOA response updated January 9, 1984, (Volume I, pages 131 and 132 and Attachment No. 4).

The applicant has committed to conduct an in-mine ground water monitoring program (DOA response, July 20, 1984, pg. 131F); however, revisions are necessary in order to conform to the recently developed OSM/UDOGM guidelines. Condition No. 7 defines the requirements of the in-mine ground water monitoring program.

No wells are available to monitor changes in ground water resources. Springs are monitored instead to indicate if mining impacts are occurring. At the present time 10 springs (Springs SP-1 to SP-10; See Map M02 in the DOA response updated January 9, 1984.) are monitored twice annually at low flow and high flow. Spring water quality samples are proposed to be analyzed for a list of parameters including temperature, specific conductance, total dissolved solids, and the major cations and anions. The applicant also proposes to delete monitoring springs SP-3, SP-7, and SP-10. Springs SP-11, SP-12, and SP-13 (i.e. springs 15-8-19-2, 15-8-30-4, and 15-8-31-4, respectively, on Exhibit VII-1D in the DOA response updated January 9, 1984) are proposed as replacement monitoring springs because the applicant feels they are more representative of springs that may be affected by mining.

The OSM Cumulative Hydrologic Impact Assessment (CHIA) concludes that previous mining adjacent to the water bearing Bear Canyon Fault has already had a maximum impact on water resources associated with the fault zone. These impacts occurred years ago and remain quantified, and there is no point in monitoring springs associated with the fault when maximum impacts have already occurred; therefore, springs SP-3, SP-7 and SP-10 can be deleted from the monitoring program as proposed by U.S. Fuel.

Subsidence is considered the mechanism most likely to affect flow to springs. The assumption has been made in the PAP (DOA response updated January 9, 1984, Volume I, page 74) that subsidence will only occur in areas within the angle of draw of workings that will be fully extracted. The maximum extent of potential subsidence is delinated on Exhibit VII-1C (DOA response updated January 9, 1984). Within this zone it is possible that some spring flow may be diminished or dry up as a result of mine subsidence. While the 10 springs proposed to be monitored by the applicant (i.e., SP-1, SP-2, SP-4, SP-5, SP-6, SP-8, SP-9, SP-11, SP-12, and SP-13) represent the variability of springs issuing from the potentially affected geologic sources, it is also likely that very localized ground water flow paths may be responsible for individual springs. In other words, local ground water flow systems that are not related to areally extensive flow systems may be disrupted by subsidence fractures.

Because the effects of mining cannot be documented totally by monitoring the 10 springs, and because it is not practical to monitor all springs (See Exhibit VII-1D, in the PAP.), it is reasonable to require that in addition to the 10 springs that U.S. Fuel has committed to monitor, the most important springs in the subsidence zone should also be monitored. To meet this requirement, U.S. Fuel must also monitor the sole spring with water rights (not belonging to U.S. Fuel) in the area and located within the subsidence zone as depicted on Exhibit VII-1C. The water right (91-1633) belongs to the USFS and is used for stock watering. U.S. Fuel was required to adopt this monitoring plan in January and March 1984, but has not included this spring to date.

OSM and UDOGM are developing an agreement concerning the ground water monitoring program that will be implemented at Utah coal mines. U.S Fuel must also change their spring monitoring program to agree with the new ground water monitoring guidelines. It should be noted that this request was previously made by U.S. Fuel in the February 13, 1984 letter.

With acceptance of Conditions No. 6 and 7 the application will be in compliance with UMC 817.52.

Condition No. 6

Within sixty (60) days of the effective date of this permit, the permittee must revise and submit to the regulatory authority for approval a revised spring monitoring schedule. U.S. Fuel must include in its monitoring program the USFS spring (Water Right 91-1633).

Condition No. 7

Within sixty (60) days of the effective date of this permit, the permittee shall revise the in-mine ground water monitoring program in consultation with UDOGM. This monitoring program shall be submitted to the regulatory authority for final approval.

XIII CLIMATOLOGICAL INFORMATION AND AIR RESOURCES - UMC 783.18 AND 784.26

UMC 783.18 CLIMATOLOGICAL INFORMATION AND AIR RESOURCES

The applicant was not requested by the regulatory authority to provide information on the climate or air resources of the permit area. Therefore, the applicant is in compliance with UMC 783.18.

UMC 784.26 AIR POLLUTION CONTROL PLAN

The applicant has filed a notice of intent to construct a unit train loadout facility on May 10, 1984, with the Utah Bureau of Air Quality, which was approved July 23, 1984. The applicant was not required by UDOGM or Utah Department of Health to develop an air pollution control plan. The applicant is, therefore, in compliance with UMC 784.26.

XIV - TOPSOIL - UMC 783.21, 784.13(b)(3 and 4), AND 817.21 THROUGH .25

UMC 784.13(b)(4) and UMC 817.21 - TOPSOIL: GENERAL REQUIREMENTS

The applicant has provided results of chemical and physical analyses for topsoil, subsoil, and substitute topsoil (topsoil/subsoil/overburden mixtures) for disturbed areas to be reclaimed. The document and page number where information on sampling methodologies and analytical results are listed by area of disturbance in the table below. Chemical and physical data for soils prior to disturbance exist only for the new portal breakout area in the Middle Fork of Miller Creek and borrow areas A, B, C, and D.

Disturbance Area	Sampling Methodologies	Analytical Results
North Fork area[1]	DOA response, Vol. I, pp. 125A-129	DOA response, Vol. I, Table VIII-1
Middle Fork area		
Portals	DOA response, Vol. I, pp. 47-48	DOA response, Vol. I, Table VIII-9
Breakout	DOA response, Vol. I, pp. 47, 140	DOA response, Vol. I, Table VIII-14
South Fork area		
Portal	DOA response, Vol. I, pp. 47-47A, 54-55	DOA response, Vol. I, Table VIII-9
Conveyor/Load-out sediment pond[2]	ACR response, Chap. VIII, Table VIII-1 and Bio/West report	ACR response, Chap. VII, Bio/West report
Preparation plant area		
Coal refuse area	DOA response, Vol. I, pp. 125A-129	DOA response, Vol. I, Tables VIII-1, VIII-2
Nonrefuse area	---	DOA response, Vol. I, Table VIII-21
Slurry ponds		
Topsoil[1] Subsoil/substrate	DOA response, Vol. I, pp. 125A-129	DOA response, Vol. I, Table VIII-1
Pond No.1		
Sampling 1	DOA response, Vol. I, p. 134	DOA response, Vol. I, Tables VIII-11&12
Sampling 2	15 March 1984 DOA response, Attachment 1	---
Pond No. 3	DOA response, Vol. I, p. 134	DOA response Vol. I, Tables VIII-11, VIII-12, VIII-13
Pond No. 4	DOA response, Vol. I, p. 134	DOA response Vol. I, Tables VIII-11&12
Pond No. 5	DOA response, Vol. I, p. 134	DOA response, Vol. I, Tables VIII-11&12

Borrow areas		
Area A	DOA response, Vol. I, pp. 125A-129	DOA response, Vol. I, Table VIII-1
Equipment storage yard addition	---	---
Area B	DOA response, Vol. I, pp. 101-102, 125c-129	DOA response, Vol. I, Table VIII-20
Area C	DOA response, Vol. I, pp. 101-102, 125c-129	DOA response, Vol. I, Table VIII-20
Area D	DOA response, Vol. I, pp. 125c-129	DOA response, Vol. I, Table VIII-1

1 Sources of substitute topsoil are materials from borrow areas A, B, C, and/or D.

2 Additional 806 cubic yards to be obtained from borrow area A.

There is an existing ventilation breakout on the South Fork of Miller Creek. The breakout measures 8' x 20' with a total disturbance of 300 square feet. The portal was constructed from within the mine, hence, there is no access from the outside. There is a two-tracked jeep road leading partially up the canyon that was constructed prior to SMCRA and is rarely used. The applicant proposes to seal the portal from within the mine. Prior to sealing, a berm will be built for erosion control and the small pad seeding by hand broadcasting. OSM and UDOGM concur that it would be more environmentally damaging to construct a road to the portal for reclamation, therefore the applicant's proposal is acceptable.

Site-specific soil quality information is not presented in the PAP for existing disturbed areas in the nonrefuse portion of the preparation plant area or the equipment storage yard adjacent to borrow area A confirming that soil material is suitable for reclamation purposes. Analyses should include soil pH, EC, SAR, and texture. The applicant should conduct additional sampling to demonstrate that the projected quantity and quality of soil is available. Therefore, the PAP is not in full compliance with UMC 784. 13(b)(4) and UMC 817.21 and 22. The applicant's acceptance of Condition Numbers 8 and 9 will be necessary to confirm compliance with these regulations.

Condition No. 8

Within ninety (90) days of the effective date of this permit, the permittee must provide results of sampling to a minimum of seven feet and laboratory analyses of soil from the equipment storage yard confirming that the projected quantity and quality of soil are accurate.

Condition No. 9

Within ninety (90) days of the effective date of this permit, the permittee must provide the results of sampling and laboratory analysis of the soils in the nonrefuse portion of the preparation plant area to insure that a minimum of 18 inches of suitable subsoil material is available for redistribution after backfilling and grading.

UMC 784.13(b)(4) and UMC 817.22 TOPSOIL: REMOVAL

The applicant has provided adequate information detailing the timing of topsoil salvage, the materials to be removed, and the area of topsoil salvage for the new breakout portals in the Middle Fork of Miller Creek. This information is presented in the ACR response, Chapter VIII, p. VIII-1 and DOA response, Volume I, page 140.

The applicant has also provided information detailing the sources and characteristics of substitute topsoil material. The document and page number where information on the composition, areal extent, and available volume of material are listed by disturbed area requiring substitute topsoil in the table below. Refer to UMC 784.13(b)(4) and UMC 817.21 Topsoil: General Requirements in this TA for location of chemical and physical analytical results.

Area	Composition	Areal Extent and Available Volume
North Fork area	DOA response, Vol. I, pp. 54 and 125C-129	DOA response, Vol. I, p. 40A and Vol. III, Exhibit VIII-4A
Middle Fork area Portal	DOA response, Vol. I, pp. 47-47A	DOA response, Vol. I, p. 47A and Vol. III, Exhibit IX-3B
South Fork area Portal	DOA response, Vol. I, pp. 54-55A	DOA response, Vol. I, pp. 55-55A and Volume III, Exhibit IX-4A
Conveyor/load-out sediment pond[2]	ACR response, Chap. VIII, Bio/West report	DOA response, Vol. I, p. 55A and Vol. III, Exhibit VIII-4
Preparation plant area coal refuse area	DOA response, Vol. I, pp. 40A and 125C-129	DOA response, Vol. I, p. 40A and Vol. III, Exhibit VIII-4A.1
Non-refuse area		
Railroad underpass	DOA reponse, Vol. I, pp. 131-132	No map but DOA response, Vol. I, pp. 131-132

Preparation plant	DOA response, Vol. I, pp. 55A-56 and 125A-129	DOA response, Vol. I, pp. 40A-42 and Vol. III, Exhibit VIII-4A
Slurry ponds		
Substitute topsoil	DOA response, Vol. I, pp. 55A-56, 125-129 133-136	DOA response, Vol. I, pp. 40A-42 and Vol. III Exhibit VIII-4A
Substitute subsoil	DOA response, Vol. I, pp. 133-136	DOA response, Vol. I, p. 136 and Vol. II Exhibit III-3
Borrow areas A, B, C, D	DOA response, Vol. I, pp. 101-102, 125C-129	DOA response, Vol. I, pp. 42-44 and Vol. III, Exhibit VIII-4A.1

In addition, the applicant has committed to conducting field trials to test the suitability of substitute topsoil materials to be used in reclamation. Description of study designs, schedule, and monitoring program are provided for the coal refuse areas, substitute topsoil borrow sites, mining pads and portals and areas of associated disturbance, and riparian areas to be disturbed. The applicant has proposed monitoring field trial studies for ten years (DOA response, Volume 1, pp. 104-125B).

Required information is not presented in the PAP for the nonrefuse portion of the preparation plant area. Therefore, the PAP is not in compliance with UMC 784.13 and UMC 817.22. The applicant's acceptance of Condition No. 9 will be necessary to confirm compliance with these regulations.

UMC 784.13(b)(4) and UMC 817.23 TOPSOIL: STORAGE

The applicant has provided adequate information detailing the need for topsoil storage, the selection of stockpile locations, and the protection of proposed and current topsoil stockpiles for all disturbed areas except the nonrefuse portion of the Hiawatha preparation plant area. The document and page number where pertinent information is presented are listed by stockpile location (area of disturbance) in the table below.

Disturbance Area	Stockpile Locations	Protective Measures
Middle Fork area		
Current stockpile	DOA response, Vol. III Exhibit VIII-4	DOA response, Vol. I, p. 131A
Proposed stockpile	DOA response, Vol. III, Exhibit VIII-4	DOA response, Vol. I, pp. 47 and 140
South Fork area		
Lambs trailer	DOA response, Vol. III, Exhibit VIII-4	ACR response, Chap. VIII, p. VIII-2 and Bio/West report
Equipment storage yard	DOA response, Vol. III, Exhibit III-3	DOA response, Vol. I, p. 56A
Preparation plant		
Non-refuse area	9/84 submittal	9/84 submittal
Borrow areas	DOA response, Vol. III, Exhibit VIII-4A.1	N/A
Access/haul road corridors	9/84 submittal	9/84 submittal
Pond No. 5	9/84 submittal	DOA response, Vol. I, pp. 131-132

The PAP does not demonstrate compliance with UMC 784.13(b)(4) and UMC 817.23 because of the lack of information specific to the nonrefuse portion of the preparation plant area, borrow areas, and slurry pond No. 5 topsoil stockpile. Applicant acceptance of Condition No. 10 will be necessary to achieve compliance with these regulations.

Condition No. 10

Within ninety (90) days of the effective date of this permit, the permittee must provide the location (exhibit), and proposed protective measures to be used for any and all substitute topsoil stockpiles in the nonrefuse portion of the preparation plant area.

UMC 784.13(b)(4) and UMC 817.24 TOPSOIL: REDISTIBUTION

The applicant has provided information on regraded surface preparation and topsoil redistribution requirements including achievements of stable, uniform thickness, prevention of excess compaction, and protection from erosion. The document and page number where this information appears is listed by area of disturbance in the table below.

Disturbance Area	Surface Preparation	Redistribution Requirements
North Fork area	DOA response, Vol. I, p. 54	DOA response, Vol. I, p. 54
Middle Fork area		
Portals	DOA reponse, Vol. I, p. 47A	DOA response, Vol. I, p. 47A
Breakout	DOA response, Vol. I, pp. 47A and 141	DOA response, Vol. I, pp. 47A and 141
South Fork area		
Portal	DOA response, Vol. I, p. 55	DOA response, Vol. I, p. 55
Conveyor/load-out/sediment pond	ACR response, Chap. VIII, Bio/West report	ACR response, Chap. VIII, Bio/West report
Preparation plant area		
Coal refuse area	DOA response, Vol. I, pp. 56-56A	DOA response, Vol. I, pp. 56-56A, 131A, p. 136
Nonrefuse area	DOA response, Vol. I, pp. 56-56A	DOA response, Vol. I, pp. 56-56A, 131- no depth 136
Slurry ponds	DOA response, Vol. I, p. 134	DOA response, Vol. I, pp. 136, 131A, 136
Borrow areas		
Area A (equipment storage pond)	DOA response, Vol. I, pp. 41-42	DOA response, Vol. I, pp. 41-42
Areas B and C	DOA response, Vol. I, p. 42A	DOA response, Vol. I, P. 42A
Area D	DOA response, Vol. I, p. 43	DOA response, Vol. I, pp. 42B-43
Access/haul roads	9/84 submittal	9/84 submittal

The PAP is in compliance with UMC 784.13(b)(4) and UMC 817.24

UMC 784.13(b)(4) and UMC 817.25 TOPSOIL: NUTRIENTS AND SOIL AMENDMENTS

The applicant has provided either rates of fertilizer application or a commitment to sample and test for rates of fertilizer application for all areas of disturbance except for the areas indicated below. The document and page number where information on fertilization requirements is listed are presented by area of disturbance in the table below.

Disturbance Area	Nutrients and Soil Amendments Information
North Fork area	DOA response, Volume I, page 43
Middle Fork area	DOA response, Volume I, pages 47-47A
South Fork area	
Portal	DOA response, Volume I, page 55
Conveyor/load-out/sediment pond	ACR response, Chapter VIII, Bio/West report
Preparation plant area	
Coal refuse area	
Borrow A and D materials	DOA response, Vol. I, p. 136, Table VIII-7
Borrow B and C materials	DOA response, Vol. I, p. 136
Nonrefuse area	—
Slurry ponds	
Borrow A and D materials	DOA response, Vol. I, p. 136, Table VIII-7
Borrow B and C materials	DOA response, Vol. I, p. 136

Borrow areas

Area A	DOA response, Vol. I, p. 42, Table VIII-3
Equipment storage yard	—
Area B	DOA response, Vol. I, p. 42, Table VIII-3a
Area C	DOA response, Vol. I, p. 42A, Table VIII-3A
Area D	DOA response, Vol. I, pp. 43-44, Table VIII-4

The PAP is in compliance with UMC 784.13(b)(4) and UMC 817.25.

XV - VEGETATION RESOURCES - UMC 783.19, 784.13(b)(5), and 817.111-817.117

Information regarding existing vegetation resources and the applicant's proposed revegetation plan are found in the following sections of the PAP.

Section	Date of Submission	Pages
Vegetation Resources:		
Vol. III, Chapter IX	March 1981	1-80
Vol. III, Exhibits	March 1981	IX-1 to IX-4
ACR response, Chapter IX Section 783.19	July 1983	
Vol. I, Chapter III	March 1981	III-31
Vol. III, Exhibits, Response to DOA	November 1983	IX-1 and IX-1A
	February 1984	IX-2A IX-3A and IX-3B IX-4A to IX-4C
Revegetation Plan:		
Vol. I, Chapter III	March 1981	III-35 to III-47
Vol. III, Exhibits, Response to DOA	November 1983	IX-5
Response to ACR, Section 783.13(5)	July 1983	III-31A to III-46
Response to ACR, Attachment 1	July 1983	
Response to ACR, Attachment 2	July 1983	

No threatened or endangered plant species occur in the proposed permit area and no Federally-designated critical habitats are present (ACR response, Chapter IX, Section UMC 783.19). The U.S. Fish and Wildlife Service (USFWS) did not list any plant species in its biological assessment of August 13, 1984, for the Hiawatha Mines Complex.

Ten vegetation types have been mapped within the permit area as described in Chapter II of this TA. The species composition of these vegetation types are presented in Chapter IX of the ACR response. Exhibits, submitted as Volume III, DOA responses dated November 7, 1983, February 13, 1984, and March 16, 1984, provide a suitable vegetation map of the permit area and the locations of all sampling and reference areas. The appropriate exhibits are IX-1; IX-1A, IX-2A, and IX-3A; IX-3B; and IX-4A to IX-4C. Table X-2, page 89A, presents the disturbed acreage by community type.

The mining complex has disturbed a total of 435 acres of vegetation within the present permit area. Proposed reclamation activities within the permit area will disturb an additional 46 acres of vegetation for substitute topsoil borrow areas, for a total of 481 acres of disturbance. The types of plant communities and the quantities that have been and will be affected are presented in the table below.

Summary of Vegetation Losses at the Hiawatha Mines Complex by Vegetation Type

Vegetation Type	Total Acres Disturbed	Percent of Total Disturbance
Pinyon-juniper	391	81.3
Mountain brush	35	7.3
Sagebrush	25	5.2
Mixed conifer	15	3.1
Riparian wood	15	3.1
Total	481	100.0

Twelve reference areas of 1.03 acres each have been established (ACR response, Chapter IX, p. 3). Nine of these reference areas were established in the present permit area and three were located outside the mine permit area along Cedar Creek (DOA response, February 13, 1984, Exhibit IX-1). At least one reference area has been established for each vegetation type that has been or will be disturbed. Sampling adequacy was achieved for cover, productivity, and woody plant density (ACR response, Chapter IX, Appendix B) at the required confidence and precision levels. However, concerns have been raised as to the sampling adequacy of the reference areas relating to the Division of Oil, Gas and Mining's minimum for similarity indices. The company must during the next growing season, in 1985, resample all reference areas and redefine the similarity of each reference area to the vegetation type it represents. The company must satisfy Condition No. 11 to be in compliance.

Condition No. 11

The permittee shall by October 1, 1985, submit the necessary data collected during 1985, that reevaluates the similarity indices for all vegetation reference areas. Discussions evaluating the new data and how it relates to the vegetation type must also be provided.

The revegetation plan contains technically adequate plans for mulching (proposed rate of one ton per acre, DOA response, p. 119), fertilizer applications (DOA response, Section UMC 784.13(a)pp. 41-44), seed mixtures and rates for broadcast methods (DOA response, Tables IX-1 to IX-4), tree and shrub planting densities and spatial arrangements (DOA response, updated January 9, 1984, pp. 62), and criteria for demonstrating successful revegetation (DOA response, p. 63, updated January 9, 1984). A technically sound field trial design is presented for testing seed mixtures, soil depths, fertilizer types and application rates, and mulching rates (DOA response, updated January 9, 1984, pp. 103-125). The results of these field trials will be used to modify, if necessary, the approaches now described in the PAP.

During the PAP review process, concerns were raised about the suitability of the refuse pile substrates to support future plant growth. Some of the laboratory data indicated a marginal suitability of some chemical and physical properties (e.g., water holding capacity and fertility) of the substrates for sustaining plant growth equivalent to the reference areas. Such concerns were recognized by the applicant and formed the basis for designing the field trial experiments. It has been demonstrated that the substrate materials have the potential capability of supporting some plant growth.

The applicant has proposed a 6-inch cover of substitute soil materials over the coal refuse area. OSM and UDOGM found this to be unacceptable until successful reclamation is demonstrated by the field trials. The applicant revised its reclamation plans and field trial designs to test for 6, 12, and 16 inches of substitute soil cover over the coal refuse area (PAP, DOA response p. 40A, Volume I). There is an adequate volume of soil material in borrow area A, B, C, and D to cover the refuse area with 16 inches of substitute material. The bond has been calculated to reclaim the refuse area with 16 inches of substitute material (see TA Appendix B). The applicant intends to demonstrate that 6 inches is sufficient for successful reclamation. When this is demonstrated through the field trials, the bond may be reduced.

Whether the substrates will actually support the proposed revegetation mixtures at suitable production levels remains to be demonstrated by the field trials. Modifications in the proposed substitute topsoil depths, fertilizer rates and types, seed mixtures, and mulching rates may be required as a result of the field trial results. The applicant has recognized that these potential effects may result and has committed to incorporating the findings into a modified revegetation plan, as necessary, to achieve revegetation success equivalent to the reference areas.

XVI - FISH AND WILDLIFE RESOURCES - UMC 784.21 AND UMC 817.97

Information regarding fish and wildlife resources and the applicant's fish and wildlife protection plan are found in the following sections of the PAP.

Section	Date of Submission	Pages
Fish and Wildlife Resource Data		
Vol. III, Chapter X	March 1981	1-46
Vol. III, Chapter X Appendix A	March 1981	1-68
Response to ACR Comments Section 784.21	July 1983	6A-6C
Response to ACR Comments Chapter X, Appendix D	July 1983	1-17
Fish and Wildlife Plan		
Vol. I, Chapter III	March 1981	32
Vol. III, Chapter X Appendix B	March 1981	1-22
Vol. III, Response to DOA	November 1983	Exhibits X-1, X-2, and X-3A
Vol. I, Response to DOA Section 784.21	January 1984	85-90
Vol. I, Response to DOA Section 817.97	January 1984	132-133
Vol. III, Response to DOA	November 1983	Exhibit X-4

No threatened or endangered fish or wildlife species occur on the proposed permit area and no Federally-designated critical habitats are present (original submittal, Volume III, Chapter X). However, in a letter to OSM (January 16, 1984), the USFWS identified concern with all Utah mines utilizing and potentially depleting water from the Upper Colorado River system. The agency has identified the need to analyze the impacts of the depletions of water from the river as habitats for the Colorado squawfish and humpback chub. The USFWS feels there is a need for those who deplete the source to contribute to the conservation program designed to compensate for the loss of water from the system. The USFWS currently assesses a one-time fee of $15 per acre/foot to each water user depleting the source. The USFWS provided a biological assessment and Section 7 consultation opinion for the Hiawatha Mines Complex in a letter dated August 13, 1984.

OSM's CHIA concludes, based on the applicant's estimate of evaporative losses and other information collected from nearby mines, that U.S. Fuel depletes approximately 26 acre/feet per year of water. Based on this figure, the applicant would be obligated to contribute a one-time fee of $388 to USFWS study program.

The company must commit to Condition No. 12 in order to comply with regulations protecting threatened and endangered species.

Condition No. 12

As a condition of the U.S. Fish and Wildlife Service's Windy Gap analysis for impacts to threatened and endangered species, the permittee shall, within thirty (30) days of the effective date of this permit, implement the mitigation measures identified in the USFWS letter dated August 13, 1984, and submit proof of such compliance to the regulatory authority.

The bald eagle, American peregrine falcon, and arctic peregrine falcon occur sporadically in the local area but do not nest in the permit area. The permit area has been designated as having substantial value for the bald eagle and American peregrine falcon by the UDWR (original submittal Volume III, Chapter X) and of limited value for the arctic peregrine falcon. The golden eagle is commonly observed in the permit area. A nest site survey (ACR response, Appendix D) conducted within a 0.5 km radius of the disturbance areas revealed no golden eagle nesting activity.

The design and construction of power transmission and distribution lines have been reviewed by the USFWS and have been found acceptable to protect raptors (letter dated March 5, 1984, from UDOGM). The applicant has also committed to designing future power transmission and distribution lines in a manner that protects raptors (PAP, DOA response April 13, 1984, Vol. 1, page 89).

Fish and wildlife issues that developed during the numerous reviews of the PAP include the need for: (1) inventory of raptors and species of high Federal interest; (2) riparian habitat protection and restoration plan; (3) mitigation plan for wildlife habitat, especially big game; (4) survey of electric transmission lines to meet raptor protection standards; (5) survey of springs and seeps and their wildlife use; (6) adequate design of King No. 6 conveyor to allow big game passage; (7) the postmining reclamation of haul roads; and (8) consultation with the USFWS on the presence of threatened and endangered species in the mine permit area. The PAP has provided technically adequate information and/or plans for all of the issues above.

In response to concerns raised about the status of raptors, a raptor survey was conducted in 1983. The results were reported as Appendix D of Chapter X in the ACR response dated July 1983. It was reasonably concluded that mining did not represent a significant hazard to raptors.

The USFWS conducted a survey of electric transmission and distribution lines at the Hiawatha Mines Complex during August 1981 and recommended no structural modifications because existing lines did not represent a hazard to raptors (letter dated October 9, 1981).

Concern was expressed about the protection and restoration of disturbed riparian habitat and/or the riparian zones (OSM ACR dated November 8, 1982; UDOGM ACR dated November 8, 1982). The applicant subsequently committed to: (1) restoring disturbed riparian habitat (about 10.5 acres); (2) establishing one acre of new riparian vegetation in the Middle Fork of Miller Creek to mitigate for the net loss of riparian habitat that was disturbed within the town of Hiawatha and that cannot be reclaimed; (3) establishing a riparian habitat buffer zone 100 feet wide; and (4) contacting the appropriate regulatory agency prior to any future disturbance of riparian habitat. The proposed species mixture, buffer zone width, and approach for restoring riparian habitat are appropriate for creating a diverse, self-sustaining, and native community type.

A survey of springs and seeps was conducted, and use by wildlife species, principally deer, was noted (ACR response, UMC 783.15). Using the worst-case assumptions that subsidence would induce reduction in spring and seep flows, U.S. Fuel estimated that a maximum of 11 springs and seeps would be affected. The cumulative flow of these springs and seeps is approximately 24 gpm (DOA response, January 1984, p. 80). U.S. Fuel has committed to providing replacement water sources for wildlife for springs and seeps that are affected by subsidence (DOA response, p. 63). This commitment is considered adequate for compliance with UMC 817.97.

Blockage of mule deer movements by the proposed King No. 6 conveyor system became an important concern of UDOGM (letter dated July 15, 1981, and letter dated July 30, 1981). The applicant provided the required engineering plans and modifications of the conveyor system to accommodate deer passage. The modified conveyor system was approved by the UDWR as representing no barrier to deer movement (letter dated April 19, 1983). The conveyor system complies with UMC 784.21 and 817.97.

The vagueness of the proposed wildlife mitigation measures and the quantity of wildlife habitat that would be affected by mining operations were issues constantly raised by OSM, USFWS, UDWR and UDOGM during PAP reviews. Big game habitat restoration was an especially frequent concern. The mining permit area includes critical deer and elk winter range (8,305 acres), high-priority elk winter range (1,017 acres), and high-priority deer and elk summer range (3,335 acres). Some of these areas within the permit area overlap. Mining activities in the Miller Creek and Cedar Creek drainages have affected critical deer and elk winter range, while development of the town of Hiawatha, the processing plant, and waste disposal sites have affected high-priority deer and elk winter ranges. The total area of disturbance is 481 acres. Wildlife habitat mitigation will be accomplished by restoring the plant community that was present before mining began. Revegetation success will be determined by comparisons with reference areas.

Regarding the development and commitment to specific wildlife mitigation measures, the PAP contains 14 measures that are considered to constitute adequate wildlife mitigation. These include commitments to (1) revegetate disturbed areas to approximate pre-mining conditions; (2) establish riparian habitat buffer zones; (3) replace lost springs/seeps with an alternate water source in the form of a guzzler or retention pond; (4) conduct a wildlife education program; (5) enforce poaching regulations; (6) reduce highway speed limits; (7) design any future conveyor systems to allow deer passage; (8) restore big game habitats to original or better conditions; (9) notify UDWR of raptor nests and to conduct surveys in areas of future disturbance; (10) avoid disturbance to aspen, conifer, and mixed aspen-conifer stands; (11) supply water to BLM habitat improvement projects; (12) report discovery of snake and bear dens to UDWR; (13) clear all pesticide use with UDWR and UDOGM; and (14) reclaim all future temporary exploration roads and prevent public access. These commitments are considered appropriate and satisfactory wildlife mitigation that comply with the intent of UMC 784.21 and UMC 817.97.

XVII - PRIME FARMLAND - UMC 783.27, 784.17 and 823

The PAP (DOA response, Volume I, pp. 93-103) states that the permit area of the Hiawatha Mines Complex contains no lands suitable for flood irrigation because of steep slopes (10 to 15 percent), cobbly soils, and limited size of stream terrace deposits. In addition, the U.S. Soil Conservation Service has provided a letter (ACR response, January 17, 1983, Appendix VIII-1) documenting that there are no prime farmlands in the vicinity of the Hiawatha Mines Complex. The PAP is in compliance with UMC 783.27. UMC 785.17 and UMC 823 do not apply since no prime farmlands will be affected.

XVIII - EXPLOSIVES - UMC 784.23(b)(9) AND 817.61 THROUGH .68

The applicant has identified the location of the existing explosives storage structure on Exhibit III-14 and has stated that no surface use of explosives has been made for the past two years, nor is there any anticipated use of explosives. The applicant is in compliance with these regulations.

XIX - OPERATION DESCRIPTION - UMC 784.11 and 784.12

The applicant has provided in the original submittal, Volume I, Chapter III, a description of the mining procedures, techniques, equipment and facilities as well as annual planned production of coal. Also involved are detailed descriptions of the construction, use, and reclamation of slurry and sedimentation ponds; disposal of spoil, mine, and noncoal wastes; and disposal of waste water generated by the mining operations. The applicant has also provided a description of the proposed unit train loadout and its operation in supplemental material submitted on July 11, 1984 and September 7, 1984. The application is in compliance with the provisions of UMC 784.11 and 784.12.

XX - BACKFILLING AND GRADING - UMC 784.13(b)(93), 817.101, 817.72, 817.73 and 817.74

A plan for the backfilling, compaction, and grading of existing mine portals, work yards, sedimentation ponds, and roads has been presented in the original submittal, Volume I, Chapter III. Contour maps and cross sections showing the anticipated final surface configuration have been included for these areas. Plans have been included for the restoration of the existing haul and mine access roads in the North Fork of Miller Creek, Middle Fork of Miller Creek, and South Fork of Miller Creek.

XXI - COAL PROCESSING WASTE AND NON-COAL PROCESSING WASTE - UMC 784.13(b)(6), (b)(7), 784.16(c) AND (d), 784.19, 784.25, 817.71, 817.93, AND 817.103

The applicant has provided information which addresses the issues of handling and disposal of debris (noncoal), acid-forming and toxic-forming materials, and materials constituting a fire hazard, including contingency plans to preclude sustained combustion. A plan for noncoal waste storage and disposal is presented in the ACR response, Chapter III, and August 13, and November 3, 1981, letters from the applicant to UDOGM. The applicant has committed to the burial of acid-forming and toxic-forming materials beneath four feet of the best available nonacid-forming and nontoxic-forming materials (ACR response, Chapter III, page III-52). The applicant has also indicated that no acid-forming or toxic-forming materials occur in any of the disturbed areas, based on data provided in the DOA response, Volume I, pages 133-137. The disposal of combustible materials (coal refuse) is also discussed in the DOA response, Volume I, pages 133-137. Contingency plans for precluding sustained combustion of these materials are presented in the original submittal, Chapter XII, and May 24, 1976, letter from the applicant to MSHA.

The plan for noncoal waste disposal has been approved by UDOGM (ACR response, Chapter III, February 10, 1982 letter). The handling and disposal of potentially combustible materials (slurry pond embankment refuse materials) is in compliance with 817.103 (DOA response, August 17, 1984, Volume I, page 136). The plan for precluding sustained combustion of combustible materials has been approved by MSHA (June 30, 1976 letter). Therefore, the PAP is in compliance with UMC 817.13(b)(7), UMC 817.89, and 817.103.

UMC 784.16(d) and (e) RECLAMATION PLAN: PONDS, IMPOUNDMENTS, BANKS, DAMS, AND EMBANKMENTS

The applicant has provided information addressing coal processing waste banks, dams, and embankments in the original submittal, Volume IV, Chapter XII, and page 133 of the DOA response. MSHA has approved the plans for all currrently active impoundments (Numbers 1, 4, 5 North, and 5 South). Revisions to Slurry Pond No. 1 was approved by OSM in March 1979.

Compliance was determined in regard to UMC 817.81 through 817.85 (Coal Processing Waste Banks), UMC 817.86 and 817.87 (Coal Processing Waste: Burning), and UMC 817.91 through 817.93 (Coal Processing Waste). UDOGM approved the design of the slurry ponds without a subdrainage system because the ponds are already built and have been shown to have a static safety factor of greater than 1.5.

UMC 784.19 and 817.71 UNDERGROUND DEVELOPMENT WASTE

Information concerning the description and disposal of underground development waste is provided in the ACR response (page III-34A) and in plans submitted to UDOGM dated August 13, 1981 and November 1981. U.S. Fuel has a demonstrated history of producing minimal amounts of underground development waste. The waste that has been produced has been associated with portal entries or vent shafts and in each case the waste has been used in the construction of mine pads. U.S. Fuel's past history of not producing coal process waste and the reclamation plan for mine pads discussed under UMC 784.13 are considered to be an adequate demonstration of compliance with 784.19. The application is in compliance with UMC 817.71 through 817.74.

UMC 784.25 RETURN OF COAL PROCESSING WASTE TO ABANDONED UNDERGROUND WORKINGS

U.S. Fuel does not propose to backfill any coal processing waste to abandoned underground workings. Therefore, UMC 784.25 is not applicable.

XXII - MINE FACILITIES, COAL HANDLING STRUCTURES, AND SUPPORT FACILITIES - UMC 784.11, 784.12, 784.16(a)(2) AND (a)(3), 817.181

Chapter III of the original submittal, paragraphs 3.5.1 through 3.5.4, Tables III-2, III-3, III-6 through III-9, Plate III-1, Exhibits III-1A through 4B, and supplemental submittals dated May 11, 1984 and July 11, 1984 (unit train loadout) describe the existing and proposed mine facilities and surface support facilities. All facilities conform to the requirements of the regulations.

XXIII - ROADS - UMC 784.18, 784.24, and 817.150 THROUGH 817.180 UMC 817.50 THROUGH 817.155 and UMC 817.171 THROUGH 817.175

Descriptions of the existing roads in the North, Middle and South Forks of Miller Creek canyons are contained in the original submittal, Chapter III, and designs of the South Fork Road are contained in Chapter XIII, paragraph 13.2. Culvert spacing for the Middle Fork Road was submitted in 1978 (Vaughn Hansen, 1978) and approved in a letter from OSM dated May 30, 1980. U.S. Fuel recently received a notice of violation (N84-4-8-8, No. 8) for not having adequate drainage and erosion control on the Middle Fork road. The applicant submitted a report (dated August 17, 1984) in response to this notice of violation and showed that the culvert spacing and sizing was adequate and committed to check dams, flexible discharge pipes, and riprap for erosion control. The violation has been terminated (phone conversation with Mr. David Lof, August 29, 1984); however, the applicant is still submitting information requested by UDOGM.

During the review of the King No. 6 Mine, OSM and UDOGM stipulated (Nos. 7-81-7 and 7-81-8) compliance for the South Fork haul road. The applicant has submitted this information (documented in letter from UDOGM dated July 3, 1982), and the applicant has committed to a road maintenance plan (letter dated June 7, 1984, and the PAP, Chapter XIII, and Exhibits XIII, 1-3E (updated May, 1984), for both the Middle Fork and South Fork haul roads. Therefore, with approval of the final abatement plans for the Middle Fork road, the applicant will be in compliance with UMC 817.151, 817.152, 187.153, 817.154, and 817.155.

Currently, there are no Class II roads in the permit area. Therefore, UMC 817.160-166 are not applicable.

One Class III road is in the permit area. This road was constructed prior to SMCRA, but it is currently being used to service a ventilation portal and a diversion dam on the North Fork of Miller Creek. The road design (letter of August 7, 1979) was approved by OSM (letter dated March 21, 1980), and the maintenance plan (letter of June 7, 1984) has been reviewed by OSM and found to be in compliance. Therefore, the applicant is in compliance with UMC 817.170, 817.171, 817.172, 817.173, 817.174, and 817.175.

A stream crossing will be necessary when soil salvage activities are initiated in Area D. A stream crossing exists at the present time and is scheduled to be used during salvage activities. It is not known what the condition of the crossing will be or if it will be sufficient to handle the traffic in an environmentally safe manner. Therefore, the applicant must agree to contact the regulatory authority, prior to initiating salvage, to determine if crossing is adequate. The applicant must satisfy Condition No. 13 to be in compliance.

Condition No. 13

Prior to initiating soil salvage activities in Area D borrow area or developing the existing access road through the adjacent riparian zone, the permittee shall consult with the regulatory authority to determine whether any design changes are required due to changes in the condition of the stream crossing. At such time, at a minimum, the disturbance to established riparian vegetation, topsoil salvages, the need for temporary culverts, and spillage into the perennial stream shall be considered.

UMC 784.18 RELOCATION/USE OF PUBLIC ROADS

The applicant proposes to relocate a portion of State Highway 122 and County road 338 in order to build an overpass for the unit train system. The overpass will allow for uninterrupted traffic flow to and from the town of Hiawatha. The Utah Department of Transporation approved the relocation in a letter to the applicant dated May 17, 1984. As required by UMC 761.12(d), UDOGM published public notice of the proposed relocation in the Price, Utah, Sun Advocate. No requests for a public hearing were received. The applicant is in compliance with UMC 784.18 and UMC 761.12(d).

UMC 817.156, 817.166, and 817.176 - ROADS RESTORATION

The existing haul roads in the Middle Fork and South Fork canyons qualify as Class I roads. The North Fork access road and the borrow areas access/haul roads qualify as Class III roads. There are no Class II roads currently existing or proposed. Reclamation of all roads will be accomplished by using plans submitted as part of Chapter 3 of the PAP. All road material will be removed, the roads will then be backfilled and seeded.

The PAP is in compliance with 817.156, 817.166 and 817.176.

UMC 817.180 OTHER TRANSPORATION FACILITIES AND 817.181 SUPPORT FACILITIES AND UTILITY INSTALLATIONS

With regard to the transporation facilities associated with the unit train loadout, designs have been provided as required by these regulations. The applicant proposes to modify an existing coal refuse pile to build the conveyor structure, which requires approval from MSHA.

XXIV - BONDING - UMC 805 and 806

Bonding to cover the reclamation of the Hiawatha Mines Complex was determined to be $5,600,000 (see Appendix B of this TA). These costs are shown below:

Hiawatha facilities area	$ 2,451,000
South Fork area	293,000
Middle Fork area	306,000
North Fork area	11,000
Roads to the facilities	134,000
Borrow areas	147,000
Maintenance	84,400
Total	$ 3,426,000

Additional costs:

Supervision:

One person full time for a year - $31.33/hr X 2080 hr = $65,000
Contingency:

15% of the above total = $514,000
Escalation:

6.78% compounded annually for five year permit term (rate currently used by UDOGM) = $1,330,000

Bond amount = $5,600,000

These bonding estimates were developed by OSM using information provided in the PAP and independent estimates developed by OSM. Upon submittal of a bond to cover reclamation costs of $5,600,000.00 prior to permit issuance, the applicant will be in compliance with this section.

XXV - SEALING OF DRILLED HOLES AND UNDERGROUND OPENINGS - UMC 817.14 AND 784.13(b)(8)

The applicant has described and furnished details of the methods proposed for sealing mine portal openings and other openings as part of the reclamation plan (original submittal, Volume I, Chapter III). The applicant is in compliance with UMC 817.14 and 784.13 (b)(8).

XXVI - SUBSIDENCE - UMC 817.126 AND 784.20

The applicant has presented data on the monitoring and effects of subsidence and the control of any resulting subsidence in the original submittal (Volume I, Chapter III, p. 33, and 65-83). The probability of subsidence under a variety of mining conditions has been assessed and provisions for mitigating the effects of subsidence to the environment have been developed. For a discussion of subsidence effects to streams, refer to Chapter XII, Part 784.14 of this TA. No perennial streams will be affected by subsidence. The applicant has complied with the requirements of UMC 817.126 and 784.20.

XXVII - SPECIAL CATEGORIES OF MINING OTHER THAN ALLUVIAL VALLEY FLOORS AND PRIME FARMLAND - UMC 827 and UMC 828

All support facilities associated with the Hiawatha Mines Complex are located within the permit area. Therefore, UMC 827 is not applicable.

No in situ processing of coal is proposed at the Hiawatha Mines Complex. For this reason, UMC 828 is not applicable.

XXVIII - MISCELLANEOUS COMPLIANCE

UMC 817.49 SLIDES AND OTHER DAMAGE

The applicant has committed to notifying UDOGM and the U.S. Forest Service should a slide occur which may have a potential adverse effect on life or public property (DOA response, Volume I, pg. 133 July 20, 1984).

UMC 817.100 CONTEMPORANEOUS RECLAMATION

The applicant has conducted interim revegetaion on areas of disturbance including topsoil stockpiles, fill slopes, cut slopes, and sediment pond outslopes. The documents and page numbers where information is presented are the DOA response (Volume I, page 133; Volume II, Exhibits III-12B and III-4B; Volume III, Exhibits IX-4A and IX-4B) and the ACR response (Chapter III, page III-31D and 31E). The applicant is in compliance with this regulation.

UMC 817.106 REGRADING OR STABILIZING RILLS AND GULLIES

The applicant has committed to fill, grade, reseed, and stabilize all rills and gullies deeper than 9 inches (ACR response, Chapter III, p. III-53); therefore, the PAP is in compliance with UMC 817.106.

UMC 817.11 SIGNS AND MARKERS

Personal communication with David Lof (UDOGM inspector for the Hiawatha Mines Complex) on March 21, 1984, indicated that the applicant is in compliance with UMC 817.11.

UMC 784.13(b)(9) COMPLIANCE WITH CLEAN AIR AND CLEAN WATER ACTS

The applicant has a current NPDES permit (UT 0023094) from the Environmental Protection Agency (EPA). The applicant had no outstanding violations on that permit as of March 13, 1984, and, therefore, is regarded as being in compliance with the Clean Water Act by the EPA, UDOGM, and Utah Department of Health.

The Utah Department of Health has not required an air quality control plan for the Hiawatha Mines Complex but does maintain a systematic inspection program for the mines. The applicant is, therefore, considered to be in compliance with the Clean Air Act (personal communication Lynn Menlove, Utah Department of Health, March 20, 1984). The applicant filed a notice of intent to build a unit train loadout facility with the Utah Department of Health, Bureau of Air Quality. It was approved on July 23, 1984. The applicant remains in compliance with the Clean Air Act.

UMC 786.11 PUBLIC NOTICES OF FILING OF PERMIT APPLICATIONS

Information on the required newspaper advertisment and proof of publication are provided in the original submittal (Volume I, Chapter II, p. II-15) and the DOA response (Volume I, Chapter II, UMC 782.21). UDOGM published a public notice of the proposed unit train loadout and road relocation for the railroad overpass in accordance with UMC 784.16 and UMC 761.12(d) (see page 25 of this TA). The applicant is in compliance with UMC 786.11.

APPENDIX A

EXECUTIVE SUMMARY

Under the Surface Mining Control and Reclamation Act of 1977 (PL 94-87), the regulatory authority is required to perform a cumulative hydrologic impact assessment (CHIA) before approving any application to mine. This report assesses the cumulative hydrologic impact of the Hiawatha Mine Complex and all other anticipated mining in the area.

The Hiawatha Mines Complex is located about 14 miles southwest of Price, Utah. The hydrologic system associated with the Hiawatha Mines Complex may interact with the Star Point Mines Complex, both in terms of surface and ground water resources. Therefore, both mines are considered to be within the cumulative impact area for the Hiawatha Mines Complex. Surface disturbances associated with the current mining at the Hiawatha Mines and the Star Point Mines Complexes occur in the Miller Creek watershed. Future mining at the Hiawatha Mines Complex will disturb additional lands in the Cedar Creek watershed.

Because affected watersheds and ground water systems differ in areal extent, the surface and ground water cumulative impact areas (CIAs) have different but overlapping boundaries. The surface water CIA includes Miller Creek to the confluence of Serviceberry Creek and Cedar Creek to the Mohrland loadout. The ground water CIA includes the area over the underground mine workings for the Hiawatha Mines Complex and the Star Point Mines Complex.

Previous studies have documented that the major hydrologic impacts associated with underground coal mining in the area are related to changes in ground water quantity and surface water quality. The levels of impacts on ground water quality are low. Impacts to ground water quantity are usually associated with consumptive use of ground water for dust control and losses resulting from evaporation caused by mine ventilation. Consumptive uses of ground water are regulated by the Utah State Engineer, since they are associated with water rights.

Changes in surface water quality are usually associated with increases in dissolved salts and suspended sediment. Increases in dissolved salt content in the surface water system occur through three mechanisms:

1. Ground water that recharges the surface streams has a naturally higher TDS content than the receiving waters. The major source of TDS increases are associated with ground water discharges from Mancos Shale.

2. Ground water that discharges from underground coal mines frequently has a higher TDS content than the receiving waters. Increases in TDS load will vary, depending on the length of time water contacts the coal seams and dust control measures implemented at the mine.

3. Leaching of salts from freshly disturbed surface mining operations and coal stockpiles results in increases in TDS content to the local ground water which usually recharges the surface water system.

This study defines the magnitude and duration of changes in ground water quantity and surface water quality. Data were obtained from the mining and reclamation plans of those mines in the CIA and from research studies in the area. There was sufficient information from the mine discharge data and description of mine geology to define the probable impacts on ground water quantity with a moderate level of confidence.

Impacts on surface water quality were studied for both Miller Creek and Cedar Creek. There were sufficient data to analyze the impacts on Cedar Creek and Miller Creek above the town of Hiawatha with a moderate level of confidence. However, there was not the same level of information on Serviceberry Creek and Miller Creek below the town of Hiawatha. For these reaches, the lack of data and the heavy influences of the Mancos Shale made prediction of impacts very difficult, and the level of confidence in the results is low to moderate.

The level of confidence in the results can be raised by providing more long-term hydrologic data. The water monitoring programs for the mines in the cumulative impact area may provide these data over time.

Results of the analyses indicate that underground coal mining will not cause a significant transbasin diversion of water from the historic discharge point of the Huntington Creek basin to the Miller Creek basin. This is based on the assumption that the Mohrland Portal will continue to be used as the discharge point for the Hiawatha Mines Complex.

Current mining in the CIA consumptively uses approximately 160 acre-feet per year (100 gallons per minute (gpm)). Total projected consumptive use will be between this level and about 230 acre-feet per year (145 gpm), depending on the ventilation requirements and production levels achieved in the future. All of the water consumptively used is owned by the coal operators through a combination of surface and underground water rights.

Historic mining through the Bear Canyon Fault has produced a significant amount of long-term discharge (100 to 200 gpm) to the mine. Maximum ground water discharge from the cumulative impact area is projected at about 1,900 acre-feet per year (1,170 gpm). All of the discharge will be from the Hiawatha Mines Complex.

Historic mining may have diverted some ground water from the Bear Canyon Fault into the underground mine workings at the Hiawatha Mines Complex. Ground water inflow to the Hiawatha Mines Complex was more than 500 gpm in 1972 and this diversion of ground water may have altered the flow patterns of several springs associated with the Bear Canyon Fault. However, it is difficult to define the level of impacts because there are no historic flow data for these springs. The rate of ground water flow into the Hiawatha Mines Complex has been steady for the past several years, with 10 gpm contributed from the Bear Canyon Fault. With the exception of the Star Point Mines, all future mining will leave a barrier of unmined coal along the fault. In the vicinity of the Star Point Mines the fault has been dry. Therefore, no additional impacts are associated with diverting ground water flows from the Bear Canyon Fault.

The only ground water discharges from mines in the CIA occur from the Hiawatha Mines Complex. Mixing of the ground water with surface water increases the concentration of total dissolved solids (TDS) in the receiving streams.

TDS concentrations in surface water below the coal mining activities are higher than above the coal mining activities. TDS increases are associated with increases in sulfate, chloride, magnesium and sodium concentrations. Current TDS levels do not exceed any set or recommended water quality criteria for the current water uses. Future mining will cause an additional increase in TDS concentration, but this level will also be below the set and recommended water quality criteria. TDS loads (i.e., concentration multiplied by flow rate) are approximately 900 tons per year from nonpoint sources associated with existing mining operations on Miller Creek. Because no new surface disturbances are proposed, the TDS load should not increase in the future. There is no active surface mining operation on Cedar Creek, but an increase of 180 tons per year from nonpoint sources is projected in relation to future mining operations on Cedar Creek.

Water chemistry of surface waters in the CIA naturally change from a calcium carbonate type to a magnesium sulfate type as streams traverse the Blackhawk Formation and the Mancos Shales. Mancos Shales have significant impact on the water quality of streams traversing them. TDS concentrations of streams on the Mancos Shales are as much as 100 times the TDS levels of streams on top of the Wasatch Plateau. Most of these increases are natural and are probably caused by ground water flowing through the formation, leaching available salts from the marine shales, and discharging into the surface waters. Impacts resulting from the surface facilities associated with mining in the CIA are overshadowed by the degradation of water quality from streams traversing the Mancos Shales.

Sulfate levels are presently below established water quality standards, and if projected estimates of sulfate increases are accurate, surface disturbances associated with the King 7 and 8 Mines will cause about a two-fold increase in sulfate concentrations. Projected sulfate concentrations will remain below water quality standards.

Total suspended sediment (TSS) concentrations are also higher downstream from surface facilities associated with mining. Most of the increased suspended sediment naturally settles out before Miller or Cedar Creek leaves the permit area because of relatively flat stream gradients.

The OSM Surface Water Model was used to route the known water quantity and quality of Miller Creek (at the town of Hiawatha) and of Serviceberry Creek (near the town of Wattis) to the confluence of the two creeks. According to the results of the model, the TDS concentration below the confluence of Serviceberry Creek and Miller Creek will exceed the water quality standard for irrigation use during the middle and late summer months. Most of the TDS concentration is caused by Serviceberry Creek traversing the Mancos Shale, however.

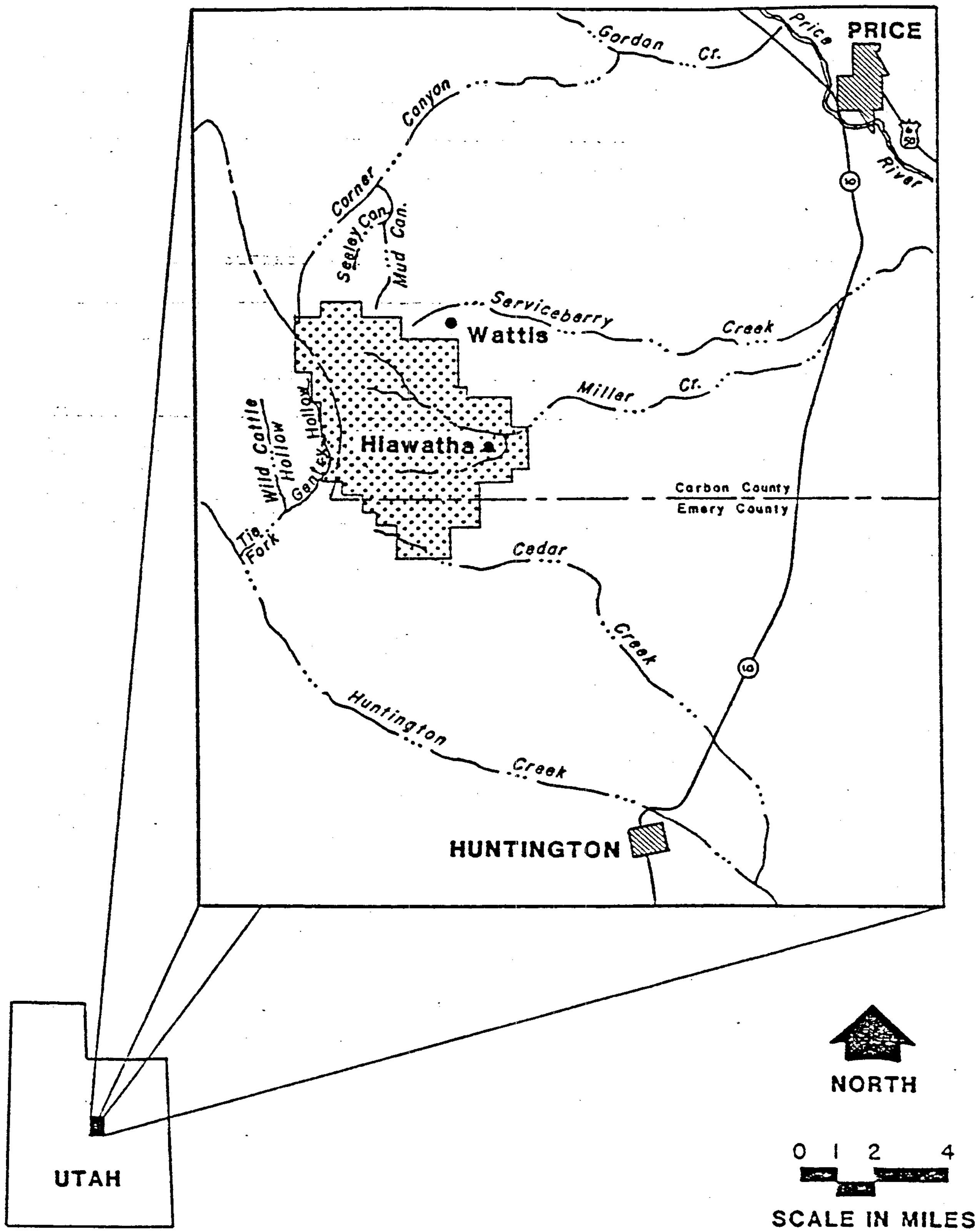

FIGURE 1

LOCATION OF STUDY AREA

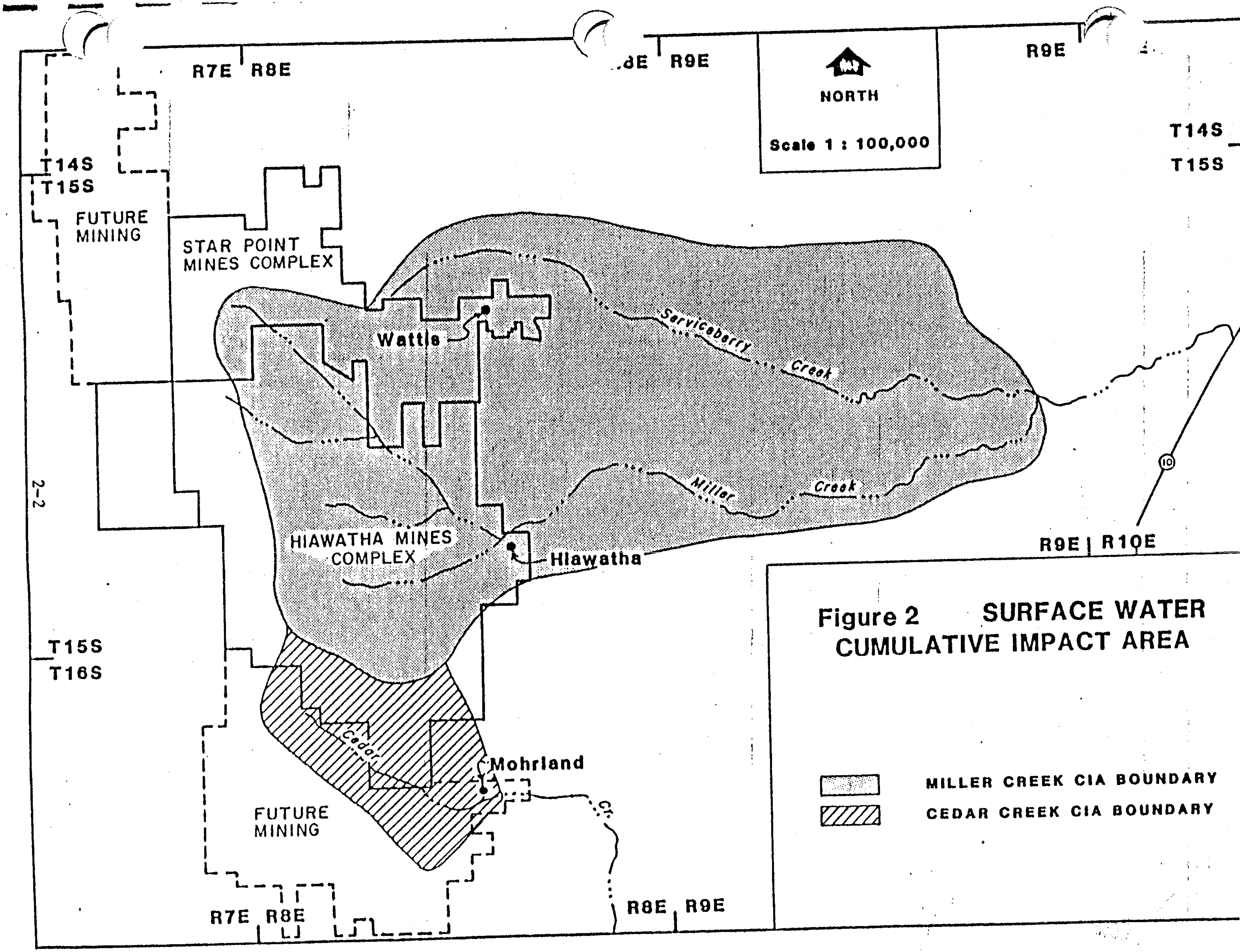

Figure 2 SURFACE WATER CUMULATIVE IMPACT AREA

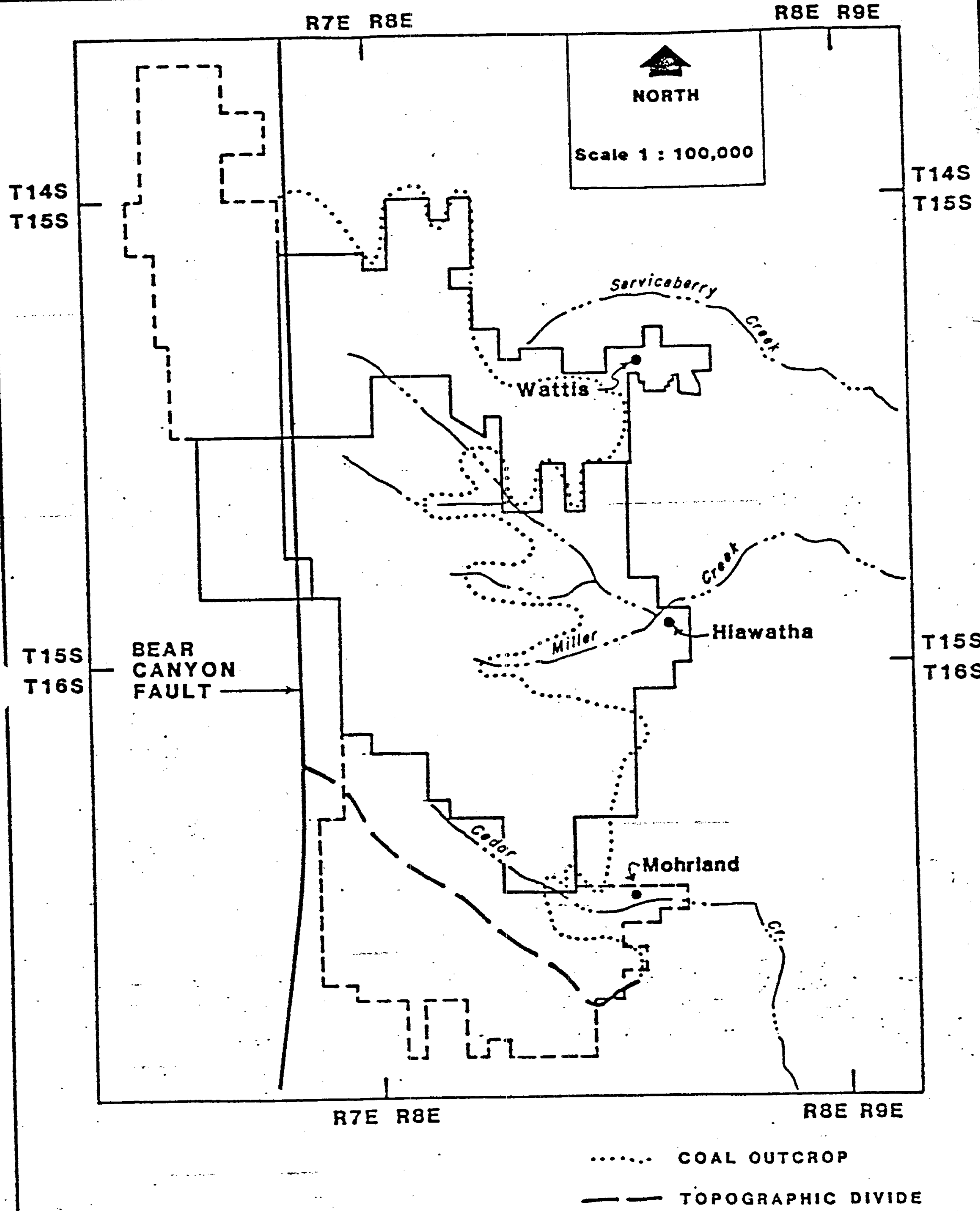

Figure 3 GROUND WATER CUMULATIVE IMPACT AREA