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PART 4: TABLES

1.4 MINING PERMITS - COMPLIANCE INFORMATION

Coastal States Energy Company presently holds an approved Mining Permit (Number ACT/041/002) for its Southern Utah Fuel Company operation located in Sevier County, Utah. The permit was approved and issued by the State of Utah Division of Oil, Gas, and Mining on September 14, 1977 and the mining and reclamation plan for the operation was approved by the U. S. Geological Survey on February 3, 1978.

Coastal States Energy Company also currently holds an approved mining permit Number ACT 10061005 for the Skyline Mines dated November 9, 1982.

Neither the Skyline Mines nor Southern Utah Fuel Company have pending any Notice of Violations as of the date of filing of this
* Application. A history of recent NOV's and the action taken, as required by UMC 782.14(c), may be found on pages 1-8A through 1-8E.

Skyline Coal Company, formerly Getty Mining Company, was purchased by Coastal States Energy Company in 1985. At the date of purchase, Skyline Coal Company held no coal mining permits other than the Skyline Mines permit. Coastal States Energy Company has no information regarding coal mining operations permits which Skyline Coal Company may have held prior to the date of purchase by Coastal States Energy Company.

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* Survey on February 3, 1978. A permanent program mining permit was issued for the SUFCo mine on May 19, 1987.

Coastal States Energy Company also currently holds an approved mining permit Number ACT 10061005 for the Skyline Mines dated November 9, 1982.

Neither the Skyline Mines nor Southern Utah Fuel Company have pending any Notice of Violations as of the date of filing of this Application. A history of recent NOV's and the action taken, as required by UMC 782.14(c), may be found on pages 1-8A through 1-8E.

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resulted in case file closure by the Utah State Engineer's Office on August 8, 1961. When Federal Coal Lease Utah 044076 was issued, the site area of the proposed Lawrence Reservoir was excluded from the leased premises. At the time of filing this Application, the Permittee has no leasehold rights to mine the site on the proposed Lawrence Reservoir and, therefore, the area of the formerly proposed Lawrence Reservoir site is excluded from the proposed permit area. The Permittee intends to pursue the acquisition of this excluded acreage as a lease modification of Federal Coal Lease Utah-044076 or as a separate Federal Coal Lease. No surface activity pursuant to underground coal mining or underground coal mining will be carried out within the excluded, unleased area until the acreage is under lease to the Permittee. At the time of acquisition the Permittee will request that the acquired acreage be included in the Skyline permit area.

Due to the great volume of documents involved with the ownership, right-of-entry, etc. of the Skyline properties, photocopies of the agreements have not been included in this Application. The relevant documents are maintained at the offices of Coastal States Energy Company and Skyline Coal Company in Salt Lake City, Utah, and at the Skyline Mine's office. Copies of the agreements can be viewed by interested persons during normal business hours.

The Permittee holds no interest under any real estate contracts covering surface lands or other realty to be affected by mining activities at the Skyline Mines.

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The Permittee holds no interest under any real estate contracts covering surface lands or other realty to be affected by mining
* activities at the Skyline Mines. Also, there are no purchasers of record under real estate contracts with respect to the Skyline properties.

1.7 CONTIGUOUS OWNERS

The following list contains the names and addresses of all owners of surface lands contiguous to the permit boundary (excluding the waste rock disposal area):

United States of America
Department of Agriculture
U. S. Forest Service
599 West Price River Drive
Price, Utah 84501

Kaiser Steel Corporation
300 Lakeside Drive
Oakland, California 94666

Kemmerer Coal Company
Frontier, Wyoming 83121

Helen Marakis
160 East 1st South
Price, Utah 84501

Nick and Koula Marakis
150 East 1st South
Price, Utah 84501

Milton A. Oman
61 South Main
Salt Lake City, Utah 84115

Phelps-Dodge
300 Park Avenue
New York City, New York 10022

Utah Power and Light Company
1407 West North Temple
Salt Lake City, UT 84110

The following list contains the names and addresses of the owners of mineral acreage contiguous to the permit boundary (excluding the waste rock disposal area):

Carbon County, Utah
Court House
Price, Utah 84501

United States of America
Department of the Interior
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

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* Estate of Leon Nicholaides
c/o Law Office of James Jensen
190 North Carbon
Price, Utah 84501

Kemmerer Coal Company
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* Denver & Rio Grande Railway
1515 Arapahoe
Denver, Colorado 80202

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Kaiser Steel Corporation
300 Lakeside Drive
Oakland, California 94666

Kanawha and Hocking Coal and Coke Company
P. O. Box 507
Clear Creek, Utah 84501

Kemmerer Coal Company
Frontier, Wyoming 83121

Phelps - Dodge
300 Park Avenue
New York City, New York 10022

Utah Power and Light Company
1407 West North Temple
Salt Lake City, Utah 84110

Various organizations hold interest, as overriding royalty interests, in and to the coal within permit area boundaries. The identified holders of overriding interests are:

Kanawha and Hocking Coal and Coke Company
P. O. Box 507
Clear Creek, Utah 84501

Routt County Development, Ltd.
c/o Energy Fuels Corporation
Three Park Central
Suite 900
1515 Arapahoe
Denver, Colorado 80202

Denver & Rio Grande Railway
1515 Arapahoe
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Clear Creek, Utah 84501

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Geotechnical

The geotechnical data report by Dames and Moore dated October 30, 1979 is included in its entirety in Appendix Volume A-3. Much of that report is interpretive in nature and deals with facilities that have since been constructed.

2.2.10 General Geology of the Rock Disposal Site

The coal-bearing Blackhawk Formation makes up the surface of the rock disposal site. This formation consists of alternating, laterally discontinuous layers of sandstone, siltstone, shale and coal. Only occasional sandstone ledges are exposed at the surface of the proposed site, with the remaining surface being covered with up to 20 feet of soil and weathered rock debris.

Two mineable coal seams occur beneath the site, including the Upper and Lower O'Connor seams. The pertinent data for these coal beds is as follows:

Coal Bed	Thickness	Depth below Surface
Upper O'Connor	8.0'	45'
Lower O'Connor	18.0'	130'

Four faults of undetermined displacement have been mapped near the
* site. These faults are generally north-south trending and have acted as local barriers to mining in coal mines near the site.

Conversations with Mr. Frank Helsten of Scofield, Utah on September 17, 1981 and May 17, 1982, revealed that the strip mining work was done from 1948 to 1950. Mr. Helsten was the spot hole driller and indicated that no abandoned underground workings were intercepted when drilling the seam lying 45 feet beneath the floor of the pit. Mining of the below-lying seam was planned but not accomplished due to economic conditions at the time.

contrast, faulting within the Star Point Sandstone probably increases its water yielding capacity through the creation of secondary porosity.

A detailed discussion of the geological characteristics of the project area is presented in the preceding section (Section 2.2).

2.3.2 Characteristics of Seeps and Springs

As a result of field investigations during the low flow season, 174 seeps and springs were located on and immediately adjacent to the Skyline project area. This equates to an average of one water source for approximately every 40 acres existing in the area, not including the perennial streams. The quality of the subsurface water was evaluated at select springs and is shown in Appendix Volume A-1. Additional ground water quality data may be found in the tabulations submitted regularly to the Division of Oil, Gas and Mining and in Volume 4. The travel distance between water supplies is short for the wildlife and sheep which utilize the area. Therefore, should a frequently-used spring dry up, animals using the water supply would not be greatly affected.

Geologic conditions play an important role in the occurrence of springs in the project area. A majority of the springs issue from west-facing slopes, often at a sandstone-shale interface considerably above the adjacent stream bed. Apparently, water which infiltrates into the soil and is not consumptively used percolates down until an impeding shale lens is met. It then follows the shale member downdip until an outlet is reached (either the surface or a discontinuous sandstone member). Thus, deep ground water recharge is apparently slow in the project area due to the presence of large amount of shale.

Very few seeps and springs in the project area appear to be fault-related, due to the sealing ability of the Blackhawk Formation. Instead, spring water appears to originate in the small surface depressions or basins in the immediate vicinity.

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* As requested by the Division, the operator conducted a survey of springs in the South Fork of Eccles Creek area where mining will take place during this permit term. This survey, conducted during the summer of 1988, varies slightly in locations from that found in the consultant's report. The differences are most likely the result of mapping errors. The results of this survey may be found on Figure 2.3.2-1.

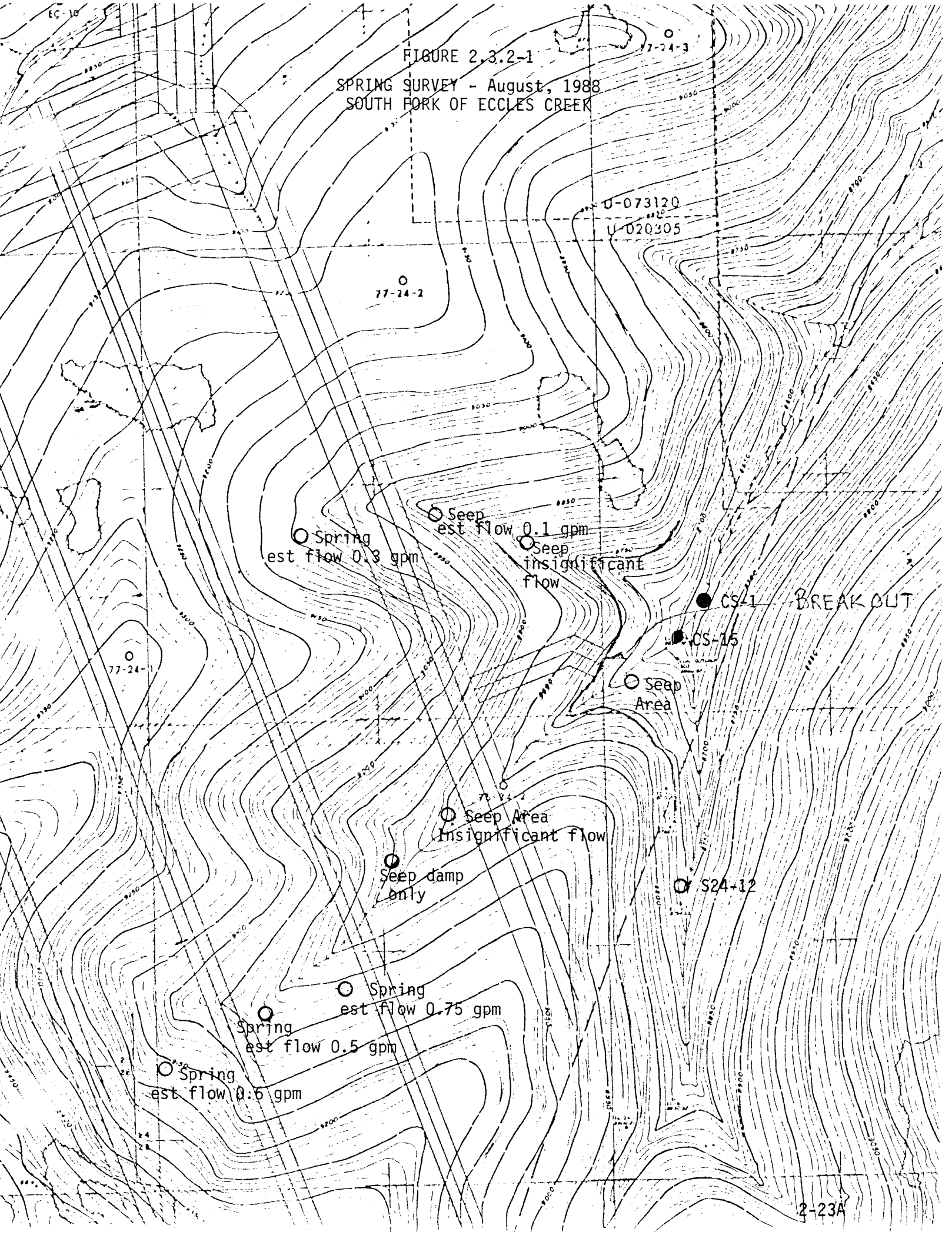
FIGURE 2.3.2-1
SPRING SURVEY - August, 1988
SOUTH FORK OF ECCLES CREEK
U-073120
U-020305
77-24-2
77-24-3
77-24-1
Seep
est flow 0.1 gpm
Spring
est flow 0.3 gpm
Seep
insignificant
flow
CS-1
BREAK OUT
CS-15
Seep
Area
Seep Area
Insignificant flow
Seep damp
only
S24-12
Spring
est flow 0.75 gpm
Spring
est flow 0.5 gpm
Spring
est flow 0.6 gpm

Geologic conditions play an important role in the occurrence of springs in the project area. A majority of the springs issue from west-facing slopes, often at a sandstone-shale interface considerably above the adjacent stream bed. Apparently, water which infiltrates into the soil and is not consumptively used percolates down until an impeding shale lens is met. It then follows the shale member downdip until an outlet is reached (either the surface or a discontinuous sandstone member). Thus, deep ground water recharge is apparently slow in the project area due to the presence of large amount of shale.

Very few seeps and springs in the project area appear to be fault-related, due to the sealing ability of the Blackhawk Formation. Instead, spring water appears to originate in the small surface depressions or basins in the immediate vicinity.

The groundwater situation is complicated by the present of underground workings of the old Union Pacific Mine. The present condition of these workings is unknown and unobtainable due to an underground smoldering fire.

2.3.5 Uses of Water in the Aquifers

2.3.5.1 Surface Water Rights

The water rights on and adjacent to the Skyline property which were on record with the Utah Division of Water Rights as of December, 1986 are listed in Volume 4. The locations of these water rights can be found on Plate 2.3.5.1-1.

Surface water rights in the area are primarily for stockwatering and irrigation. Stockwatering rights are almost entirely directly on the stream. Irrigation rights are centered around the town of Scofield and in Flat Canyon, southwest of the center of the property. Irrigated lands consist almost entirely of pasture. Only stockwatering rights are present on the lease area.

2.3.5.2 Ground Water Rights

Ground water rights on and adjacent to the Skyline Property, on record with the Utah Division of Water Rights as of December, 1986, are listed in Volume 4 and presented on Plate 2.3.5.2-1. Again, rights are primarily for stockwatering and irrigation (mainly lawns and gardens). Only one spring on the lease area has a filed water right. Only a limited number of wells are located in the area.

Also shown on Plate 2.3.5.2-1 are exchanges of Scofield Reservoir water for ground water in Pleasant Valley Creek Basin. These are also listed in Volume 4. All exchanges are wells, with the exception of 91-940. Most of the exchanges serve the industrial and domestic needs for mining companies in the area.

differences do not appear to be very significant. In many cases, trace metal concentrations were consistently below the detection limit of routine laboratory techniques.

The sample analysis reports located in the Hydrology Section of Appendix Volume 1-A, as submitted by Commercial Testing and Engineering Company, Denver, Colorado, are tendered to document that no potential acid-forming or toxic-forming material is to be found either above or below the coal seams. The equipotential figures do show some alkalinity producing tendencies occur.

The analysis reports are arranged by seam, i.e., McKinnon, Upper O'Connor, and Lower O'Connor A; and then by sample location, e.g., roof, floor.

The locations of the exploration holes at which these samples were taken are shown on Plate 2.3.6-1.

2.3.7 Monitoring Program

The ground water monitoring program outlined in this section is a continuation of a program approved with the original Mining and Reclamation Permit Application. It incorporates practices designed to provide the baseline data necessary to validate the determination of the probable hydrologic consequences of proposed and existing mining and reclamation operations. The program also is designed to meet site specific requirements and incorporates the flexibility for change if necessary.

A monitoring program is being conducted at each of the ground water stations shown on Plate 2.3.6-1.

Water quality samples are collected during August of each year from the 16 selected springs in the project area. The samples are analyzed for the parameters listed in Table 2.3.7-1 or an approved abbreviated schedule. (Seasonally, these springs will be monitored for those constituents listed on Table 2.3.7-2, except > out of 4/4/88 proposal

differences do not appear to be very significant. In many cases, trace metal concentrations were consistently below the detection limit of routine laboratory techniques.

The sample analysis reports located in the Hydrology Section of Appendix Volume 1-A, as submitted by Commercial Testing and Engineering Company, Denver, Colorado, are tendered to document that no potential acid-forming or toxic-forming material is to be found either above or below the coal seams. The equipotential figures do show some alkalinity producing tendencies occur.

The analysis reports are arranged by seam, i.e., McKinnon, Upper O'Connor, and Lower O'Connor A; and then by sample location, e.g., roof, floor.

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A monitoring program is being conducted at each of the ground water stations shown on Plate 2.3.6-1.

* Water quality samples are collected from the 15 selected springs in the project area. The samples are analyzed for the parameters listed in Table 2.3.7-1 or an approved abbreviated schedule.

for oil and grease. On a monthly basis, when accessible, the field measurements, (see Table 2.3.7-1) except dissolved oxygen, will be taken.

In addition to the collection of the outlined water quality data, water level data will be collected during August of each year from each of the nine wells noted on Plate 2.3.6-1.

The amount of water discharged from the mines will also be monitored at the mine mouth through the use of a totalizing flow meter or similar device. Significant changes in the source of water in the mine will be noted during the period of operation. Underground water pumped from the mine will be monitored at the sedimentation pond as a composite sample. Should the concentrations result in a sedimentation pond discharge which exceeds the NPDES discharge permit limitations, an attempt will be made to isolate the contributing source and an evaluation made of possible appropriate remedial action.

Monitoring of the ground water regime is designed specifically to evaluate the effects of mining on existing water rights and to protect postmining land uses.

Obtaining ground water data from abandoned mines in the area has been investigated but not found to be practical. The only abandoned portal in the permit area is the old Eccles Canyon Mine. This portal was sealed and covered during construction of the Skyline portal area surface facilities and is no longer accessible.

There are several abandoned mines in the adjacent area, located in Winter Quarters, Pleasant Valley and Boarding House Canyons. The Permittee is not aware of any discharge data from these old portals and is not in a position to obtain information since these facilities are on private and protected land.

* Seasonally, these springs will be monitored for those constituents listed on Table 2.3.7-2. On a seasonal basis, when accessible, the field measurements, (see Table 2.3.7-1) except dissolved oxygen, will be taken.

* In addition to the collection of the outlined water quality data, water level data will be collected during the summer of each year from each of the nine wells noted on Plate 2.3.6-1.

The amount of water discharged from the mines will also be monitored at the mine mouth through the use of a totalizing flow meter or similar device. Significant changes in the source of water in the mine will be noted during the period of operation. Underground water pumped from the mine will be monitored at the sedimentation pond as a composite sample. Should the concentrations result in a sedimentation pond discharge which exceeds the NPDES discharge permit limitations, an attempt will be made to isolate the contributing source and an evaluation made of possible appropriate remedial action.

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There are several abandoned mines in the adjacent area, located in Winter Quarters, Pleasant Valley and Boarding House Canyons. The Permittee is not aware of any discharge data from these old portals and is not in a position to obtain information since these facilities are on private and protected land.

As required, ground water quality data collected from the property area will be submitted to the Utah Division of Oil, Gas, and Mining. Such reports will normally be submitted within 90 days of the end of each calander quarter. An annual report which will included a summary of water quality data for the previous year will be submitted within 90 days of the end of each year.

* Water level in the observation wells will be monitored annually. The depths of these wells preclude obtaining water quality data. Water level data will be submitted annually as an update for the Water Well Data Summary in Volume 4.

As required, ground water quality data collected from the property area will be submitted to the Utah Division of Oil, Gas, and Mining. Such reports will normally be submitted within 90 days of the end of each calander quarter. An annual report which will included a summary of water quality data for the previous year will be submitted within 90 days of the end of each year.

Table 2.3.7-1

COMPREHENSIVE WATER QUALITY ANALYTICAL SCHEDULE

Field Measurements	Laboratory Measurements	
Flow	Acidity (as $CaCO_3$	Lead, Total
Dissolved Oxygen	Alkalinity (as $CaCO_3$)	Magnesium
pH	Ammonia (NH_3 as N)	Manganese, Total
Specific Conductance	Barium, Total	Nitrate (NO_3 as N)
Temperature, Air	Bicarbonate	Oil and Grease
Temperature, Water	Boron, Total	Phenol
Turbidity	Calcium	Phosphate (PO_4 as P)
	Chloride	Potassium
	Copper, Total	Seleium, Total
	Cyanide	Selenium, Dissolved
	Fluoride	Silver, Total
	Iron, Total	Sodium
		Sulfate
		Suspended Solids
		Total Disolved Solids
		Total Organic Carbon
		Zinc, Total

Table 2.3.7-1

COMPREHENSIVE WATER QUALITY ANALYTICAL SCHEDULE

* -LOW SUMMER FLOW-

* ANNUAL - ALL STATIONS

FIELD MEASUREMENTS	* LABORATORY MEASUREMENTS	
Flow	Acidity	Lead, Total & Dis
Dissolved Oxygen	Alkalinity	Magnesium
pH	Ammonia	Manganese, Total & Dis
Specific Conductance	Barium, Total & Dis	Nitrate
Temperature, Air	Bicarbonate	Phosphate
Temperature, Water	Boron, Total & Dis	Potassium
Turbidity	Calcium	Sodium
	Chloride	Sulfate
	Copper, Total & Dis	Suspended Solids
	Fluoride	Total Dissolved Solids
	Iron, Total & Dis	

* ANNUAL ADDITIONS TO ECCLES CANYON STREAM STATIONS AND WASTE ROCK DISPOSAL SITE

Cyanide	Phenols
Oil & Gas	Total Organic Carbon

REPLACES	TEXT
Table 2.3.7-1 Page 2-34	Table 2.3.7-1 Page 2-34 Date 10/15/88

Table 2.3.7-1

COMPREHENSIVE WATER QUALITY ANALYTICAL SCHEDULE

-LOW SUMMER FLOW-

ANNUAL - ALL STATIONS

FIELD MEASUREMENTS	LABORATORY MEASUREMENTS	
Flow	Acidity	Lead, Total & Dis
Dissolved Oxygen	Alkalinity	Magnesium
pH	Ammonia	Manganese, Total & Dis
Specific Conductance	Barium, Total & Dis	Nitrate
Temperature, Air	Bicarbonate	Phosphate
Temperature, Water	Boron, Total & Dis	Potassium
Turbidity	Calcium	Sodium
	Chloride	Sulfate
	Copper, Total & Dis	Suspended Solids
	Fluoride	Total Dissolved Solids
	Iron, Total & Dis	

ANNUAL ADDITIONS TO ECCLES CANYON STREAM STATIONS AND WASTE ROCK DISPOSAL SITE

	Cyanide	Phenols
*	Oil & Grease	Total Organic Carbon

REPLACES	TEXT
Table 2.3.7-1 Page 2-34	Table 2.3.7-1 Page 2-34 Date 1/10/89

* Denotes change or addition

TABLE 2.3.7-2

ABBREVIATED WATER QUALITY ANALYTICAL SCHEDULE

(Monthly and Seasonal Analyses)

FIELD MEASUREMENT	LABORATORY MEASUREMENTS	
Flow	Bicarbonate	Potassium
pH	Calcium	Sodium
Specific Conductance	Chloride	Sulfate
Temperature, Air	Iron, Total	Suspended Solids
Temperature, Water	Magnesium	Total Dissolved Solids
Turbidity	Manganese, Total	

SEASONAL ADDITIONS

Ammonia (NH_3 as N)
Phenol
Phospate (PO_4 as P)
Oil and Grease

TABLE 2.3.7-2

ABBREVIATED WATER QUALITY ANALYTICAL SCHEDULE

-High Spring and Late Fall Flows-

* FIELD MEASUREMENT	* LABORATORY MEASUREMENTS		
Flow	Ammonia	Nitrate	
pH	Bicarbonate	Phosphate	
Specific Conductance	Calcium	Potassium	
Temperature, Air	Chloride	Sodium	
Temperature, Water	Iron, Total	Sulfate	
Turbidity	Magnesium	Suspended Solids	
	Manganese, Total	Total Dissolved Solids	

* SEASONAL ADDITIONS TO ECCLES CANYON STREAM STATIONS AND WASTE ROCK DISPOSAL SITE STATIONS
Phenols
Oil & Grease

* In addition to the high spring and late fall monitorings taken at all stations, winter season monitoring for the above abbreviated schedule, including seasonal additions, will be taken at the following stations as accessibility permits: CS-2, CS-3, CS-6, CS-9, CS-11, CS-12, CS-14, VC-6 and VC-9. Station CS-15 will be monitored for flow only for a one year period beginning fall 1988.

REPLACES	TEXT
Table 2.3.7-2 Page 2-35	Table 2.3.7-2 Page 2-35 Date 10/15/88

TABLE 2.4-1
SURFACE WATER INFORMATION - AVERAGED FROM SKYLINE DATA
STATION VC-9, MOUTH OF ECCLES CREEK
(MAY 1978 - MARCH 1986)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Flow-cfs	2.8	--	2.2	5.3	20.0	12.2	5.4	3.3	2.8	2.4	2.5	2.4
TDS-mg/l	332	367	--	427	247	235	267	324	308	325	352	379
TSS-mg/l	57	33	127	6.7	1060	26	34	62	26	36	24	20
pH-std units	8.0	8.1	8.2	8.1	8.1	8.1	8.0	8.0	7.8	8.0	7.7	7.9
Iron-total mg/l	1.48	2.45	1.17	5.59	10.44	0.70	0.40	0.63	0.64	0.56	0.51	0.69
Iron-Dis. mg/l	--	--	--	--	0.033	0.036	0.016	0.050	0.020	--	0.010	--
Manganese-mg/l	0.13	0.11	0.14	0.22	0.28	0.06	0.06	0.08	0.07	0.10	0.10	0.10

TABLE 2.4-2
SURFACE WATER INFORMATION - AVERAGED FROM SKYLINE DATA
STATION UPL-10 - HUNTINGTON CREEK ABOVE ELECTRIC LAKE
(NOVEMBER 1978 - MARCH 1986)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Flow-cfs	6	--	6.6	7.6	11.9	33.5	6.37	3.00	3.62	2.92	1.40	4.50
TDS-mg/l	185	--	--	226	123	122	165	195	180	192	182	212
TSS-mg/l	3	--	--	1	13	6	4	14	6	2	12	2
pH-std units	7.3	--	7.7	7.8	7.9	8.1	8.1	8.0	7.8	7.7	7.7	8.0
Iron-total mg/l	0.423	--	0.144	--	0.350	0.037	0.450	0.440	0.370	0.550	0.440	0.270
Iron-dis. mg/l	--	--	--	--	0.076	0.011	0.080	0.110	0.060	--	--	--
Manganese mg/l	0.027	--	0.022	0.014	0.022	0.020	0.024	0.012	0.005	0.035	0.035	0.017

A summary documenting the water quality data in the mine area may be found in Volume 4.

2.4.3 Sediment Yield

The Skyline project area has a sediment yield which averages approximately 0.44 acre-feet per square mile per year, based on methods developed by the Pacific Southwest Inter-Agency Committee (1968). This converts to a total annual yield of 1.25 acre-feet of sediment to the Price River Basin and 3.07 acre-feet of sediment to the San Rafael River Basin. The majority of this sediment is yielded as suspended sediment, with only a small fraction occurring as bedload.

2.4.4 Monitoring Program

The surface water monitoring program outlined in this section is a continuation of a program approved with the original Mining and Reclamation Plan application. It incorporates practices designed to provide the baseline data necessary to validate the determination of the probable hydrologic consequences of proposed and existing mining and reclamation operations. The program also is designed to meet site specific requirements and have the flexibility for change if necessary. Surface water monitoring programs are conducted at each of the appropriate stations shown on Plate 2.3.6-1. In order to concentrate on areas of immediate impact, however, surface water stations in Eccles Canyon are sampled more frequently than those on Huntington Creek during the initial phases of mining.

Eccles Canyon stream stations are monitored monthly when accessible, and are analyzed for those constituents identified in Table 2.3.7-2. As noted some additional parameters are included on a seasonal basis.

Samples are collected annually from all surface water stations and analyzed as outlined in Table 2.3.7-1. These samples are

A summary documenting the water quality data in the mine area may be found in Volume 4.

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* on Plate 2.3.6-1. Surface water stations in Eccles Canyon were sampled more frequently than those on Huntington Creek during the initial phases of mining.

* Eccles Canyon stream stations are monitored seasonally when accessible, and are analyzed for those constituents identified in Table 2.3.7-2. As noted some additional parameters are included on a seasonal basis. South Fork tributary station CS-15 will be monitored for flow only for one year beginning fall 1988. The purpose of this station is to check for subsidence effects from longwall mining.

collected during the month of August each year to allow sufficient time prior to snowfall periods for the collection of additional data should laboratory results show unique, unexpected conditions.

As mining progresses towards Huntington Creek, seasonal samples from the five Huntington Creek stations will be collected when access permits and analyzed as outlined in Table 2.3.7-2. Sampling will begin one year prior to any potential underground impact. Comprehensive analyses will still be conducted in August even after seasonal sampling begins.

Seasonal sampling will continue at all surface water stations throughout the post-mining period and until the reclamation effort is derermined successful by the regulatory authority. August samples will also continue to be analyzed for the parameters outlined in Table 2.3.7-1 throughout the post-mining period, unless deletions in the list of parameters is determined to be appropriate.

In addition to the above outlined monitoring program, NPDES discharge permits have been acquired as necessary. Monitoring and operation of all surface water discharges are conducted in accordance with conditions of this permit.

As required, water quality data collected from the surface water monitoring stations will be submitted to the Utah Division of Oil, Gas, and Mining. Such reports will normally be submitted within 90 days of the end of each quarter. An annual report, which will include a summary of the water quality data for the previous year, will be submitted within 90 days of the end of each year.

The Permittee conducted a search for seeps or springs in the downslope area west of the rock disposal site and found no seeps or springs. Should surface flow occur, surface water monitoring will be carried out, though the exceedingly ephemeral nature of the water flows in the area will necessarily affect the frequency

* Samples are collected annually from all surface water stations and analyzed as outlined in Table 2.3.7-1. These samples are collected during summer low flow in the month of August or September each year.

* As mining has progressed towards Huntington Creek, seasonal samples from the five Huntington Creek stations are being collected when access permits and analyzed as outlined in Table 2.3.7-2.

* Seasonal sampling will continue at all surface water stations throughout the post-mining period and until the reclamation effort is determined successful by the regulatory authority. Summer samples will also continue to be analyzed for the parameters outlined in Table 2.3.7-1 throughout the post-mining period, unless deletions in the list of parameters is determined to be appropriate.

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of sampling. The Permittee commits to the following surface water monitoring program when surface flow is present.

1. Four monitoring stations will be established: two stations on the drainage from the east and two sites on the drainage from the south. Stations will be located both above and below the rock waste disposal site in each of the drainages.

2. When flow is present, these stations will be monitored, when accessible, at the same frequency and for the same constituents as the stations in Eccles Creek. The data will be tabulated and reported in the same manner as the Skyline water quality data.

3. The data from these stations will be evaluated for non-point source contribution from ground water aquifers. This procedure offers the best potential for detection of ground water contamination.

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* The Upper O'Connor seam will require a breakout to improve ventilation. The breakout will be on a south facing slope in a side canyon of the South Fork of Eccles Creek (see map no. 3.1.2-1). A new road will need to be built across this canyon to gain access to the breakout area. The canyon flows water in all but the driest of years. If the canyon is flowing water, the creek will be sampled above and below the construction site on a daily basis during the active construction period. The samples will be tested for total suspended solids and settleable solids.

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regulatory requirement that sediment control measures be provided for all areas of surface disturbance, concentrations of suspended material were minimized.

Over long periods of time, groundwater in the Wasatch Plateau can be expected to flow towards the lowlands if not removed, passing through saline shales and emerging to augment streamflow with a dissolved solids content that significantly exceeds the concentrations found in the headwaters area. Because the Skyline Mines will act as interceptor drains, the groundwater that is brought to the surface from the mines has a much lower dissolved solids content than would have existed if the water was to continue its downward movement through shaley layers. Thus, the mines will have some beneficial impact on the chemical quality of water in the region. The increased flow, particularly during the summer low flow period, appears to benefit the Eccles Creek fishery by creating flow and temperature stabilization. Although suspended sediment and oil and grease may increase at the mine mouth, these constitutents are removed during the treatment processes described in Sections 4.13 and 4.19.

Because of the high alkalinity and low acidity concentrations in the area (differing normally by two orders of magnitude), acid drainage problems do not occur as a result of mining. This is supported by the fact that coal in the area has a low sulphur content.

2.5.4 Alternative Water Supply

OSM Regulation 30 CFR 783.17 requires that alternative sources of water supply be identified if mining impacts will result in the contamination, diminution, or interruption of existing sources. Because no significant adverse hydrologic impacts are expected as a result of mining in the Skyline permit area, no individual or collective source of alternative water supply has been identified.

However, the Permittee presently owns 248 acre-feet of water rights in the Scofield Reservoir. Of these water rights, water

regulatory requirement that sediment control measures be provided for all areas of surface disturbance, concentrations of suspended
* material were significantly reduced. Minimization efforts, however, met with varying degrees of success.

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sufficient for the Permittee's needs has been exchanged for rights from wells located near the mine site and at the mouth of Eccles Canyon for use in culinary and dust suppression water systems. Of this 248 acre-feet, a 148 acre-foot exchange has already been approved by the State Engineer of Utah.

The Permittee will replace the water supply of any land owner if such a water supply proves to be contaminated, diminished or interrupted as a result of the Skyline mining operations.

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Relative vitality of tree stands indicates that aspen sites are composed of different size classes: young, moderate, and old. This seems to assure the continuity of the aspen community. Where aspen grows in an admixture with spruce and fir, it appears that the woodland is successional with trends towards dominance by the coniferous species. In more xeric sites, the stand of aspen is composed of trees of all age and size classes. In that site, there is a substantial understory of chokeberry which is subordinate to the aspen overstory.

The composition of the spruce-fir community at the portal-yard area indicates a climax forest dominated by spruce, with young, intermediate, and old trees being represented. Fir trees are represented by a large number of seedlings, but the lack of trees of intermediate and older ages suggests that fir is not successful in dominating the forest type.

Total productivity of the areas to be disturbed is 839 animal unit days. This area will be lost to production during the active period of mine operation. Assuming a grazing period of three months (July, August and September), the reduction is then equivalent to the loss of nine cow-calf units for the entire three-month period.

The disturbance caused by the Skyline project is shown in Table 4.7-4.

2.7.3 Threatened and Endangered Plant Species

Passage of the Endangered Species Act of 1973 provided the legal basis for establishment of lists of endangered and threatened plant species. Such lists were prepared under direction of the Smithsonian Institution, and were published subsequently in the Federal Register (40:27824-27924. 1975; and 41:24524-24572. 1976). Work on endangered and threatened plants of Utah has been reviewed by Welsh, Atwood, and Reveal (1975), and reevaluated by Welsh (1978). The region under investigation was included in a

2.8 AQUATIC WILDLIFE RESOURCES

Introduction

Both Huntington Creek and Eccles Creek flow through the project area, and both provide habitat for reproducing resident populations of cutthroat trout. Cutthroat trout from Electric Lake use upper Huntington Creek for spawning and nursery activities. Scofield Reservoir, although stocked with rainbow trout exclusively, has numerous cutthroat trout which have been produced in Eccles Creek and other tributary streams such as Winter Quarters, Woods Creek, Lost Creeks, Pleasant Valley Creek and possibly Boardinghouse Creek.

Eccles Creek

Eccles Creek is a small mountain stream draining west to east into Pleasant Valley Creek which flows north approximately 3 miles where it empties into Scofield Reservoir. Discharges in Eccles Creek are frequently as low as 2 cfs during late summer, fall and winter months; and high flows seldom exceed 50 cfs, even at the creek mouth. Water temperatures of streams such as Eccles Creek fluctuate because of turbulence from the rough channels. During November to March, water temperatures remain between 0-2^{o}C. In the summer, water temperatures often fluctuate from 12-15^{o}C daily although high temperatures seldom exceed 20^{o}C.

Through natural erosion of mudstone, sandstone and shale deposits, Eccles Creek has periods of high total suspended solids (sedimentation). This occurs, however, during periods of high runoff when the stream waters have sufficient energy (velocity) to carry the fine sediments out of the canyon rather than depositing them on the coarser substrate materials. There are numerous clean trout spawning gravel beds in Eccles Creek. The limiting factor to spawning success and number of resident trout in Eccles Creek is the amount of water available rather than water quality or habitat available.

The existing aquatic species of Eccles Creek, fish and macroinvertebrates, have adapted to tolerate natural temperature fluctuations and sediment loads. The macroinvertebrate communities of Eccles Creek have a high diversity of species representing all major trophic groups. There are species found only in high quality water streams indicating the high water quality of Eccles Creek. There are also environmentally resistant taxa present. This high diversity represents a resiliency to environmental change, especially short term changes.

Upper Eccles Creek above the Valley Camp Mine Road (at sampling stations ECO3, ECO2, UPMF, UPSF, Figure 2.8-A), have numerous taxa of macroinvertebrates found only in high quality waters and stable habitats. Lower Eccles Creek (Stations ECO4 and ECO5) has a more tolerant macroinvertebrate community with taxa tolerant to sedimentation dominating the community.

Cutthroat trout maintain naturally reproducing populations in Eccles Creek from the National Forest boundary downstream to the creek mouth. The fish have upstream migration access to a point just above Whiskey Gulch where a series of beaver dams frequently block upstream movement. There are no fish in the upper forks of Eccles Creek.

Huntington Creek

Huntington Creek above Electric Lake is a small mountain stream draining north to south into Electric Lake. Discharges are frequently as low as 1.5 cfs, with spring high flows sometimes reaching 100 cfs. Water temperatures fluctuate during summer months, although daily highs seldom exceed 20^{o}C. During winter months water temperatures seldom exceed 2^{o}C and the stream is nearly completely iced over.

Through natural erosion of existing stream channel geological formations and adjoining hillsides, Huntington Creek waters have high loads of fine sediments during runoff periods. This occurs

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* Construction activities caused sufficient sediment loading into Eccles Creek resulting in a significant reduction in fish populations. Cooperative efforst with DWR, however, resulted in habitat improvement by 1986 sufficient for near recovery of these populations.

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Seven stations on Eccles Creek were selected in relation to impact areas, UDWR fish sampling stations, existing macroinvertebrate and sediment stations, and water quality monitoring stations. At each station on the scheduled sample date (Table 2.8-1), four macroinvertebrate samples were taken from selected optimal substrates with a modified Surber Sampler. Three sediment samples were taken from potential spawning grounds. Replicate samples were taken to enable an analysis of variance between samples.

Habitat surveys, following methodologies used by USBLM and USDFS fisheries habitat specialists, were made annually throughout construction at critical Eccles Creek stations (Table 2.8.1). Measurements included: stream bank stability, channel substrate composition; stream gradient; riparian vegetation (type, relative cover); water width, depth and velocity at various discharges (Q) and channel width and tortuosity.

Fish surveys are conducted by UDWR personnel out of the Price office. Fish surveys are usually made in August so year class I fish will be large enough to sample and young-of-year fish are large enough to observe. Fish are measured as to total length and weight, counted and then released. These data are compared with earlier UDWR collection records, thus illustrating present fish population conditions compared with years past.

Table 2.8-2 summarizes the stream monitoring data. A summary of the sediment composition data, taken in accordance with the schedule on Table 2.8-1, is shown on Table 2.8-3.

Future aquatic monitoring is planned only on an as needed basis. Need will be established in conjunction with UDWR personnel and will be required only in case of a major perturbation in fish populations or other anomalous conditions. The Permittee will cooperate with UDWR in the investigation of any such condition. This approach to future monitoring is consistent with the requirements recommended by the UDWR, Price office.

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* schedule on Table 2.8-1, is shown on Table 2.8-3. The UDWR reports have been added to the Aquatic Wildlife section of Volume A-3.

Future aquatic monitoring is planned only on an as needed basis. Need will be established in conjunction with UDWR personnel and will be required only in case of a major perturbation in fish

populations or other anomalous conditions. The Permittee will cooperate with UDWR in the investigation of any such condition. This approach to future monitoring is consistent with the requirements recommended by the UDWR, Price office.

habitat affinities and high-interest species status. These results are reported in tabular form (Tables 2.9-1 through 2.9-3). They are listed according to their various ecological classifications (Dalton et al. 1978; Durrant 1952; Hall and Kelson 1959; Hayward 1967; and Hayward et al 1958). All species whose ranges appear to overlap any or all of the potential area of impact are listed. Generally speaking, the proposed project area could potentially be inhabited by about 57 mammalian, 6 amphibian and 15 reptilian species. Some of these are considered high interest species for the habitats and local area of concern and 48 percent are protected species.

Terms used in Tables 2.9-1 through 2.9-3 are defined as follows:

1. Plant communities (discussed in detail in another portion of this report): (a) spruce-fir; (b) aspen; (c) sage brush; (d) mixed shrubs and grasses; and (e) riparian habitat.

2. Resident species: (R) Any species that inhabits the area during reproduction activities.

3. Casual or Rare: (Ca) Any species that is only observed occasionally over a period of several years but whose status has not been determined as "threatened" or endangered".

4. High-interest: (X) Any species that is endangered, threatened, game or of economic or recreation value.

Limited value wildlife use areas are "occasional use areas" for one or more species of wildlife. Such areas are not limited and although they constitute part of the substantial value wildlife use area for a species, they are not essential.

Another important term used by Utah Division of Wildlife Resources is "crucial-critical period." This refers to a time in the natural history of the species when disturbance will likely lead to serious decreases in the productivity and perpetuation of the species. Examples are the reproductive and over wintering periods.

2.9.2.1 Mammals

The potential area of impact is inhabited by about 57 species of mammals (Table 2.9-1). Approximately 30 percent of these species are protected and considered of high-interest to the State of Utah Division of Wildlife Resources. As such, each was considered in relation to the potential perturbations, but only those likely to be negatively impacted are discussed.

Moose

The population of moose inhabiting the Wasatch Plateau is most numerous in and about the drainages of Scofield Reservoir and upper Huntington Canyon where the moose are dependent upon the riparian habitats that are all designated as crucial-critical habitat by Utah Division of Wildlife Resources. These riparian zones are utilized by some moose year long, whereas the higher elevation habitats adjacent to the riparian zones are only utilized during the summer and are considered as high-priority summer range. The entire Skyline Project lies within this high-priority summer range and is utilized by moose from May 16 to November 30. Unlike other ungulates, moose do not mass migrate large distances to other altitudinally lower areas for winter but concentrate into the riparian areas from December 1 to May 15. Both high elevation and riparian habitats are used by moose as calving areas between May 15 and July 15.

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Another important term used by Utah Division of Wildlife Resources is "crucial-critical period." This refers to a time in the natural history of the species when disturbance will likely lead to serious decreases in the productivity and perpetuation of the species. Examples are the reproductive and over wintering
* periods. UDWR in recent years has modified the term "crucial-critical" in regard to relative biological value of wildlife habitats or use areas to just "critical". The term "crucial" now only relates to a time of animal use. The definition remains the same.

2.9.2.1 Mammals

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ADDITION TO	TEXT
Section 2.9.2 Page 2-86	Section 2.9.2 Page 2-86A Date 10/15/88

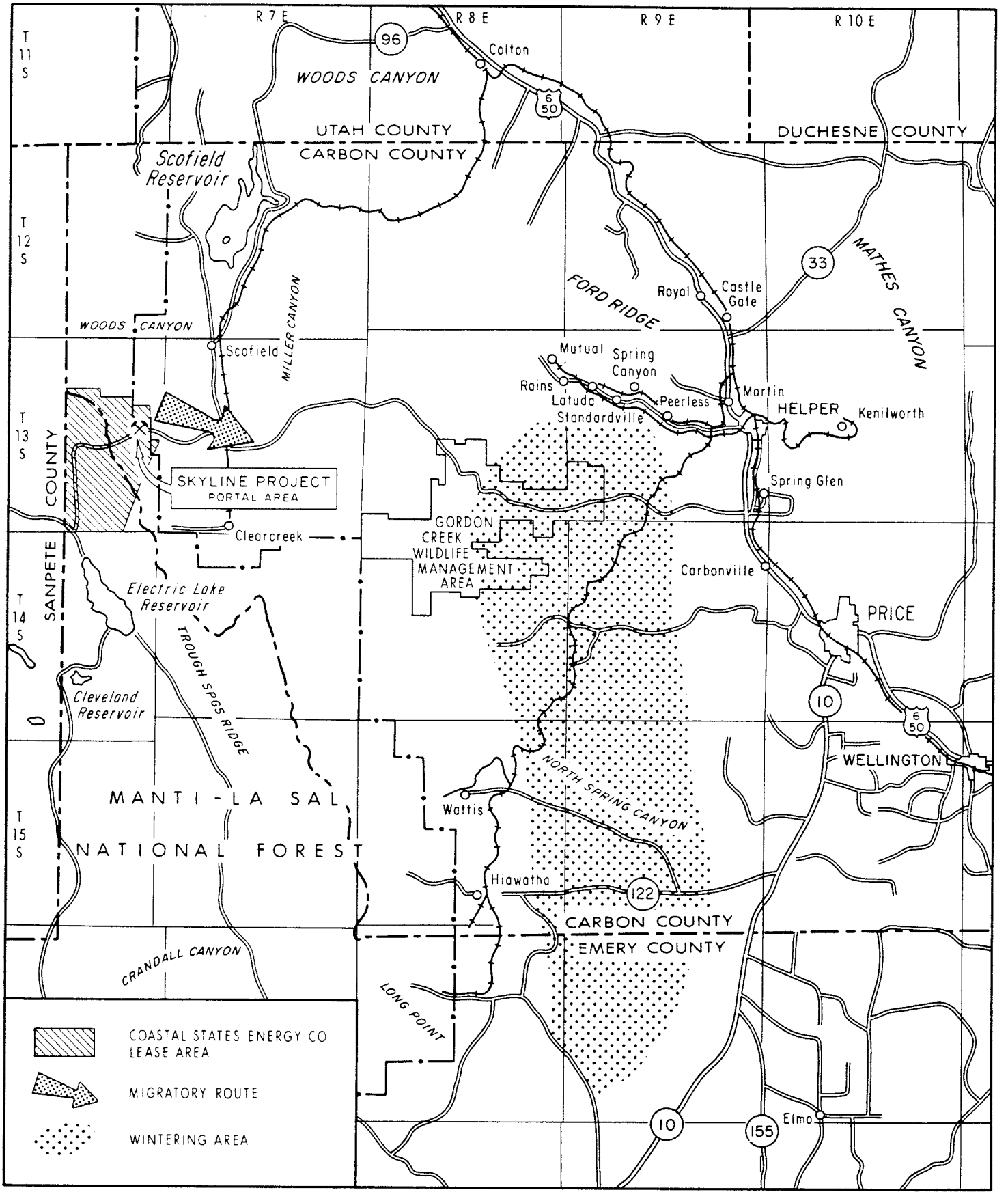

Fig. 2.9.1-A Winter range and migratory route of *elk* living in the environs of the Skyline lease area

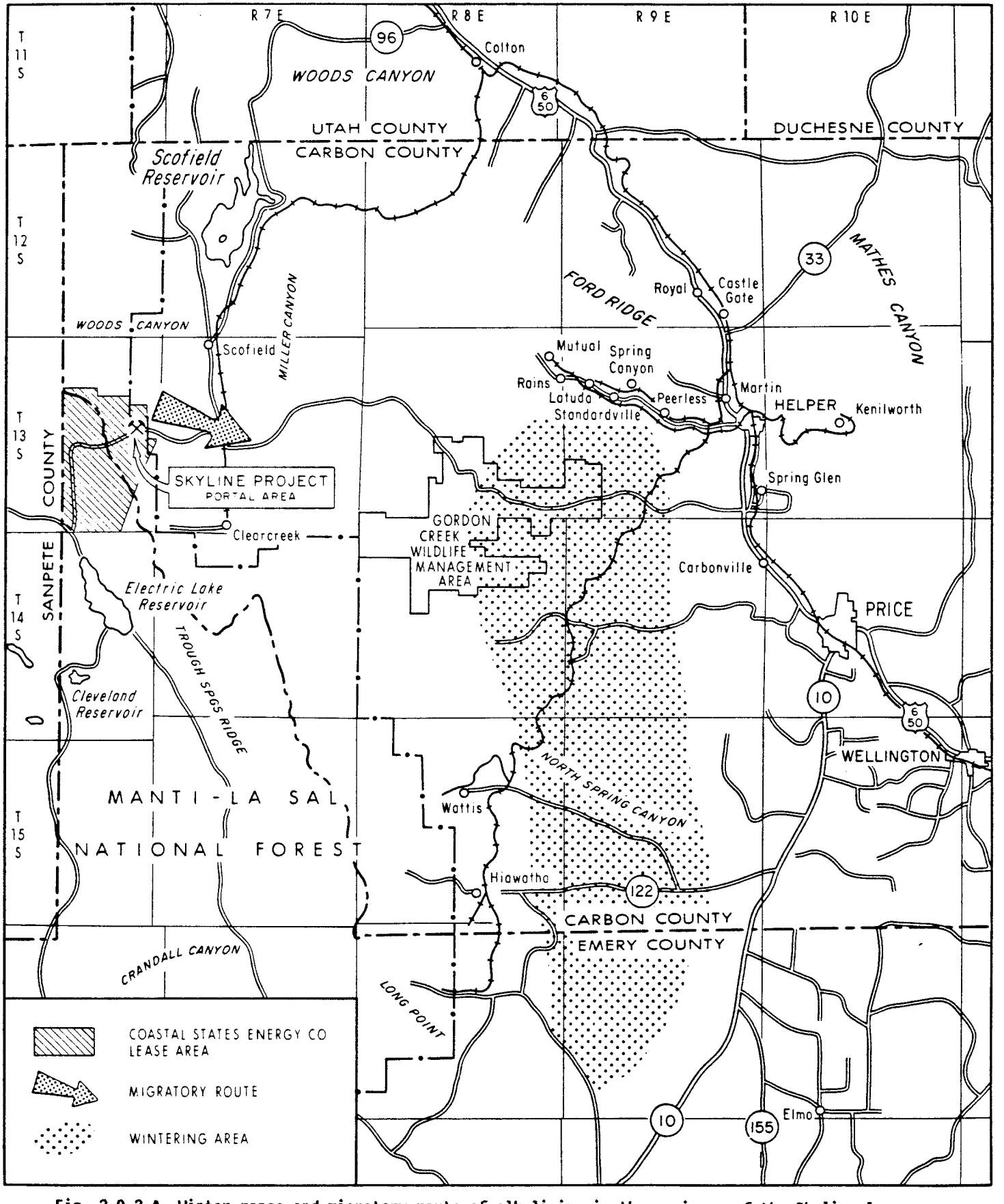

Fig. 2.9.2-A Winter range and migratory route of elk living in the environs of the Skyline lease area

REPLACES	TEXT
Figure 2.9.1-A Page 2-89	Figure 2.9.2-A Page 2-89 Date 10/15/88

* Denotes change or addition

while. Existing reproductive potential coupled with dispersal will facilitate almost immediate recovery and negate the temporary population reduction.

Overland Coal Conveyor

One of the major surface disturbance impacts of concern to terrestrial wildlife is the construction of an overland coal conveyor that will of necessity act as a partial barrier to normal wildlife movement patterns in, along and across Eccles Canyon.

The overland coal conveyor is to extend 2.6 miles down Eccles Canyon from the portal to the storage facilities at the railroad loading area, and may represent a barrier to normal big game movements in the area. The potential impact of the conveyor as a barrier is somewhat unknown. Therefore, to evaluate the impact the following study program will be implemented at the appropriate
* time. A detailed design of the conveyor system showning the big game crossings has not yet been completed. This information will be provided to the Division for their approval at least 90 days prior to start of construction.

Study Plan

1. In the spring following completion of the Eccles Canyon conveyor system, the Permittee will install two subject activated, daytime-nighttime remote sensing camera systems. The portability of these systems will enable use at those crossing sites where data collection can be optimized. The location of the sites will be coordinated with a representative from UDWR.

2. The systems will be operated from spring, or when evidence of big game is first noted, and will continue through the summer

while. Existing reproductive potential coupled with dispersal will facilitate almost immediate recovery and negate the temporary population reduction.

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The overland coal conveyor is to extend 2.6 miles down Eccles Canyon from the portal to the storage facilities at the railroad loading area, and may represent a barrier to normal big game movements in the area. The potential impact of the conveyor as a
* barrier is now well understood by wildlife specialists. A detailed design of the conveyor system showing the big game crossings has not yet been started. This information will be provided to the Division for their approval at least 90 days
* prior to start of construction. To assure that state-of-the-art knowledge concerning big game passage is implemented, the applicant will coordinate the detailed design with UDWR personnel If UDWR feels that passage success studies are necessary, these studies will be cooperatively developed at the time of final design.

*

REPLACES	TEXT
Section 2.9.4 Page 2-100	Section 2.9.4 Page 2-100 Date 10/15/88

and into the fall when snowfall makes continued operation impractical. If the numbers of animals in the area become large, the systems will be operated on a periodic basis in an attempt to spread the data base over various seasonal conditions. An attempt will be made to record a minimum of 200 crossing attempts during the season.

ADDITION TO	TEXT
Section 2.9.4 Page 2-100	Section 2.9.4 Page 2-100A Date 7/15/87

*

Loss of Habitat

Although approximately 6,400 acres of habitat will undergo disturbance, only 47.6 acres will actually be lost for habitation and production by mammal, amphibian and reptile species. This total acreage is small compared to that available and most of it is not of crucial-critical importance to the stability of the wildlife populations of concern. Minimal detrimental impact is expected to occur while still allowing such a project to proceed.

Once the mining operation is completed and the structures dismantled, the area will be revegetated to enhance the habitat for wildlife.

as indicated by the low total nitrogen content from all vegetation types.

In summary, the most important fertilizer to be applied in reclamation attempts is nitrogen. The addition of nitrogen should be timed with suitable moisture content in the soils (fall and spring). If soil moisture is insufficient, then supplemental irrigation should be provided. A soils map of the portal-yard area has been prepared and is available at the Skyline Mine office. The soils are classified by the vegetation type with which they are correlated, as recommended by the Soil Conservation Service. Information from other areas to be disturbed can be extrapolated from the vegetative map and from the soil nomenclature assigned on the portal-yard area map.

It is recommended that a minimum depth of six inches of topsoil be placed on areas to be seeded to a grass and forb mixture. A 12-inch minimum on spruce and fir plantings and a 24-inch minimum on formerly aspen/forb/elderberry sites is advised. The amount of top soil necessary to revegetate all 47.6 acres would require 84,054 cubic yards. See Table 2.11-1.

Since the minimum amount of topsoil necessary in revegetation is well below the expected stockpile amount of 131,742 cubic yards (See Table 2.11-2) it would be advisable to increase the grass and forb area to 12 inches and the aspen/snowberry areas to 30 inches. This would require 112,368 cubic yards and would still be within the expected stockpile amount.

Only soil from the "A and B" horizons were collected and put into the toposil stockpile and considered as "useable" for reclamation purposes. The soil from the "C" horizon was considered unsuitable and therefore not removed and not put into the topsoil stockpile.

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TABLE 2.11-1

Seeded Vegetation	Acres	Minimum Inches	Yards^3	Recommended Depth/in.	Yards^3
Grass/Forb	17.7	6	14,278	12	28,556
Spruce/Fir	15.2	12	24,522	12	24,522
Aspen/Snowberry	14.7	24	47,432	30	59,290
TOTAL	47.6		86,232		112,368

* TABLE 2.11-1

Seeded Vegetation	Acres	Minimum Inches	Yards^3	Recommended Depth/in.	Yards^3
Grass/Forb	17.7	6	14,278	12	28,556
Spruce/Fir	15.30	12	24,683	12	24,683
Aspen/Snowberry	15.0	24	48,700	30	60,500
TOTAL	48.0		87,661		113,739

REPLACES	TEXT
Table 2.11-1 Page 2-115	Table 2.11-1 Page 2-115 Date 10/15/88

* Denotes change or addition

* TABLE 2.11-1

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REPLACES	TEXT
Table 2.11-1 Page 2-115	Table 2.11-1 Page 2-115 Date 10/15/88

* Denotes change or addition

TABLE 2.11-2 (continued)
TOPSOIL VOLUMES

Area	Mapping Unit	Vegetation	Acreage	Good (Ave Depth/ft)	Poor (Ave Depth/ft)	Useable Soil, yd^3	Unsuitable Soil, yd^3
Conveyor Route	2	Grass/Forb	0.8	4.5	0.5	5,808	645
	5	Sagebrush/ Grass	2.1	0.5	0.-	1,694	--
	6	Aspen/ Snowberry	0.1	2.5	2.5	403	403
	7	Sagebrush/ Grass	0.3	--	--	--	--
	8	Aspen	.3	2.0	3.0	968	1,452
	9	Rock Outcrops	0.3	--	--	--	--
	10	Aspen	0.5	2.5	1.0	2,017	807
	11	Aspen	0.8	2.5	1.5	3,227	1,936
	12	Grass/forb Elderberry	0.3	2.5	--	1,210	--
	13	Spruce/fir	0.5	1.0	2.5	806	2,016
Total - Conveyor			6.0			16,133	7,259
Waste Rock Disposal		Sagebrush/ Grass	1.3	0	0	0	0
Water Tank and Wells		Aspen	.2				
	GRAND TOTAL		47.6			131,742	124,691

* TABLE 2.11-2 (continued)
TOPSOIL VOLUMES

Area	Mapping Unit	Vegetation	Acreage	Good (Ave Depth/ft)	Poor (Ave Depth/ft)	Useable Soil, yd^3	Unsuitable Soil, yd^3
Conveyor Route	2	Grass/Forb	0.8	4.5	0.5	5,808	645
	5	Sagebrush/ Grass	2.1	0.5	0.-	1,694	--
	6	Aspen/ Snowberry	0.1	2.5	2.5	403	403
	7	Sagebrush/ Grass	0.3	--	--	--	--
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	9	Rock Outcrops	0.3	--	--	--	--
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	12	Grass/forb Elderberry	0.3	2.5	--	1,210	--
	13	Spruce/fir	0.5	1.0	2.5	806	2,016
Total - Conveyor			6.0			16,133	7,259
Waste Rock Disposal		Sagebrush/ Grass	1.3	0	0	0	0
Water Tank & Wells		Aspen	.2				
South Fork Breakout		Aspen	.3	4.5	4.4	2,242	2,133
		Spruce/Fir	.1	4.5	4.4	747	74
	GRAND TOTAL		48.0			134,731	127,535

!Table 2.11-2 Page 2-117!! REPLACES !! TEXT !Table 2.11-2 Page 2-117 Date 10/15/88!

Recreation

Recreational use of the lease area affected by surface operations consists primarily of hunting big game, game birds, and small game species; fishing in Eccles Canyon below the portal area; from the south fork to the mouth of the canyon sightseeing, snowmobiling, and cross country skiing. Limited camping and picnicking also occurred in the mouth of Eccles Canyon (U.S. geological Survey, 1979).

Eccles Canyon Road provides the only direct access from Scofield Reservoir to Huntington Canyon and is used as an access route from the Scofield Reservoir recreation area to the recreational use areas at higher elevations in the northern end of the Wasatch Plateau (U.S. Geological Survey, 1979).

Forestry

Forest uses are limited primarily to cutting firewood and fenceposts. Occasional timber sales from National Forest lands are made to salvage insect-killed spruce timber. One such sale, totalling 2.5 million board feet, was made in the Kitchen Creek drainage basin on the west side of the coal lease area in 1977.

2.12.2 Capability and Productivity of the Permit Area Affected by Surface Operations and Facilities

Portions of the permit area affected by surface operations and facilities of the underground Skyline Mines are capable of supporting limited forestry, grazing, and recreational uses. Farming in the area is prohibited by the steep and rocky terrain of Eccles Canyon.

FORESTRY AND GRAZING

Land-Use Capability

Data concerning resource availability for forestry and grazing

uses within the permit area affected by surface operations and facilities were collected and assimilated by Dr. Joseph R. Murdock, professor of Botany and Range Science at Brigham Young University, Provo, Utah (1979). Vegetative plot studies were made in the affected permit area within five general area classifications: the spruce-fir timber type, the aspen timber type, the sagebrush type, the riparian type and the unrecovered disturbed area type, composed of existing roads and the unrecovered site of an abandoned gas well and the abandoned Eccles Mine located on the proposed portal site. From these specific vegetative plot studies, the productivity and capability of supporting grazing and forestry uses were determined for each general area. The plot studies revealed that both the spruce-fir timber type and the unrecovered disturbed area type contained no significant herbage usable for grazing purposes.

The number of animal units and animal unit months that the other three areas are capable of supporting was determined by converting the available green plant species desirable by sheep to a dry weight basis and assuming that one 1,100 pound cow having one calf, which constitutes an animal unit, consumes 27 pounds per day. The results of this analysis are presented in Table 2.12.2-1 for the yard area, the conveyor corridor and the bypass road.

The capability of the area affected by surface operations and facilities to support forestry uses was determined from the total land area in the spruce-fir and aspen timber types and the available timber volume per area as published by the U.S. Forest Service in the "Land Management Plan" for the Manti-LaSal National Forest, "Management Unit A-1", (1979). The spruce-fir timber type contained approximately 10,000 board-feet per acre and the aspen timber type contains 5,300 board-feet per acre. Therefore, within the affected area, there were approximately 201,000 board-feet of the spruce-fir timber and 93,800 board-feet of aspen timber.

Farming in the lease and permit areas would be impractical due to the steep terrain (50 - 80 percent slopes).

PREVIOUSLY MINED AREAS

Underground Mined Areas

The abandoned Eccles Canyon coal mine, located in the southwest quarter of the southwest quarter of section 13 of T13S and R6E, is the only mine located in the proposed mine plan area. The Eccles Canyon mine, operated intermittently from 1899 to 1952, mined the Lower O-Connor "A" seam using the room and pillar method. The mine covered an area of approximately 500 feet south of the portal and 700 feet west of the National Forest boundary (Doelling, 1972 and Heath, 1979). Doelling (1972) states, "Little is known about the Eccles Canyon mine....Production figures are incomplete but estimated to be small." The Eccles Canyon Mine portals have been covered and sealed by SR-264 and the Skyline Mine benches.

No other known minerals of value have been mined within the lease and permit area. There are two producing and two abandoned gas wells located in Eccles Canyon. These gas wells are not classified as "mining". Therefore, no other minerals have been mined within the Skyline coal lease area.

Surface Mined Areas

There have been no previous surface mines located within the mine plan or adjacent areas.

LOCAL LAND-USE CLASSIFICATIONS

Both the county zoning ordinances and the "Land Management Plan" for the Manti-LaSal National Forest, prepared by the U.S. Forest Service (1987), classify local land-use for the lease area of the Skyline Mine as recreation, forestry and mining.

County Zoning Ordinances

The Emery County zoning map dated 1970 and the Carbon County zoning ordinance amended February 15, 1977 with a revised zoning map dated 1974 have zoned the Skyline property for recreation, forestry, and mining (RF&M). Section 8-7-1 of the Carbon County zoning ordinance states:

> "Recreation, forestry, and mining zone has been established as a district in which the primary use of the land is for recreation, forestry, grazing, wildlife, and mining purposes. In general this zone....is characterized by...high grazing lands interspersed by ranches, recreational camps and resource outdoor recreational facilities and mines and facilities related thereto."

U.S. Forest Service Land Management Plan

All but approximately seventy acres of the lease area lie within the boundary of the National Forest, and are therefore subject to the "Land Management Plan" for the Manti-LaSal National Forest prepared by the U.S. Forest Service (1987). All of the lease area located within the National Forest boundary is designated in the land management plan as "Coal Lands Management Area A". In the "Land Management Plan" the Forest Service lists management objectives pertaining to the lease area. The management objectives (U.S. Forest Service, 1979) and the impacts from the Skyline Mine pertaining to these objectives are described in the following sections.

GROUNDWATER

Management Objective

"Improve and maintain watershed conditions to reduce overland flows and to recharge the underground aquifer. Reduce soil

losses from the unit where feasible. Protect perennial springs and ground water, and maintain or improve water quality to meet the standards for existing or possible future use of the water".

Impacts

Approximately 46.1 acres of soil were disturbed within Eccles Canyon, which include the portal and yard area of the mine, the railroad laodout area and the conveyor corridor. Though on-site erosion will increase, it will not reach the stream and significantly impact the water quality of Eccles Creek due to required sediment control measures. Therefore, the water quality of Eccles Creek will not be degraded. In fact, dissolved solids concentrations in the area should be improved downstream as a result of removal of good quality water from the ground water system through the mines prior to mixing with poorer quality ground water in the lowlands (Southeastern Utah Association of Governments. 1977).

VEGETATION, RANGE MANAGEMENT AND SOILS

Vegetation Management Objective

"Improve desirable vegetative cover to protect watersheds, decrease erosion, and maintain soil stability."

Range Management Objective

"Improve desirable plant species composition and increase forage production on suitable livestock range. Maintain livestock numbers and capacities at a level which is compatible with watershed values, wildlife uses, and other resource uses."

Soil Management Objective

"Maintain soil productivity and minimize soil loss through sound resource management."

The simultaneous production of both oil and gas and coal should present no major conflicts. The log of an oil and gas well, located in the mouth of Eccles Canyon and developed by Three States National Gas company in 1953, indicates that oil and gas zones were first discovered at an elevation of approximately 4,200 feet above sea level. Doelling (1972) shows one coal outcrop in Eccles Canyon at an elevation of approximately 8,500 feet above sea level, which is 4,300 feet higher than the shallowest oil and gas find. Though other mineable coal seams may be at greater depths, the oil and gas zones are at sufficient depths to result in no overlap between oil and gas zones and coal seams. Therefore, the production of both oil and gas and coal should be compatible.

ARCHEOLOGY AND PALEONTOLOGY

Management Objective

"Manage and protect important archeological, historical and paleontological resources to preserve scientific and interpretive values in accordance with applicable laws and regulations."

Impacts

To date there are no known archeological or paleontological sites within the proposed disturbed areas.

TIMBER AND FIRE

Timber Management Objective

"Harvest timber and forest products on a sustained yield basis where environmental effects to resource uses and activities are acceptable and where regeneration can be assured. Improve timber growth and yield on productive sites."

2.13 COMMUNITY INFRASTRUCTURE AND SOCIO-ECONOMICS

Numerous significant changes have occurred in the Skyline Mines community infrastructure and socio-economic service areas since the Permittee filed its Mining and Reclamation and permit application in 1979. These changes and their effects are reflected in the balance of this renewal update report.

This report clearly illustrates that the operation of the Permittee's Skyline Mines have had no negative socio-economic impacts on the community infrastructure of the service areas of Carbon, Emery, Sanpete, and Utah counties. In fact, the report illustrates that the development and operation of the Skyline Mines has been quite beneficial and has provided support to areas involved, and that planned future growth will have no adverse effects on the four county service area.

In general, dramatic changes have taken place in the number of coal mines in operation and the resultant work force reduction. Several changes in coal mine ownership have also occurred. One coal mining operation has had several mine fires, which significantly impacted the Skyline mines' service areas. All of these changes have impacted the general economy of the 4 county area to different degrees, and this update report will address these items in further detail.

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The original survey done by the Kaiser Engineers in August 1979 addressed the capability of the communities around the Coastal Permittee's Skyline Mines being able to accomodate the needs of Utah Fuel Company employees.

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Our five year operational experience has shown that the communities of Carbon, Emery, Sanpete, and Utah counties have had and do have the abilities to provide the necessary infrastructure, i.e., community services such as water, sewage systems, housing, schools, recreation, medical care, land, and commercial facilities.

2.13.1 Service Area

The Skyline Mines have a rather large service area. Conceptually the service area can be viewed as two concentric circles. The inner circle is primary to the Skyline Mines; the outer is secondary.

The primary area contains those communities that lie within a 45 minute commute, and therefore are most likely to receive the largest influx of new residents seeking employment at Skyline. The secondary service area consists of those communities requiring over 45 minutes commute time to the mine. These communities are listed on the following page by service area category.

The newly constructed Eccles Canyon road (part of SR-264) was completed with final paving by the end of the 1986 construction period. The construction of this highway has facilitated employee travel to the work area and also has provided a safe and short, year-round connecting route between Carbon, Emery, and Sanpete counties.

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PART 4: MAPS AND FIGURES

* Reference to Figures 4.19.5-A and 4.19.5-B removed.

PART 4: DRAWINGS SECTION

REPLACES	TEXT
Index Volume 3 Part 4	Index Volume 3 Part 4 Date 7/15/87

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reasonable proximity to railroad transportation facilities available in Pleasant Valley and the availability of at least some relatively flat acreage adjacent to the outcrop. The Lower O'Conner "B" seam will be reached via underground rock slopes from entries in the Upper O'Conner or Lower O'Conner "A" seams.

Two to four entry portals will be used at each mine drift entry location for the intake of air and the transportation of mining crews and materials, and one to three portals will be used to exhaust air. The number of entries will increase within the mine in order to reduce the velocity of the air and to facilitate a reduction of air resistance losses. One additional entry portal in each mine will be used for the conveyance of coal from the mine.

The size of portals vary to conform to the mineable height of the Upper O'Connor seam and the Lower O'Connor "A" seam.

A series of parallel underground openings called entries, separated by blocks of coal providing support, called pillars, are driven from the portal location and are called "main entries", or "mains". These entries are comparable to the main avenues of a city, and allow access for the provision of power, piping, haulage, ventilation, and support services. The design of the mains and the layout of the mines for the Skyline project have been engineered after careful review of the many conditions that can affect the mining operations.

A large number of parallel headings has been determined necessary to maintain air velocities within required acceptable limits (usually less than 800 ft/min. for the 4-6 tons of air required to be circulated through the mine for every ton of coal mined). The final number of developed entries will be based on the requirements of the mine area to be accessed.

Since the Permittee considers five feet to be the minimum seam height which can be economically extracted, maps show mining

reasonable proximity to railroad transportation facilities available in Pleasant Valley and the availability of at least some relatively flat acreage adjacent to the outcrop. The Lower O'Conner "B" seam will be reached via underground rock slopes from entries in the Upper O'Conner or Lower O'Conner "A" seams.

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* The Upper O'Connor seam will also require a breakout to improve the ventilation. The Breakout will be on a south facing slope in a side canyon of the South Fork of Eccles Creek (see map no. 3.1.2-1). No exhaust fans or permanent activity is planned for this area once construction is finished.

The size of portals vary to conform to the mineable height of the Upper O'Connor seam and the Lower O'Connor "A" seam.

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Since the Permittee considers five feet to be the minimum seam height which can be economically extracted, maps show mining

holes during mining operations which may have the potential of liberating gas or oil, all measures determined necessary by the BLM Mining Supervisor, in consultation with the appropriate BLM Oil and Gas Supervisor, will be implemented.

3.2 COMPONENTS OF OPERATION

3.2.1 Ponds, Impoundments, and Dams

Two sedimentation ponds are included in the design of the Skyline Mine plan. Each retention pond has been designed to provide adequate volume for sediment containment and also adequate volume for a theoretical 24-hour detention of run-off resultant of a 24-hour, 10-year rainstorm. The minesite sedimentation pond also contains additional volume to adequately treat mine water
* discharge. An engineers certification of proper construction for these ponds may be found on page 3-17A. The location and design characteristics for each of these two ponds are described in the following:

Mine Site Sediment Pond

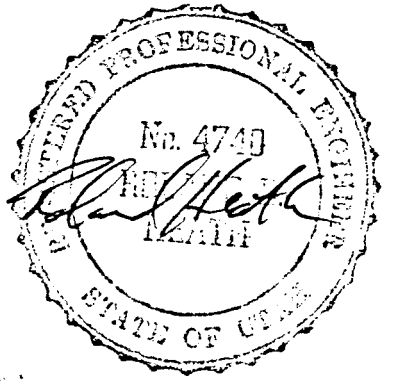
A detention pond is located at the mine site adjacent to the crushing and truck loading station. It will detain surface run-off from the 31.1 acre disturbed mine site shown on Map 3.2.1-1. Precipitation from a 10-year, 24-hour rainstorm is expected to be 2.45 inches. After infiltration, surface run-off from a storm of this intensity should be 1.50 inches, based on the assumption that the land surface will be similar to gravel and dirt roads with SCS run-off curve numbers of about 90.

The required volume for providing a theoretical detention of the run-off from a 10-year, 24-hour storm is estimated as: 1.50 inches per acre x 31.1 acres = 169,340 cubic feet. The required volume for sediment storage is estimated as (0.10 acre-feet) x (31.1 acres) = 135,472 cubic feet. The combined volumes for 24-hour retention and sediment storage equal 304,812 cubic feet. The pond contains a volume of approximately 421,505 cubic feet from the spillway elevation of 8,579.6 to a depth of 20.4 feet. The difference between the total pond volume of 421,505 cubic

SKYLINE MINE SEDIMENT PONDS

I certify that the sediment ponds at the Skyline mining project were constructed under the supervision of a registered, professional engineer. They were constructed in a prudent manner and field-fitted to meet design specifications.

The final construction of the minesite sediment pond actually exceeded design requirements for holding capacity.



Roland Heath
Professional Engineer
Aug. 1, 1982

feet and that required for surface run-off retention of 169,340 cubic feet plus sediment storage of 135,472 cubic feet is 116,693 cubic feet and is for retention and treatment of mine water discharge (See Map 3.2.1-2). The pond volume dedicated to mine water discharge will contain the average inflow from the mine based on a 30-day averaging period. This 30-day period is consistent with reporting conditions of the NPDES Discharge Permit. The pond will be decanted only after retaining the
* runoff event for the required 24-hour period or in accordance with the NPDES discharge permit conditions.

A minimum of three feet have been added to the pond embankments for freeboard. Slopes are 3h:1v for backwater impoundments (pressure slope) except on the southeast side where solid rock is located. In the area of solid rock, slopes are near vertical.

The combined emergency and principal spillway pipe utilizes an oil skimmer collar. This pipe will safely pass any run-off from a 24-hour, 100-year storm plus mine water discharge. The pipe is sized to pass a one-foot head of pressure which will allow a flow of 80 cfs. The maximum run-off inflow rate expected from the
* disturbed 31.1 acre portal site during a 24-hour, 10-year storm is 49.41 cfs.

The plan view with contours of the pond is shown on Map 3.2.1-2B. The detailed design of the mine site sedimentation pond and the pond cross-section with detailed construction notes are shown in Map 3.2.1-2. A walkway providing access to the sediment pond dewatering device control valve is shown on Map 3.2.1-1. Detailed design of the spillway pipe and dewatering structure is shown on Map 3.2.1-2A.

Coal Loadout Sediment Pond

A detention pond is located adjacent to the storage silos at the coal loadout site. It detains surface run-off and associated

sediment from the disturbed site. Precipitation from a 24-hour,10-year rainstorm has been calculated to be 2.45 inches. After infiltration, the surface runoff is estimated at 1.50 inches.

The required volume for providing a theoretical 24-hour detention of the calculated runoff has been estimated as: 1.50 inches per
* acre x 7.35 acres = 40,020 cubic feet. The required volume for
* sediment storage has been estimated as: 0.10 acre-feet x 7.35
* acres = 32,016 cubic feet. The combined volumes equal 72,036 cubic feet.

The coal load-out sediment pond contains a volume of 76,212 cubic feet. Two feet have been added for freeboard. Berm width at the top of the embankments (7,928-foot level) will be eight feet. Embankment slopes were constructed at 2h:1v.

A single pipe is used for both the emergency and principal spillway with its inlet at the 7,926-foot level. Using an anti-seep collar, this pipe will safely pass any runoff from a 24-hour, 100-year storm. The pipe is sized to pass 30 second-feet of water with a one-foot head of pressure. This is more than the maximum runoff inflow rate expected from the seven acre mine site during a 24-hour, 100-year storm.

Functioning as principal spillway, the pipe will release runoff at a rate that will allow a 24-hour detention of the runoff resultant of a 24-hour, 10-year rainstorm. A riprapped section along the pond embankment crest, similar to that described previously, is provided to prevent overtopping should the principal emergency spillway pipe become blocked during an extreme precipitation event.

The plan view of the load-out sediment pond is shown on Map 3.2.1-3, and the pond cross section with detailed construction notes is shown in Map 3.2.1-4. Engineering calculations

justifying the 4:1 total slope design are included in Appendix Volume A-3.

Decant structure and outlet pipe have been modified. The modification is shown on Map 3.2.1-4A.

3.2.2 Overburden and Topsoil Handling

A comprehensive discussion pertaining to this operational

justifying the 4:1 total slope design are included in Volume 5. The stage volume curve on Map 3.2.1-4 has been updated in the Engineering Calculations.

Decant structure and outlet pipe have been modified. The modification is shown on Map 3.2.1-4A.

3.2.2 Overburden and Topsoil Handling

A comprehensive discussion pertaining to this operational

The Eccles Canyon conveyor alignment is shown on Map 3.2.3-2.

The conveyors will be rope-supported in a manner similar to typical underground units. As far as possible, the conveyors will be supported from a graded bench.

At locations where a particular conveyor has to span a gulley or similar ground depression, the conveyor will be supported in a steel framed gallery with sides and a roof sheeting cover and enclosed at the bottom with timber or steel plating. The conveyor will be elevated at points which correspond with the natural animal crossings. The conveyor and walkway design are shown on Plate 3.2.3-3.

Crushed Coal Truck and Train Loading

Two forms of vehicle coal loading are provided: truck loading at the mine site and truck and train loading at the mouth of Eccles Canyon. The truck loading system implemented at the mine site consists of a 200-ton-capacity bin fed by conveyor (BC-7).

The train loading system is designed to load coal into rail cars at a nominal rate of 5,000 ton/hr while the cars are moving at approximately 0.66 mph. The system consists of a 300-ton capacity bin fitted with a hydraulic-operated control gate and a telescopic chute that can be retracted and traversed to one side to permit the locomotives to pass. An automatic sampling system is incorporated at the train loading station to provide an aggregate sample of the loaded coal.

Crushed Coal Storage

The permanent coal storage facility consists of two 15,000 ton capacity concrete silos. Construction of two additional 15,000 ton capacity silos at a later date may be done as additional storage capacity is needed. The bottom of each silo is furnished

The Eccles Canyon conveyor alignment is shown on Map 3.2.3-2.
* Map 3.2.3-3 shows the permit boundary for the conveyor line.

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with four vibrating feeders at a variable controlled rate of 100 to 1,800 tons/hour. These feeders will deliver loads to an 84 inch wide conveyor transporting coal to the train loading system.

Two ground storage areas at the mine site have been established. (Location shown on Map 3.2.3-4). They will be used on an as needed basis. The south storage area will hold approximately 37,500 tons and the north storage area will hold approximately 75,000 tons. Actual capacity will depend upon such factors as height, compaction, fill slope and safe working practices. It is planned for the piles to encroach onto one of the adjacent cut slopes that do not have vegetation on them. Volumes will be consistent with and in compliance with PSD regulations. Drainage will be provided on both sides of the south storage pile and will direct run-off water into the established surface drainage system. Drainage on the north storage area will always be provided along one side of the pile. This drainage system will be of sufficient size to handle the entire 50 year 24 hour storm runoff for the middle fork drainage. This provision is for emergency use in the event of flood resulting in the plugging of the Middle Fork trash rack (see map 3.2.3-4).

The haul route from the truck tipple to the stockpiles includes a section of Utah State Highway SR-264. To mitigate potential traffic hazards, the following actions have been taken: 1) Warning signs have been placed along the highway above and below the Truck Loadout tipple; 2) A traffic pattern has been implemented to allow for the best and safest traffic approach to the highway; and 3) Training sessions are required for contract truck drivers handling stockpile coal on safe driving procedures to be followed on the haul route.

Coal hauled by trucks from the mine site permit area creates the possibility of coal spilling and coal being moved onto the non-permitted highway area. To help reduce the possibility of spillage, the permittee will: 1) Load trucks so as to prevent spills and overloading; 2) apply dust pallative to unpaved haul roads; and 3) Clean up accidental coal spills on SR-264 promptly.

bench facilities through a system of large diameter culverts. This system has been designed to handle the runoff from the 100-year, 24-hour precipitation event.

Natural water runoff from the surrounding hillsides is intercepted by a system of diversion channels and directed around the site. These channels are lined or riprapped where necessary to reduce erosion and to provide energy dissipation. These constructed channels have all been seeded and have well established vegetation in them. No observations have been made of any overland flow entering these ditches since initial construction seven years ago. These observations are further validated by numerous inspections by Utah Fuel Company environmental personnel, Utah Department of Oil, Gas and Mining personnel, and Office of Surface Mining personnel who have observed these channels being lined with grass and forb vegetative litter, conifer needle fall and small twigs from adjacent aspen trees, conifer trees and browse plants. These observations conclude that no perceptive flows have occurred in these channels although there has been significent above average precipitation during the past several years. The Permittee does commit to continue inspection and to maintain these channels in an operational state.

All runoff from disturbed areas is directed to the sedimentation pond for settling through a collection system of surface ditches, paved swales and culverts. Engineering design calculations for these collection ditches are included in the Engineering Calculation section of Appendix Volume A-3. The drainage from the upper pads are collected and directed to a buried culvert. The entrance to this culvert is by the main entrance gate to the mine maintenance complex area and is shown on Map 3.2.1-1. This buried culvert is underneath Utah State Highway SR-264 to an outfall above the sediment pond. No drainage from the Utah State Highway system enters the mine drainage system.

There are several exempt areas that do not report to a sediment pond. At the railroad loadout area there are three areas, as shown on Map 3.2.1-3, that do not report to the sediment pond.

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*

The first area is on the north side of the disturbed area. This area has been reseeded and has a well established cover of grass and forbs. The toe of the slope is lined with straw bales to intercept any sediment. Part of the area also has a collection ditch below the straw bales. The ditch has a series of straw bales across the drainage at 15-20 feet intervals. Much of the ditch has become well grassed-in and is almost indistinguishable from the adjacent undisturbed areas. The ditch empties into a flat, naturally grassed area and no sediment has been observed to reach this area during the past six years. The second area is adjacent to the sediment pond. This area is lower in elevation than the pond and therefore cannot be drained into the pond. Part of this area is a roadway and has been paved. The rest of the area has been seeded and grass and forbs are becoming established. The unpaved area is lined with straw bales to intercept sediments, and two drainage collection basins have been constructed to collect drainage water. No measurable amounts of sediment have left this area. The third area is adjacent to the railroad loadout structure. There are two parcels to this area, a north parcel and a south parcel. The south parcel is covered with 4 inches of clean 2 inch material. A silt fence is placed along the edge of the drainage area. The north area is also covered with the same material as the south area. This area does not have a silt fence, but does report to a sediment catch basin. No measurable amounts of sediment have left either of these two parcels.

There are five other exempt areas along the Eccles Canyon Highway which do not report to a sediment pond. There are three well houses, a water storage tank area and the conveyor bench, shown on Map 3.2.3-2. The three well houses and the water storage tank area all have straw bales to intercept any sediment. No measurable amounts of sediment have left any of these areas. The conveyor bench is located at the top of the cut slope for Utah State Highway SR-264. The drainage pattern for this conveyor bench was field located and fitted through a cooperative effort of Utah Fuel Company and Utah Department of Oil, Gas & Mining.

There are several exempt areas that do not report to a sediment
* pond. At the railroad loadout area there are four areas, as shown on Map 3.2.1-3, that do not report to the sediment pond. The first area is on the north side of the disturbed area. This area has been reseeded and has a well established cover of grass and forbs. The toe of the slope is lined with straw bales to intercept any sediment. Part of the area also has a collection ditch below the straw bales. The ditch has a series of straw bales across the drainage at 15-20 feet intervals. Much of the ditch has become well grassed-in and is almost indistinguishable from the adjacent undisturbed areas. The ditch empties into a flat, naturally grassed area and no sediment has been observed to
* reach this area during the past six years. The second area (.30 acre) is south of the track dump area and is the fill slope of the access road. The ditch at the toe of the fill slope has a
* series of straw bales to control sediment. The third area (.30 acre) is adjacent to the sediment pond. This area is lower in elevation than the pond and therefore cannot be drained into the pond. Part of this area is a roadway and has been paved. The rest of the area has been seeded and grass and forbs are becoming established. The unpaved area is lined with straw bales to intercept sediments, and two drainage collection basins have been constructed to collect drainage water. No measurable amounts of
* sediment have left this area. The fourth area (.2 acre) is adjacent to the railroad loadout structure. There are two
* parcels to this area, a north parcel and a south parcel. The north and south parcels are covered with 4 inches of clean 2 inch material. No measurable amounts of sediment have left either of these two parcels.

There are five other exempt areas along the Eccles Canyon Highway which do not report to a sediment pond. There are three well houses (.25 acre), a water storage tank area (.3 acre) and the conveyor bench area (6.0 acres), shown on Map 3.2.3-2. The three well houses and the water storage tank area all have straw bales

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Map 3.2.5-1 illustrates the water and wastewater flow diagram.

Sanitary sewage from the mine surface facility is routed through a system of gravity pipes below grade to the collection tank. The sewage is removed by truck for disposal at a municipal facility. No sewage effluent will be discharged into Eccles Creek. Oil and water separators are used within the maintenance complex building for separation of oils from wash-down water. Skimmed oil is then discharged to the waste oil storage tank for disposal. Waste oil is pumped from the tank and sold to a waste oil dealer for refining. The remaining water is discharged to the sedimentation pond.

As mining progresses, underground storage sumps are developed for storage of mine drainage water. This water is pumped to these underground sumps for later reuse within the mine as process water. Quantities in excess of that necessary for this purpose will be discharged to the sedimentation pond for further clarification prior to discharge. Oil skimmers have been installed to remove oil and grease residue from mine discharge water. Should the mine water drainage be either high or low pH or high in concentrations of heavy metals, treatment will be provided to reduce these values to acceptable levels prior to discharge from the permit area. Water quality data collected to date indicate that additional treatment will not be necessary. Table 3.2-2 lists five parameter measurements and applicable NPDES Standards. This table also summarizes mine water discharges collected in compliance with NPDES Discharge Permit No. UT-0023540. As illustrated in the table, levels of pH, TDS, oil and grease, suspended solids and iron were normally well within NPDES standard limits. The Permittee's installation of oil skimmers has prevented any occurrences of oil or grease levels exceeding permit limitations.

TABLE 3.2-2

RESULTS OF WATER QUALITY MEASUREMENTS OF THE NPDES-001 DISCHARGE

	Number of Measurements	Minimum	Average	Maximum	NPDES Permit Standard
PH	32	6.8	7.66	8.3	6.5-9.0
Iron, mg/l	32	0.12	0.81	3.13	Maximum 2.0 Daily Maximum 7.0
Oil & Grease, mg/l	32	.1	0.12	0.8	10
Total Suspended Solids mg/l	16	5	26.8*	171*	Maximum 35 Daily Maximum 70 Average 25
Total Dissolved Solids mg/l	32	140	348	695	700
Settleable Solids mg/l (as applicable)	17	.1	.12	0.4	Maximum 0.5

*After this maximum, the option of measuring settleable solids in lieu of suspended solids during precipitation or runoff events was initiated. Average without this maximum is 17.1 mg/l.

compacted to ensure culvert stability during subsequent mine bench construction.

The culvert inlets of the North Fork and Middle Fork were reconstructed in 1984 after being plugged by debris flows. These inlets are shown on Maps 3.2.6-1A, 3.2.6-1B and 3.2.6-1C. The culvert in the south west fork was extended by UDOT in 1986 approximately 300 feet off of the permit area and the inlet is now within their jurisdiction.

The culvert system was designed to allow easy maintenance access. Manholes were placed at each directional change point as additional access points. The culverts were constructed of galvanized metal to ensure that the culverts do not rust. Culverts will be inspected periodically throughout the life of the mines.

The culverts will be removed and the approximate stream channel restored following completion of the mining operations. The channel will be riprapped in erosional areas.

Eccles Canyon Road

The Eccles Canyon road is part of the State Road collector system.

Mine Site Sediment Pond

The initial construction phase of the mine site sediment pond structure involved the removal of topsoil and vegetation. As the pond was being constructed, lift heights were maintained to ensure maximum compaction. The final lift, which achieved the proposed elevation of the pond bottom, is of an impermeable material, capable of preventing seepage. Following this construction operation, the bank and spillway pipe construction was begun. The bank was constructed in lift heights to ensure maximum compaction and was constructed of impermeable material to prevent seepage. A spillway pipe was added during construction

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Mine Site Sediment Pond

The initial construction phase of the mine site sediment pond structure involved the removal of topsoil and vegetation. As the pond was being constructed, lift heights were maintained to ensure maximum compaction. The final lift, which achieved the proposed elevation of the pond bottom, is of an impermeable material, capable of preventing seepage. Following this construction operation, the bank and spillway pipe construction was begun. The bank was constructed in lift heights to ensure maximum compaction and was constructed of impermeable material to prevent seepage. A spillway pipe was added during construction

of the bank. The pond is shown in plan view (Map 3.2.1-1) and in cross section (Map 3.2.1-2).

Surface runoff will enter the pond via gravitational flow.

Other than sediment removal when 60 percent of the design sediment storage volume is exceeded, only limited maintenance of the pond will be required.

Following cessation of mining operations, the sedimentation pond will remain in place to receive upslope runoff, where possible, until the mine site is revegetated, stabilized and surface runoff is demonstrated to meet the applicable water quality standards. After these conditions have been met, the water will continue to be permanently diverted to the pond. The pond edges will be revegetated to provide a potential recreational site.

Coal Load-out Sediment Pond

Prior to construction of the coal load-out sediment pond, topsoil and vegetation were removed from the pond site area. The pond was excavated to the proposed bottom elevation and the excavated material used to construct the dam. The dam was constructed in lifts of heights which ensured maximum compaction. A spillway pipe was added during the construction of the dam. After the dam was completed, a principal emergency spillway was constructed. The pond is shown in plan view (Map 3.2.1-4) and in cross section (Map 3.2.1-2). The pond requires only limited maintenance, i.e., sediment removal to an approved disposal site when 60% of the design sediment storage volume is exceeded.

After mining operations are completed, the site will be revegetated. The sedimentation pond will remain until surface runoff from the site is demonstrated to meet the applicable water quality standards. Water will then be permanently diverted from the pond and residual pond water allowed to evaporate. When the residual water has evaporated and the mud dried, the pond will be backfilled, covered with topsoil and revegetated.

of the bank. The pond is shown in plan view (Map 3.2.1-1) and in cross section (Map 3.2.1-2).

Surface runoff will enter the pond via gravitational flow.

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* After these conditions have been met, water will then be permanently diverted from the pond and residual pond water allowed to evaporate. When the residual water has evaporated and the mud dried, the pond will be backfilled, covered with topsoil and revegetated.

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After mining operations are completed, the site will be revegetated. The sedimentation pond will remain until surface

of the bank. The pond is shown in plan view (Map 3.2.1-1) and in cross section (Map 3.2.1-2).

Surface runoff will enter the pond via gravitational flow.

Other than sediment removal when 60 percent of the design sediment storage volume is exceeded, only limited maintenance of the pond will be required.

Following cessation of mining operations, the sedimentation pond will remain in place to receive upslope runoff, where possible, until the mine site is revegetated, stabilized and surface runoff is demonstrated to meet the applicable water quality standards.
* After these conditions have been met, water will then be permanently diverted from the pond and residual pond water allowed to evaporate. When the residual water has evaporated and the mud dried, the pond will be backfilled, covered with topsoil and revegetated.

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Prior to construction of the coal load-out sediment pond, topsoil and vegetation were removed from the pond site area. The pond was excavated to the proposed bottom elevation and the excavated material used to construct the dam. The dam was constructed in lifts of heights which ensured maximum compaction. A spillway pipe was added during the construction of the dam. After the dam was completed, a principal emergency spillway was constructed. The pond is shown in plan view (Map 3.2.1-4) and in cross section (Map 3.2.1-2). The pond requires only limited maintenance, i.e., sediment removal to an approved disposal site when 60% of the design sediment storage volume is exceeded.

After mining operations are completed, the site will be revegetated. The sedimentation pond will remain until surface

runoff from the site is demonstrated to meet the applicable water quality standards. Water will then be permanently diverted from the pond and residual pond water allowed to evaporate. When the residual water has evaporated and the mud dried, the pond will be backfilled, covered with topsoil and revegetated.

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those points of the operation where public or employee access to the perennial is possible. Those points include the portal area on the southwest and middle forks of upper Eccles Creek, the pump houses along Eccles Creek and at the loadout facility near Eccles and Pleasant Valley Creeks.

3.2.8 Plan for Disposal of Rock Waste

Coastal States Energy Company ("Coastal") has developed a rock waste disposal site at a location southeast of Scofield, Utah and approximately 3.6 air miles from the Skyline mine site (Map 4.16.1-1A). The rock waste disposal site is an abandoned strip mine pit which is accessed by an upgraded existing road (see Maps 4.16.1-1A and 3.2.8-1). The facility is required for the disposal of rock wastes to be generated from the Skyline Mines during mine's developmental and operational phases. Additional discussion on this disposal site can be found in Section 4.16.

Coastal hauls the rock wastes by truck from the Skyline mine site (portal area) and the unit train loadout facility to the waste disposal area. An operation plan has been developed to establish proper techniques for disposal of the rock waste. A reclamation plan provides for satisfactory final reclamation. The disposal site has been designed to facilitate proper management and operation of the overall disposal process as well as successful reclamation and revegetation. No sanitary waste will be disposed of at the site.

The rock disposal site and access road are located upon land owned by the Estate of George Telonis. The legal right of access and use of the lands for the disposal of rock waste has been granted to Coastal by the heirs of the Estate in a lease effective January 1, 1982 and expiring, unless renewed, on December 31, 2011 (See Exhibit A for photocopy of lease). The lands referred to in the lease include a 7.00 acre right of way for the disposal site access road and a 17.83 area tract of land containing the rock waste disposal site. The legal description of the leased lands is:

those points of the operation where public or employee access to
* perennial and intermittent streams is possible. Those points include the portal area on the southwest and middle forks of upper Eccles Creek, the pump houses along Eccles Creek and at the loadout facility near Eccles and Pleasant Valley Creeks and South
* Fork Breakout area.

3.2.8 Plan for Disposal of Rock Waste

Coastal States Energy Company ("Coastal") has developed a rock waste disposal site at a location southeast of Scofield, Utah and approximately 3.6 air miles from the Skyline mine site (Map 4.16.1-1A). The rock waste disposal site is an abandoned strip mine pit which is accessed by an upgraded existing road (see Maps 4.16.1-1A and 3.2.8-1). The facility is required for the disposal of rock wastes to be generated from the Skyline Mines during mine's developmental and operational phases. Additional discussion on this disposal site can be found in Section 4.16.

Coastal hauls the rock wastes by truck from the Skyline mine site (portal area) and the unit train loadout facility to the waste disposal area. An operation plan has been developed to establish proper techniques for disposal of the rock waste. A reclamation plan provides for satisfactory final reclamation. The disposal site has been designed to facilitate proper management and operation of the overall disposal process as well as successful reclamation and revegetation. No sanitary waste will be disposed of at the site.

The rock disposal site and access road are located upon land owned by the Estate of George Telonis. The legal right of access and use of the lands for the disposal of rock waste has been granted to Coastal by the heirs of the Estate in a lease effective January 1, 1982 and expiring, unless renewed, on December 31, 2011 (See Exhibit A for photocopy of lease). The lands referred to in the lease include a 7.00 acre right of way for the disposal site access road and a 17.83 area tract of land containing the rock waste disposal site. The legal description of the leased lands is:

No hydrologic information is available for the quality and quantity of the ground water of the area due to the existence of coal fires. Coastal believes that the proper sealing of the rock waste containment area, as outlined in the Development and Operations Plan, will prevent the communication of any accidental ignitions of the rock/coal waste into the adjacent coal seams, thereby eliminating degradation of the ground water resources beyond the effects of the existing underground coal fires.

No surface water information is presented herein due to the intermittent surface water flows in the disposal site area. Coastal proposed to redirect any surface runoff waters around the site into the original pre-strip mining drainage system in order to prevent contamination of the surface runoff by the disposal activities. Coastal will also contain all runoff water from within the area to be affected in a catchment basin. Therefore, no surface water will discharge from within the disposal site.

Site Development

The development of the rock disposal site required upgrading the existing unpaved access road to the abandoned pit as well as the development work required to convert the abandoned strip pit into a disposal site.

Access Road

The access road to the disposal site follows the alignment of an existing unimproved access road shown on Map 3.2.8-1. Approximately 3,158 feet of the unimproved pre-existing road were upgraded to comply with the standards set forth for Class II roads in UMC 817.170 to 817.164, inclusive. The gravelled surface road is approximately 16 feet wide (see Figure 3.2.8-A).

Near-surface portions of the UP coal seams which were mined and then burned have subsided at the intersection of entries. Other

areas have developed subsidence cracks which transfer the coal fire combustion products to the surface, generally leaving coal-like condensates which are readily apparent in field examinations. No evidence of subsidence or of coal fires has been observed under or within ten or more feet from either side of the exising road. The anticipated infrequent need to use the rock waste disposal site once there is sufficient underground development for the material to be permanently stored underground will minimize the potential for subsidence due to truck traffic over the road. Truck drivers have been trained to look for the surface evidence of subsidence and, should subsidence occur, good engineering practices will be employed in backfilling depressions and compacting the subsided area. A subsidence monitoring program is not needed due to the absence of current mining and the inferred low density of underground development beneath the access road alignment.

Disposal Site

The preparation of the disposal site entailed:

1. Emplacment of drainage controls to redirect surface waters around the site and into the original, pre-strip mining drainage system.

2. The emplacement of non-combustible fill material to form a barrier across the floor and along the walls of the abandoned strip pit where coal seams were exposed during prior mining activities and where cracks or fissures are venting from adjacent coal fires.

3. The construction of a fence and gate to control access to the disposal site.

4. Some shrubs will be removed from near the top of the north side of the pit just prior to the time the area

they occupy will be covered with waste rock. The sparse grass and weeds will not be removed.

The previous course of the drainage from the canyon to the east of the abandoned strip pit was rerouted around the abandoned strip pit in order to redirect the flow into the original stream course, and therefore, around rather than into the disposal site. An open channel and dip are used to redirect the water flow (Maps 3.2.8-1 and 4.16.1-1B).

The dip to redirect the drainage across the access road and into the original stream channel was rip-rapped with a blanket of reasonably well graded, hard, durable native rock approximately 4" x 4" or larger in size, compacted in a layer approxiamtely two feet deep and no less than 30 feet wide. The surface of the rip-rap blanket was graded such that water is directed into the orignal stream channel to the south of the road.

The compacted non-combustible fill is being emplaced along the floor and walls of the pit in order to isolate the coal seams and venting cracks or fissures in the highwall from the material disposed of in the pit. Approximately two feet of compacted material was placed on the floor and three feet along the wall. The material to isolate exposed coal and venting cracks or fissures along the walls is being built up and compacted in lifts during normal rock disposal operations after an initial 3 to 4 feet high barrier is constructed. Any new venting cracks or fissures will be reported. Drainage onto the floor of the pit is directed to a pre-existing sump at the east end of the abandoned strip pit (Map 4.16.1-1B). Cross sections through the pit and sump are shown in Maps 3.2.8-2 and 4.16.1-1B. A fence and gate were installed in order to prevent unauthorized access to the rock disposal site (Map 3.2.8-1).

There are two locations in the pit where coal is exposed. These exposures of the coal seam are shown in Map 4.16.1-1B. The exposure in the west end of the pit required sealing before any

dumping of waste was undertaken. The initial 3 to 4 feet high barrier was built-up of incombustible material and was obtained from the slope detritus along the highwall. The material was dumped alongside and on top of the coal and compacted to form the barrier between the exposed coal and material being dumped.

The second location where coal is exposed is in the extreme east end of the pit in the highwall. This location will probably never require sealing since the pit will not reach the location upon attaining final fill configuration (Maps 4.16.1-1B and 3.2.8-2).

Waste Rock Disposal Operational Plan

A. Access Road

During operations, the access road will be maintained using a road grader and any other equipment which may be necessary to ensure compliance with the requirements of UMC 817.165. Drainage ditches and cross drains will be maintained to ensure proper functioning. Additional gravel will be selectively placed as required to ensure approximately four inches of road base gravel on the road.

Accidental spillage of rock waste during haulage from the minesite to the disposal site will be minimized by not overloading the haulage trucks. Accidental spills, if they occur, will be cleaned up by and transported to the disposal site within 24 hours after the accidental spill occurs.

B. Disposal Site

The underground development waste rock and excess fill material from the unit train loadout area will be emplaced and compacted in layers not exceeding two feet in thickness. As layers of compacted material are added to the floor of the pit, the three-feet thick noncombustible barrier, where required to

dumping of waste was undertaken. The initial 3 to 4 feet high barrier was built-up of incombustible material and was obtained from the slope detritus along the highwall. The material was dumped alongside and on top of the coal and compacted to form the barrier between the exposed coal and material being dumped.

The second location where coal is exposed is in the extreme east end of the pit in the highwall. This location will probably never require sealing since the pit will not reach the location upon attaining final fill configuration (Maps 4.16.1-1B and 3.2.8-2).

Waste Rock Disposal Operational Plan

A. Access Road

During operations, the access road will be maintained using a road grader and any other equipment which may be necessary to
* ensure compliance with the requirements of UMC 817.163 - .165. Drainage ditches and cross drains will be maintained to ensure
* proper functioning. The outfall of the cross drains are rip rapped to control erosion and sediment. Additional gravel will be selectively placed as required to ensure approximately four
* inches of road base gravel on the road. Map 3.2.8-1 shows the boundary and location of the access road. A guard rail has been installed along portions of the road as required by MSHA along with other MSHA requirements.

Accidental spillage of rock waste during haulage from the minesite to the disposal site will be minimized by not overloading the haulage trucks. Accidental spills, if they occur, will be cleaned up by and transported to the disposal site within 24 hours after the accidental spill occurs.

B. Disposal Site

The underground development waste rock and excess fill material from the unit train loadout area will be emplaced and compacted in layers not exceeding two feet in thickness. As layers of compacted material are added to the floor of the pit, the three-feet thick noncombustible barrier, where required to

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isolate any exposed coal seams and venting cracks and fissures, will be added.

The compacted layers of fill will be sloped at an angle of 2-3 percent to the east in order to direct any drainage from the pit floor into the sump at the east end of the pit. The sump will be pumped out if filled and the water will be hauled to the loadout sedimentation pond.

Shrubs that are along the north side of the pit will be removed just prior to the time the area they occupy will be covered with waste rock.

The spreading and compaction of the rock waste will be accomplished through the use of a dozer and dump trucks. The dozer will be used to spread and level the material and both the dozer and the dump truck will be used to compact the material. Repeated, long-term operation of the equipment on each lift of material will ensure adequate compaction of the fill.

The Permittee cannot commit to the size of the dozer or the number of trucks to be used during the infrequent use of the pit. The Permittee will use its 10-ton capacity truck that may be supplemented by others which, in addition to the dozer, will be used as the need occurs.

The rock waste disposal site will be regularly inspected during configuration and at least quarterly after disposal operations begin.

The Permittee's registered engineer or other qualified professional specialist will provide the Division a certified report within two weeks after each quarterly inspection and after the completion of construction. The reports will describe the activities during the reporting period and will certify that the site has been constructed and operated as specified in the design approved by the Division.

* 3.2.11 South Fork Breakout Area

The Upper O'Connor seam will require a breakout to improve ventilation. The breakout will be on a south facing slope in a side canyon of the South Fork of Eccles Creek (see map 3.1.2-1).

Access to the breakout area will be via an existing road up the South Fork of Eccles Creek to the Manti-LaSal National Forest boundary. From the Forest boundary on, the road had been water barred and will need to be reopened. Where the road leaves the main South Fork tributary, it crosses two side drainages. Temporary 18" culverts will be installed in these drainages during the construction period. The Forest Service road then continues up the side drainage. Approximately 600 feet up the side drainage a new class III life of project road will need to be constructed for a distance of 75' across the drainage to the breakout area (see map 3.2.11-1). During installation of the culverts silt fence and/or straw bales, dikes will be placed downstream to control sediment in the stream.

As construction starts on the project, the trees and brush will be cleared from the road location. The topsoil will then be stripped from the road location and stored on the abandoned temporary Forest Service road above the construction area. All of the topsoil will be stored on this abandoned road in a lift not to exceed 2' deep, and then seeded to the approved seed mixture. After the topsoil from the road location has been removed, a 36" culvert will be placed in the stream bed to provide a life of project crossing. The initial fill material over the culvert will be hauled in from the mouth of the side canyon where a small knob will be removed to help dress up an area (see map no. 3-2-11-1). This will also create a safe open area to burn slash created by the breakout construction. After the slash has been burned, the area will be dressed up and seeded

with the approved seed mixture. No further activity is planned for this area. The fill slopes of the fill covering the 36" culvert will be seeded and covered with excelsior mats to help prevent erosion until the vegetation is established. A flared inlet will be installed on the culvert. The fill slope will be rocked up to the high water line to also help protect the inlet. The culvert will be bedded in washed gravel at the slope of the natural channel of 14.3%.

A track hoe will then start removing the topsoil from the breakout area so it can be stored in the storage area. As the subsoils are encountered, they will be used to bring the new road up to grade. The new road will be built with a 1-2% adverse grade from the existing road to the breakout area. Subsoil not used as road fill will also be stored on the abandoned temporary Forest Service road below the topsoil storage area. All of the stored soil will then be seeded with the approved seed mix, and then a layer of straw mulch will be applied.

It is estimated that the new road will disturb .11 acres and the breakout area .29 acres, for a total new disturbance of .40 acres.

The breakout pad will be constructed so that the surface drainage will drain into the mine where it will enter the normal mine drainage and will eventually enter the portal area sedimentation pond.

A combination of silt fences and strawbales will be used to treat the surface run-off from the disturbed area of the new road, the breakout pad and the topsoil and subsoil storage areas. The silt fences and strawbales will be located as needed between the disturbed and undisturbed areas to treat run-off from the disturbed area. These silt fences and strawbales will be maintained until adequate vegetation is established.

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The breakout portals will be screened to prevent humans or animals from entering the mine. No exhaust fans or permanent activity is planned for this area once construction is finished.

Once the breakout portals have been established, all of the disturbed area will be seeded and all of the roads on National Forest land will be water barred and seeded. All seeding will be done with the approved seed mixtures. One of the temporary 18" culverts will be removed but left on site in case emergency access is needed back into the breakout area.

All slash created by the project will be piled so it can be burned at a later date. All brush disposal will be in accordance with standard U.S. Forest Service requirements.

Once the breakout area has been faced up and the portals established, no further activities are planned or anticipated at the area until final reclamation begins.

3.2.11 South Fork Breakout Area

The Upper O'Connor seam required a breakout to improve ventilation. The breakout is on a south facing slope in a side canyon of the South Fork of Eccles Creek (see map 3.1.2-1).

Access to the breakout area is via an existing road up the South Fork of Eccles Creek to the Manti-LaSal National Forest boundary. From the Forest boundary on, the road had been water barred and was reopened. Where the road leaves the main South Fork tributary, it crosses two side drainages. Temporary 18" culverts were installed in these drainages during the construction period. The Forest Service road then continues up the side drainage. Approximately 600 feet up the side drainage a new class III life of project road was constructed for a distance of 75' across the drainage to the breakout area (see map 3.2.11-1). During installation of the culverts silt fence and/or straw bales, dikes were placed downstream to control sediment in the stream.

As construction started on the project, the trees and brush were cleared from the road location. The topsoil was then stripped from the road location and stored on the abandoned temporary Forest Service road above the construction area and on the small
* opening at the mouth of the canyon where the knob was removed. All of the topsoil was stored in lifts not to exceed 2' deep, and then seeded to the approved seed mixture and fertilized. After the topsoil from the road location was removed, a 36" culvert was placed in the stream bed to provide a life of project crossing. The initial fill material over the culvert was hauled in from the mouth of the side canyon where a small knob was partially removed to help dress up an area. This also created a safe open area to burn slash created by the breakout construction. After the slash has been burned, the area will be dressed up and seeded with the approved seed mixture and fertilized. No further activity is planned for this

area unless there is fill material that was not used and is needed for final reclamation. The fill slopes of the fill covering the 36" culvert were seeded, fertilized, and covered with excelsior mats to help prevent erosion until the vegetation is established. A flared inlet and a trash rack were installed on the culvert. The fill slope was rocked up to the high water line to also help protect the inlet and outlet. The culvert was bedded in washed gravel at the slope of the natural channel of 14.3%.

A track hoe removed the topsoil from the breakout area so it could be stored in the storage area. As the subsoils were encountered, they were used to bring the new road up to grade. * The new road was built with a 1-2% adverse grade from the existing road to the breakout area. Subsoil not used as road fill was stored on the small opening at the mouth of the canyon where the knob was removed. All of the stored soil was then seeded with the approved seed mix, and then a layer of straw mulch was applied.

The new road and the breakout area disturbed .42 acres, and the area where the knob was partially removed disturbed .19 acres, for a total new disturbance of .61 acres. The road that was reopened for access and to provide topsoil storage disturbed an additional .35 acres.

The breakout pad will be constructed so that the surface drainage will drain into the mine where it will enter the normal mine drainage and will eventually enter the portal area sedimentation pond. A small seep was encountered during construction. A French drain was constructed to drain this seep into the creek drainage system.

A combination of silt fences and strawbales was used to treat the surface run-off from the disturbed area of the new road, the breakout pad and the topsoil and subsoil storage areas. The silt

fences and strawbales were located as needed between the disturbed and undisturbed areas to treat run-off from the disturbed area. These silt fences and strawbales will be maintained until adequate vegetation is established.

The breakout portals are screened to prevent humans or animals from entering the mine. No exhaust fans or permanent activity is planned for this area once construction is finished.

Once the breakout portals were established, all of the disturbed areas were seeded and all of the roads on National Forest land were water barred and seeded. All seeding was done with the * approved seed mixtures and then fertilized. One of the temporary 18" culverts was removed but left on site in case emergency access is needed back into the breakout area.

All slash created by the project was piled so it can be burned at a later date. All brush disposal will be in accordance with standard U.S. Forest Service requirements.

Once the breakout area has been faced up and the portals established, no further activities are planned or anticipated at the area until final reclamation begins, except for periodic inspections. The culvert trash rack and portal high wall will be inspected at a minimum of three times a year: (1) early spring; (2) mid-summer at the beginning of the thunderstorm season, and (3) late fall before freeze-up.

3.3 TIMING OF OPERATION

The construction phase of the Skyline Mines project commenced in the summer of 1980. The construction phase included the dirtwork and installation of surface facilities and premining activities such as portal conveyor slope drivage. The construction phase continued during 1982 with the installation of surface facilities and portals. Construction is expected to continue throughout the life of the mines to support and maintain the operation.

No. 3 mine commenced coal production in October 1981. The total period of coal production is expected to be 33 years: life of Mine No.1, 30 years; life of Mine No.2, 27 years; and life of Mine No. 3, 33 years.

Cessation of Operation

Prior to any temporary cessation of the Skyline mining operations for a period of 30 days or more, or as soon as it is determined that a temporary cessation will extend beyond 30 days, the Permittee will submit to the appropriate regulatory authority a notice of its intent to cease or abandon operations.

The Permittee's notice will state the exact number of surface acres and extent of subsurface strata which had been affected by underground or surface developments in the permit area prior to cessation or abandonment of mining. The cessation notice will also state the extent and kind of surface reclamation completed to date and the backfilling, regrading, revegetation, environmental monitoring, underground opening closures completed. It will also state water treatment activities the Permittee plans to continue during the temporary cessation period. During periods of temporary cessation, the Permittee will effectively support and maintain all surface access openings to underground operations, and secure surface facilities in areas in which there are no current operations, but operations are to be resumed under an approved permit. The Permittee acknowledges

that temporary abandonment shall not relieve the obligation to comply with any provisions of the approved permit.

Following a decision to permanently cease mining operations at the Skyline Mines, all affected areas will be permanently reclaimed in accordance with the approved permit. Unless approved as suitable for postmining landuse purposes or environmental monitoring, the surface equipment, structures, and other facilities no longer required for mining activity and monitoring will be removed and affected lands reclaimed.

3.4 AREA AFFECTED BY EACH PHASE OF OPERATIONS

The area affected by the Skyline Mines project can be divided into two major categories:

(a) Surface acreage disturbed by construction/installation of coal handling and associated facilities, and
(b) Surface acreage overlying underground mine workings.

Disturbed Surface Acreage

The offices, bathhouse, workshop, portal, fans, and other necessary facilities utilize a site of 31.1 acres. Approximately .26 acres is used for water tank bench. The coal loading and handling facility at the mouth of Eccles Canyon utilizes approximately 9.0 acres, of which a sedimentation pond requires 0.6 acres. The enclosed conveyor belt, transporting material from the mining portals to loading points, has disturbed 6.0 acres. The Scofield waste rock disposal site utilizes 1.3 acres. In total, the surface acres disturbed is 47.6 acres. The disturbed permitted area and bonded area for the mine portal area and loadout area are shown on Maps 3.2.1-1 and 3.2.1-3 respectively.

The pre-mining phase of earth work and dirt removal commenced in the spring of 1980 and was completed in 1981. The actual construction and installation of facilities necessary for coal mining and handling began in early 1981.

Area Overlying Underground Mining

Interpretation of the available geological data and bore holes information indicates that certain portions of all three seams within the leasehold are non-mineable. Total acreage values for mineable acreage do not include such areas. Surface area to be affected by underground mining is shown in Section 4.17 Subsidence Control Plan.

3.4 AREA AFFECTED BY EACH PHASE OF OPERATIONS

The area affected by the Skyline Mines project can be divided into two major categories:

(a) Surface acreage disturbed by construction/installation of coal handling and associated facilities, and

(b) Surface acreage overlying underground mine workings.

Disturbed Surface Acreage

The offices, bathhouse, workshop, portal, fans, and other necessary facilities utilize a site of 31.1 acres. Approximately .26 acres is used for water tank bench. The coal loading and handling facility at the mouth of Eccles Canyon utilizes approximately 9.0 acres, of which a sedimentation pond requires 0.6 acres. The enclosed conveyor belt, transporting material from the mining portals to loading points, has disturbed 6.0 acres. The Scofield waste rock disposal site utilizes 1.3 acres. The * South Fork breakout area has disturbed approximately .4 acre. In total, the surface acres disturbed is 48.0 acres. The disturbed permitted area and bonded area for the mine portal area and loadout area are shown on Maps 3.2.1-1 and 3.2.1-3 respectively.

The pre-mining phase of earth work and dirt removal commenced in the spring of 1980 and was completed in 1981. The actual construction and installation of facilities necessary for coal mining and handling began in early 1981.

Area Overlying Underground Mining

Interpretation of the available geological data and bore holes information indicates that certain portions of all three seams within the leasehold are non-mineable. Total acreage values for mineable acreage do not include such areas. Surface area to be affected by underground mining is shown in Section 4.17 Subsidence Control Plan.

3.4 AREA AFFECTED BY EACH PHASE OF OPERATIONS

The area affected by the Skyline Mines project can be divided into two major categories:

(a) Surface acreage disturbed by construction/installation of coal handling and associated facilities, and

(b) Surface acreage overlying underground mine workings.

Disturbed Surface Acreage

The offices, bathhouse, workshop, portal, fans, and other necessary facilities utilize a site of 31.1 acres. Approximately .26 acres is used for water tank bench. The coal loading and handling facility at the mouth of Eccles Canyon utilizes * approximately 9.0 acres, of which a sedimentation pond requires 0.6 acres. The enclosed conveyor belt, transporting material from the mining portals to loading points, has disturbed 6.0 acres. The Scofield waste rock disposal site utilizes 1.3 acres. The South Fork breakout area has disturbed approximately .96 acre. In total, the surface acres disturbed is 48.6 acres. The disturbed and permitted area and bonded area for the mine portal area and loadout area are shown on Maps 3.2.1-1 and 3.2.1-3, respectively.

The pre-mining phase of earth work and dirt removal commenced in the spring of 1980 and was completed in 1981. The actual construction and installation of facilities necessary for coal mining and handling began in early 1981.

Area Overlying Underground Mining

Interpretation of the available geological data and bore holes information indicates that certain portions of all three seams within the leasehold are non-mineable. Total acreage values for mineable acreage do not include such areas. Surface area to be affected by underground mining is shown in Section 4.17 Subsidence Control Plan.

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PART 4: TABLES

The proposed timetable for the reclamation plan activities is presented in Section 4.2 - RECLAMATION TIMETABLE.

Once the revegetation procedures are completed, a monitoring program will be established to ensure that an acceptable vegetational cover is established. If during the monitoring program erosion develops in revegetated areas, regrading and reseeding will be conducted in the affected areas. When the disturbed areas are stabilized by revegetation and surface runoff is demonstrated to meet water quality standards without detention time, the drainage ditches and sedimentation pond will be backfilled and revegetated.

That portion of the project area used for the new state highway (SR-264), and for which the Utah Department of Transportation (UDOT) now has jurisdiction, will not be reclaimed. UDOT jurisdiction also includes slopes attendant to the highway.

4.1.1 Reclamation Plan - Rock Disposal Site

Reclamation activities will be conducted on portions of the affected areas as those portions are filled to design capacity. The final contours of the rock disposal site are presented in Map
* 4.16.1-B. The disturbed area affected by the disposal operation will, at the request of the property owner's representative, be leveled off and reclaimed to native rangeland for subsequent use as a corral (Exhibit 1).

The proposed timetable for the reclamation plan activities is presented in Section 4.2 - RECLAMATION TIMETABLE.

Once the revegetation procedures are completed, a monitoring program will be established to ensure that an acceptable vegetational cover is established. If during the monitoring program erosion develops in revegetated areas, regrading and reseeding will be conducted in the affected areas. When the disturbed areas are stabilized by revegetation and surface runoff is demonstrated to meet water quality standards without detention time, the drainage ditches and sedimentation pond will be backfilled and revegetated.

That portion of the project area used for the new state highway (SR-264), and for which the Utah Department of Transportation (UDOT) now has jurisdiction, will not be reclaimed. UDOT jurisdiction also includes slopes attendant to the highway.

* No impoundments, sedimentation ponds or treatment facilities will remain upon abandonment. Diversions and culverts which may remain will be renovated to the approved design specification prior to abandonment of the area.

4.1.1 Reclamation Plan - Rock Disposal Site

Reclamation activities will be conducted on portions of the affected areas as those portions are filled to design capacity. The final contours of the rock disposal site are presented in Map 4.16.1-B. The disturbed area affected by the disposal operation will, at the request of the property owner's representative, be leveled off and reclaimed to native rangeland for subsequent use as a corral (Exhibit 1).

4.2 RECLAMATION TIMETABLE

A suitably permanent and diverse vegetative cover, as required by the U. S. Forest Service, will be established on all affected areas of land, except areas of railroad rights-of-way and travelled roadways.

Land reclamation will take place as soon as possible after surface disturbance. Steep cut slopes will be revegetated as recommended in Section 4.7 - REVEGETATION PLAN. The "first appropriate growing season" is defined as the earliest possible available growing season. The Permittee interprets available growing seasons to be the favorable spring and fall intervals during which revegetation attempts have the optimum chance for success. Areas occupied by support facilities such as roads, office buildings, shops, coal handling structures and conveyors will not be reclaimed until conclusion of the mining operations. The reclamation sequence is shown on Table 4.2.1.

4.2 RECLAMATION TIMETABLE

A suitably permanent and diverse vegetative cover, as required by the U. S. Forest Service, will be established on all affected areas of land, except areas of railroad rights-of-way and travelled roadways.

Land reclamation will take place as soon as possible after surface disturbance. Steep cut slopes will be revegetated as recommended in Section 4.7 - REVEGETATION PLAN. The "first appropriate growing season" is defined as the earliest possible available growing season. The Permittee interprets available growing seasons to be the favorable spring and fall intervals during which revegetation attempts have the optimum chance for success. Areas occupied by support facilities such as roads, office buildings, shops, coal handling structures and conveyors will not be reclaimed until conclusion of the mining operations. The reclamation sequence is shown on Table 4.2.1.

The phasing of the reclamation effort is shown on drawing 4.2-1.

TABLE 4.2.1

RECLAMATION TIMETABLE

YEAR(S)	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
1979	Establishment of Baseline Reference Plots	N/A
1980	Construction of Site Drainage System	0.0
1981-1982	Mine Site Temporary Stabilization Topsoil Stockpile	0.6
	Loadout Site Temporary Stabilization Topsoil Stockpile	0.3
1983-1984	Mine Site Initial Reclamation - Completed Excludes 100 ft. from any portal for MSHA safety reasons	8.3
	Mine Access and Eccles Canyon Conveyor Banks Final Reclamation - Conveyor bench slopes	6.0

TABLE 4.2.1

RECLAMATION TIMETABLE

	YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
	1979		Establishment of Baseline Reference Plots	N/A
	1980		Construction of Site Drainage System	0.0
	1981-1982	Contemp-oraneous	Mine Site Temporary Stabilization Topsoil Stockpile	0.6
			Loadout Site Temporary Stabilization Topsoil Stockpile	0.3
	1983-1984	Contemp-oraneous	Mine Site Initial Reclamation - Completed. Excludes 100 ft. from any portal for MSHA safety reasons	8.3
*	1988-1995	Contemp-oraneous	Mine Access and Eccles Canyon Conveyor Banks Final Reclamation - Conveyor bench slopes	6.0
*	1988-1994	Contemp-oraneous	Loadout Site Final Reclamation - South Side Cut Slope	.84

REPLACES	TEXT
Table 4.2.1 Page 4-6	Table 4.2.1 Page 4-6 Date 10/15/88

* Denotes change or addition

TABLE 4.2.1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	AREA DESCRIPTION/ACTIVITY	RECLAIMED ACRES
1985-1990	Maintenance of Reclaimed Banks	N/A
2010	Reassessment of Operational Reclamation Success;	N/A
	Modifications to Abandonment Reclamation Plan	N/A
2016	Mine Site	
	Water Tank Area	0.3
	Upper Bench	
	-Mine #1 Portal Area	
	-Substation	
	-Conveyor Area	
	-Drainage Considerations	
	Culvert Removal or Filling	
	Ditch Filling	
	Drainage Reconstructing	11.3
	Middle Bench	
	-Shop-Warehouse-Changehouse-Offices	
	-Substation	
	-Conveyors	
	-Rock and Coal Bypass	
	-Silo	
	-Drainage Considerations	
	Culvert Removal or Filling	
	Ditch Filling	
	Mine 1 & 2 Conveyor Slope Portal	
	Drainage Reconstructing	10.0

* TABLE 4.2.1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
1985-1990		Maintenance of Reclaimed Banks	N/A
2010		Reassessment of Operational Reclamation Success;	N/A
		Modifications to Abandonment Reclamation Plan	N/A
2016		Mining cessation recover underground equipment	N/A
	I A.	Structure Removal	
		Mine Site - Lower Bench	N/A
		-Crusher	
		-Rock and Coal Bypass	
		-Sampling Stations	
		-Conveyors	
		-Truck Loadout	
		-Substations	
		Mine Site - Upper Bench	N/A
		-Substation	
		-Conveyor Area	

REPLACES	TEXT
Table 4.2.1 Page 4-7	Table 4.2.1 Page 4-7 Date 10/15/88

* Denotes change or addition

TABLE 4.2-1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	AREA DESCRIPTION/ACTIVITY	RECLAIMED ACRES
2016 (continued)	Lower Bench	
	-Crusher	
	-Rock and Coal Bypass	
	-Sampling Stations	
	-Conveyors	
	-Truck Loadout	
	-Substations	
	-Mine No. 3 Portal Areas	
	-Drainage Considerations	
	Culvert Removal or Filling	
	Ditch Filling	
	Drainage Reconstructing	9.8
*		
	Scofield Disposal Site	
	Disposal area	2.3
	Loadout Site	
	Parking Area	
	Silos	
	Substation	
	Drainage considerations	
	-Culvert Removal or Filling	
	-Ditch Filling	
	-Drainage Reconstructing	8.7

REPLACES	TEXT
Table 4.2-1 Page 4-8	Table 4.2-1 Page 4-8 Date 7/15/87

* Denotes change or addition

* TABLE 4.2.1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2016 (continued)		Mine Site - Middle Bench	N/A
		-Conveyors	
		-Rock and Coal Bypass	
		-Mine 2 & 3 Conveyor Slope Portal	
		Loadout Site	N/A
		-Parking Area	
		-Substation	
		-Conveyors	
		-Train Loadout	
		Overland Conveyor Site	N/A
		-Conveyor	
2017	I	A. Structure Removal	
		Mine Site	N/A
		-Water Tank Area	
		Upper Bench	N/A
		-Mine #1 Portal Area	
		Middle Bench	N/A
		-Shop-Warehouse-Changehouse-Office	
		-Substation	
		-Silo	

REPLACES	TEXT
Table 4.2.1 Page 4-8	Table 4.2.1 Page 4-8 Date 10/15/88

* Denotes change or addition

TABLE 4.2-1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)		AREA DESCRIPTION/ACTIVITY	RECLAIMED ACRES
2016 (continued)		Lower Bench	
		-Crusher	
		-Rock and Coal Bypass	
		-Sampling Stations	
		-Conveyors	
		-Truck Loadout	
		-Substations	
		-Mine No. 3 Portal Areas	
		-Drainage Considerations	
		Culvert Removal or Filling	
		Ditch Filling	
		Drainage Reconstructing	9.8
		Scofield Disposal Site	
		Disposal Area	2.3
	*	South Fork Breakout	.4
		Loadout Site	
		Parking Area	
		Silos	
		Substation	
		Drainage Considerations	
		-Culvert Removal or Filling	
		-Ditch Filling	
		-Drainage Reconstructing	8.7

Replaces	Text
Table 4.2-1 Page 4-8	Table 4.2-1 Page 4-8 dtd 7/18/88

*Denotes change or addition

TABLE 4.2-1 (cont'd)

RECLAMATION TIMETABLE

	YEAR(S)	AREA DESCRIPTION/ACTIVITY	RECLAIMED ACRES
	2016 (continued)	Portal to Loadout Area	
	2016-2018	Maintenance of Reclaimed Areas (if necessary)	N/A
		Regrading and Reseeding (if necessary)	N/A
	2019-2020	Success Monitoring and Extended Responsibility Period	N/A
		Determination of Successful Reclamation Expected	N/A
		Removal/Reclamation of Site Drainage Ditches and Ponds	N/A
		Compliance Documentation	-
*	2021-2026	Removal/Reclamation of Site Drainage Ditches and Ponds	N/A
		Maintenance of Reclaimed Areas (if necessary)	
		Regrading and Reseeding (if necessary)	

REPLACES	TEXT
Table 4.2-1 Page 4-9	Table 4.2-1 Page 4-9 Date 7/15/87

* Denotes change or addition

* TABLE 4.2.1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2017 (continued)	I	Structure Removal	
		Lower Bench -Mine No. 3 Portal Area	N/A
		Loadout Site -Silos	N/A
	I	B. Earth Work	
		Mine Site -Water Tank Area	0.3
		Upper Bench -Drainage Considerations Culvert Removal or Filling Ditch Filling Drainage Reconstruction	11.3
		Middle Bench -Drainage Considerations Culvert Removal or Filling Ditch Filling Drainage Reconstruction	10.3
		Lower Bench -Drainage Considerations Culvert Removal or Filling Ditch Filling Drainage Reconstruction	9.8

REPLACES	TEXT
Table 4.2.1 Page 4-9	Table 4.2.1 Page 4-9 Date 10/15/88

* Denotes change or addition

* TABLE 4.2.1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2017 (continued)	I	Structure Removal	
		Scofield Disposal Area	2.3
		-Disposal Area	
		South Fork Breakout	.4
		Loadout Site	8.7
		-Drainage Considerations	
		Culvert Removal or Filling	
		Ditch Filling	
		Drainage Reconstruction	
2017-2019		Maintenance of Reclaimed Area (if necessary)	N/A
		Regrading and Reseeding (if necessary	N/A
2020-2021		Success Monitoring and Extended Responsibility Period	N/A
		Determination of Successful Reclamation Expected	N/A
2022-2027		Removal/Reclamation of Loadout Site Drainage Ditches and Ponds	N/A
		Removal/Reclamation of Mine Site Drainage Ditches and Ponds	N/A

REPLACES	TEXT
Table 4.2.1 Page 4-9A	Table 4.2.1 Page 4-9A Date 10/15/88

* Denotes change or addition

TABLE 4.2.1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2017 (continued)	I	Structure Removal	
		Scofield Disposal Area -Disposal Area	2.3
*		South Fork Breakout	.96
		Loadout Site	8.7
		-Drainage Considerations	
		Culvert Removal or Filling	
		Ditch Filling	
		Drainage Reconstruction	
2017-2019		Maintenance of Reclaimed Area (if necessary)	N/A
		Regrading and Reseeding (if necessary)	N/A
2020-2021		Success Monitoring and Extended Responsibility Period	N/A
		Determination of Successful Reclamation Expected	N/A
2022-2027		Removal/Reclamation of Loadout Site Drainage Ditches and Ponds	N/A
		Removal/Reclamation of Mine Site Drainage Ditches and Ponds	N/A

REPLACES	TEXT
Table 4.2.1 Page 4-9A	Table 4.2.1 Page 4-9A Date 04/17/89

* Denotes change or addition

* TABLE 4.2.1 (cont'd)

RECLAMATION TIMETABLE

YEAR(S)	PHASE	AREA DESCRIPTION/ACTIVITY	NUMBER OF RECLAIMED ACRES
2022-2027 (continued)		Maintenance of Reclaimed Area (if necessary)	N/A
		Regrading and Reseeding (if necessary)	N/A
		Compliance Documentation	

REPLACES	TEXT
Table 4.2.1 Page 4-9B	Table 4.2.1 Page 4-9B Date 10/15/88

4.3 COST ESTIMATE FOR PERFORMANCE BOND

The Surface Mining Control and Reclamation Act of 1977 requires the operator of a coal mine to file with the Office of Surface Mining, a bond payable to the regulatory authority in the amount equal to the estimated cost of completing the work described in the operator's reclamation plan. The purpose of the bond provision is to ensure the State of Utah that in the event of the operator being financially unable to reclaim the disturbed areas, such areas can and will be restored by the proper regulatory authority at no cost to state residents.

The Permittee believes that a bond is not required for the surface area over the underground mine workings. This conclusion is based on the fact that, due to the strata characteristics above the coal seams, the slow and uniform rate of subsidence will not affect the surface terrain to such an extent that reclamation work will be necessary.

The Permittee's reclamation cost calculations for the facilites area disturbance is shown in Table 4.3-1. The estimated reclamation costs are shown on Table 4.3-2. The engineering estimates supporting the reclamation cost may be found in the Engineering Calculations section of Appendix Volume A-3.

TABLE 4.3-1

RECLAMATION COST CALCULATIONS

Description	Units	Unit Cost	Subtotal
BUILDING AND EQUIPMENT REMOVAL			
Equipment Removal	Tons	$140/ton	
1,500 tons x 75% (25% assumed saleable)	1,125		$157,500
Steel Frame Building Removal	ft^3	$0.17/$ft^3$ of Volume	
Shop-Warehouse	1,856,000		$315,520
	113,000		19,210
Administration Building	78,000		13,260
Mine #1 Transfer Tower	96,000		16,320
Mine #2 & 3 Drive House	180,000		30,600
Crusher--Raw Coal	88,000		14,900
Truck Loadout	30,000		5,100
Railcar Loadout	118,000		20,060
Transfer Towers (3)	168,000		28,560
			$463,530
CONCRETE AND BLACKTOP REMOVAL	yd^2, yd^3, or ft^3		
Upper Terrace Conveyor Foundation	972 ft^3	$.22/$ft^3$	$ 210
Middle Terrace Shop Warehouse Foundation	5,130 ft^3	$.22/$ft^3$	1,130
Transfer Tower Foundation Mine #1	1,782 ft^3	$.22/$ft^3$	390
Conveyor Foundation	1,458 ft^3	$.22/$ft^3$	$ 320
Silo	18,360 ft^3	$.22/$ft^3$	$ 4,040

TABLE 4.3-1

RECLAMATION COST CALCULATIONS

	Description	Units	Unit Cost	Subtotal
	BUILDING AND EQUIPMENT REMOVAL			
	Equipment Removal	Tons	$140/ton	
	1,500 tons x 75% (25% assumed saleable)	1,125		$157,500
	Steel Frame Building Removal	ft^3	$0.17/$ft^3$ of Volume	
	Shop-Warehouse	1,856,000		$315,520
		113,000		19,210
	Administration Building	78,000		13,260
	Mine #1 Transfer Tower	96,000		16,320
	Mine #2 & 3 Drive House	180,000		30,600
	Crusher--Raw Coal	88,000		14,900
	Truck Loadout	30,000		5,100
	Railcar Loadout	118,000		20,060
	Transfer Towers (3)	168,000		28,560
*	Water Tanks (2)	46,800		7,960
*	Overland Conveyor System (5)	480,000		81,600
*	Well Houses (3)	860		150
				553,240
	CONCRETE AND BLACKTOP REMOVAL	yd^2, yd^3, or ft^3		
	Upper Terrace Conveyor Foundation	972 ft^3	$.22/$ft^3$	$ 210

REPLACES	TEXT
Table 4.3-1 Page 4-11	Table 4.3-1 Page 4-11 Date 10/15/88

* Denotes change or addition

Table 4.3-1 (continued)

Description	Units	Unit Cost	Subtotal
Parking Area	140 yd^2	$1.40/$yd^2$	$ 200
Disposal	1,026 yd^3	$5.10/$yd^3$	$ 5,230
Lower Terrace			
Crusher Foundation	2,916 ft^3	$.22/$ft^3$	640
Mine 2 & 3 Drive House	3,660 ft^3	$.22/$ft^3$	800
Conveyor Foundation	2,430 ft^3	$.22/$ft^3$	$ 530
Truck Loadout Foundation	270 ft^3	$.22/$ft^3$	$ 60
Road and Storage	14,670 yd^2	$1.48/$yd^2$	$ 21,700
Disposal	340 yd^3	$5.10/$yd^3$	$ 1,730
Road			
Conveyor - Transfer Tower Foundations	32,400 ft^3	$.22/$ft^3$	7,130
Disposal	1,200 yd^3	$5.10/$yd^3$	6,120
Concrete Removal - Loadout Silo Sides	162,000 ft^3	$.22/$ft^3$	35,640
Railcar Loadout	6,706 ft^3	$.22/$ft^3$	1,470
Paving	4,660 yd^2	$1.48/$yd^2$	$ 6,900
Disposal	6,784 yd^3	$5.10/$yd^3$	$ 34,600
Backfilling			
Mine #1	6,940		$ 6,940
Mine # 2 & 3	6,940		$ 6,940

Table 4.3-1 (continued)

Description	Units	Unit Cost	Subtotal
Middle Terrace			
Shop Warehouse Foundation	5,130 ft^3	$.22/$ft^3$	1,130
Transfer Tower Foundation Mine #1	1,782 ft^3	$.22/$ft^3$	390
Conveyor Foundation	1,458 ft^3	$.22/$ft^3$	$ 320
Silo	18,360 ft^3	$.22/$ft^3$	$ 4,040
Parking Area	140 yd^2	$1.40/$yd^2$	$ 200
Disposal	1,026 yd^3	$5.10/$yd^3$	$ 5,230
Lower Terrace			
Crusher Foundation	2,916 ft^3	$.22/$ft^3$	640
Mine 2 & 3 Drive House	3,660 ft^3	$.22/$ft^3$	800
Conveyor Foundation	2,430 ft^3	$.22/$ft^3$	$ 530
Truck Loadout Foundation	270 ft^3	$.22/$ft^3$	$ 60
Road and Storage	14,670 yd^2	$1.48/$yd^2$	$ 21,700
Disposal	340 yd^3	$5.10/$yd^3$	$ 1,730
Road			
Conveyor - Transfer Tower Foundations	32,400 ft^3	$.22/$ft^3$	7,130
Disposal	1,200 yd^3	$5.10/$yd^3$	6,120
Concrete Removal - Loadout			
Silo Sides	162,000 ft^3	$.22/$ft^3$	35,640
Railcar Loadout	6,706 ft^3	$.22/$ft^3$	1,470
Paving	4,660 yd^2	$1.48/$yd^2$	$ 6,900
Disposal	6,784 yd^3	$5.10/$yd^3$	$ 34,600
Backfilling			
Mine #1	6,940		$ 6,940
Mine # 2 & 3	6,940		$ 6,940

REPLACES	TEXT
Table 4.3-1 Page 4-12	Table 4.3-1 Page 4-12 Date 10/15/88

TABLE 4.3-2

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	MINE SITE											
	Water Tank Area	0.3	--	3,200	850	100	1,400	50	120	240	300	$ 6,260
	Upper Terrace	11.3	--	83,250	--	26,530	5,960	49,500	880	7,040	8,800	185,480
ABANDONMENT	Mine #1 & 2 Portals		--	6,940	--	--	--	--	--	--	--	6,940
	Conveyor Foundations		420	--	--	--	--	--	--	--	--	420
	Drainage Reconstructions		--	--	93,060	--	--	--	--	--	--	93,060
	Mine #1 Transfer Tower		520	--	--	--	--	--	--	--	--	520
	Middle Terrace	10.0	--	4,350	380	3,770	5,820	930	3,720	7,440	4,300	30,710
	Shop-Warehouse		2,100	--	--	--	--	--	--	--	--	2,100
	Mine #1 Sampling Tower		960	--	--	--	--	--	--	--	--	960
	Conveyor Foundations		1,470	--	--	--	--	--	--	--	--	1,470
	Silo & Feed Tunnel		350	--	--	--	--	--	--	--	--	350
	Drainage Reconstruction	--	--	--	250	--	--	--	--	--	--	250

TABLE 4.3-2

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	MINE SITE											
	Water Tank Area	0.3	—	3,200	850	100	1,400	50	120	240	300	$ 6,260
	Upper Terrace	11.3	—	83,250	26,530	5,960	49,500	880	3,520	7,040	8,800	185,480
ABANDONMENT	Mine #1 & 2 Portals		—	6,940	—	—	—	—	—	—	—	6,940
	Conveyor Foundations		420	—	—	—	—	—	—	—	—	420
	Drainage Reconstructions		—	—	93,060	—	—	—	—	—	—	93,060
	Mine #1 Transfer Tower		520	—	—	—	—	—	—	—	—	520
	Middle Terrace	10.0	—	4,350	380	3,770	5,820	930	3,720	7,440	4,300	30,710
	Shop-Warehouse		2,100	—	—	—	—	—	—	—	—	2,100
	Mine #1 Sampling Tower		960	—	—	—	—	—	—	—	—	960
	Conveyor Foundations		1,470	—	—	—	—	—	—	—	—	1,470
	Silo & Feed Tunnel		350	—	—	—	—	—	—	—	—	350
	Drainage Reconstruction	—	—	—	250	—	—	—	—	—	—	250

REPLACES TEXT

Table 4.3-2 Page 4-13 :: Table 4.3-2 Page 4-13 Date 10/15/88

* Denotes change or addition

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	Lower Terrace	9.8	--	34,320	6,100	3,200	41,130	730	292	5,840	7,300	101,540
ABANDONMENT	Crusher		1,190	--	--	--	--	--	--	--	--	1,190
	Conveyors		560	--	--	--	--	--	--	--	--	560
	Truck Loadout		110	--	--	--	--	--	--	--	--	110
	Mine #3 Portals		--	6,940	--	--	--	--	--	--	--	6,940
	Silo		7,510	--	--	--	--	--	--	--	--	7,510
	Road and Storage		21,700	--	--	--	--	--	--	--	--	21,700
	Drainage Reconstruction		--	420	--	--	--	--	--	--	--	420
	Subtotal (Mine site-Abandonment Phase)		36,890	136,220	126,320	12,930	96,450	2,540	10,160	20,320	20,400	$462,230
	ECCLES CANYON CORRIDOR											
	Transfer Towers Conveyor	1.0	1,325	--	2,480	380	9,360	100	400	800	1,000	27,770
	Subtotal (Road Abandonment Phase)		1,325	--	2,480	300	9,360	100	400	800	1,000	27,770

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	Lower Terrace	9.8	—	34,320	6,100	3,200	41,130	730	2,920	5,840	7,300	101,540
ABANDONMENT	Crusher		1,190	—	—	—	—	—	—	—	—	1,190
	Conveyors		560	—	—	—	—	—	—	—	—	560
	Truck Loadout		110	—	—	—	—	—	—	—	—	110
	Mine #3 Portals		—	6,940	—	—	—	—	—	—	—	6,940
	Silo		7,510	—	—	—	—	—	—	—	—	7,510
	Road and Storage		21,700	—	—	—	—	—	—	—	—	21,700
	Drainage Reconstruction		—	420	—	—	—	—	—	—	—	420
	Subtotal (Mine site-Abandonment Phase)		36,890	136,420	127,170	13,030	97,850	2,590	10,280	20,560	20,700	$468,490
	ECCLES CANYON CORRIDOR											
	Transfer Towers Conveyor	1.0	13,250	—	2,480	380	9,360	100	400	800	1,000	27,770
	Subtotal (Road Abandonment Phase)		13,450	—	2,480	300	9,360	100	400	800	1,000	27,770

REPLACES TEXT

Table 4.3-2 Page 4-14 Table 4.3-2 Page 4-14 Date 10/15/88

* Denotes change or addition

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	LOADOUT SITE	8.7	--	45,070	6,930	1,560	64,050	870	3,480	6,960	8,700	137,620
	Silos (4)		64,700	--	--	--	--	--	--	--	--	64,700
ABANDONMENT	Railcar Loadout		2,630	--	--	--	--	--	--	--	--	2,630
	Sedimentation Pond Backfill		1,540	--	--	--	--	--	--	--	--	1,540
	Paving		12,440	--	--	--	--	--	--	--	--	12,440
	Subtotal (Loadout - Abandonment Phase)		81,310	45,070	6,930	1,560	64,050	8,700	3,480	6,960	8,700	$218,930
	WASTE ROCK DISPOSAL SITE	2.3	--	--	11,400	870	43,060	230	920	1,840	2,300	60,620
	Subtotal (Waste rock Abandonment Phase)		--	--	11,400	870	43,060	230	920	1,840	2,300	60,620
	Sub-Total Abandonment Phase		131,450	184,490	147,980	15,840	214,320	3,790	15,080	30,160	32,700	$775,810
	BUILDING AND EQUIPMENT REMOVAL		621,030 (Building removal)									621,030
	Subtotal (Removal - Abandonment Phase)		621,030									621,030

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	LOADOUT SITE	8.7	—	45,070	6,930	1,560	64,050	8,700	3,480	6,960	8,700	137,620
	Silos (4)		64,700	—	—	—	—	—	—	—	—	64,700
A	Railcar Loadout		2,630	—	—	—	—	—	—	—	—	2,630
B	Sedimentation Pond Backfill		1,540	—	—	—	—	—	—	—	—	1,540
AND	Paving		12,440	—	—	—	—	—	—	—	—	12,440
ON	Subtotal (Loadout - Abandonment Phase)		81,310	45,070	6,930	1,560	64,050	8,700	3,480	6,960	8,700	$218,930
MENT	WASTE ROCK DISPOSAL SITE	2.3	—	—	11,400	870	43,060	230	920	1,840	2,300	60,620
	Subtotal (Waste rock Abandonment Phase)		—	—	11,400	870	43,060	230	920	1,840	2,300	60,620
	SOUTH FORK BREAKOUT AREA	.4		4,250	1,700	300	1,850	150	180	375	800	9,605
	Subtotal (South Fork Abandonment Phase)		—	4,250	1,700	300	1,850	150	180	375	800	9,605
	Sub-Total Abandonment Phase		131,450	188,740	149,680	16,140	216,170	3,940	15,260	30,535	33,500	$785,415

REPLACES TEXT

Table 4.3-2 Page 4-15 Table 4.3-2 Page 4-15 Date 10/15/88

* Denotes change or addition

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	LOADOUT SITE	8.7	--	45,070	6,930	1,560	64,050	8,700	3,480	6,960	8,700	137,620
	Silos (4)		64,700	--	--	--	--	--	--	--	--	64,700
A	Railcar Loadout		2,630	--	--	--	--	--	--	--	--	2,630
B												
A	Sedimentation Pond Backfill		1,540	--	--	--	--	--	--	--	--	1,540
N												
D	Paving		12,440	--	--	--	--	--	--	--	--	12,440
O												
N	Subtotal (Loadout -											
M	Abandonment Phase)		81,310	45,070	6,930	1,560	64,050	8,700	3,480	6,960	8,700	$218,930
E												
N-												
T												
	WASTE ROCK DISPOSAL SITE	2.3	--	--	11,400	870	43,060	230	920	1,840	2,300	60,620
	Subtotal (Waste rock											
	Abandonment Phase)		--	--	11,400	870	43,060	230	920	1,840	2,300	60,620
	SOUTH FORK BREAKOUT AREA	.96		8,500	3,400	600	3,700	300	360	750	1,600	19,210
	Subtotal (South Fork											
	Abandonment Phase)		--	8,500	3,400	600	3,700	300	360	750	1,600	19,210
	Sub-Total Abandonment Phase		131,450	192,990	151,580	16,440	218,000	4,090	15,440	30,910	34,300	$804,625

REPLACES	TEXT
Table 4.3-2 Page 4-15	Table 4.3-2 Page 4-15 Date 2/20/89

* Denotes change or addition

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
ABANDONMENT	TOTAL ABANDONMENT PHASE		752,480	184,490	147,980	15,840	214,320	3,790	15,080	30,160	32,700	1,396,840
	Contingency (10%)											139,680
	Sub Total											$1,536,520
	Inflation Factor (1.97% per year)											$151,350
	PROJECT TOTAL											**$1,687,870**

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	BUILDING AND EQUIPMENT REMOVAL		710,740 (Building removal)									710,740
ABANDONMENT	Subtotal (Removal - Abandonment Phase)		710,740									710,740
	TOTAL ABANDONMENT PHASE		842,190	188,680	149,680	16,140	216,170	3,940	15,260	30,535	33,500	1,486,550
	Contingency (10%)											148,670
	Sub Total											$1,635,220
	Inflation Factor (1.97% per year)											$161,070
	PROJECT TOTAL											$1,796,290

REPLACES TEXT

Table 4.3-2 Page 4-16 : Table 4.3-2 Page 4-16 Date 10/15/88

* Denotes change or addition

TABLE 4.3-2 (continued)

ESTIMATED RECLAMATION COSTS

PHASE	Area Description	No. of Acres	Concrete and/or Blacktop Removal	Back-filling	Grading	Ripping	Topsoil Additions	Fertil-ization and/or Neutral-ization	Seeding and Tree Planting	Moisture Retention	Maintenance and Monitoring	TOTAL
	BUILDING AND EQUIPMENT REMOVAL		621,030 (Building removal)									621,030
ABA	Subtotal (Removal - Abandonment Phase)		621,030									621,030
AND	TOTAL ABANDONMENT PHASE		752,480	192,990	151,580	16,440	218,000	4,090	15,440	30,910	34,300	1,416,230
* ON												
MENT	Contingency (10%)											141,623
	Sub Total											$1,557,853
	Inflation Factor (1.97% per year)											$153,449
	PROJECT TOTAL											$1,711,302

REPLACES	TEXT
Table 4.3-2 Page 4-16	Table 4.3-2 Page 4-16 Date 4/19/89

* Denotes change or addition

intervals. The area around Mine No. 3 portals is overlain by thin (1 to 2 feet thickness) sandstones, shales and siltstones. Final cut slopes in this area will be contoured to a one horizontal to one vertical slope (1h:1v) with 8-foot-wide benches provided at 30-foot height intervals. The described specifications have been determined to be stable and safe by analysis of the geotechnical core drilling. Stability and designated postmining landuse will be achieved without extensive backfilling and therefore the mine site * will not be returned to the original contours. The sedimentation pond at the portal area will not be backfilled but will be allowed to fill in naturally, thus creating additional riparian habitat to enhance wildlife. All drainage diversion ditches will not be reclaimed as they will already be fully revegetated and in stable condition.

The reclamation plan is shown on in maps 4.4.2-1A and 4.4.2-1B.

The cut slopes will be constructed in a manner which will achieve the necessary physical stability. The Permittee will develop cutslopes with 1h:2v slopes in competent rock only and will develop cutslopes with 1h:1v (maximum) slopes in less competent materials such as soil and colluvium. This design will prevent slides and reduce other related erosional damage from occurring. The operational bench slopes will be reduced to the approximate original contour (2h:1v) upon abandonment, utilizing a bulldozer working along the slopes.

Grading operations will be possible at the railroad load-out site which will be returned to the approximate original contour and shown on Maps 4.4.2-1C and 4.4.2-1D. Water tank final reclamation contours are shown on Map 4.4.2-1E. The waste rock disposal site final reclamation contours are shown on Map 4.16.1-1B.

intervals. The area around Mine No. 3 portals is overlain by thin (1 to 2 feet thickness) sandstones, shales and siltstones. Final cut slopes in this area will be contoured to a one horizontal to one vertical slope (1h:1v) with 8-foot-wide benches provided at 30-foot height intervals. The described specifications have been determined to be stable and safe by analysis of the geotechnical core drilling. Stability and designated postmining landuse will be achieved without extensive backfilling and therefore the mine site will not be returned to the original contours. The sedimentation * pond at the portal area will be backfilled but will be allowed to fill in naturally, thus creating additional riparian habitat to enhance wildlife. All drainage diversion ditches will not be reclaimed as they will already be fully revegetated and in stable condition.

The reclamation plan is shown on in maps 4.4.2-1A and 4.4.2-1B. * Costs and mass balance data associated with reclamation may be found in the Engineering Calculations.

The cut slopes will be constructed in a manner which will achieve the necessary physical stability. The Permittee will develop cutslopes with 1h:2v slopes in competent rock only and will develop cutslopes with 1h:1v (maximum) slopes in less competent materials such as soil and colluvium. This design will prevent slides and reduce other related erosional damage from occurring. The operational bench slopes will be reduced to the approximate original contour (2h:1v) upon abandonment, utilizing a bulldozer * working along the slopes. The only steeper slope (1h:1v) will be the area between the benches at the portal area. A geotechnical analysis will be made of this slope at the time of reclamation and design adjustment made as necessary to insure slope stability.

Grading operations will be possible at the railroad load-out site which will be returned to the approximate original contour and

intervals. The area around Mine No. 3 portals is overlain by thin (1 to 2 feet thickness) sandstones, shales and siltstones. Final cut slopes in this area will be contoured to a one horizontal to one vertical slope (1h:1v) with 8-foot-wide benches provided at 30-foot height intervals. The described specifications have been determined to be stable and safe by analysis of the geotechnical core drilling. Stability and designated postmining landuse will be achieved without extensive backfilling and therefore the mine site will not be returned to the original contours. The sedimentation * pond at the portal area will be backfilled, covered with topsoil and revegetated. All drainage diversion ditches will not be reclaimed as they will already be fully revegetated and in stable condition.

The reclamation plan is shown on in maps 4.4.2-1A and 4.4.2-1B. Costs and mass balance data associated with reclamation may be found in the Engineering Calculations, Volume 5.

The cut slopes will be constructed in a manner which will achieve the necessary physical stability. The Permittee will develop cutslopes with 1h:2v slopes in competent rock only and will develop cutslopes with 1h:1v (maximum) slopes in less competent materials such as soil and colluvium. This design will prevent slides and reduce other related erosional damage from occurring. The operational bench slopes will be reduced to the approximate original contour (2h:1v) upon abandonment, utilizing a bulldozer working along the slopes. The only steeper slope (1h:1v) will be the area between the benches at the portal area. A geotechnical analysis will be made of this slope at the time of reclamation and design adjustment made as necessary to insure slope stability.

Grading operations will be possible at the railroad load-out site which will be returned to the approximate original contour and

4.4.3 Soil Stabilization

In addition to the vegetative stabilization discussed in Section 4.7 - REVEGETATION PLAN, physical stabilization of the soil is also planned. The specific methods to be implemented will be defined on the basis of additional soil analyses at the time of reclamation. An example of the soil stabilization methodology that might be used includes the placement of crushed and heavier material at the toe of road fill slopes and along stream banks.

4.4.4 Stabilization of Rills and Gullies

All rills and gullies which erode to a depth of nine inches or more will be filled, regraded and reseeded.

4.4.5 Acid and Toxic-Forming Materials

Extensive testing of soils in the disturbed area and of materials near the coal seams has failed to identify the presence of any materials capable of causing acidity or toxicity problems. (Refer * to Section 2.2.8 for test results.) Consequently, it is not anticipated that there will be any such material for disposal.

Should any such material be identified, it will be placed in a protected area and will be enclosed by berms to prevent runoff. The Division will be immediately notified and an acceptable disposal plan formulated.

shown on Maps 4.4.2-1C and 4.4.2-1D. Water tank final reclamation contours are shown on Map 4.4.2-1E. The waste rock disposal site final reclamation contours are shown on Map 4.16.1-1B.

4.4.3 Soil Stabilization

In addition to the vegetative stabilization discussed in Section 4.7 - REVEGETATION PLAN, physical stabilization of the soil is also planned. The specific methods to be implemented will be defined on the basis of additional soil analyses at the time of reclamation. An example of the soil stabilization methodology that might be used includes the placement of crushed and heavier material at the toe of road fill slopes and along stream banks.

4.4.4 Stabilization of Rills and Gullies

All rills and gullies which erode to a depth of nine inches or more will be filled, regraded and reseeded.

4.4.5 Acid and Toxic-Forming Materials

* Extensive testing of soil material near the coal seams failed to identify the presence of any materials capable of causing acidity or toxicity problems. (Refer to Hydrology Section of Volume A-1 for test results. These test, however, were conducted using different procedures than those currently requested by the Division. More recent tests on waste material removed from the mine have given mixed signals, particularly on acid forming potential. (Recent test data are appended to this section.)

* Material placed at the waste disposal site will be compositely sampled on a quarterly basis during periods of deposition at the site. Composite samples will also be taken during recontouring prior to final reclamation at the waste rock disposal site and on

the waste material to be left at the loadout facility site. Operational test data will be submitted to the Division annually. However, should acidity or toxicity problems be defined either during operation or reclamation, the Division will be notified immediately and mutually acceptable remedial action will be taken.

ADDITION TO	TEXT
Section 4.4.5 Page 4-19A	Section 4.4.5 Page 4-19A Date 10/15/88

the waste material to be left at the loadout facility site. Operational test data will be submitted to the Division annually. However, should acidity or toxicity problems be defined either during operation or reclamation, the Division will be notified immediately and mutually acceptable remedial action will be taken.

* Waste material temporarily stored in the mine site gob pile will be tested for each accumulation of approximately 2,000 tons. The location from which the sample is taken will be identified. Materials found to be toxic will be removed to the permanent disposal site within 30 days or as soon thereafter as weather conditions permit. Drainage from the temporary storage site reports to the sedimentation pond where the discharge is tested in accordance with NPDES Discharge Permit conditions.

ADDITION TO	TEXT
Section 4.4.5 Page 4-19A	Section 4.4.5 Page 4-19A Date 1/10/89

Branch Code

Lab. No. 72203

Rec'd. 07.20.87

Date Sampled 07.17.87

Sampled By YOURSELVES

STANDARD LABORATORIES, INC

SAMPLE ID:

ROCK SAMPLE

UTAH FUEL COMPANY
COASTAL STATES ENERGY
175 EAST 400 SOUTH
SALT LAKE CITY, UTAH 84111
(801) 529-7428

ACID - BASE ACCOUNTABILITY
CaCO3 EQUIV. (TONS/1000 TONS OF MATERIAL)

COLOR	FIZZ	%SUL.	MAX. FROM %SUL.	AMOUNT PRESENT	MAX. NEEDED pH 7	EXCESS	PASTE pH
5Y 6-1	1	0.069	2.16	39.42		37.27	7.94

ELECTRICAL CONDUCTIVITY - 530 umhos/cm

PARTICAL SIZE ANALYSIS (BY HYDROMETER)

% SAND 45.6

% SILT 38.6

% CLAY 15.8

SODIUM ABSORPTION RATIO - 0.193 meq/L

SATURATED WATER PERCENTAGE - 39.80%

TOTAL SELENIUM - 1.08 ppm

TOTAL BORON - 5.68 ppm

Respectfully Submitted, Cliff Smart

CLIFF SMART 08.21.87

3515

Branch Code 43

Lab No 71932

Date Rec'd 05/05/87

Date Sampled 04/30/87

Sampled By YOURSELVES

STANDARD LABORATORIES, INC.

SAMPLE ID: WASTE ROCK SAMPLE

UTAH FUEL COMPANY
COASTAL STATES ENERGY
~~411 WEST 7200 SOUTH~~
~~MIDVALE, UTAH 84047~~

ACID - BASE ACCOUNTABILITY

CACO3 EQUIV. (TONS/1000 TONS OF MATERIAL)

COLOR	FIZZ	%SUL.	MAX. FROM %SUL.	AMOUNT PRESENT	MAX. NEEDED pH 7	EXCESS	PASTE pH
10YR 5/1	0	0.704	22.00	7.73	14.27	0	7.89

ELECTRICAL CONDUCTIVITY - 700 µmhos/cm

PARTICAL SIZE ANALYSIS (BY HYDROMETER)

% SAND 71.60
% SILT 20.20
% CLAY 8.20

SODIUM ABSORPTION RATIO - 1.16

SATURATED WATER PERCENTAGE - 39.16%

TOTAL SELENIUM - 0.45 ppm

TOTAL BORON - 46.8 µg/g

Respectfully Submitted, Kayd Simpson

4-19C

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (312) 953-9300

INCE 1908

Member of the SGS Group (Societa' Generale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81024

Date Rec'd. May 5, 1988

Date Sampled April 21, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock Sample
Scofield Waste Rock Site
Siltstone, 1 bag

Boron, Water Soluble .088ppm

Selenium, Water Soluble <.001ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

4-19D

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (312) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81016

Date Rec'd. May 5, 1988

Date Sampled April 26, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock Sample
Scofield Waste Rock Site
Peridefite, 1 bag

Boron, Water Soluble .114ppm

Selenium, Water Soluble .004ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

4-19E

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (312) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81026

Date Rec'd. May 5, 1988

Date Sampled April 26, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock Sample
Scofield Waste Rock Site
Sity Sandstone, 1 bag

Boron, Water Soluble .070ppm

Selenium, Water Soluble .004ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

4-19F

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (312) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81028

Date Rec'd. May 5, 1988

Date Sampled April 26, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock sample
Scofield Waste Rock Site
Highwall Sandstone

Boron, water soluble	.104 ppm
Selenium, water soluble	.001 ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

4-19G

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (312) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311

Branch Code 5900

Job. No. 81025

Date Rec'd. May 5, 1988

Date Sampled April 26, 1988

Sampled By Utah Fuel

UTAH FUEL CO.
P.O. Box 719
Helper, UT 84526

Sample I.D.

Rock Sample
Scofield Waste Rock Site
Sity Shale, 1 bag

Boron, Water Soluble .068ppm

Selenium, Water Soluble .007ppm

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

4-19H

4.5 SOIL PREPARATION AND FERTILIZATION PLAN

Prior to redistribution, the topsoil stockpile will be loosened by ripping, disking, or other reclaiming means to break up the topsoil.

Following redistribution, the topsoil will be fertilized. Fertilizer application and rate to be applied to the to redistributed topsoil will be based on and established by analysis of stockpiled topsoil and/or by analyses conducted on topsoil that has been disturbed prior to revegetation. The topsoil will be analyzed for N, P, K, Fe, Mg, Mn, Zn, Ca, and pH to determine the fertilizer formulation and application. The fertilizer will be applied when there is suitable moisture in the soil; and initial application will be done at the time of seeding by the same method as the seeding, i.e., drilling, broadcasting or with the hydromulch. If follow up applications are needed, they will be applied by broadcasting.

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Chemical analyses for micro-nutrients on the permit areas was conducted by testing soil extracts with DTPA solution and measured by use of an atomic absorption analyzer. Ammonium acetate was used to extract potassium, calcium and magnesium for atomic absorption analysis. Phosphorous determination was made by using sodium bicarbonate extraction and colorimetric analysis. The Kjeldahl method was used for determination of * total nitrogen. Soil texture was determined by using a Bouyoucus hydrometer method (sodium herametaphosphate dispersing agent). Soil pH was determined on a 1:1 soil/water mixture tested with an electrode pH meter. Salinity was analyzed by using a Wheatstone conductivity cell on an extract of each soil sample. These analyses correlated with the consultant's recommendation that 100 pounds per acre of available nitrogen be applied during initial seeding on all areas for seedling establishment and to assist in the breakdown of straw that may be used for mulch. Additional fertilization will be determined on a case-by-case basis. After seedlings are established, additional fertilizer will not be used to increase production.

Addition to	Text
Section 4.5 p. 4-20	Sec. 4.5, p. 4-20, dtd 4/10/89

The stockpiled topsoil will not be removed or otherwise disturbed until required for redistribution operations on a prepared, regraded disturbed area.

4.6.4 Topsoil Redistribution

Topsoil redistribution on slopes steeper than 3h:1v will be done immediately prior to revegetation. Other surfaces will have topsoil redistributed up to a maximum of six months prior to seeding. This period is designed to permit even settling of topsoil prior to revegetation. Prior to topsoil redistribution, regraded land will be scarified by a ripper-equipped tractor. The ground surface will be ripped to a suitable depth in order to reduce surface compaction, provide a roughened surface assuring topsoil adherence and to promote vegetional root penetration.

Within a suitable time period prior to seeding, topsoil will be distributed on all areas to be reclaimed. During this time period, the topsoil will be allowed to settle and attain equilibrium with its natural environment. This procedure will be followed for all areas in which facilities such as road beds, mine pads, and building sites are to be abandoned. The Permittee does not anticipate the use of any substitute or supplemental topsoil. Should such use become necessary, the Permittee will notify the regulatory authority of such proposed use and will provide information on the suitability of the supplemental or substitute topsoil.

Topsoil redistribution procedures will ensure an approximate uniform thickness consistent with the proposed reclamation plan. Topsoil for the proposed aspen and spruce areas will be spread in relatively deeper layers than for the proposed sagebrush areas due to the vegetational characteristics of each type. Topsoil will be redistributed at a time of year suitable for seeding permanent revegetation.

The stockpiled topsoil will not be removed or otherwise disturbed until required for redistribution operations on a prepared, regraded disturbed area.

4.6.4 Topsoil Redistribution

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Topsoil redistribution procedures will ensure an approximate uniform thickness consistent with the proposed reclamation plan. Topsoil for the proposed aspen and spruce areas will be spread in
* relatively deeper layers than for the proposed grass/forb areas due to the vegetational characteristics of each type. Topsoil will be redistributed at a time of year suitable for seeding permanent revegetation.

The results of revegetation work at the Skyline Mine suggests that 12 inches of topsoil will be adequate for the proposed rock waste disposal site.

The soil will be spread in a manner to provide a roughened surface so that seed and mulch can remain during germination and initial growth of the seedlings. Raking the surface prior to planting seeds will provide the necessary roughened surface.

The potential for upward migration of salts is unknown. The Permittee commits to analyze for electrical conductivity sodium content and sodium absorption ratio prior to revegetation efforts.

Fertilizer rates may change after the soil's analyses of the topsoil are completed. The Permittee plans at this point to apply 100 pounds per acre of available nitrogen rather than 150 pounds as stated. The consultant has recommended that wood fiber mulch be used; hence, nitrogen consumption due to microbial breakdown has not been considered. The Permittee's consultant has stated that phosphorous and potassium concentration based upon Skyline's data should be adequate in the aspen soils, and, therefore, since the topsoil will be an aspen type, no potassium or phosphorous is recommended. The Permittee plans to test the topsoil before it is seeded to determine the type and amount of fertilizer or neutralizer required. The soil's analyses will determine the following components: (a) micro-nutrients, (b) potassium, (c) calcium, (d) magnesium, (e) phosphorus, (f) nitrogen, (g) soil pH and salinity, and (h) soil texture.

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* The drainage diversion ditch will not be reclaimed as it will be fully revegetated and in stable condition.

* The soil will be spread 12 inches thick in a manner to provide a roughened surface so that seed and mulch can remain during germination and initial growth of the seedlings. Topsoil depth was determined from soil pits in the reference area. Raking the surface prior to planting seeds will provide the necessary roughened surface.

The potential for upward migration of salts is unknown. The Permittee commits to analyze for electrical conductivity sodium content and sodium absorption ratio prior to revegetation efforts.

Fertilizer rates may change after the soil's analyses of the topsoil are completed. The Permittee plans at this point to apply 100 pounds per acre of available nitrogen rather than 150 pounds as stated. The consultant has recommended that wood fiber mulch be used; hence, nitrogen consumption due to microbial breakdown has not been considered. The Permittee's consultant has stated that phosphorous and potassium concentration based upon Skyline's data should be adequate in the aspen soils, and, therefore, since the topsoil will be an aspen type, no potassium or phosphorous is recommended. The Permittee plans to test the topsoil before it is seeded to determine the type and amount of fertilizer or neutralizer required. The soil's analyses will determine the following components: (a) micro-nutrients, (b) potassium, (c) calcium, (d) magnesium, (e) phosphorus, (f) nitrogen, (g) soil pH and salinity, and (h) soil texture.

The drainage diversion ditch will not be reclaimed as it will be fully revegetated and in stable condition.

* 4.6.5 South Fork Breakout

Before any top soil is removed, all woody vegetation will be removed from the project area. Soils are basically a sandy loam mixture and have been classified by the S.C.S. as Uinta Family loam/tozc Family fine Sandy loam. Core sampling in the area shows that the soils vary in depth from 24 - 36+" in depth.

After the vegetation has been removed, the A & B horizons of soil will be removed using a track hoe. The track hoe will stack the soil where a front-end loader will pick it up and transport it to the storage area on the abandoned temporary Forest Service road. The front-end loader will spread the soil in approximately a two foot lift. By handling the soil in this manner, it will not be compacted in the storage area and the roots of the revegetation plants will penetrate the entire depth of the soil. This will allow the soil to maintain itself as viable top soil to be used during final reclamation. It is estimated that approximately 2,990 cubic yards of topsoil will be removed and stored.

As subsoils are encountered, they will be used to bring the new access road up to grade. Subsoil not used as road will also be stored on the abandoned temporary Forest Service road on a section below the topsoil storage. It is estimated that approximately 2,840 cubic yards of subsoil will be removed. Approximately 1,820 cubic yards of the subsoil will be used in the road fill and the remaining 1,020 cubic yards will be stored for final reclamation.

As the coal in the coal seam is encountered, it will be hauled out so as to eliminate the possibility of spontaneous combustion occurring.

Once the construction is complete, all of the disturbed area will be seeded and all the roads that are National Forest Lands and the disturbed areas will be water barred and seeded with the mixture shown on Table 4.6-1. A combination of silt fences and strawbales will be used to treat surface run-off from the disturbed area of the new road, the breakout pad and the topsoil-subsoil storage areas until adequate vegetation is established. The silt fences and strawbales will be located as needed between the disturbed and undisturbed areas to treat run-off from the disturbed area.

At the end of the life of mine, the road into the breakout site will be reopened. The portals will be sealed as outlined in section 4.9. The area will then be returned to approximate original contour and the highwall eliminated by front-end loaders and track hoe type equipment. First the subsoil from the storage area and road will be uniformly placed in the breakout area. The topsoil will then be uniformly distributed over the area.

The soil will be spread in a manner to provide a roughened surface so that seed, fertilizer and mulch can remain during germination and initial growth of the seedlings. Raking the surface prior to planting may also be needed to provide the necessary roughened surface.

Once the construction was complete, all of the disturbed area were seeded and all the roads that are on National Forest Lands and the disturbed areas were water barred and seeded with the mixture shown on Table 4.6-1. A combination of silt fences and strawbales were used to treat surface run-off from the disturbed area of the new road, the breakout pad and the topsoil-subsoil storage areas until adequate vegetation is established. The silt fences and strawbales were located as needed between the disturbed and undisturbed areas to treat run-off from the disturbed area.

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* and track hoe type equipment. First the subsoil from the storage area and road will be uniformly placed in the breakout area. The topsoil will then be uniformly distributed over the area. If additional fill material is needed, the remainder of the small knob at the mouth of the canyon may be used.

The soil will be spread in a manner to provide a roughened surface so that seed, fertilizer and mulch can remain during germination and initial growth of the seedlings. Raking the surface prior to planting may also be needed to provide the necessary roughened surface.

The highwall at the breakout area will be eliminated by frontend and track hoe type equipment. If additional fill material is needed to return the area to approximate orignal contour, the remainder of the small knob at the mouth of the canyon may be
* used. The subsoil from the storage area will be uniformly placed in the breakout area, and then the topsoil will be uniformly spread over the area. The access road up the side canyon to the breakout area and the temporary road used for soil storage will then be return to aproximate original contour of surrounding terrain. The area where the knob was will also be contoured to blend in with the surrounding terrain.

REPLACES	TEXT
Section 4.6 Page 4-26B	Section 4.6.5 Page 4-26B Date 4/17/89

* Denotes change or addition

Riparian zones were revegetated with handset seedlings of yellow willow, blue spruce, Woods rose and American red raspberry at intervals at 1/2-1 meter. Table 4.7-3 lists the seed mixture spread on the inter-spaces. Steep slopes which have been rip-rapped were not revegetated.

4.7.2 Final Reclamation Seeding Tillage and Mulching, Portal and Train Loadout Areas

Seed mixture for final reclamation are shown on Tables 4.7-4, 4.7-5 and 4.7-6.

Seeding of the south-facing slopes (1h:3v) or lower flat areas will be conducted using a cyclone spreader. For slopes less than 2h:1v, seeding will be accomplished using a hydro-seeder. Plantings of shrubs and trees will be hand-set to ensure a plant cover of a permanent nature. Slopes of 2h:1v or steeper will be revegetated by hand-set planting techniques.

Tillage practices on level ground and on slopes flatter than 10h:1v will include leveling and tilling. Slopes of 10h:1v up to
* 3h:1v will be mulched using 1,000 pounds per acre of straw or other inert mulch material which will be anchored by crimping. Slopes steeper than 3h:1v will be treated with hydro mulch. All hydro mulch will be applied at the rate of 2,000 pounds per acre plus 140 pounds of tacifer per acre.

Planting on slopes less than 10h:1v will be accomplished by drilling seed with a mechanical drill. Slopes between 10h:1v and 1.5h:1v will be seeded by hand broadcast and manually buried by raking. Mulch will be applied over the hand broadcast seed. The Permittee electes to revegetate areas with slopes greater than 1.5h:1v without topsoil; such areas will be treated to handset plantings in basins filled with topsoil and with hydromulch seeding in between. Where the substrate consists of outcroppings of stone, no attempt will be made to revegetate.

Riparian zones were revegetated with handset seedlings of yellow willow, blue spruce, Woods rose and American red raspberry at intervals at 1/2-1 meter. Table 4.7-3 lists the seed mixture spread on the inter-spaces. Steep slopes which have been rip-rapped were not revegetated.

* 4.7.2 Final Reclamation Seeding Tillage and Mulching, Portal and Train Loadout Areas and Other Small Areas

* Seed mixture for final reclamation are shown on Tables 4.7-3. 4.7-4, 4.7-5 and 4.7-6.

Seeding of the south-facing slopes (1h:3v) or lower flat areas will be conducted using a cyclone spreader. For slopes less than 2h:1v, seeding will be accomplished using a hydro-seeder. Plantings of shrubs and trees will be hand-set to ensure a plant cover of a permanent nature. Slopes of 2h:1v or steeper will be revegetated by hand-set planting techniques.

Tillage practices on level ground and on slopes flatter than
* 10h:1v will include leveling, tilling and mulching. All slopes up to 3h:1v will be mulched using 2,000 pounds per acre of straw or other inert mulch material which will be anchored by crimping. Slopes steeper than 3h:1v will be treated with hydro mulch. All hydro mulch will be applied at the rate of 2,000 pounds per acre plus 140 pounds of tacifer per acre.

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Revegetation on slopes steeper than 3h:1v will be undertaken as soon as possible following topsoil placement, mainly during spring and early fall. Where too steep for topsoil placement, planting will be followed immediately after the area becomes available during construction activities. Revegetation on slopes less steep than 3h:1v will follow topsoil placement.

The Permittee will create a natural appearance during post mining reclamation by extending tree and shrub planting past the toes of slopes. However, linkages will be left short or extended slightly as necessary to provide an irregular appearance. Grasses and forbs will be reestablished from seed. Trees will be planted as seedlings. The Permittee will additionally place rocks, originally designated as wind barriers, at the bottom of large rock cuts in an informal way so as to provide a more natural appearance. Maps 4.7.2-1 and 4.7.2-2 show where the different seed mixes will be utilized.

* Noxious plants invading the disturbed areas will be controlled by hand grubbing. Surveillance will be maintained annually during the period of liability. Acreage by type for each disturbed area is shown in Table 4.7-7.

4.7.3 Revegetation and Stabilization of the Conveyor Bench

Revegetation and stabilization of the conveyor belt slopes have been evaluated during the middle of each growing season, when cover and composition studies are most feasible. Erosion pins were placed on slopes at the time of reseeding operations; a table of random numbers was used to determine location. Statistically acceptable techniques have been used in determining percent cover and composition of disturbed area. Revegetation analyses have been conducted annually and reported to the
* regulatory authority. The steep slopes (60%+)

Revegetation on slopes steeper than 3h:1v will be undertaken as soon as possible following topsoil placement, mainly during spring and early fall. Where too steep for topsoil placement, planting will be followed immediately after the area becomes available during construction activities. Revegetation on slopes less steep than 3h:1v will follow topsoil placement.

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* All riparian areas will be revegetated with handset seedlings of yellow willow, blue spruce, woods rose and American red raspberry at intervals of 1/2-1 meter. Table 4.7-3 lists the seed mixture to be used on the inter-spaces. Rip-rapped banks will be included in the revegetation process where physically possible.

Noxious plants invading the disturbed areas will be controlled by hand grubbing. Surveillance will be maintained annually during the period of liability. Acreage by type for each disturbed area is shown in Table 4.7-7.

4.7.3 Revegetation, Stabilization and Reclamation of the Conveyor Bench

Revegetation, stabilization and reclamation of the conveyor belt slopes have been evaluated during the middle of each growing

Revegetation on slopes steeper than 3h:1v will be undertaken as soon as possible following topsoil placement, mainly during spring and early fall. Where too steep for topsoil placement, planting will be followed immediately after the area becomes available during construction activities. Revegetation on slopes less steep than 3h:1v will follow topsoil placement.

The Permittee will create a natural appearance during post mining reclamation by extending tree and shrub planting past the toes of slopes. However, linkages will be left short or extended slightly as necessary to provide an irregular appearance. Grasses and forbs will be reestablished from seed. Trees will be planted as seedlings. The Permittee will additionally place rocks, originally designated as wind barriers, at the bottom of large rock cuts in an informal way so as to provide a more natural appearance. Maps 4.7.2-1 and 4.7.2-2 show where the different seed mixes will be utilized.

All riparian areas will be revegetated with handset seedlings as
* shown on Table 4.7-G. Table 4.7-3 lists the seed mixture to be used on the inter-spaces. Rip-rapped banks will be included in the revegetation process where physically possible.

Noxious plants invading the disturbed areas will be controlled by hand grubbing. Surveillance will be maintained annually during the period of liability. Acreage by type for each disturbed area is shown in Table 4.7-7.

4.7.3 Revegetation, Stabilization and Reclamation of the Conveyor Bench

Revegetation, stabilization and reclamation of the conveyor belt slopes have been evaluated during the middle of each growing

* have continued to slough, which has precluded total revegetation on these slopes. The Permittee will develop a special revegetation program for submittal for inclusion in the M&RP to the regulatory authority by the Spring of 1988 for the revegetation of the conveyor bench slopes that have not been sucessfully revegetated.

* have continued to slough, which has precluded total revegetation on these slopes. The Permittee has developed a special revegetation plan for the conveyor bench slopes that have not been successfully revegetated. This revegetation plan is included in Volume A-2 and is directed at final reclamation. Although the mine does still plan to use the conveyor in the future, the final reclamation is to leave the conveyor bench intact. The current condition of the conveyor bench is an area that is well drained with drainage being treated with silt fences and/or strawbales. The bench itself is becoming well vegetated and is functioning as a safety bench to prevent rolling material from rolling onto SR264. The revegetation plan is planned to establish the necessary vegetation from final reclamation. During final reclamation the conveyor will be removed, along with the supporting structures. The only areas requiring treatment will be the disturbed areas where the supporting structures were located. These small areas will be revegetated as outlined in section 4.7.1 and 4.7.2.

REPLACES	TEXT
Section 4.7 Page 4-36	Sec. 4.7 Pg. 4-36, dtd 7-15-87

* Denotes change or addition

season, when cover and composition studies are most feasible. Erosion pins were placed on slopes at the time of reseeding operations; a table of random numbers was used to determine location. Statistically acceptable techniques have been used in determining percent cover and composition of disturbed area. Revegetation analyses have been conducted annually and reported to the regulatory authority. The steep slopes (60%+) have continued to slough, which has precluded total revegetation on these slopes. The Permittee has developed a special revegetation plan for the conveyor bench slopes that have not been sucessfully
* revegetated. This revegetation plan is included in Volume A-2 and is directed at final reclamation. Although the mine does still plan to use the conveyor in the future, the final reclamation is to leave the conveyor bench intact. The current condition of the conveyor bench is an area that is well drained with drainage being treated with silt fences and/or strawbales. The bench itself is becoming well vegetated and is functioning as a safety bench to prevent rolling material from rolling onto SR 264. The revegetation plan is planned to establish the necessary vegetation for final reclamation. During final reclamation, the conveyor will be removed along with the supporting structures. The only areas requiring treatment will be the disturbed areas where the supporting structures were located. These small areas will be revegetated as outlined in Section 4.7.1 and 4.7.2.

Table 4.7-7

The acreage and proportion of each disturbance area is as follows:

	Vegetation	Acreage	%
Loadout	Grass/Forb	6.8	76
	Spruce/Fir	2.2	24
		9.0	100
Portal Yard	Aspen	6.8	22
	Spruce/Fir	14.0	45
	Sagebrush	2.5	8
	Disturbed	7.8	25
		31.1	100
Water Tank and Well Pads	Aspen	.2	100
Conveyor Route	Sagebrush	3.8	63
	Aspen/Conifer	2.2	37
		6.0	100
Waste Rock Disposal	Already Disturbed	1.3	100
		47.6	

Table 4.7-7

The acreage and proportion of each disturbance area is as follows:

	Vegetation	Acreage	%
Loadout	Grass/Forb	6.8	76
	Spruce/Fir	2.2	24
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	Spruce/Fir	14.0	45
	Sagebrush	2.5	8
	Disturbed	7.8	25
		31.1	100
Water Tank and Well Pads	Aspen	.2	100
Conveyor Route	Sagebrush	3.8	63
	Aspen/Conifer	2.2	37
		6.0	100
Waste Rock Disposal	Already Disturbed	1.3	100
* South Fork Breakout	Aspen	.3	75
	Spruce/Fir	.1	25
		.4	100
		47.6	

REPLACES	TEXT
Table 4.7-7 Page 4-37	Table 4.7-7 Page 4-37 Date 10/15/88

* Denotes change or addition

4.7.4 Irrigation, Portal & Train Loadout Areas

Since the species used for reclamation were known for their survival characteristics, it was felt that application of additional water will not be needed. Should 50 percent lower than average precipitation occur following the initiation of reclamation procedures, irrigation may be needed on a short-term basis. If irrigation is needed, an irrigation plan will be developed at that time and submitted to the Division of Oil, Gas and Mining for approval.

4.7.5 Monitoring Procedures, Portal, Train Loadout and Waste Rock Disposal Site Areas

The Permittee re-evaluated vegetative data collected and resubmitted data using a monitoring method designed to give empirical values sufficient to detect a 10 percent change in vegetative cover at a 90 percent stastistical confidence interval. These data are from those communities disturbed and for established reference areas which will be used for comparison (aspen & sagebrush, reference area for south slopes; spruce-fir, reference area for north slopes; riparian, reference area for the riparian zone). Vegetative parameters to be measured are: cover, density, productivity and species composition. Minimum sample size will be 10 and maximum will be 40. Sampling of the approved reference area and revegetated area will occur for the last two years of the liability period.

A minimum of the following data will be provided: 1) canopy cover by species and total canopy cover excluding trees, 2) productivity by life form, and 3) density of woody species by life form (trees and shrubs). The Permittee will provide results of statistical analyses showing similarity between disturbance areas and reference areas.

4.7.4 Irrigation, Portal & Train Loadout Areas

Since the species used for reclamation were known for their survival characteristics, it was felt that application of additional water will not be needed. Should 50 percent lower than average precipitation occur following the initiation of reclamation procedures, irrigation may be needed on a short-term basis. If irrigation is needed, an irrigation plan will be developed at that time and submitted to the Division of Oil, Gas and Mining for approval.

* 4.7.5 Monitoring Procedures, Portal, Train Loadout, Waste Rock Disposal Site, and South Fork Breakout Areas

The Permittee re-evaluated vegetative data collected and resubmitted data using a monitoring method designed to give empirical values sufficient to detect a 10 percent change in vegetative cover at a 90 percent stastistical confidence interval. These data are from those communities disturbed and for established reference areas which will be used for comparison (aspen & sagebrush, reference area for south slopes; spruce-fir, reference area for north slopes; riparian, reference areas for
* the riparian zone and the waste rock disposal). Vegetative parameters to be measured are: cover, density, productivity and species composition. Sampling of the approved reference area and
* revegetated area will occur for the last two years of the liability period and will meet sample adequacy tests for 90 percent confidence level with a 10 percent change in the mean.

A minimum of the following data will be provided: 1) canopy cover by species and total canopy cover excluding trees, 2) productivity by life form, and 3) density of woody species by life form (trees and shrubs). The Permittee will provide results of statistical analyses showing similarity between disturbance areas and reference areas.

REPLACES	TEXT
Section 4.7.5 Page 4-38	Section 4.7.5 Page 4-38 Date 10/15/88

The Permittee has inspected all seeded areas at the end of each growing season to determine the success of the seeding program for a period of at least five years (reclamation years 1-5).

Where success is apparent, as represented by achievement of 80 percent original cover during the five-year period, the interval of future monitoring efforts will be set at once every five years. Any area not achieving 80 percent original cover in the first five years will be immediately investigated to determine the possible failure cause(s) so steps can be taken to establish the desired permanent vegetation. A written report will prescribe the corrective actions to be taken prior to the next growing season.

The Permittee has monitored the vegetative reference area annually for five years to determine if the reference areas have been subjected to heavy animal use or have been significantly altered by subsidence or other man-induced degradation. If the reference areas are subsided or subject to subsidence the Permittee will quantitively monitor the reference areas. If damage is such that the reference area is no longer viable, an additional reference area proposal will be submitted to the regulatory authority for approval. The reference areas will be surveyed by the S.C.S. at five year intervals OK to determine their condition class.

The Permittee understands that the extended period of liability is ten years, unless site-specific data can be submitted which justifies a five-year period, beginning after the last period of augmented seeding, fertilizing or other mechanical practice and that the revegetated areas will be monitored the last years of liability and comparisons made with reference areas. * Climatological data shows that the extended period of liability for the portal-loadout area will be 5 years while the waste rock disposal site will be 10 years.

REPLACES	TEXT
Section 4.7.5 Page 4-39	Section 4.7.5 Page 4-39 Date 7/15/87

* Denotes change or addition

4.7.4 Irrigation, Portal & Train Loadout Areas

Since the species used for reclamation were known for their survival characteristics, it was felt that application of additional water will not be needed. Should 50 percent lower than average precipitation occur following the initiation of reclamation procedures, irrigation may be needed on a short-term basis. If irrigation is needed, an irrigation plan will be developed at that time and submitted to the Division of Oil, Gas and Mining for approval.

4.7.5 Monitoring Procedures, Portal, Train Loadout, Waste Rock Disposal Site, and South Fork Breakout Areas

The Permittee re-evaluated vegetative data collected and resubmitted data using a monitoring method designed to give empirical values sufficient to detect a 10 percent change in vegetative cover at a 90 percent statistical confidence interval. These data are from those communities disturbed and for established reference areas which will be used for comparison (aspen & sagebrush, reference area for south slopes; spruce-fir, reference area for north slopes; riparian, reference areas for the riparian zone and
* the Reference Area for the waste rock disposal site). Vegetative parameters to be measured are: cover, density, productivity and species composition. Sampling of the approved reference area and revegetated area will occur for the last two years of the liability period and will meet sample adequacy tests for 90 percent confidence level with a 10 percent change in the mean.

A minimum of the following data will be provided: 1) canopy cover by species and total canopy cover excluding trees, 2) productivity by life form, and 3) density of woody species by life form (trees and shrubs). The Permittee will provide results of statistical analyses showing similarity between disturbance areas and reference areas.

The Permittee has inspected all seeded areas at the end of each growing season to determine the success of the seeding program for a period of at least five years (reclamation years 1-5).

Where success is apparent, as represented by achievement of 90 percent original cover during the five-year period, the interval of future monitoring efforts will be set at once every five years. Any area not achieving 90 percent original cover in the first five years will be immediately investigated to determine the possible failure cause(s) so steps can be taken to establish the desired permanent vegetation. A written report will prescribe the corrective actions to be taken prior to the next growing season.

The Permittee has monitored the vegetative reference area annually for five years to determine if the reference areas have been subjected to heavy animal use or have been significantly altered by subsidence or other man-induced degradation. If the reference areas are subsided or subject to subsidence the Permittee will quantitively monitor the reference areas. If damage is such that the reference area is no longer viable, an additional reference area proposal will be submitted to the regulatory authority for approval. The reference areas will be surveyed by the S.C.S. at five year intervals to determine their condition class.

The Permittee understands that the extended period of liability is ten years, unless site-specific data can be submitted which justifies a five-year period, beginning after the last period of augmented seeding, fertilizing or other mechanical practice and that the revegetated areas will be monitored the last years of liability and comparisons made with reference areas. On-site
* climatological data will be evaluated at the beginning of final reclamation to determine the liability period. The length of the liability period will be established based on the conditions outlined in UMC 817.116(b)(1).

* 4.7.8 South Fork Breakout

After the area has had the soils redistributed, as outlined in Section 4.6.5, the site will be revegetated. The aspen site will use the seed mixture shown on Table 4.7-4 while the spruce-fir site will use the mixture shown on Table 4.7-5. The area will be seeded by hydro-seeding. After the area has been seeded, it will be hydro-mulched at the rate of 2,000 pounds per acre plus 140 pounds of Tacifer.

Fertilizer rates and applications are discussed in the soil preparation and fertilizer plan (Section 4.5).

ADDITION TO	TEXT
Section 4.7 Page 4-41A	Section 4.7.8 Page 4-41A Date 10/15/88

* Denotes change or addition

Culinary water usage at the mine site qualifies as a public water supply and will be treated to meet State of Utah primary and secondary water standards.

4.11.2 Monitoring Program

In order to concentrate on areas of immediate impact, surface water stations located in Eccles Canyon are sampled more frequently than those on Huntington Creek during the initial phases of mining. (See Sections 2.3 and 2.4.)

As mining progresses toward the Huntington Creek area, sampling frequency will be increased to more closely monitor mining impacts

Surface water monitoring will continue according to the monitoring schedule, presented in Section 2.3.7 and 2.4.5, throughout the mining and reclamation operations. Postmining data collection will continue on a quarterly basis at each of the stations until the reclamation effort is determined successful by the regulatory authority. The August samplings will continue to be analyzed according to Table 2.3.7-1 during the postmining period.

Water quality data collected from surface and ground water monitoring stations will be submitted quarterly to the regulatory authority. These reports will normally be submitted within 90 days of the end of each quarter depending upon the date of the laboratory analysis. An annual summary will also be prepared and submitted within 90 days after the end of each calendar year.

In addition to the above outlined monitoring program, NPDES discharge permit monitoring is conducted in accordance with the stipulated permit conditions. The monitoring program will continue on the sediment pond discharges until the revegetation effort
* is complete and a bond release is obtained. Water entering the ponds during the reclamation period will be monitored in accordance with State and Federal regulations in effect at that time.

Kaiser Engineers for the Permittee. Streams crossing the mine site are collected outside of the disturbed area and diverted into corrugated metal pipe (CMP) culvert of adequate size for the 100 year, 24-hour precipitation event. The CMP culverts are located to transfer the upstream flow under the minesite to Eccles Creek below the minesite. Diversion channels were constructed above the disturbed area to collect the runoff from the undisturbed areas and direct it to Eccles Creek.

4.11.6 Load-out Site Drainage

The drainage plan for the load-out site was designed by Kaiser Engineers for the Permittee. The creek in Eccles Canyon was diverted from its natural state to gain space. Diversion channels were constructed south of the disturbed area to collect runoff from the undisturbed areas and direct it to Eccles Creek. The disturbed area surface runoff is collected and diverted to the sedimentation pond located adjacent to the storage silos.

4.11.7 Portal Locations

The mine portals have been designed to ensure that water will not be gravity discharged from the mine. The portals will have a minimum negative (in mine) slope of four percent to prevent any gravity discharge.

4.11.8 Underground Water Treatment

The mine water encountered at the working face is collected in the face area and pumped to collection points located within each mine. The impoundments allow some time for suspended solids to settle. The water is pumped from the mine into the sediment pond which is the principle treatment facility. Mechanical devices have been installed at collection points to screen grease and oil which might be present in the water before it is pumped out of the mine.

TABLE 4.12-1

PROPOSED POSTMINING LANDUSE

Area	Present Ownership	Premining Landuse	Proposed Postmining Use	Alternative Use	Capacity To Support Proposed Use	Relationship To Existing Landuse Policies
Mine Site and Exploratory Excavations	USFS	Wildlife/ Grazing Habitat	Wildlife/ Grazing Habitat	Picnic Area	Adequate	Compatible
Conveyor and Pipeline	Private	Grazing	Grazing	Wildlife Habitat	Adequate	Compatible
Main Access Road	State	Forest Access and Service Road	State Road	None	Adequate	Compatible
Loadout	Private	Grazing, Picnic, and Stock Pens	Grazing, Picnic, and Stock Pens	Wildlife Habitat	Adequate	Compatible
Waste Rock Disposal	Private	Grazing	Grazing	Wildlife Habitat	Adequate	Compatible

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	Main Access Road	State	Forest Access and Service Road	State Road	None	Adequate	Compatible
	Loadout	Private	Grazing, Picnic, and Stock Pens	Grazing, Picnic, and Stock Pens	Wildlife Habitat	Adequate	Compatible
	Waste Rock Disposal	Private	Grazing	Grazing	Wildlife Habitat	Adequate	Compatible
*	South Fork Breakout	USFS	Wildlife/ Grazing Habitat	Wildlife/ Grazing Habitat	Wildlife Habitat	Adequate	Compatible

REPLACES	TEXT
Table 4.12-1 Page 4-56	Table 4.12-1 Page 4-56 Date 10/15/88

* Denotes change or addition

Plugging of Small Diameter Openings

Exploratory holes and water wells not approved for abandonment monitoring or postmining landuse:

- Each hole will be cased and sealed with a cement plug.
- A monument will then be erected over sealed holes.

Backfilling of Ponds

- Ponds will be drained, then allowed to dry out.
- When the soil is dry, ponds will be backfilled.

Removal of Buildings

Office, shop, storage, changehouses, treatment buildings, explosive storage:

- Each structure will be removed.
- Removal or fracture of foundations will follow if they are close to the surface. Deeper foundations will be covered with at least six feet of dirt.

Equipment Removal

Mining equipment, conveyors, power structure and line, coal processing and handling equipment:

- The above mentioned items will be removed.
- Support structures will then be removed and foundations fractured and covered.

Blacktop Removal

The Permittee will, upon completion of mining operations, dispose of asphalt-concrete surfaces, aggregate base, and bituminous sub-base sealant as well as other materials used in non-highway

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ADDITION TO	TEXT
Section 4.12 Page 4-57	Section 4.12 Page 4-57A Date 10/15/88

- Mulch - Wood mulch may be sprayed on terrace banks.
- Soil Retention Blanket - Wood fiber held by plastic net may be used on steeper banks.

Maintenance

Fencing, irrigation, and weed control will be used only as needed, according to operational testing results.

Regrading and Reseeding

Erosion that develops in completed areas will be minimized by repeated grading and seeding.

Success Monitoring and Extended Responsibility Period

Vegetation and water will be monitored during the applicable period of liability to determine success of abandonment reclamation. A determination of vegetation success will then be made.

Removal of Site Drainage Ditches and Sedimentation Ponds

After the disturbed areas are stabilized and runoff meets the suspended solids standard without detention time, the site drainage system will be removed. The site drainage system areas, including the sedimentation ponds, will be backfilled and revegetated.

Road Abandonment

The mine support roads will be reclaimed in the permit area. Culverts and blacktop surfacing material will be removed. Reclamation would then include recontouring, ripping, adding cross drains, water bars, topsoil and seed.

Compliance Documentation

Upon expiration of the responsibility period and at the time of bond release, compliance documentation will be presented by the Permittee.

4.12.2 Proposed Underground Mining Activities and Consistency with Landuse Plans

The mine site is on U.S. Forest Service land. The U.S. Forest Service has indicated that the land should be returned to wildlife/grazing (rangeland) habitat. (U.S. Forest Service, Intermountain Region, 1979, Land Management Plan, Manti-LaSal National Forest, Price, Utah.) The Longwall underground mining system is consistent with this plan as it controls the effects of subsidence.

Final Surface Configuration

The proposed final surface contour plan would allow the side hill cuts and operational benches at the mine site to remain after abandonment. The fill banks between each bench level would be reduced to 3.0h:1v.

Various illustrations, Maps 4.4.2-1A, 4.2.2-1B and 4.7.2-2, present the proposed topography of the postmining area. The final abandonment contours have been drawn with heavier lines over the lighter original contour lines. As the drawings illustrate, the final surface drainage channels will include meanders and drop structures to allow energy dissipation.

4.12.3 Visual Resource Assessment to Achieve Postmining Landuse

The abandonment assessment will concentrate on how effectively final drainages and slope patterns fit into the area's general visual resources. This assessment will occur through the period of liability.

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* maps include location of operational facilities for reference purposes only. Upon abandonment, all surface facilities will be removed.

4.12.4 Recreational Resource Assessment to Achieve the Postmining Landuse

During the life of the project and with special emphasis at abandonment, recreational resources, as assessed by the U.S. Forest Service, will include a review of postmining fishing, hunting, camping, hiking, and recreational landuse. If it is found, during the liability period, that any of these activities are decreased due to the mining operation, corrective actions may be taken.

4.12.5 Mineral Resource Assessment to Achieve the Postmining Landuse

Before abandonment, the mineral resources contained within the Skyline permit area will be assessed. The abandonment assessment will ensure that oil and gas development will be possible at the conclusion of mining. Measures taken to protect the unmined coal, such as portal sealing, will also be assessed. No other mineral resources are known to be present in commercial quantities.

4.12.6 Rock Disposal Site

The assumed pre-mining land use was native rangeland. The pit area will be reclaimed to native rangeland per the reclamation plan. The access road will not be reclaimed. See Map 4.16.1-1B.

The representative of the owners of the leased property have, through a letter to the Application, stated that the land around the proposed disposal site will be used for grazing once the abandoned strip pit is filled. The letter is attached as Exhibit 1.

The owner's representative requests that the pit fill be leveled off so that it can be used for corrals. The leveled-off fill will be reclaimed to native rangeland per the Reclamation Plan.

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* plan. The access road will not be reclaimed (see Map 4.16.1-1B) and at the request of the landowner, (see page 4-63) the guard rail along portions of the road will be removed during reclamation.

The representative of the owners of the leased property have, through a letter to the Application, stated that the land around the proposed disposal site will be used for grazing once the abandoned strip pit is filled. The letter is attached as Exhibit 1.

The owner's representative requests that the pit fill be leveled off so that it can be used for corrals. The leveled-off fill will be reclaimed to native rangeland per the Reclamation Plan.

includes sediment from the mine. The sediment level will be determined by cross sectioning the sediment level at a point labeled B-B' on Maps 3.2.1-2B and 3.2.1-4. During sediment clean out the pond shall be drained of all water that will meet permit requirements. Water not meeting discharge requirements will be hauled to the railroad loadout area sediment pond. Mine water discharge during cleanout shall by-pass the pond but shall still meet NPDES Discharge Permit requirements. Sediments will be disposed of as outlined in Section 4.16.

The portal area sedimentation pond is recessed and, therefore, has no embankments requiring geotechnical investigations. The engineering evaluation for the load-out area sedimentation pond is discussed in Section 3.2.1.

Both sediment ponds will be inspected, at a minimum, once each calendar quarter for structural weakness, erosion, and other hazardous conditions. Any deficiencies found will be reported to DOGM.

The loadout area sedimentation pond was designed and built with a combined slope of 4:1. Engineering justification for departure from the recommended 5:1 combined slope is included in the Engineering calculations section of Appendix Volume A-3.

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Both sediment ponds will be inspected, at a minimum, once each calendar quarter for structural weakness, erosion, and other hazardous conditions. Any deficiencies found will be reported to DOGM.

The loadout area sedimentation pond was designed and built with a combined slope of 4:1. Engineering justification for departure from the recommended 5:1 combined slope is included in the Engineering calculations section of Appendix Volume A-3. During
* sediment clean out of the loadout sedimentation pond, the pond shall be drained of all the water that will meet permit requirements. Water not meeting discharge requirements may be used to water roads for dust suppression, water vegetation within the area reporting back to the sediment pond or may be hauled to the portal area sedimentation pond.

4. Truck drivers transporting the Permittee's coal have been individually alerted to be especially watchful and give special consideration to public vehicles traveling SR 264 to ensure their safety.

5. Skyline's telephone and ambulance service are available for public assistance in the event of a public emergency.

Topsoil was removed prior to initial road construction and properly protected and stored as outlined in Section 4.6 - TOPSOIL AND SUBSOIL HANDLING PLAN.

The UDOT and the USFS are presently finalizing the jurisdictional agreement for the transfer of Forest Development Road 50227, the Eccles Canyon Highway, from the Forest Service to the Utah Department of Transportation. Completion of the jurisdictional transfer agreement is expected to be finalized about April 1, 1987. Copies of that final agreement will be forwarded upon receipt for inclusion in the mine plan at that time.

4.16 UNDERGROUND DEVELOPMENT WASTE AND EXCESS SURFACE SPOIL

Rock and earth materials produced in the underground mines will normally be disposed of in the underground working areas. Excess material produced that cannot be stored underground will be brought to the surface and stored in a temporary gob pile (location shown on Map 3.2.1-1) until the material can be transported to the approved waste rock disposal site near Scofield, or will properly be used as fill material within the disturbed permitted area. The temporary gob pile will not exceed 6,000 tons of material.

There is approximately 35,000 cubic yards of underground development waste material at the railroad loadout area. This material is located just east of the topsoil stockpile. Toxicity tests were made on the material before DOGM gave approval for the material to be placed at this site. It is planned for this material to remain on site and be used as fill material in final reclamation as shown on Map 4.4.2-1C.

Development waste and surface spoil produced in the construction of the surface facilities and portal entries of the mine have been used as fill material for building the mine pad areas.

Other mine wastes from the sediment ponds and earthen materials from clean up of pads, ditches, etc., will be disposed of at the Scofield Waste Rock Disposal site. Sediments will be tested for toxicity before being disposed of. Sediment from the portal yard sediment pond may also be pumped back into the mine if suitable mined out areas are available.

4.16.1 Waste Rock Disposal General Description

A rock waste disposal site has been developed and approved at a location southeast of Scofield, Utah and approximately 3.6 air miles from the Skyline mine site (Map 4.16.1-A & 1-B). The rock waste disposal site is an abandoned strip mine pit accessed by an existing road which has been upgraded.

4.16 UNDERGROUND DEVELOPMENT WASTE AND EXCESS SURFACE SPOIL

Rock and earth materials produced in the underground mines will normally be disposed of in the underground working areas. Excess material produced that cannot be stored underground will be brought to the surface and stored in a temporary gob pile (location shown on Map 3.2.1-1) until the material can be transported to the approved waste rock disposal site near Scofield, or will properly be used as fill material within the disturbed permitted area. The temporary gob pile will not exceed 6,000 tons of material.

There is approximately 35,000 cubic yards of underground development waste material at the railroad loadout area. This material is located just east of the topsoil stockpile. Toxicity tests were made on the material before DOGM gave approval for the material to be placed at this site. It is planned for this material to remain on site and be used as fill material in final reclamation as shown on Map 4.4.2-1C.

Development waste and surface spoil produced in the construction of the surface facilities and portal entries of the mine have been used as fill material for building the mine pad areas.

* Approximately ____ cubic yards of early operational waste material were used as fill at the loadout site. This material was placed on natural grade. After stripping, the topsoil is well above the 100 year flood plain for the Eccles Creek stream channel. Ground water levels in the loadout area were found to range between 4.5 and 17.7 feet; consequently, no waste material was placed below ground water level. (Reference: Report Excavation Dewatering Investigation, Loadout Area, Coastal States Skyline Coal Mine Project Near Scofield, Utah for Coastal States Energy Company, Dames and Moore Job No. 6701-019-06, Salt Lake City, Utah July

28, 1981. Copies available at minesite or at the Salt Lake City offices.)

A seep and spring survey in the immediate area of the loadout waste disposal site has identified only one source. A trench drain was constructed to drain subsurface flow for part of the loadout area including that waste disposal section. Flow from this source is monitored and reported as station CS-13.

This loadout area waste material will be left at the site during reclamation but will be recontoured to achieve final configuration as shown on Plate 4.4.2-1D. During recontouring, the waste material will not be placed below groundwater table level or within the 100 year flood plain.

Other mine wastes from the sediment ponds and earthen materials from clean up of pads, ditches, etc., will be disposed of at the Scofield Waste Rock Disposal site. Sediments will be tested for toxicity before being disposed of. Sediment from the portal yard sediment pond may also be pumped back into the mine if suitable mined out areas are available.

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A rock waste disposal site has been developed and approved at a location southeast of Scofield, Utah and approximately 3.6 air miles from the Skyline mine site (Map 4.16.1-A & 1-B). The rock waste disposal site is an abandoned strip mine pit accessed by an existing road which has been upgraded.

* During recontouring, the waste material at the railroad loadout will all be used as on-site fill. The material will be spread in 3 to 4 foot lifts and compacted. Cover will be at least as deep as the cover over the waste material at the Scofield disposal site.

ADDITION TO	TEXT
Section 4.16 Page 4-74	Section 4.16 Page 4-74A Date 10/15/88

During recontouring, the waste material at the railroad loadout will all be used as on-site fill. The material will be spread in
* 1 to 2 foot lifts and compacted. Cover will be at least as deep as the cover over the waste material at the Scofield disposal site.

ADDITION TO	TEXT
Section 4.16 Page 4-74	Section 4.16 Page 4-74A Date 1/10/89

4.17 SUBSIDENCE CONTROL PLAN

This section describes in further detail the Permittee's mine plan design, ensuring subsidence effects of the Skyline Mine produce minimum environmental impact. Section 3.1 - SKYLINE MINING OPERATION PLAN describes in detail the proposed methods of coal extraction and mine development which were selected partly on subsidence and nonsubsidence criteria. Section 2.2 presents the detailed geological information which provided an analytical base for mine plan and subsidence control design. The following subsections describe the principal factors involved in measuring and controlling subsidence resultant of the proposed mining operations.

4.17.1 Subsidence Probability Survey

Careful review of the permit area shows that the following areas could face potential subsidence impact caused by mining: Mountain Fuel Supply gas pipeline, upper reaches of Electric Lake Reservoir, perennial streams of the permit area, and public roads which cross the permit area. These potential affected areas are identified on Map 4.17.1-1.

Springs, aquifers and aquifer recharge areas may also be affected by subsidence. Vegetation types are shown on Map 2.7.2-1.

4.17.2 Mining Methods

The mining methods to be used by the Permittee include longwall mining, room and pillar mining with pillar removal, and room and pillar mining with pillars left in place. Certain room and pillar mining systems are designed to provide full support and will prevent subsidence. Subsection 3.1.5 contains descriptions of the mining methods to be implemented.

Full extraction areas (room and pillar panels with pillar removal and longwall panels) are, by definition, planned and controlled

subsidence areas. The extent of these full extraction areas is shown on Map 4.17.1-1. Subsidence prediction work has shown the expected maximum planned and controlled subsidence will vary from 0 to 16 feet, assuming that the total cumulative extraction from the three mineable seams will not exceed 30 feet.

4.17.3 Subsidence Effect Prevention Measures

The mining plan has been designed in such a way as to align the full extraction panels as parallel as possible to main faults. This alignment should help prevent the formation of irregular saw-tooth subsidence cracks in the overlying surface lands. It is anticipated that the planned subsidence will result in a generally uniform lowering of the surface lands in broad areas, thereby limiting the extent of material effect to those lands and causing no appreciable change to present land uses and renewable resources. The Permittee established a subsidence monitoring program in the early stage of mining for use in reviewing the surface effect of mining and as an aid in future mine planning.

It is planned that coal support pillars will be left in place under the natural gas pipeline to prevent any surface movement for a 25-foot zone on each side of the pipeline. The width of the area of supportive mining is equal to 50 feet (25 feet on each side of the pipeline centerline no surface movement) plus the tangent of 22^{o} (assumed draw angle) multiplied by the overburden depth of the deepest mined coal bed:

- Nonsubsidence Mining Width = 50 feet + (tan 22^{o} x depth)

The width of the supportive mining area will be adjusted, as appropriate, when detailed subsurface information and monitoring provides a more accurate estimate of the draw angle. However, if appropriate details can be worked out with Mountain Fuel Supply Company, planned subsidence may occur beneath the gas pipeline.

There will be no mining caused subsidence under either the Electric Lake Reservoir or Upper Huntington Creek inlet to the

reservoir, and no mining from which subsidence at a 22-degree (from vertical) angle of draw would influence either this reservoir inlet section of Upper Huntington Creek or the high-water level of Electric Lake Reservoir. Map 4.17.1-1 shows the buffer zone within which there will be no full extraction mining. The width of the buffer zone was calculated as follows:

- Buffer zone width = tan 22^{o} x overburden depth

The width of the buffer zone has been calculated using the overburden depths to the deepest-lying coal seam.

The Permittee plans to review the results of subsidence surveys after an initial period of mining and reserves the right to modify the width of the buffer zone after submitting a minor modification to the mining plan. There is a very substantial tonnage of coal which lies to the west of Upper Huntington Creek and Electric Lake Reservoir, which the Permittee plans to mine.

The buffer zone width will also be adjusted, if appropriate, when a more accurate draw angle is determined. Panels within the buffer area will be room and pillar panels with supporting pillars left in place.

The sequence and timing of mining will be such that the upper reaches of Huntington Creek and/or its tributaries outside the buffer zone will be mined in the early stages of mining in the Huntington Creek drainage. This plan will allow an assessment to be made of the effect of subsidence on the upstream portion of Huntington Creek. Evaluation of the effects will be used to alter, if necessary, the extent and type of mining under the inlet waters of Huntington Creek into Electric Lake, in such a manner that environmental values are protected.

Drill holes show that there are bentonitic shale layers present which will probably swell and decompose into an impervious clay when wet. This characteristic is expected to seal possible