

April 12, 2016

Permit Supervisor, Utah Coal Regulatory Program  
Utah Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
PO Box 145801  
Salt Lake City, UT 84114-5801

**RECEIVED**  
**APR 13 2016**  
**DIV. OF OIL, GAS & MINING**

Re: Amendment to Provide Revised Legal Description of Permit/Disturbed Area Boundary for Fossil Rock Resources, LLC, Canyon Fuel Company, LLC, Permit No. C/015/00029

Dear Sirs:

Please find enclosed with this letter a copy of the amendment related to the revised legal description to include land between the centerline of Cottonwood Creek and the center line of the Cottonwood Canyon access road in the Mine's permit boundary.

If you have questions or need addition information please contact Vicky Miller at (435)286-4481.

CANYON FUEL COMPANY, SUFCO Mine

*Vicky S Miller for*

Kenneth E. May  
General Manager

Encl.

cc: DOGM Correspondence File

## APPLICATION FOR COAL PERMIT PROCESSING

Permit Change  New Permit  Renewal  Exploration  Bond Release  Transfer

Permittee: Canyon Fuel Company, LLC

Mine: Fossil Rock Resources, LLC

Permit Number: C/015/0009

Title: Amendment to Provide Revised Legal Description of Permit/Disturbed Area Boundary for Fossil Rock Mine

Description, include reason for application and timing required to implement:

**Instructions:** If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ <input type="checkbox"/> increase <input type="checkbox"/> decrease. |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 2. Is the application submitted as a result of a Division Order? DO# _____  |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?                                     |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 4. Does the application include operations in hydrologic basins other than as currently approved?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 6. Does the application require or include public notice publication?   |
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | 7. Does the application require or include ownership, control, right-of-entry, or compliance information?   |
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 9. Is the application submitted as a result of a Violation? NOV # _____   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 10. Is the application submitted as a result of other laws or regulations or policies?<br><i>Explain:</i> _____                                   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 11. Does the application affect the surface landowner or change the post mining land use?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)                                |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 13. Does the application require or include collection and reporting of any baseline information?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 15. Does the application require or include soil removal, storage or placement?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 16. Does the application require or include vegetation monitoring, removal or revegetation activities?  |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 17. Does the application require or include construction, modification, or removal of surface facilities?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 18. Does the application require or include water monitoring, sediment or drainage control measures?  |
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | 19. Does the application require or include certified designs, maps or calculation?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 20. Does the application require or include subsidence control or monitoring?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 21. Have reclamation costs for bonding been provided?   |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?  |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 23. Does the application affect permits issued by other agencies or permits issued to other entities?   |

**Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) copies, thank you. (These numbers include a copy for the Price Field Office)**

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

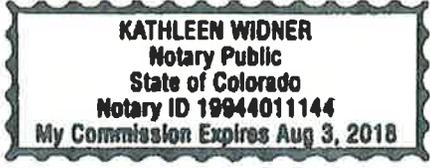
Richard Parkins  
Print Name

Richard Parkins GENERAL MGR, APRIL 5<sup>th</sup>, 2016  
Sign Name, Position, Date

Subscribed and sworn to before me this 5<sup>th</sup> day of APRIL, 2016

Kathleen Widner  
Notary Public

My commission Expires: 8-3, 2018  
Attest: State of COLORADO ) ss  
County of MESA



<b>For Office Use Only:</b>     	<b>Assigned Tracking Number:</b>   	<b>Received by Oil, Gas &amp; Mining</b>   
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**CHAPTER 1**

**INTRODUCTION AND SUMMARY OF PERMIT APPLICATION**

**TABLE OF CONTENTS**

<b>Section No.</b>	<b>Description</b>	<b>Page No.</b>
1.1	INTRODUCTION .....	1
1.2	SCOPE OF OPERATION .....	2
1.3	SUMMARY OF ENVIRONMENTAL IMPACTS .....	3

**LIST OF FIGURES**

<b>Figure No.</b>	<b>Description</b>	<b>Page No.</b>
1-1	Location Map of the Mine.....	4

## **1.1 INTRODUCTION**

Fossil Rock Mine is located in Cottonwood Canyon, 12 miles west of Orangeville, Utah (See Figure 1-1). A mining and reclamation permit, ACTC/015/009, which incorporates the Office of Surface Mining (OSM) permit UT-0017, was issued by the State of Utah, Division of Oil, Gas and Mining (DOG M) to Trail Mountain Coal Company on February 19, 1985. The subsequent permit, ACT-C/015/009-1, was modified to include the Tract II area on April 30, 1987. A permit transfer from Arch Minerals (Trail Mountain Coal Co.) to Beaver Creek Coal Company (Trail Mountain No. 9 Mine) was approved by DOGM on 11/23/87. A permit transfer from Beaver Creek Coal Company (Trail Mountain No. 9 Mine) to PacifiCorp (Mine) was approved on 11/13/92. A permit transfer from PacifiCorp (Trail Mountain Mine) to Fossil Rock Resources, LLC (Fossil Rock Mine) was approved on October 8, 2015.

PacifiCorp notified the Division of temporary cessation of coal mining operations at the Mine effective May 4, 2001. Coal mining at the Mine ceased as of March 15, 2001. In preparation of temporary cessation, all mining equipment including:” production (longwall and continuous miner), belt haulage and electrical were removed from the mine. Verification of equipment removal was conducted on April 6, 2001 with the Bureau of Land Management (Steve Falk) and Division of Oil, Gas and Mining (Pete Hess) participating in the review. A plan to construct permanent seals was submitted to and approved by Mine Safety Health Administration. Sealing of the mine portals was completed on May 1, 2001.

The following Permit Application will focus on the entire mine which from this time forth will be referred to as the Fossil Rock Mine.

The surface facilities are located in Sections 25, T.17S, R 6 E., SLB&M, in Emery County, twelve miles west of Orangeville, Utah.

Historically, the Trail Mountain Mine has been developed to operate with longwalls and continuous miners in the Hiawatha Coal Seam. The Hiawatha seam is the only minable seam in the Mine area. The historic Trail Mountain Mine operated approximately 220 days per year, three shifts per day, eight hours per shift with two production shifts and one maintenance shift. Annual production from the Mine has been approximately 3,500,000 to 5,000,000 tons. Annual production was dictated by the demand requirements of the Hunter Power Plant.

## **1.2 SCOPE OF OPERATION**

The Mine is an underground coal operation. The Trail Mountain operations have historically extended throughout Sections 25, 26, 27, 34, 35, and 36 in Township 17 South, Range 6 East; and Sections 1, 2, and 3 in Township 18 South, Range 6 East; and Section 6 in Township 18 South, Range 7 East, Salt Lake Base and Meridian, Emery County, Utah. ~~The underground working covered an area of approximately 773.50 acres of Federal leases and fee coal lands.~~ For the legal and financial information for the Fossil Rock Mine, refer to the General Chapter 1 binder and Chapter 2. The waste rock site that serves the mine is located in Section 34, Township 17 South, Range 7 East.

Underground mining occurs in the Hiawatha seam of the Blackhawk Formation. Surface facilities, including the offices, bathhouse, shop, storage facilities and tipple are located at the

intersection of the coal seam and the canyon floor. ~~Surface facilities occupy approximately 10.39 acres. The waste rock site disturbance adds an addition 15.82 acres.~~

### **1.3 SUMMARY OF ENVIRONMENTAL IMPACTS**

Similar to many other coal operations along the east front of the Wasatch Plateau, the Mine is located in a steep walled canyon. Vegetation, soils, geology, hydrology, and wildlife of the mine plan area are typical of the general area.

As mining has been conducted in the area for over 50 years with rather minimal impact to the environmental resources, it is expected that continued operation of the Mine will also have minimal impact. Impacts are expected to be minimal due to implementation of mining practices which incorporate sound and practical engineering and environmental considerations in the mine planning process.





**CHAPTER 2**  
**LEGAL AND FINANCIAL**

**FOSSIL ROCK MINE  
LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION**

This application for a mining and/or reclamation permit is submitted to the State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining, in accordance with the Utah Coal Mining and Reclamation Act, Title 40, Chapter 10, U.C.A., 1953 (as amended); the applicable rules and regulations adopted thereunder; the Surface Mining Control & Reclamation Act of 1977, and applicable regulations adopted thereunder (30 CFR 770, et seq.), the Cooperative Agreement between the State of Utah and the United States Secretary of Interior, and other applicable laws and regulations.

**R645-301-100 GENERAL CONTENTS**

Additional Legal and Financial Information pertaining to the Fossil Rock Mine is located in the Supplemental Volume entitled: GENERAL CHAPTER 1

Business Entity: Fossil Rock Resources, LLC is a Limited Liability Company organized under the laws of Delaware on August 29, 2014 and is owned 100% by Canyon Fuel Company, LLC. Canyon Fuel Company LLC a Limited Liability Company organized under the laws of Delaware in December 1996 which in turn is owned 100% by Bowie Resource Partners, LLC a Delaware Limited Liability Company. Refer to General Chapter 1 for addition organizational structure.

Applicant: Operations, Administration, Permit Revisions and Amendments  
Fossil Rock Resources, LLC  
225 North 5<sup>th</sup> Street, 9<sup>th</sup> Floor  
Grand Junction, CO 81501  
Telephone: (970)263-5130

Operator: Fossil Rock Resources, LLC (See information above)

Resident Agent: CSC Lawyers Incorporating Service Company  
421 West Main  
Frankfort, KY 40601  
(800) 927-9800

**Fossil Rock Resources, LLC**

**Fossil Rock Mine**

Contact Person: Eugene E. DiClaudio  
Canyon Fuel Company, LLC  
225 North 5<sup>th</sup> Street, 9<sup>th</sup> Floor  
Grand Junction, CO 81501  
Telephone: (970) 263-5130

Person Who Will Pay Abandoned Mine Reclamation Fees:

Eugene E. DiClaudio  
Canyon Fuel Company, LLC  
225 North 5<sup>th</sup> Street, 9<sup>th</sup> Floor  
Grand Junction, CO 81501  
Telephone: (970) 263-5130

Employer ID#: 47-1742876

Right of Entry Information

See information below regarding surface and subsurface ownership and right of entry to underground coal mining operations. For surface and coal ownership, see Plate 4-1.

		Right of Entry Acres	Permit Acres
<b>Fossil Rock</b>	Federal Coal Leases		
	UTU-64375	260	260
	UTU-49332	380	380
	UTU-82996	80	80
	UTU-65027	25.87	25.85
	Private Coal Leases		
	Fee	56.36	56.36
	Total	802.23	802.21

**Surface Right of Entry Information:**

The disturbed area (18at the Fossil Rock Mine is owned by Fossil Rock. The disturbed area at the waste rock site is leased under Federal Lease UTU-65027.

**Mine Site Permit Area Legal Description – (776.36 Acres more or less)**

Township 17 South, Range 6 East, SLM

Section 25: S1/2 NW1/4, SW1/4 SE1/4, SW1/4: (280 Acres)

Beginning at the point of SW corner of NW1/4 SE1/4, thence North 160 Rods, thence East 44 Rods to center of Cottonwood Creek, Southward along the centerline of the creek to a point 76 Rods east of the beginning, thence West 76 Rods to the Point of Beginning. Beginning at a point which is West, 116 Rods, more or less from the Northeast corner of the Southeast quarter of the Northeast quarter (S 89°46'01" W, 1898.88 feet along 40 acre line by survey), and point being at the center of Cottonwood Creek and running thence in a Southerly direction along center of said Creek to a point 84 Rods more or less, West of the Southeast corner of the Northeast quarter of the Southeast quarter of said Section 25 (S 89°20'20" W, 1482.82 feet along 40 acre line by survey); thence N 89°20'20" E, 68.64 feet to the centerline of Cottonwood Canyon road; thence N 18° 32'22" W, thence N 18o00'23" W, 236.55 feet along centerline of said road; thence N13°36'45" W, 219.23 feet along centerline of said road; thence N 10°17'37" W, 104.54 feet along centerline of said road; thence N 08°20'49" W, 350.40 feet along centerline of said road; thence N 10°33'11" W, 476.22 feet along centerline of said road; thence N 24°01'08" W, 163.55 feet along centerline of said road; thence N 20°01'04" W, 87.46 feet along centerline of said road; thence N 10°00'01" W, 150.85 feet along centerline of aid road; thence N 02°27'38" W, 152.52 feet along centerline of said road;

thence N 01°54'03" E, 211.25 feet along centerline of said road; thence N 00°12'51" W, 242.02 feet along centerline of said road; thence 10°41'22" E, 106.12 feet along centerline of said road to the north line of the South half of the Northeast quarter of said Section 25; thence S89°46'01" W, 48.79 feet along 40 acre line to the point of beginning. (Acres 2.86 + 53.5 = 56.36 acres)

Section 26: S1/2 SW1/4, SE1/4 NE1/4, E ½ SW1/4 NE ¼, E1/2 SE1/4, E1/2 SW1/4 NE 1/4,  
SW1/4 SE1/4: (280 Acres)

Section 27: S1/2 S1/2 (160 Acres)

**Waste Rock Site Permit Area Legal Description – (25.85 Acres more or less)**

Township 17 South, Range 7 East, SLM

Section 34: Beginning at point N82° 39'28"W, 809.58 feet from the east 1/4 corner of Sec. 34;  
thence, S 74° 09' 46" W, 246.23 feet; thence, S 27° 14' 28" W, 647.59 feet; thence, S 46° 59' 05"  
W, 165.64 feet; thence, S 76° 41' 51" W, 264.72 feet; thence, N 72° 09' 12" W, 670.20 feet;  
thence, S 06° 10' 47" W, 105.57 feet; thence, S 23° 08' 12" W, 35.27 feet; thence, S 36° 59' 41"  
W, 71.59 feet; thence, S 40° 44' 45" W, 114.04 feet; thence, S 23° 37' 34" W, 93.77 feet; thence,  
S 60° 40' 32" W, 113.86 feet; thence, S 05° 17' 52" E, 108.19 feet; thence, S 23° 20' 37" E,  
105.29 feet; thence, S 24° 38' 51" W, 61.70 feet; thence, S 31° 19' 19" E, 129.90 feet; thence, S  
29° 19' 58" E, 80.45 feet; thence, S 24° 11' 44" E, 104.97 feet; thence, S 47° 47' 54" E, 168.95  
feet; thence, S 40° 17' 54" E, 87.31 feet; thence, S 17° 50' 49" W, 43.32 feet; thence, S 72° 11'  
49" E, 213.13 feet; thence, S 78° 08' 28" E, 287.64 feet; thence, N 11° 43' 23" E, 86.24 feet;  
thence, N 73° 40' 14" E, 120.87 feet; thence, N 17° 04' 33" E, 74.31 feet; thence, N 14° 20' 36"  
W, 65.70 feet; thence, N 17° 05' 06" E, 75.21 feet; thence, N 09° 13' 24" W, 65.92 feet; thence, N  
12° 54' 35" W, 99.73 feet; thence, N 02° 44' 30" W, 82.47 feet; thence, N 08° 32' 17" W, 85.51  
feet; thence, N 01° 39' 36" W, 104.82 feet; thence, N 17° 50' 48" E, 218.03 feet; thence, N 76°  
41' 51" E, 353.88 feet; thence, N 27° 14' 28" E, 629.52 feet; thence, N 50° 42' 06" E, 123.74 feet;  
thence, N 74° 09' 48" E, 113.70 feet; thence, N 15° 50' 13" W, 150.00 feet; to the point of  
beginning. Said parcel contains 25.85 acres more or less.



**CHAPTER 3  
ENGINEERING**

**CHAPTER 3  
ENGINEERING**

## OPERATION AND RECLAMATION PLAN

### 3.1 SCOPE

Chapter 3 sets out the plans intended to be undertaken during the permit term and life of the operation. The chapter is divided into five sections: surface facilities, operation plan, environmental protection, reclamation plan, and bibliography.

~~The Division was notified of temporary cessation of coal mining operations at the Trail Mountain Mine effective May 4, 2001. Refer to Section 3.3.6.4 for additional information. Coal mining at the Trail Mountain Mine ceased as of March 15, 2001. In preparation of temporary cessation, all mining equipment including: production (longwall and continuous miner), belt haulage and electrical were removed from the mine. Verification of equipment removal was conducted on April 6, 2001 with Bureau of Land Management (Steve Falk) and Division of Oil, Gas and Mining (Pete Hess) participating in the review. A plan to construct permanent seals was submitted to and approved by Mine Safety Health Administration. Sealing of the mine portals was completed on May 1, 2001.~~

### 3.2 SURFACE FACILITIES

The Trail Mountain Mine (renamed Fossil Rock Mine in 2015) is an existing operation that was started in the 1940's. All Surface facilities are in place under an approved mining and reclamation plan C/015/0009.

#### 3.2.1 Site Selection and Preparation

~~The mine site was selected for its location. Access to the coal seam is facilitated by the intersection at the mine site of the coal outcrop and the canyon floor.~~

Site preparation consisted of clearing the site, construction of pads and facilities, and development of portals.

**3.2.2 Portals**

Historically, five portals provide access to the Mine. One portal located on the corner of the outcrop of Cottonwood Canyon and a small side-drainage canyon is a fan portal. The second portal, 150 feet south of the fan portal, is the main intake and travel portal. The third portal is the belt portal. It is located just to the south of the main portal. The fourth portal is south of the belt portal and is used as a ventilation portal.

A fifth portal has been driven to the outside approximately 1000' south of the fourth portal. This is a ventilation portal, and surfaces just south of the old sealed entry at this location. Complete description of this project is found in Appendix 3-7. (See Plate 3-1 for locations). An old sealed entry is found 500 feet south of the fourth portal (ventilation portal). It is not used in this operation. The Mine went into temporary cessation on May 4, 2001. All-Portals associated with the Mine were sealed as specified in 30CFRPart 75.335 (except one (1) opening which was inaccessible, this opening was completely backfilled with non-combustible fill from the surface).

**3.2.3 Surface Building and Structures**

The buildings and structures associated with the Mine are shown in Plate 3-1. They consist of an office, bathhouse, shop, power substation, and fan control house, coal handling system, ~~explosive magazines~~, sediment control facilities, and fuel storage tank farm area. The following table describes the tanks within the tank farm area:

Tank Contents*	Diesel	Unleaded Gasoline	Emulsion Oil	Calcium Chloride
Capacity	15,000 gal.	4,100 gal.	6,300 gal.	500 gal.

\* Spill containment and cleanup is outline in the SPCC Plan.

Historical - the office, shop, sub-station, fan control house, fuel storage tank farm area, and sediment controls were all in place prior to 1987. A new bathhouse, coal handling facility, explosive magazines, ventilation portal, and culinary water system were added in late 1990. The main canyon culvert was also extended approximately 300' at that time. After PacifiCorp purchased the Trail Mountain Mine in 1992, surface modifications have taken place such as, concrete portal liners, new travel portal, new twin fan, new fuel storage area, high pressure water building and tank, relocation of water treatment plant, storage shed, storage dock, modified ROM transfer and a 60" overland tube conveyor. See Appendix 3-4 for the Operation Plan for the structures. Also see Appendices 3-7, 3-8, 3-9, 3-10 and 7-13 for details on the new facilities.

### **3.2.4 Coal Handling, Processing, Preparation, and Storage**

Historical - Coal in the Mine has been mined by longwalls and continuous miners. The 48 inch section belts transferred coal to the 60 inch main belt. The 60 inch main belt conveyed the coal to the surface where a magnet at the ROM transfer removed metal from the coal stream. The coal could then be shipped on a 60 inch belt to the Cottonwood Mine via the tube conveyor or could be shipped to the 575 ton silo and coal storage area via the crusher and the 54 inch belt. When the coal was shipped to the Cottonwood Mine it was sized from 16" x 0" run of mine to 6" x 0". When the coal was shipped to the Mine Facilities it passed through a crusher. The crusher at the Mine has the capability of sizing the coal from 16" x 0" through 2" x 0". The crushed coal was then conveyed to a 575-ton bin where it was loaded by a short belt into on-road trucks for shipment. In the event the crusher failed or the bin was full, coal was diverted by a flop gate into a chute and placed in an open storage pile. Figure 3-1 shows a generalized schematic of the coal handling system. Appendix 3-8 describes further details on the coal handling system.

Coal mining at the Mine ceased as of March 15, 2001. In preparation of temporary cessation, all-mining equipment including; production (longwall and continuous miner), belt haulage and

electrical were removed from the mine. Verification of equipment removal was conducted on April 6, 2001 with Bureau of Land Management (Steve Falk) and Division of Oil, Gas and Mining (Pete Hess) participating in the review. A plan to construct permanent seals was submitted to and approved by Mine Safety Health Administration. Sealing of the mine portals was completed on May 1, 2001.

### **3.2.5 Power System Transmission Lines, Substation, Mine Feeders**

The present utility power is supplied at 25,000 volts, 60 HZ. This incoming line supplies the mine substation located south of the office building. The existing 25,000 volts primary, 12,470 volts secondary, substation rated at 7500 KVA is connected to this transmission line in a delta primary, wye secondary configuration for underground distribution. Underground power was distributed by three (3) 4/0 mine feeder cables at 12,470 volts. At each working section, belt drive location, compressor station, high pressure pump station, etc., a transformer reduces the 12,470 volts to 950/480 machine voltage.

A 400 KVA 4160 volt primary, 480 volt secondary transformer supplies power to miscellaneous surface areas (tipple, shop, etc.). The mine office receives power from a pole mounted 480/220/120 transformer.

PacifiCorp upgraded the power system on August 5, 1995 which consisted of the following: 1) incoming utility power upgraded by Utah Power to 69,000 volts, 60 HZ, phase 3, 2) installation of two (2) identical substation transformers (one of which is a standby/backup unit) rated at 10 MVA. These transformers are located southwest of the office building. The primary voltage is 69,000 volts delta connected and the secondary will be 12,470 volts wye connected. The existing 7500 KVA transformer will remain in place for a secondary backup power system. All Power from the substation will remain the same as mentioned above.

### 3.2.6 Water Supply System

Historically, the culinary water supply for the Mine was drawn from underground mine water. Mine water was collected in an underground sump and skimmed of oil. Approximately 10,000 gallons per day of this water was prepared in the treatment plant for use as potable water. Some mine water was used for wash down. Water was treated on the surface at a maximum rate of 10 gpm and then stored in two 22,000 gallon capacity fresh water storage tanks. The treatment plant and process are approved by the State of Utah, Department of Environmental Quality, Division of Drinking Water. A schematic of the water system is shown in Figure 3-2. This system is connected to the mine water system at the belt portal location. If the need should develop for filling water trucks, or supplying alternate water to the mine or surface system, this water would be drawn from the 2-22,000 gallon surface storage tanks referred to in Figure 3-2.

Refer to Figure 3-3 for typical underground water system schematic. As stated previously, PacifiCorp notified the Division of temporary cessation of coal mining operations at the Trail Mountain Mine effective May 4, 2001. Coal mining at the Mine ceased as of March 15, 2001. In preparation of temporary cessation, all of the mine de-watering system was removed from the mine, except for a six (6) inch steel supply line (9066') and a twelve (12) inch PVC de-watering line (9066), refer to Plate 3-8 for details. Verification of equipment removal was conducted on April 6, 2001 with Bureau of Land Management (Steve Falk) and Division of Oil, Gas and Mining (Pete Hess) participating in the review.

### 3.2.7 Sewage System

Historic - The septic system for the Facility was approved by the Division of Water Quality on March 17, 1995. The system is somewhat unique in that the grey-water portion of the sewage is separated and eventually enters the Cottonwood Mine sewage system and leach field for final disposal.

The sewage enters one of three septic tanks, depending on location, removing the majority of solids from the sewage. The grey-water then flows, via an 8 inch line, to the collection/pumping station, located south of the rock dust silo. The collection/pumping station contains a 10,000 gallon holding tank and two pumps. In the case of emergencies, the system can dispose of the sewage grey-water at the collection/pumping station by haulage truck to ~~the Cottonwood Mine sewage system or to~~ another facility licensed to accept septic tank waste. For short term emergencies, the storage capacity of the collection tank can handle more than the 24 hour sewage waste generation of the mine.

### **3.2.8 Water Diversion Structures**

Three water diversion structures are maintained at the Mine. A concrete curb and gutter running north-south through the facilities area diverts water from the disturbed area into the sediment pond. A 66-inch culvert that has been placed in Cottonwood Creek has allowed the facilities pad area to be extended, and also allow Cottonwood Creek to flow beneath the mining operation. The length of this culvert is approximately 1,900 feet, extending from below the sedimentation pond to the property boundary north of the bathhouse (see Chapter 7). A 48-inch culvert located at the mouth of the side canyon, just west of the fan portal, diverts water from the canyon directly into the 66-inch culvert of Cottonwood Creek without crossing the mine property (see Chapter 7).

### **3.2.9 Sedimentation Control Structures and Water Treatment Facilities**

A sedimentation pond is located on the southern end of the ~~permit~~ disturbed area. All Surface water that has crossed the mine property is diverted to this structure. Mine water can also be periodically pumped directly into the sediment pond. The pond contains a 48 inch emergency overflow culvert and a decant pipe, located on the east side of the pond (see Chapter 7).

### 3.2.10 Transportation, Roads, Parking Areas

Access to the mine and its facilities is provided by a county road, Forest Service road, and private right-of-way along Cottonwood Creek. The road is paved and used by mine personnel private vehicles, coal trucks for haulage, and by the public for access to the upper canyon.

~~The facilities area of the Mine is accessed from a county road~~ The facilities area consists of: coal storage areas, parking lot, supply yard, equipment and material storage areas. No primary road exists on the mine site. Controlled pad and parking lot drainage flow across the facility and enters the curb and gutter system which reports to the sediment pond.

The roads on the site are ancillary roads. These include the upper terrace access road, portal access road and the tipple access road. Ancillary roads are used on an occasional, as needed basis only, and therefore are classed as ancillary roads according to R645-301-527.100.

The roads are constructed and maintained to minimize disturbance and adverse impacts on fish, wildlife and related environmental values. Roads will be maintained to meet applicable design standards throughout their use, by blading, watering and resurfacing as necessary. Roads are also located, designed, constructed, reconstructed, used, maintained, and will be reclaimed so as to prevent or control damage to public or private property; using non-acid or non-toxic forming substances in surfacing; and will have a static safety factor of 1.3 for all embankments.

The mining operation is conducted within 100 feet of a public (county owned) road. The requirements of R645-103-234 and protection of the public interests are met in the following ways:

- (1) This is a pre-law operation, and has always been located adjacent to the public road which provides access to the public and private lands in and beyond Cottonwood Canyon;
- (2) The road has been upgraded and paved through cooperation of the Mine, Emery County Road Department, and the US Forest Service;
- (3) Necessary approvals for the road have been obtained from the authorities with jurisdiction over the public road through the cooperative effort of upgrading and paving of the road to the mine site. Necessary encroachment permits have been obtained from Emery County for accesses to and from the public road.
- (4) Required public notices concerning the operation have been posted in local newspapers for Permit Approvals, Permit Renewals and Permit Transfers.

### **3.2.11 Total Area for Surface Disturbance During the Permit Term**

The total area of present surface disturbance at the Mine plan area, including all compliance activities (sediment pond, upper and lower culvert installation, borrow area, portal areas, and surface pad extension), is 10.39 acres (see Plate 3-1 in ~~Volume 3~~). Other disturbed areas include the waste rock site area which covers 15.85 acres of disturbance (refer to Plate 4-1) in ~~Volume 4~~

### **3.2.12 Detailed Construction Schedule**

Construction of basic facilities was completed prior to the 1977 Act. Sediment controls, including the sediment pond, curb/gutter and bypass culverts were completed in late 1987. Minor system enhancements were completed from 1987 through the fall of 1990. Construction details and schedules for these projects are found in Appendices 7-13, 3-7, 3-8, 3-9 and 3-10 respectively.

### 3.3 OPERATION PLAN

Historic - During the operational phase of Trail Mountain (pre 2015), the mine employed a maximum of approximately 300 people to conduct its underground mining activities. Underground mining consisted of longwall retreat mining and continuous miner development. Production ranged from 3,500,000 to 5,000,000 tons per year. Coal was conveyed to the surface at approximately 16" x 0" run of mine product. It was then conveyed through an overland tube conveyor (demolished in September 2014) to the Cottonwood Mine Portal on the opposite canyon side. It then traveled underground until it reached the Cottonwood Mine Facility, where it was crushed to a 6" x 0" run of mine product before shipment via triple trailers to the Hunter Power Plant. Coal could also be crushed to 6" x 0" run of mine product at the existing Mine facilities and shipped via double trailers.

#### 3.3.1 Mining Plans

The layout of the mine are shown on Plate 3-2. Historically, first and second mining occurred in the areas within the southern end of Trail Mountain. Those areas have been mined out and the leases have been relinquished backed to the federal agencies who manage the surface and subsurface resources.

##### 3.3.1.1 Orientation and Multiple Seam Considerations

Historic - As shown on Plate 3-2, the original mains were driven north to south, with panels being driven off the mains in an east to west orientation. This mine layout was developed prior to the Act. Longwall section development was in an east to west orientation. Surface exploration drilling, along with geologic mapping, have been utilized to document the coal resources of the Trail Mountain area. (United States Department of the Interior. Memorandum Resource Recovery Report,

March 25, 1982, states that the Hiawatha is the only coal seam of current economic interest known to occur in the vicinity of the Trail Mountain tract). Coal resources above the Hiawatha seam to date show the seams to be thin, discontinuous and of poor quality<sup>1</sup>. PacifiCorp had no plans to mine the upper coal seam (see Appendix 3-2).

### **3.3.1.2 Portals, Shafts, and Slopes**

Portals have been previously addressed in the Surface Facilities section. Shafts and slopes do not apply to this property because of the geology of the coal seam.

### **3.3.1.3 Mining Methods – Continuous Miner and Longwall**

~~No Room and pillar mining is anticipated during the permit term.~~ Longwall retreat mining with continuous miner development of mains, longwall panels and gate road development will be employed during the life of the mine.

#### Continuous Mining Unit

The principal purpose of continuous mining units at the Mine was mine development; i.e., section development of mainline entries, longwall sections - gate road development and longwall section - setup/bleeder entry development.

Figure 3-4 illustrates the basic configuration of a typical five entry main, consisting of 20 ft. wide entries and crosscuts driven on 80 ft. x 100 ft. pillar centers. The pillars created measure a nominal 60 ft. wide x 80 ft. long; a size which has been developed for sufficient support of the main entries and overlying strata.

Figure 3-4 also illustrates the basic configuration of a typical two-entry longwall panel development, consisting of 20 ft. wide entries and crosscuts driven on 50 ft. x 100 ft. pillar centers. Bleeder and setup development consists of 20 ft. wide entries and crosscuts on nominal 50 ft. x 100 ft. pillar centers. With the retreating longwall mining system, all-panel development work is accomplished by continuous mining units prior to longwall equipment installation.

#### Longwall Mining System

The predominant mining method at the Trail Mountain Mine was longwall retreat mining. This method, as practiced by PacifiCorp, presents the safest and most efficient underground resource recovery mining method available. PacifiCorp notified the Division of temporary cessation of coal mining operations at the Trail Mountain Mine effective May 4, 2001 and mining ceased as of March 15, 2001.

As referenced above, the two-entry gate road system is developed with 20 ft. wide entries and crosscuts on nominal 50 ft. x 100 ft. pillar centers. This type of "yield pillar" configuration is designed so that the gate road support pillars will gradually yield as longwall retreat proceeds from panel to panel. The purpose of this design is to prevent the buildup of unrelieved stresses within the pillar; stresses which, in the past have resulted in pillar failure and the accompanying danger to personnel and property.

Figure 3-5 illustrates the basic configuration of a retreating longwall system. After gate road entries are driven to the extent of the longwall panel length, on both sides of the longwall face, setup and bleeder entries are driven to connect the gate roads. A solid coal barrier is left between the setup and bleeder entries, sized based on geologic parameters, to insure long term bleeder stability.

Long wall face width, depending on geologic parameters of the coal deposit, varies from 500 ft. to 1000 ft. wide. Standard face width is 750 ft., from center-line of headgate entry to center-line setup entry, the longwall begins retreat mining; from the setup entry, "outby" toward the mainline entries. A protection barrier is left between the mined out longwall panel (extraction face) and the mainline entries; sized to insure long term mainline entry stability. Panels are designed within the mining area, bounded by natural and imposed limits with varying degrees of confidence as to location and extent. Lease boundaries are definitely located and invariable in the short term. Faults may vary somewhat from currently assumed locations. Geologic limitations; such as seam splits, channel scours, spars, stratigraphic thinning, etc. may affect the mining limits by varying hundreds of feet as information becomes available and as mining recovery economics and practicality are further refined. Underground burned areas, from a practical point of view, are indeterminate prior to mining. Regulatory mining restrictions, such as escarpment protection barriers and perennial stream buffer zones further confine the mining extent.

Within the limitation of the above boundaries, longwall panel length and width are maximized to the extent possible due to the economic cost and production loss associated with longwall moves. The minimum panel length, currently considered economical, is 1500 ft. of recoverable reserves. The minimum panel width, currently considered economical, is 500 ft. of recoverable reserve.

#### **3.3.1.4 Projected Mine Development – Mains, Submains, Panels, Etc.**

~~The plan of mine development projected for the Mine is shown in Plate 3-2.~~

Historic - After the mine acquisition, development of the fifth left mains and third west mains continued. The panels east of fifth left main were driven west to east and

the panels west off the fifth left mains were driven east to west. Panel sequence for extraction was from second east to fifth east and tenth right to first right. The coal lease of these underground areas (with exception of 3<sup>rd</sup> West) were partially relinquished effective January 9, 2009.

#### **3.3.1.5 Retreat Mining**

Historic - Panel extraction commenced once the fifth left mains were developed below the second east panel and the second east tailgate, headgate and bleeders were completed. ~~All~~ The coal leases containing panels off the 5<sup>th</sup> Left mains below 1<sup>st</sup> Right have been relinquished effective January 9, 2009.

#### **3.3.1.6 Roof Control, Ventilation, Water Systems, Dust Suppression, Dewatering, Electrical, Etc.**

Plans for roof control, ventilation, water system, dust suppression, etc., have been submitted to MSHA and are on file at the MSHA district office; Mine Safety and Health Administration. ~~P.O. Box 25367, Denver Colorado 80225.~~

#### **3.3.2 Barrier Pillars**

PacifiCorp left barrier pillars around oil and gas wells, surface structures and streams, property boundaries, and outcrops. These barriers will protect the recovery of the resource and the environment. A ~~complete~~ discussion of barrier pillars is presented in Chapter 12, Geotechnical.

**3.3.2.1 Protection of Oil and Gas Wells**

Presently no oil or gas wells exist in the areas of underground mining activities. However, should any well be drilled, a barrier of 300 feet in diameter will be left unless a variance from MSHA is obtained to leave a smaller barrier.

**3.3.2.2 Protection of Surface Structures and Streams**

No surface structures or perennial stream beds will be undermined during the life of the mine.

**3.3.2.3 Boundaries**

Lease, permit, and adjacent area boundaries are designated in accordance with both State and Federal mining regulations.

**3.3.2.4 Outcrop Protection**

Historic - Outcrop protection is provided by leaving a minimum barrier of 200' between mine workings and the coal outcrop. One exception to the above is the eastern most entry of the 3-entry system driven north and northeast to the ventilation portal. The eastern entry is located within the 200' barrier for a distance of approximately 240' and at no time comes closer than 160' from the outcrop. The 3-entries were necessary to meet MSHA regulations and provide adequate ventilation. The location of this variance is in the side canyon approximately 1700' south of the forth portal, and is shown on Figure A-3-7-2, Appendix 3-7. Outcrop protection is further addressed in the geotechnical chapter of this permit.

### 3.3.3 Conservation of Coal Resources

#### 3.3.3.1 Projected Maximum Recovery

There is no recoverable coal from the historical (relinquished) Trail Mountain mine plan area. Table 3-1 shows the breakdown of coal recovery (refer to Plate 3-2: Mining Plan and Plate 3-3: Areas of Coal Recovery).

#### 3.3.3.2 Justification of Non-Recovery

**Historic** - It is estimated that resource recovery rate of 80% or better can be obtained within the proposed longwall panels. Overall minable reserve recovery for the Trail Mountain Mine was estimated at 60%.

The maximum amount of economically recoverable coal will be extracted with the exception of protective coal, which must be left in place to ensure the integrity of the mine. This protective coal falls into two categories. The two categories are barrier coal and strata control coal. (See Appendix 11-1).

#### 3.3.3.3 Access to Future Reserves

**Historic** - There are two (2) areas currently designated as future reserve access points at the Mine: 1) 3rd West Mains and 2) North Mains. Access to future western reserves will be by western extension of the existing 3rd West Mains, running east/west, at the northern boundary of Federal Lease U-64375. Access to future northern reserves will be by northern extension of the existing North Mains, running north/south, at the western boundary of Federal Lease U-49332. Solid coal barrier pillars are to be left on either side of these main entries to ensure their long term stability for access.

Mining plans and projections may change between permit submittal and actual mining. However, the permittee will commit to conducting operations in accordance with accepted industry practices, so as to achieve maximum economic recovery as specified by 43 CFR 3482.1 (c) (7). The permittee also commits to professional cooperation with the Bureau of Land Management (BLM) in achieving MER on all-Federal Coal leases.

**TABLE 3-1  
RECOVERABLE RESERVES**

LEASE AREA	IN-PLACE TONS	RECOVERABLE TONS	ACTUAL PRODUCED TONS By EWMC (as of 6/1/2001)	TOTAL PRODUCED TONS BY ALL
*Federal Lease UTU-49332	4,361,837	1,239,936	22,917	1,509,199
Federal Lease U-082996	276,954	56,718	0	219,755
**Federal Lease U-64375	45,404,832	433,363	21,508,007	21,938,730
<b>TOTAL TONS</b>	<b>50,043,623</b>	<b>1,730,017</b>	<b>21,530,924</b>	<b>23,667,684</b>
<b>TOTAL REMAINING TONS</b>		<b>1,730,017</b>		

\*Partial relinquishment of 261.47 acres effective January 9, 2009.

\*\*Partial relinquishment of 2504.01 acres effective January 9, 2009.

**3.3.4 Equipment Section** As stated previously, PacifiCorp notified the Division of temporary cessation of coal mining operations at the Trail Mountain Mine effective May 4, 2001. Coal mining at the Trail Mountain Mine ceased as of March 15, 2001.

**3.3.4.1 Surface Equipment**

In preparation of temporary cessation, ~~all~~ the surface equipment was transferred to remaining operations.

**3.3.4.2 Underground Equipment**

~~The permit area will be mined with longwall and continuous mining equipment.~~  
Typical continuous mining equipment is;  
Continuous Miners, Shuttle Cars, Section Scoops, Roof Bolters  
Feeder Breakers, Rock Dusters, Face Fans, Power Centers  
Welders, Shop Car

Typical longwall mining equipment is;

Longwall Shearer	Power Center
Face Conveyor	Electrical Controls
Longwall Supports	Emulsion pumps
Stageloader	Shield Movers
Crusher	Pod Rock Duster
Scoop/Forklift	Shop Car

Typical general mine equipment is;

Diesel Scoops,	Conveyors
Diesel Trucks	Belt Storage
Diesel Pickups	Road Grader
Mantrips	Dozer
Trailers	Power Centers
Compressors	Section Switches
Welders	Submersible Pumps
Belt Drives	Rock Dusters

**3.3.5 Mine Safety, Fire Protection, and Security**

During mining operations, a safety department was maintained at the mine site. All-New miners were trained in basic first aid before working underground. Once each year all miners were given an eight hour retraining class. All-Working sections maintained the necessary first aid items including stretchers, bandages, splints, tourniquets, etc. ~~Fire protection-All machines underground are equipped with a fire suppression system. On portable non-water machines a dry type chemical system is used. On machines equipped with water, a deluge system or a dry type chemical system is maintained. All belt drives and take-ups were equipped with these systems. An adequate supply of rock dust and a dry type fire extinguisher were located at belt drives transformers, oil storage areas, and other dangerous areas in and around the mine.~~

**Surface Fire Fighting Plan**

In compliance with Title 30 Code of Federal Regulations Part 77.215(j) and R645-301-528.323.1 the following plan to extinguish surface fires and coal waste fires will be adhered to in the advent of a fire.

I. PREVENTION

- A. All-Warning and non-smoking signs will be observed by employees and visitors to the mine.
- B. Accumulations of oil, grease, diesel fuel, coal fines and other combustibles will not be allowed to accumulate as a possible source of fire.
- C. Coal stock piles and coal waste piles will be closely monitored to detect symptoms of a possible fire.
- D. All Employees will be trained as to their responsibilities in the advent of a fire.

II. EXTINGUISHING SURFACE FIRES

- A. In the advent of a fire on the surface area of the coal mine all employees both in the mine and on the surface will be notified immediately, all persons will be accounted for and evacuated to a safe place.
- B. The local fire departments, mine rescue teams and other trained and qualified persons experienced in fighting fires will be notified immediately, equipped with the appropriate equipment, and the proper action will be taken to extinguish the fire.
- C. Measures will be taken to prevent unauthorized persons interfering or being endangered by the fire and the methods to extinguish the fire.
- D. All-Necessary controls available to prevent adverse impact on water quality and other environmental concerns will be incorporated immediately.

### III. REPORTING PROCEDURES

- A. All Necessary reports and accident claims will be completed and filed with the appropriate state and/or federal agency.

#### **3.3.5.1 Signs**

~~Required signs are maintained at the Mine.~~ Property boundary signs are posted along the access to the mine property and at the northern and southern property boundaries. Buffer zone signs are maintained on the west side of Cottonwood Creek (see Figure 3-6).

All Signs will be maintained throughout the operational life of the facility, or at least as long as they are required and relevant. Permit ID signs and required perimeter markers will be maintained until bond release.

#### **3.3.5.2 Fences and Gates**

Approximately 2,000 feet of chain link fence, containing ~~three~~ multiple-access gates, is maintained at the Mine site. This chain link fence also serves to alienate the east boundaries of the surface disturbance of the mine plan area. Identification and perimeter signs are installed on the fence. ~~Also, a~~ The substation is enclosed by a ~~seven-foot~~ chain link fence with a ~~three strand barb-wire cap and two gates.~~

#### **3.3.5.3 Facilities – Coal Stockpiles, Refuse Piles, Coal Seams**

Historic - Coal conveyed from the mine is transferred via a tube conveyor (demolished September 2014) to the Cottonwood Mine or to a 575-ton storage bin at the Mine. In the event of a system failure or if the bin is full, coal is diverted and stockpiled north of the bin. The size of this pile will vary greatly

Depending on conditions; however, extreme dimensions are approximately 300' by 150'. This pile is recovered by front-end loaders which place the coal back into the handling system going to the loadout bin. ~~All~~ The runoff from the stockpile, as well as other coal handling facilities, is directed to the sediment pond. ~~All~~ Conveyors are covered, and water sprays are used as necessary to reduce fugitive dust emissions. ~~There are no refuse piles at this mine site.~~ Any Coal refuse or waste generated will be hauled to the approved ~~Cottonwood~~Wilberg Waste Rock disposal area.

#### **3.3.5.4 Explosive – Storage and Handling (Removed from Mine Site)**

Storage - Explosives and caps are stored in separate MSHA approved explosive magazines. The magazines are of approved steel construction. The doors are so constructed to prevent easy access and tampering with the locking mechanisms. ~~All~~Magazines are properly electrically grounded. The magazines are located as required to provide added security. Locations of the magazines are shown on Plate 3-1.

Handling - All Materials are transported in an approved boxes separated into two compartments with a divider. These boxes are then carried on trailers and diesel powered tractors.

Use - Explosives are primarily used underground. Underground explosives are used to blast rock to make room for overcasts, belt drives, and at other areas where extra height is required. Other uses underground include grading of roadways and to facilitate cleaning up of unintentional roof falls, etc.

When surface blasting is done it will be in accordance with the applicable R645-301-524 rules. Surface blasting will be done by a certified blaster under the Utah

Blaster Certification Program. This certification will be carried by the blaster or kept on file during the blasting operations. At least one other person will be present during the blast. Proper training will be given to crews associated with the blast or explosive handling. The blast design will be prepared by a certified blaster and will be submitted to the Division at a time before the blast.

No blasts will utilize more than five (5) pounds of blasting agent or explosives detonated in any eight-millisecond period; therefore a pre-blast survey is not required.

When using explosives on the surface, all-blasting will be done between sunrise and sunset. No residents are located within a half mile radius of the permit area. Blasting signs will meet R645-301-521.200 and be conspicuously placed along the edge of the blasting area or road entrance. Signs will be placed at all accessible entrances to the blasting area from public roads stating "Warning! Explosives in Use". Access control will be exercised preventing unauthorized access to the blasting area. No structures exist within a distance that would present concerns from air blast or ground vibration.

Blasting records will be kept on file for review by the Division. Blasting records will comply with R645-301-524.700. Exhibit 1 (Appendix 3-6) shows a typical report which will be compiled to satisfy these requirements.

### 3.3.6 Operation Schedule

**Historic** - Trail Mountain Mine operated with longwalls and continuous miners for development of longwall panels and mains. The longwall operated two shifts a day or two machine shifts and the continuous miners operated two shifts a day or four machine shifts.

#### 3.3.6.1 Annual Production Per Year for the Permit Term

**Historic** - The Trail Mountain Mine produced approximately 3,500,000 to 5,000,000 tons per year until notifying the Division of temporary cessation on May 4, 2001.

#### 3.3.6.2 Operating Schedule – Days, Shifts

**Historic** - The Trail Mountain Mine operated as follows:

208-240 days/year

3 shifts/day

10 hours/shift

2 production shift/day

1 maintenance shift/day

2 continuous miner shifts/production shift

1 longwall shift/production shift

This schedule is a general outline and subject to change.

#### 3.3.6.3 Operation Employment

**Historic** - During coal mining operations, Trail Mountain Mine employed approximately 300 people, 66 salaried and 234 hourly employees.

#### 3.3.6.4 Temporary Cessation

Whenever it is known that operations are to be temporarily ceased for more than 30 days, the permittee shall submit to the Division a notice of intention to cease or abandon the operations, in accordance with R645-301-515.320 and to MSHA standards.

This notice will describe mitigation measures to be employed in accordance with the terms and conditions of the permit approval, such as a statement of the number of surface acres involved in the cessation, extent of sub-surface strata, prior reclamation efforts accomplished on the property, and identification of all backfilling, regarding, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during the temporary cessation.

If underground openings are to remain inactive for a period greater than 90 days, such openings will be temporarily closed off from access. Such closures will consist of a chain link or other substantial wire mesh fabric fence placed over the portals to prevent public access while allowing for air flow. Locked gates may be installed in the portal to allow for mine inspection.

PacifiCorp notified the Division of temporary cessation of coal mining operations at the Trail Mountain Mine effective May 4, 2001. Coal mining at the Trail Mountain Mine ceased as of March 15, 2001. In preparation of temporary cessation, all mining equipment including; production (longwall and continuous miner), belt haulage and electrical were removed from the mine. Verification of equipment removal was conducted on April 6, 2001 with Bureau of Land

Management (Steve Falk) and Division of Oil, Gas and Mining (Pete Hess) participating in the review. A plan to construct permanent seals was submitted to and approved by Mine Safety Health Administration. Sealing of the mine portals was completed on May 1, 2001.

### **3.3.7 Mine Plan Area**

The mine plan area of the Trail Mountain Mine is outlined in Plate 3-2. A total of 773.50 acres are included in the mine plan area.

#### **3.3.7.1 Projected Mining By Year**

The mine development and projected mining schedule are shown on Plate 3-2. As shown, additional permit terms will be required.

#### **3.3.7.2 Acreage and Delineation**

As described in Chapter II, the mine plan area consists of approximately 773.50 acres of fee and federal land. Federal land consists of three leases totaling 720.00 acres. The remainder of the mine plan area (53.50 acres) is fee land.

## **3.4 ENVIRONMENTAL PROTECTION**

This section addresses the environmental concerns and impact of the mining operation. The aspects of land-use, cultural resources, hydrology, soils, vegetation, fish and wildlife, air quality, subsidence, and waste disposal are addressed. Each aspect is addressed in terms of projected impacts and control measures. For those aspects that warrant it (hydrology, vegetation, fish and wildlife, air quality, and subsidence) a discussion of monitoring procedures are also included.

### 3.4.1 Preservation of Land Use

The post-mining land-uses are anticipated to remain the same as the pre-mining land-uses of grazing, wildlife habitat and recreation. A full discussion of these uses area found in Chapter 4.

Following completion of the mining operations, the mine site will be reclaimed and revegetated. The area will be graded, scarified, and seeded. ~~before the next growing season.~~ The seed mixtures to be used are discussed in Chapter 9 and Section 3.5 of this Chapter. ~~The site will receive treatments of fertilizer and additional seedings until it is determined stable for the bond release period. During low run off, the stream diversion culvert will be removed and the stream channel will be restored.~~ No reclamation work is contemplated on the access road to the site. This road has varied ownership (county, federal and private) and provides access for Forest Service and private land up Cottonwood Canyon.

~~Lands held by PacifiCorp are classified by Emery County, the US Forest Service, and the State of Utah as a recreation, forestry and mining area.~~ *Moved to Chapter 4*

#### 3.4.1.1 Projected Impacts of Mining on Current and Future Land Use

~~Within The permit area, approximately 10.39 acres has been disturbed by surface facilities of the mine.~~ This disturbance **Construction of the surface facilities** has affected the soils and vegetation of the area. The effect on vegetation is temporary and will be eliminated by revegetation of the disturbed area. ~~Wildlife~~ **The loss of wildlife** habitat in the riparian community ~~has occurred.~~ The acreage is small; however, the riparian area is considered to be of critical value to the overall density of terrestrial wildlife. Continued operation of the surface facilities will have no significant impact on the local wildlife. A full discussion can be found in Chapter 10. Discussion of the impact at the Waste Rock Disposal Site are found in Volume 4.

### 3.4.1.2 Control Measures to Mitigate Impacts

Careful planning of the reclamation activities will help to minimize the impact of the Mine on land-use. Return of the mine site to the premining land-use of grazing, wildlife, and recreation at the conclusion of mining will be accomplished according to the steps outlined below:

- 1) Seal all large diameter openings with non-combustible material.
- 2) Remove all surface structures, equipment and facilities, followed by trash and debris removal.
- 3) Re-establishment of drainages and grading and contouring of disturbed areas.
- 4) Establishment of a permanent diverse vegetative cover suited to the post-mining land-use on all affected land will be done as soon as practicable following reclamation.

Contemporaneous reclamation of those areas not needed during operation will take place throughout the life of the mine. All Other areas (building and equipment sites, storage and parking areas) will not be reclaimed until the conclusion of mining.

### 3.4.2 Protection of Cultural Resources

No public parks or historical sites worthy of preservation have been found in the mine plan area. Chapter 5 contains a discussion of cultural resources.

### 3.4.2.1 Projected Impacts of Mining on Cultural Resources

Two types of projected impacts exist on cultural resources as a result of mining. Direct impacts are a direct **as a** result of mine development or operation. And indirect impacts result from activities that are not directly associated with the mine development or operation. Any effect of the Trail Mountain Mine on cultural resources probably occurred during development. No cultural resources have been found in the area of the mine, therefore no direct impacts from any future development are likely to occur.

The inventory indicated two CRRS: 2 sites located in the lower canyon. These sites are vulnerable to indirect impact from vandalism. During development of the canyon road by Emery County, measures to avoid impact were observed.

### 3.4.2.2 Control Measures to Mitigate Impacts

Measures used to mitigate the effects of the mining operation on cultural resources were implemented prior to any disturbance associated with the development. Once construction began, only avoidance procedures were the only feasible mitigation measures.

During 1985 and 1986, the proposed construction and realignment of three miles of county road **by Emery County** from Highway 29 to the Trail Mountain Mine site was completed. Two CRRS **cultural sites** were located **and avoided during the road construction**. all engineer and design work conducted by the Emery County Engineering departments was done in such a manner as to avoid these cultural sites.

In 1990, additional facilities were constructed at the mine site. Construction details, as well as control measures to mitigate impacts for each of these projects are described in Appendices 7-13, 3-9, 3-7, 3-8, 3-9 and 3-10 respectively.

The Mine site contains no known cultural resources that are liable to be impacted by the continued operation or compliance construction.

### **3.4.3 Protection of Hydrologic Balance**

The Mine operates all-mine activities in such a way as to minimize potential impacts to surface and groundwater resources. Drainage control facilities will contain and hold the required volume for the specified period for water flowing through or originating in the disturbed area. Suspended material will be allowed to settle in a sediment control pond before discharge into natural drainages. Such discharges will be in accordance with an approved UPDES Discharge Permit.

The protection of the hydrologic resources at the waste rock site are discussed in the waste rock permit ~~Volume 4~~.

Sedimentation production from the berm outslope to the creek has been greatly reduced by a portion of the creek being placed in a bypass culvert. This bypass culvert was installed in 1983, and extended some 300' to the north in 1990 and 70' further north in 1996.

All Mine portals are designed in accordance with R645-301-731.521. This ensures that water will not discharge from the portal by gravity flow. Upon reclamation of the mine, portal seals will be placed in all entries as soon as underground reclamation has been completed.

The Division was notified of temporary cessation of coal mining operations at the Trail Mountain Mine effective May 4, 2001. Refer to Section 3.3.6.4 for additional information. ~~Coal mining at the Trail Mountain Mine ceased as of March 15, 2001. In preparation of temporary cessation, all mining equipment including; production (longwall and continuous miner), belt haulage and electrical were removed from the mine. Verification of equipment removal was conducted on April 6, 2001 with Bureau of Land Management (Steve Falk) and Division of Oil, Gas and Mining (Pete Hess) participating in the review. A plan to construct permanent seals was submitted to and approved by Mine Safety Health Administration. Sealing of the mine portals was completed on May 1, 2001.~~

#### **3.4.3.1 Projected Impacts of Mining on the Groundwater Hydrologic Balance**

Geology controls movement of groundwater. Because of the low permeability of the consolidated sedimentary rocks in the Trail Mountain area, groundwater is primarily through fractures. Data has been collected from numerous coal exploration drill holes, from within the mine workings, from surface drainages, and from spring surveys. ~~The data have identified two separate isolated aquifer systems within the vicinity of the mine; the first is localized perched water tables in the North Horn Formation, and the second is a combination of localized perched water tables in the Blackhawk Formation and the Starpoint Sandstone which exhibits some limited potential as a regional aquifer. The generally discontinuous nature of the Blackhawk and apparent low specific yield (Cordova, 1964) indicates that the water yielding capabilities of the Blackhawk are only of local importance. A complete description of the hydrologic/geologic resources of the Trail Mountain area is discussed in Chapter 7, Section 7.1, and Appendix 7-10 (PHC).~~

Groundwater Quantity – Refer to Section 7.1.3.2.

Mining occurs in the lower Blackhawk Formation, which consists of interbedded layers of sandstone and mudstone separated by mineable and non-minable coal seams. The sandstone beds fluvial channel systems are generally massive while the mudstone layers are fine textured and have a tendency to swell when wet and decompose into an impervious clay. Because of the aquiclude formed by mudstone layers in the North Horn Formation, recharge to the Blackhawk Formation is limited, even along major fault systems. Due to the lithologic characteristics of the Blackhawk, both vertical and horizontal migration is constricted. Refer to Chapter 7, Hydrology, for a detailed discussion of the Hydrologic Balance.

The interception of groundwater varies and is dependent on several factors. One of the most significant is that when the mine enters virgin country, a significant amount of water is liberated. In virtually all cases the amount of water which flows into the mine exceeds the recharge and, in time, the water inflow decreases in volume. If new areas are not mined, the discharge from the mine will decrease accordingly.

Groundwater Quality – Refer to Section 7.1.3.2

Groundwater chemical quality is very good in strata above the Mancos Shale. The USGS reports a range in dissolved solids from 50 to 750 mg/l for samples from 140 springs in the region issuing from the Starpoint Sandstone and overlying formations (Danielson et al., 1981). Danielson et al. (1981) identified the regional trends of decreasing water quality from north to south and west to east across the Wasatch Plateau. Waters percolation through the underlying Mancos Shale quickly deteriorate, with total dissolved solids concentrations frequently exceeding 3000 mg/l.

The quality also decreases vertically because of the influence of marine sediments along with the trend of decreasing quality from north to south. The predominant

~~dissolved chemical constituents of the groundwater from both surface springs and samples collected in the mine are calcium, bicarbonate, magnesium and sulfate. Concentrations of magnesium are normally about one-half the concentration of calcium. Sulfate concentrations are typically higher in water from springs issuing from the Starpoint-Blackhawk aquifer zone or confined aquifers intersected by mine workings. As mentioned earlier water quality degrades from the north to the south and also vertically.~~

#### **3.4.3.2 Control Measures to Mitigate Impacts**

~~Refer to Sections 7.1.3 and 7.1.6.1. Although the analysis of the overburden samples tested has shown that no toxic or hazardous materials are present, groundwater quality will be protected by handling earth materials and runoff in a manner that minimizes infiltration to the groundwater system. Mine water encountered in the mine, which is not needed for dust suppression or mining, will be discharged according to stipulations in UPDES Permit No. UT-0023728.~~

~~State and federal regulations (R645-301-727) require that an alternate water supply be provided to replace any water source disrupted, degraded, or diminished by the mining operation. Though the mining operation is unlikely to affect the water supplies in the Trail Mountain area, the permittee will provide this alternate supply if needed.~~

~~In the unlikely event of mining adversely affecting a water source, the permittee will review and select an alternative after considering all possibilities of each site-specific circumstance.~~

### 3.4.3.3 Groundwater Monitoring Plan

Representative springs **and groundwater** (see Chapter 7, **Section 7.1.7**) will be monitored in accordance with the monitoring program. ~~In addition, data will be collected from within the mine.~~

### 3.4.3.4 Projected Impacts of Mining on Surface Water Hydrologic Balance

As has been previously mentioned, the occurrence and quality of water in any region is highly controlled by geology. The Permittee's adjacent and permit area is located in the headwater region of the San Rafael River Basin. The surface drainage system of the permit area is within the Cottonwood Creek drainage system. **Reference Section 7.2.3.1 for quantity information.**

#### Quantity

~~Cottonwood Creek above Straight Canyon drains approximately 21.9 square miles. The average channel gradient of Cottonwood Creek above Straight Canyon is 300 feet/mile (5.7 percent). Only a short period of record (October 1978 to present) is available for the USGS stream gaging station (09324200) on Cottonwood Creek above Straight Canyon. Danielson et al. (1981) estimate the average annual precipitation to be on the order of twenty two (22) inches, or 26,000 acre-feet, on the Cottonwood Creek drainage above Straight Canyon. Danielson et al. (1981) also estimate that only two percent of the precipitation on Cottonwood Creek above Straight Canyon leaves the basin as stream flow compared to thirty percent for Huntington Creek above Huntington. The suggested reasons for the wide difference in percent of precipitation contributing to stream flow are: 1) Cottonwood Creek Basin has a greater portion of area with southern exposure with more gradual slopes than Huntington Creek Basin and 2) possible subsurface movement of water through fractures associated with Joe's Valley Fault. About seventy percent of the total discharge at the Cottonwood Creek station above Straight Canyon for the water year 1979 occurred during the snow melt period (April-July).~~

Sixty years of data are available for the gaging station on Cottonwood Creek near Orangeville (9324500). The drainage area above Orangeville contributing to Cottonwood Creek is approximately 208 square miles. Cottonwood Creek has an average discharge near Orangeville of about ninety-five (95) cfs, or 69,000 acre-feet per year. The maximum and minimum discharges of record on Cottonwood Creek near Orangeville are 7,220 cfs (August 1, 1964) and 1.2 cfs (April 8, 1966), respectively.

The mine adjacent and permit area is drained by minor drainage systems associated with Cottonwood Canyon Creek. Cottonwood Canyon Creek is a major drainage system which borders the eastern limit of the mine plan area. Based on data collected by PacifiCorp, (see 1992 Annual Hydrologic Report) Cottonwood Canyon Creek is an ephemeral stream from its headwaters to the northeast quarter of Section 24 Township 17 South, Range 6 East and intermittent from that point to its confluence with Cottonwood Creek at Straight Canyon. During periods of drought, flow in Cottonwood Canyon Creek is limited to flow emanating from the alluvial deposits at the intersection with Reans Canyon. From the intersection with Reans Canyon to Section 36 the stream loses water to alluvial deposits. The drainage is dry from Section 36 to Section 6 except during spring runoff which normally occurs from late April through June or during precipitation events. Flow in the channel re-emerges in Section 6 and continues to the confluence with Cottonwood Canyon at Straight Canyon.

The quality of flow from the headwaters of the San Rafael River Basin is excellent. However, this quality rapidly deteriorates downstream as streams cross shale formations and receive irrigation return flow from Mancos-derived soils. The impact of the mining on this system will be quite limited.

~~The existence of runoff and sediment control structures should minimize the potential for degradation of the quality of stream waters due to runoff from disturbed areas of the Mine. The construction and upgrading of surface facilities utilized in conjunction with the Mine (yard areas, road, etc.) may result in temporary increases in the suspended sediment concentration of the adjacent stream. However, because of the regulatory requirement that sediment control be provided for all areas of surface disturbance, concentrations should be quickly normalized.~~

#### **3.4.3.5 Mitigation and Control Plans**

Runoff from all disturbed areas will be passed through sediment control facilities, as discussed earlier in this chapter report. Any Discharge from facilities will be monitored in accordance with UPDES permit standards and state and federal regulations.

The effects of the mining operation on the surface water system will be analyzed through the surface water monitoring plan described in Chapter 7 (Section 7.2.7). ~~In the unlikely event that monitoring shows that the surface water system is being adversely affected by mining activities, additional steps will be taken to rectify the situation in consultation with state and federal regulatory agencies.~~

#### **3.4.3.6 Surface Water Monitoring Plan**

An ongoing hydrologic monitoring program will be conducted at each of the stations shown in Figure 7-9. Stations have been established to monitor water quality and quantity above and below the mine plan area.

#### **3.4.4 Preservation of Soil Resources**

The Mine site is a previously disturbed site. Topsoil resources were not protected during development activities from 1948 to 1967. A small amount of topsoil has been removed and

stockpiled from the more recent channel/culvert construction. In the event of any future disturbances, soil resources will be protected. Protection will involve the removal, stockpiling and stabilizing of soils suitable for reclamation. Suitability will be determined by analyses of soil samples.

#### **3.4.4.1 Projected Impacts of Mining on Soil Resources**

Little soil exists on the presently disturbed mine site. What soil existed prior to commencement of mining activities has long been buried by construction of the pads and buildings.

A small pile of topsoil has been stored just northwest of the fan portal area. This material was salvaged prior to the recent installation of the 48" culvert in the side canyon. The topsoil pile has been marked and reseeded according to requirements.

The remaining surficial materials are being compacted and mixed with crushed coal and coal fines. Operation and maintenance of equipment contributes oil, gasoline and diesel fuel to the soil in some places.

#### **3.4.4.2 Control Measures to Mitigate Impacts**

As only limited amounts of soil remain on the disturbed site due to previous disturbance and no further disturbances are proposed, few, if any, mitigation measures can be implemented.

In the event future disturbances of operations uncover or encounter salvageable soils, the permittee will remove, stockpile and stabilize the soils for use in future reclamation work.

Testing is planned to determine if the surficial materials can be used for revegetation work. Historic plots were set up on the mine site in cooperation with the regulatory agency to determine the feasibility of using the existing material for revegetation.

In 1984, a test plot area was installed just north of the bathhouse at the Trail Mountain Mine site. For a complete description of this test plot and record of yearly sampling, please refer to Chapter 9.

### **3.4.5 Protection of Vegetative Resources**

The mine site was disturbed during development activities from 1948-1967. As such no vegetative protection activities were implemented during development of the mine site. Future disturbances will require verification that threatened and endangered species do not exist on the area of proposed disturbance. If any threatened and endangered species are found, the appropriate authorities will be contacted.

#### **3.4.5.1 Projected Impacts of Mining on Vegetative Resources**

The mine has been in existence since 1948 and development work since that time has removed or covered vegetative resources. Impact has been to portions of the riparian and grassland-shrub communities. The extent of impact is not great due to the limited areal extent of the disturbance.

#### **3.4.5.2 Mitigating Measures to be Employed to Reduce Impacts to Vegetative Resources**

As previously mentioned, the mine site was disturbed during development activities for 1948-1967. Disturbance of the vegetative resources has already occurred. Any further disturbance will require the verification that threatened and

endangered species do not exist on the proposed site. If any threatened and endangered species are found, the appropriate authorities will be contacted.

### **3.4.5.3 Monitoring Procedures – Reference Areas and Revegetation**

Revegetation of the disturbed area will be undertaken following the completion of the mining activities. Success of the revegetation activities will be determined yearly through quantitative and qualitative data. The vegetation test plot methods and design that were used are described in Chapter 9.

### **3.4.6 Protection of Fish and Wildlife**

The presence of wildlife in the mine plan area indicates their adaptability to the impacts of the mine. As a result, the overall impacts to wildlife are expected to be very minor. In addition, the permittee is committed to practical mitigation of adverse effects of construction and maintenance of the mine operation.

#### **3.4.6.1 Projected Impacts of Mining on Fish and Wildlife**

Refer to Section 10.4. ~~The known impacts of mining on fish and wildlife resources are many and varied according to the type, location, and age of the mine and technology used to remove the coal. Additionally the floral and faunal components in the mining area determine the resultant impact. It is desirable that environmental protection be accomplished during all aspects of the life of the mine from construction through final reclamation, but the degree of environmental protection is often difficult to determine. This is particularly true in cases where mining operations have been functioning for many years prior to serious environmental awareness and new improved standards of protection. Such mining operations do not have the benefit of modern sites, design, construction, and technology and have often already impacted the environmental resources such that continued operation will not be a serious additional consequence.~~

~~Continued operation of Mine will continue to have the same effect on the fish and wildlife resources in the area; therefore consideration of these affects is warranted. Reclamation also needs to be considered since discontinuation of the operation would potentially facilitate a return of the habitat to its "normal state". The impacts of concern that have and could result in perturbations to the environment and ultimately relate to the stability of fish and wildlife in the area of concern are directly related to: (1) surface disturbance, (2) loss of habitat, (3) noise and (4) human activity. Both aquatic and terrestrial habitats are of concern since the portals, loading facilities and haul roads occupy riparian habitat adjacent to a small stream, and the mine underlies a variety of terrestrial communities that are considered of high interest to various management agencies because these species are of economic or recreational value.~~

#### **3.4.6.2 Mitigating Measures to be Employed to Protect Fish and Wildlife**

~~Refer to Sections 10.5 and 10.7.~~

~~The permittee will perform the following mitigation measures in order to minimize disturbances and impacts on wildlife and their habitats that could be impacted during continued operation of the mine. The mitigating measures will meet the requirements of R645-301-322 and will be consistent with the performance standards of R645-301-358.~~

~~The permittee will make significant efforts to educate all employees associated with their on-site mine operation to the intricate values of the wildlife resources within the mine plan permit and adjacent areas. High interest species, critical habitats and critical life history periods will be emphasized.~~

~~— The company will maintain the relative inaccessibility of the mine plan area.~~

~~Discharge of firearms by employees will be prohibited on company controlled property during working hours.~~

~~In winter a portion of the mine plan area, particularly the canyon bottom along the stream and haul and access road is inhabited by mule deer, and the potential is present for road strikes and harassment when the animals are in a weakened energy state due to snow and cold. These impacts need to be reduced. Drivers will be informed of the concerns for protection of wildlife, and encouraged to reduce speed in the canyon between November 1 and May 15 when mule deer are abundant.~~

~~The permittee will take precautions to keep all forms of coal or other sediments generated by operation of the mine from inadvertently entering the stream.~~

~~Since the major area of concern in introduction of sediments into the stream is the portal and load out facilities immediately adjacent to the stream, the company has put the stream into a bypass culvert. This will prevent sediment input. This was done in consultation with the appropriate management agency to alleviate the problem. The main canyon culvert was extended approximately 300' upstream in late 1990. This extension impacted approximately 0.21 acres of riparian habitat. As mitigation for this removal of riparian area, 20 small rock check dams were installed in the lower portion of Cottonwood Creek to enhance water retention and possible fish survival. This mitigation was performed in accordance with approval from DWR. Details on location and installation of these structures (as well as the culvert extension) are found in Appendix 7-13 of this MRP. All Wildlife habitats will be maintained or improved if disturbed. This will be done by using native or other vegetation approved for reclamation or~~

~~habitat improvement. No new actions will be undertaken that compromise wildlife or their use areas without prior approval by the appropriate management or regulatory agency.~~

### **3.4.6.3 Monitoring Procedures**

~~There are few species that will be seriously impacted by the proposed actions. There are no identified active aeries being occupied by high interest species of raptors, nor any readily accessible reproductive sites for game species that are critical to perpetuation of the species. However, should raptors, moose or any threatened or endangered species subsequently move into or be found in the mine plan area, appropriate UDOGM, UDWR and USWS personnel will be notified and mutually agreed upon monitoring instituted.~~

The mitigation action planned is such that it will require little to no monitoring, but enforcement by company officials and management or law enforcement personnel will be necessary. An exception might be the activities planned to reduce sediment loads in the stream. This is covered by the surface water monitoring program (Section 7.2.7). Refer to Section 10.7 for additional monitoring information.

### **3.4.7 Protection of Air Quality**

#### **3.4.7.1 Projected Impacts of Mining Operations on Air Quality**

The mining operation has some effect on the air quality of Cottonwood Canyon. Dust production by the mining operation is the main contribution. The areas that are the highest producers of dust are coal haulage down canyon from the mine, coal handling, and surface winds over the disturbed area.

### **3.4.7.2 Mitigating Measures to be Employed to Control Air Quality**

Several practices are incorporated in the operations of the mine to protect the air quality in the mine vicinity. Protection of the air quality is mainly accomplished by reduction of dust production by the mine operations. Practices used to reduce dust production are:

- 1) Periodic watering, scraping, and compaction of coal loading area and paving of the coal haulage road.
- 2) Wetting of coal during handling activities.
- 3) Keeping the size of the disturbed area to a minimum.
- 4) Revegetation of disturbed areas as soon as practicable.

### **3.4.7.3 Air Quality Monitoring Plans**

Plans to monitor the air quality in the vicinity of the Mine have not been considered or incorporated in the mining and reclamation plan. The effect on air quality by the mine will be minimal due to the limited area and the mitigation measures incorporated in the operation.

### **3.4.8 Subsidence Control Plan**

The subsidence monitoring requirements were first imposed by the 211 US Geological Survey regulations. Later with the formation of the Office of Surface Mining and the realignment of the USGS responsibilities subsidence monitoring became the authority of OSM. Chapter 11 describes in detail the Applicant's plan to ensure minimal environmental impacts from mine induced subsidence.

#### **3.4.8.1 Projected Subsidence Effects**

Several surveys have been conducted over the area presently controlled by Pacificorp the various permittees which may be affected by mining operations. Timber, wildlife, grazing areas, water seeps and springs are the renewable resources occurring within the permit and adjacent areas. There are no oil and gas wells, pipelines, utility structures or high power lines that will be affected by any surface subsidence within the permit boundary and adjacent areas. No buildings or dwellings have been constructed on any surface that will be subject to subsidence within the mine plan area. Timber growth and wildlife should not be affected as regional subsidence is anticipated rather than cracking the surface due to the thickness of overburden. Seeps and springs within mine permit and adjacent areas have been surveyed and are currently being monitored (refer to Chapter 7 - Hydrology, for a description of groundwater resources and monitoring).

#### **3.4.8.2 Control Measures to Mitigate Impacts**

Should material damage be incurred by any structure despite the planned subsidence damage prevention measures, the applicant will repair the damage caused by subsidence resulting from the applicant's activities or will compensate the owner of the structure for such damage.

Any Roads, fences, stock ponds, earth dams, or water troughs which are materially damaged by subsidence will be repaired and regraded to restore them to their pre-subsidence usefulness.

Should significant subsidence impacts occur, the applicant will restore, those surface lands that were reduced in reasonably foreseeable use as a result of such subsidence to a condition capable of supporting reasonably foreseeable uses that such lands were capable of supporting before subsidence.

In order to restore any land affected by Applicant's mining operations to a condition capable of supporting the current and postmining land uses stated herein, the Applicant will replace water determined to have been lost or adversely affected as a result of Applicant's mining operations if such loss or adverse impact occurs prior to lease relinquishment. The water will be replaced from an alternate source in sufficient quantity and quality to maintain the current and postmining land uses as stated herein.

During the course of regular monitoring activities required by the permit, or as the Applicant otherwise acquires knowledge, the Applicant will advise the Division of the loss or adverse occurrence discussed above, within ten working days of having determined that it has occurred. Within ten working days after the Division notifies Applicant in writing, that it has determined that the water loss is the result of the Applicant's mining operation, the Applicant will meet with the Division to determine if a plan for replacement is necessary and, if so, establish a schedule for submittal of a plan to replace the affected water. Upon acceptance of the plan by the Division, the plan shall be implemented. Applicant reserves the right to appeal the Division's water loss determinations as well as the proposed plan and schedule for water replacement as provided by Utah Code Ann. 40-10-22(3)(a).

#### PUBLIC NOTICE

Applicant will not mine in any areas that would allow potential subsidence effects (as indicated by the angle of draw) to affect any area outside of the lease, and permit boundary until this constraint on coal recovery is resolved by the OSM and the BLM Branch of Solid Minerals or permission is granted by the adjacent surface agencies.

A mining schedule which details the area in which mining is to take place and the planned date of the mining activity will be submitted to the affected surface owners, following approval of the application and prior to mining.

#### **3.4.8.3 Subsidence Monitoring**

The subsidence monitoring at Trail Mountain Mine prior to PacifiCorp's acquisition (November 1992) was conducted using conventional surveying methods. Nowhere did monitoring identify subsidence greater than a few tenths of feet. PacifiCorp used aerial photogrammetric survey methods and annual helicopter reconnaissance flights to monitor subsidence. Baseline photography was conducted August 6, 1993 including color infrared (See Chapter 11 for details on subsidence monitoring.) Refer to Chapter 11 for additional subsidence information.

#### **3.4.8.4 Slides and Other Damage**

At any time a slide occurs which may have a potential adverse effect on public property, health, safety or the environment, the permittee shall notify the Division by the fastest available means and comply with remedial measures required by the Division.

#### **3.4.9 Waste Disposal**

The permittee has contracted with local firms to handle and remove all non-coal wastes from the mine site. Non-coal wastes and materials that constitute a potential fire hazard are hauled by a licensed contractor to a state approved waste disposal area.

Waste oil is collected in drums in a designated storage area at the site. A licensed contractor will pick up this material on a regular basis and remove it for recycling purposes.

It should be noted that during a spoils survey, it was pointed out that there was no evidence of toxic materials at this mine site (Mr. George Cook, SCS). Prior to reclamation, all-spoil material will be re-sampled in a comprehensive random method and retested in accordance to UDOGM guidelines for acid and/or toxic forming potential. Sampling will be conducted per Appendix 9-1, Attachment C.

Sediment pond waste is removed from the site and disposed of in the ~~Gottonwood~~Wilberg Waste Rock Site in accordance with the ~~Division's "Sediment Pond Clean-out Procedural Guidelines"~~. The ~~Division will be notified and procedures will be approved prior to the start of pond cleaning activities.~~ The sediment material will be sampled and **analyzed for acidity and toxicity parameters outlined in Table 7 of the UDOGM Soil Guidelines. If the sediment material does not meet the acceptable value for the acidity and toxicity parameter as reported in Table 8 of the UDOGM Soil Guidelines the material will be buried beneath 4 feet of material within the waste rock pile.** Previous analyses of this material have shown it to be non-toxic and non-acid forming. ~~tested according to Division "Title V Coal, Program Policy for Disposal of Sediment Pond Waste"~~.

Underground development waste is kept underground as allowed by MSHA regulations. In the event this material must be brought out of the mine, it will be hauled to the ~~Gottonwood~~Wilberg Waste Rock Site and disposed of in an approved manner.

There are no coal washing facilities at this mine site; therefore, there are no refuse or other permanent waste piles located at the Mine. The waste rock temporary storage area is shown on Plate 3-1.

### 3.5 RECLAMATION PLAN

Reclamation of the Mine site will be accomplished in an efficient and environmentally sound manner. This section addresses the reclamation plans for the site. Seven areas are

addressed: contemporaneous reclamation, soil removal and storage, final abandonment, backfilling and grading, revegetation, reclamation schedule, and reclamation cost estimate.

### 3.5.1 Contemporaneous Reclamation

The mine disturbs only a minimal area for surface facilities. ~~Most of the disturbed area will be needed for operations during the life of the mine. These~~ Areas not needed (outslopes, embankments, etc.) will be prepared, seeded with quick growing species and mulched to provide protection and cover to reduce erosion. (See following section, "Contemporaneous Reclamation Plan for Mine" and Plate 3-7 for location of contemporaneous reclamation.)

#### CONTEMPORANEOUS RECLAMATION PLAN FOR MINE

PLANTING DATES - Seeding will normally occur in October or November of the year, depending on climatic conditions at that time. This will allow little chance of premature germination, increase the likelihood of hibernation (or inactivity) of most seed predators and will allow seed emergence in early spring when moisture conditions are most favorable.

PLANT SPECIES - Plant species used for temporary, contemporaneous reclamation with their respective justifications are listed below:

Agropyron dasystachyum --Thickspike Wheatgrass-- This grass species was chosen for its on-site adaptability of these climatic patterns, high salt tolerance, sod forming characteristics and rapid establishment capabilities.

Oryzopsis hymenoides--Indian Rice grass-- This grass species has excellent success on spoils establishment and has moderate salt tolerance qualities.

Astragalus cicer--Silklepod Milkvetch--This forb will be planted because it is sod forming, nitrogen fixing, has moderate salinity adaptation, has establishment qualities and for aesthetics values.

Melilotus officinalis--Yellow Sweetclover-- This species is an introduced forb that establishes readily on severe disturbed sites. It is also a nitrogen fixing plant that has high affinity for salt tolerance.

No shrub or tree species are included in the seed mix for contemporaneous reclamation.

SEEDING METHODS - Slopes less than 20% will be drill seeded, or seeded by hydro seeder or hand broadcast methods. Slopes greater than 20 % will be seeded by hydro seeder or hand broadcasting.

MULCH - Hydro seeded areas will be sprayed with a wood fiber mulch. Since this is temporary reclamation the application of mulch will be optional on areas of drill seeding or seeded by hand broadcasting.

FERTILIZATION - Contemporaneous reclaimed areas will be visually checked on a yearly basis to determine success. ~~Qualitative observations of interim or contemporaneous revegetation will be submitted in the annual report.~~ An appropriate fertilizer will be applied if it appears necessary to increase plant vigor or to obtain the desired cover.

FUTURE CONTEMPORANEOUS RECLAMATION - If additional areas are disturbed or, if current disturbed areas become idle, contemporaneous reclamation procedures (as described above) will be implemented pursuant to R645-301-352.

Note: seeding rates of species will be in equal proportions totaling 52 PLS per square foot, with not more than 20 PLS per square foot of any one species.

### 3.5.2 Soil Removal and Storage

~~Refer to Section 8.7. The mine was operational before the 1979 State Act or the 1977 Federal Act. Having been constructed prior to the requirement to save and stockpile topsoil, the soils on the site were used in construction of the roads and pads.~~

~~A post-law borrow pit was utilized on site to obtain fill material for the 66" culvert for Cottonwood Creek. Topsoil was salvaged from the pit area, and is stockpiled in a protected area just northwest of the intake portal for the mine. The pile has been revegetated, and is further protected by installation of a silt fence around the bottom end.~~

~~No additional area is planned for disturbance, therefore, it is unlikely that any topsoil will be encountered. However, if in the future, during upgrading operations or facility modifications, any salvageable topsoil is found, it will be tested in accordance with the "UDOGM Guidelines for Management of Topsoil and Overburden, Table 1", and if found satisfactory, will be saved and stockpiled in a location acceptable to the regulatory authority.~~

### 3.5.3 Final Abandonment

Upon final abandonment of the mining operation, the mine portals and openings will be sealed, the structures removed, and the drainages restored. More detailed description of the procedures to be followed will be found in the following sections. Unmined recoverable coal reserves will be protected in accordance with 43 CFR 3482.1 (c) (3) (IV). Prior to the abandonment of any part of the Mine, the permittee will get approval from authorized officers of the BLM.

The following table list the machinery abandoned at the Trail Mountain Mine (pre-sealing in 2001).

<u>LEASE #</u>	<u>LOCATION</u>	<u>TYPE OF EQUIPMENT</u>	<u>BUREAU OF LAND MANAGEMENT APPROVAL DATE</u>
UTU-64375 (Partial relinquishment accepted 1/9/09)	10 <sup>TH</sup> Right	148 Longwall Shields and Face Conveyor *Abandoned Due to Safety Concerns	September 11, 1998 - Verbal February 26, 2001 - Written
UTU-64375 (Partial relinquishment accepted 1/9/09)	3 <sup>rd</sup> Right	3 Longwall Shields *Abandoned Due to Safety Concerns	December 11, 2000 - Written

Abandonment of Machinery: To comply with Section 10 of the Federal Coal Lease Stipulations the permittee will request approval prior to abandonment of machinery within the mine.

Abandonment of this machinery is insignificant compared to the other steel materials that must be left underground. Ferrous materials include steel roof bolts, steel wire ceiling mesh and steel covered longwall support cans. These materials are not removed due to safety concerns in all underground coal mines.

Although the shields contained emulsified oil which could eventually enter the hydrologic system, it will have as insignificant impact on the hydrologic balance in the area based on the following criteria:

- ❖ It will be a period of many years prior to the sediments being saturated to reach potential areas of discharge

- ❖ The combination of water chemistry, temperature, and lack of oxygen will impede the rate of oxidation of the metal
  - ❖ The combination of specific gravity and dip of the geology will potentially carry any migration away from the surface waters
  - ❖ The total volume of the potential contaminants is so minute it will be diluted within a short distance
  - ❖ No municipal or domestic water uses exist within 8,000 feet of the sites
- \* DOGM Technical Findings Dated November 1, 2000 \*

Temporary Cessation: PacifiCorp notified the Division of temporary cessation of coal mining operations at the Trail Mountain Mine effective May 4, 2001. Coal mining at the Trail Mountain Mine ceased as of March 15, 2001.

In preparation of temporary cessation, all-mining equipment including; production (longwall and continuous miner), belt haulage and electrical were removed from the mine. The mine de-watering system was removed from the mine, except for a six (6) inch steel supply line (9066') and a twelve (12) inch PVC de-watering line (9066'), refer to Figure 3-8 for details.

### **3.5.3.1 Sealing of Mine Openings**

#### **A. PORTAL SEALING**

Upon completion of mining activities, the portals will be sealed in accordance with State and Federal regulation. A typical drawing of portal sealing to be used is shown in Figure 3-7. Seals will be located at least 25' inside the portal entry. All Loose material around the seal area will be removed for roof, rib and floor prior to installation. The mine entry seals will be made of solid concrete blocks to form a wall two blocks thick.

**B. DRILL HOLE SEALING**

Exploration drill holes will be sealed to BLM specifications which entails sealing each hole from total depth to the surface with cement. **Drill holes are typically sealed and the pads reclaimed within months of the exploration being completed.** See (Figure 3-8).

**3.5.3.2 Removal of Surface Facilities**

Upon completion of mining activities, all surface structures will be removed, with the exception of portions of the culverts and the sediment pond as described in the following section. Salvageable materials will be hauled off-site to a temporary storage for re-use or sale. Non-salvageable items will be removed to an approved land fill (i.e. - Emery County Dump). Concrete will be broken up by dozer or other equipment and either placed against the highwall prior to backfilling or hauled to an approved landfill.

**3.5.3.3 Disposition of Dams, Ponds, and Diversions**

Due to the close proximity of the mine site to a perennial stream, it is proposed to leave the sediment pond in place to treat reclaimed area runoff until revegetation standards are reached. To direct the runoff, a 40' length of 48" cnp will be left in place at the point where the restored side canyon drainage meets the restored main channel, as shown on Plate 3-5.

The reclaimed area will be bermed along the restored side canyon drainage where it meets the restored main channel, as shown on Plate 3-5. The reclaimed area will be bermed along the restored banks of the channels to direct runoff to the sediment pond. Approximately 300' of 66" culvert (with the 96" to 66" transition and trash rack) will be left in place beneath the pond to convey the undisturbed Cottonwood Canyon drainage. All Other diversions and culverts will be removed during this Phase I of final reclamation. Once revegetation standards are reached, the sediment ponds and all-remaining culvert

sections will also be removed, and the remaining disturbed area will be reseeded. Additional sediment controls, such as straw bales, silt fences, berms, etc., will be placed as needed to ensure protection for the stream during this final phase of reclamation (Phase II).

#### **3.5.4 Backfilling and Grading Plan**

The surface of this area was originally disturbed in the 1940's by a previous owner. The surface is all-privately owned. Since no major effort was made at that time to save or store any topsoil or other material, restoration to approximately original contour is highly impractical. However, it is the intent of the permittee is to restore the area to a topography acceptable to the Division and compatible with the post-mining land use, using such materials that are available at the site.

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

- a) After sealing of the portals and removal of all-structures, a backhoe will be brought to the upper (portal road) terrace. The backhoe will begin by reaching down over the fill bank and retrieving as much material as can be reached. This material will be placed on the terrace.
- b) ~~A-Gat~~ Other appropriate equipment will work with the backhoe where possible, taking the retrieved material and spreading and compacting it from the cut outward to reach a configuration as shown on Plate 3-5, Post-Mining Topography.
- c) The mine yard will then be re-sloped to drain as shown. A rock-lined natural drainage will be restored in the main and side channels as previously described.
- d) The reclaimed area will be left in a roughened condition by placement of material with the backhoe and subsequent ripping and/or tracking with the dozer. This will promote moisture retention on the site to enhance vegetation.

- e) Available topsoil, from the storage pile, will be redistributed to a depth of 6", starting at the north end of the storage area, and continuing down as far as material is available.
- f) Upon final shaping and preparation of an area, it will be reseeded as per the plan.
- g) Soil sampling of the regraded surface will be conducted as per the program described in Appendix 9-1, Attachment C.

#### **3.5.4.1 Contouring**

Plate 3-5 shows the post mining contours of the Mine. Upon abandonment, the post mining land use will not require extensive backfilling or returning the land to the original contours, however, all areas which are compacted through the reclamation activities or during mining will be "deep-ripped" utilizing a dozer ripper to a depth of 12" to 24" prior to seeding.

The drainage channels will be graded to reestablish the streams, following removal of the bypass culverts. Attempts will be made to restore the channels to the pre-mining slopes and conditions.

#### **3.5.4.2 Removal or Reduction of Highwalls**

Highwalls will be reclaimed as is practicable for the site and for the post mining land use. A static factor of a least 1.3 will be developed in the reclaimed highwall.

It should be noted that highwalls, by definition, are only those cut areas associated with portals. Other cut areas exist on this site; however, these are

primarily road or pad cuts and do not fit the definition of a highwall. Portions of these areas may be retained as terraces to enhance the stability of road backfills.

#### **3.5.4.3 Erosion Control**

Measures for erosion control will be implemented on a case by case basis. Some methods which might be used are: mulching, straw dikes, water bars, silt fence, and limiting access to the area.

The berms along the reclaimed channels will be checked for erosion in the flow paths. If signs of erosion are evident, erosion controls such as loose rock check dams or silt fences will be installed along at intervals of 500' or less as necessary to control the erosion. Rills or gullies deeper than nine inches in regraded areas will be filled, graded or otherwise stabilized and reseeded as per the plan. This will be accomplished by hand, using adjacent or eroded material whenever possible. If larger gullies develop, a backhoe may be used in addition to hand work. Existing material that has been found satisfactory as a growth media through testing from the site will be used to accomplish this task.

#### **3.5.5 Revegetation Plan**

The disturbed areas of the mine will be revegetated the first normal period for favorable planting conditions after final site preparation. A suitable, diverse seed mix will be used to revegetate the disturbed area. Timing of the revegetation within the mine reclamation schedule is shown in Section 3.5.6, Schedule of Reclamation. Proposed seed mixes for the revegetation are listed in Appendix 9-1 of the MRP.

The method of revegetation will be largely determined by the results of the revegetation test plots. Those test plot methods that yield the best results will be used on the full scale reclamation of the mine site.

### 3.5.5.1 Soil Preparation

With special handling, the disturbed land fill should provide a suitable seed bed for revegetation. Soil sampling will be conducted per Appendix 9-1, Attachment C. Special handling will include removal of contaminated material and large coarse rock fragments (greater than 18 inches). The large rock fragments will be used as rip-rap in channel restoration, buried with the fill, or randomly placed on the reclaimed surface. The mine coal pad areas will be removed and all coal/refuse associated with the pads will be hauled to the Cottonwood Waste Rock Site for disposal.

Contaminated soil material which contains greater than 50 percent coal fines, will be disposed of at the Cottonwood Waste Rock Site. Soil contaminated with oil and grease will be disposed of at an approved site. This will be determined by visual inspection, and any material with visible oil or grease contamination will be removed. The volume of such material cannot be accurately estimated; however, it will likely be less than two percent of total volume. Material with less than 50 percent coal fines will be buried against the cut banks and covered with a minimum of four feet of incombustible material. There are no acid-or toxic-forming materials known to exist at this site. Any of these materials discovered will be disposed of on-site and covered with 4' of material or removed to the Cottonwood Waste Rock Site.

Salt contamination may also be a problem in soils used for reclamation. If visible salty areas or analyzed salty areas are found, the soils will be buried along the cut banks or other available sites to a minimum depth of 48".

Non-coal waste will be separated from the soils, loaded into trucks and hauled to an approved landfill for final disposal. All-- The pad areas will be ripped for 12 to

24 inches to loosen the fill profile using the rippers on the dozer, and pulverized if a cloddy surface exists. Once backfilled and graded, the surface will be scarified with the teeth on the backhoe, or using the tracks of the dozer to create "pockets" for water retention and root penetration. Soil samples will be taken to identify the need for replenishment of various soil nutrients, as described in Appendix 9-1, Attachment C.

### 3.5.5.2 Seeding and Transplanting

Information from the test plots has been utilized together with proven reclamation results in order to arrive at the best treatment and seeding methods. After regrading and top soiling, the disturbed area will be mulched, fertilized (if determined beneficial) and seeded. The steeper areas will be hydroseeded or broadcast, and areas flat enough to safely allow operation of a drill seeder will may be drill seeded. Regraded areas will not be smooth, but will have numerous depressions that will hold moisture and provide a micro-climate for vegetation establishment.

Riparian Community - During reclamation, the culverts will be removed, and the stream channels will be restored. The main channel will be rip-rapped with a 1.4 foot median rock size at least 4 feet above the stream bottom. The flatter, reclaimed area is expected to be 60-70 feet west of the stream bank, and 20-40 feet east to where the public road will remain. Most of this area will consist of a slope of 5-10 degrees; therefore, drill-seeding will be used.

The riparian seed mix (see Table A9-3, Appendix 9-1) will be used approximately 20-40 feet on each side of the rip-rap, leaving a total floodplain area of 50-60 feet.

Grassland - Shrub Community - The seed mix for the grassland - shrub community will be used on the entire mine site, with the exception of the riparian

are described above. See Table A9-1, Appendix 9-1 for seed mix and application rates. Portions of the grassland - shrub community area may be flat enough to safely utilize a drill-seeder; however, the majority of this area will be on the steeper slopes and will thus be hydro-seeded or broadcast.

Containerized Stock - Following the seeding and mulching containerized woody plant species will be planted at a rate of 90 individuals/acre (or 2% of the undisturbed density in equal proportions). Wherever possible, this stock will be spatially arranged in clumps to maximize cover for wildlife. It is recommended (R645-301-358) that "edge effect" be optimized in support of resident wildlife species. Significant stands of coniferous plant cover (Pinion-Juniper and Douglas Fir) exist throughout the permit areas. These stands occur well within the limits of maximum distances required to optimize edge effect. A diagram illustrating the general spatial arrangement of the grassland - shrub community is included in Appendix 9-1, along with the description of the containerized stock proposed for both grassland-shrub and riparian areas.

One proposed option is that fresh-cut willow shoots be used on the riparian area in lieu of containerized stock. These shoots would be cut from local sources along Cottonwood Creek and placed on 3' centers on each side of the reclaimed channels.

#### **3.5.5.2.1 Seed Mix and Rate/Acre**

Two seed mixes are proposed for reclamation of the two vegetative communities that existed on the disturbed site. The first seed mix is for the riparian community, the second is for the grassland-shrub community. Lists of the species for both seed mixes can be found in Appendix 9-1.

### 3.5.5.3 Management

The reclaimed area will be protected from livestock grazing until bond release by fencing. The proposed fence is shown on Figure 3-9, and is not intended to preclude wildlife access. The revegetated area will be observed on a yearly basis. If heavy use occurs by wildlife, rodents, etc. other protection measures may be considered.

### 3.5.5.4 Vegetative Monitoring

Vegetation monitoring for permanent reclamation will be conducted as indicated in Table 3-2 and Section 9.8.

Revegetation success at the mine will be based on comparison with the approved reference areas. Ground cover, woody plant density, and shall be considered equal to their respective reference area counterparts, when there is 90 percent success at 90% statistical confidence.

### 3.5.6 Schedule of Reclamation

#### 3.5.6.1 Detailed Timetable for Completion of Each Major Step in Reclamation (See Table 3-3).

#### 3.5.6.2 Reclamation Monitoring

Monitoring of the success of reclamation will encompass subsidence, revegetation and water quality and quantity monitoring.

- Annual surveys will be conducted to determine surface deformation due to subsidence and possible movement of surface subsidence monuments for a minimum of three years after no additional subsidence is detected within the area.

- Water Quality and quantity monitoring will continue until reclamation has been accomplished as approved by the regulatory authority.
- All-Seeded areas will be inventoried to determine success of seeding.

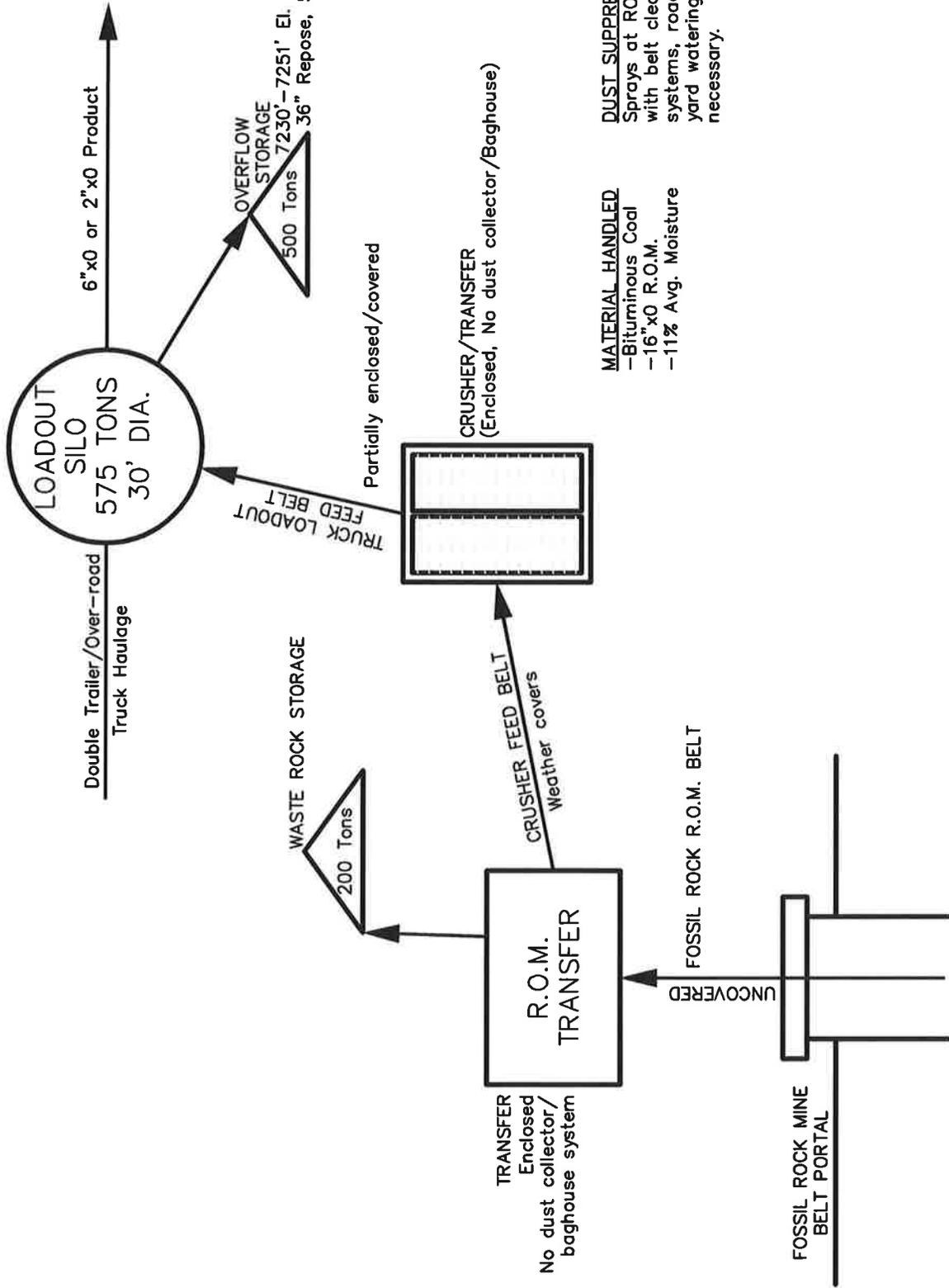
### 3.5.7 Cost Estimate for Reclamation

The 1979 Act "Regulation of Coal Mining and Reclamation Operations" requires the operator of a coal mine to file with the Utah Division of Oil, Gas and Mining (DOG M) a bond in the amount equal to the estimated cost of completing the work described in the operator's reclamation plan. The bond 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 DOGM at no cost to state residents.

The strata characteristics above the coal seam, the slow and uniform rate of subsidence will not affect the surface terrain to such an extent that reclamation will be necessary. As such, a reclamation bond is not required for the surface lands over the underground workings.

An estimate of the cost of reclamation of the Mine site is shown in Appendix 1. ~~This table reflects the required bond increase from all additions. Supporting cost calculations for each major reclamation step is also presented. The amount of the bond posted for this operation is broken down in Appendix 1.~~

Earthwork estimates for final reclamation are summarized in the Mass Balance Table 3-4. The quantities are taken from cross-sectional areas shown on Plate 3-6. Cross section locations are shown on Plates 3-1 and 3-5. Estimates indicate a cut volume of 38,579 cubic yards and a required fill volume of 39,719 cubic yards for final mine site reclamation.



**DUST SUPPRESSION**  
 Sprays at ROM Transfer, with belt cleaning systems, roadway and yard watering as necessary.

**MATERIAL HANDLED**  
 -Bituminous Coal  
 -16" x 0 R.O.M.  
 -11% Avg. Moisture

Fossil Rock Resources, LLC  
 Fossil Rock Mine  
 597 South SR 24 - Salina, UT 84654  
 (435) 286-4880 Phone  
 (435) 286-4499 Fax

**FOSSIL ROCK MINE**  
**COAL FLOW DIAGRAM**  
 DATE: 3/23/2016  
 CHECKED BY: V.M.  
 DRAWN BY: J.K.M.  
 PROJ: ###

SHEET NO.  
**FIG. 3-1**  
 FILE NAME: H:\DRAWINGS\Trail Mountain\Fossil Rock Permit Drawings\FIGURE 3-1.dwg



**APPENDIX 3-6  
TECHNICAL DATA INFORMATION**

**Add to the back of existing information**

**Exhibit 1 Blasting Record (Appendix 3-6)**

**(R645-301-524.700)**

**(R645-301-524.711) Name of Operator Conducting Blast.**

(Company \_\_\_\_\_ Name)  
(Address) \_\_\_\_\_  
(City - State) \_\_\_\_\_  
(Telephone \_\_\_\_\_ Number)

**(R645-301-524.712) Location, Date and Time of Blast.**

(Mine) \_\_\_\_\_  
(Location) \_\_\_\_\_  
(Date) \_\_\_\_\_ (Time of Blast)

**(R645-301-524.713) Name, Signature, and Certification Number of Blaster in Charge.**

(Name) \_\_\_\_\_  
(Signature) \_\_\_\_\_ (Certification Number) \_\_\_\_\_

**(R645-301-524.720) Direction and Distance, in feet from the nearest blast hole to the nearest dwelling, public building, school, church, community or institutional building outside the permit area.**

(Direction) \_\_\_\_\_  
(Distance in Feet) \_\_\_\_\_

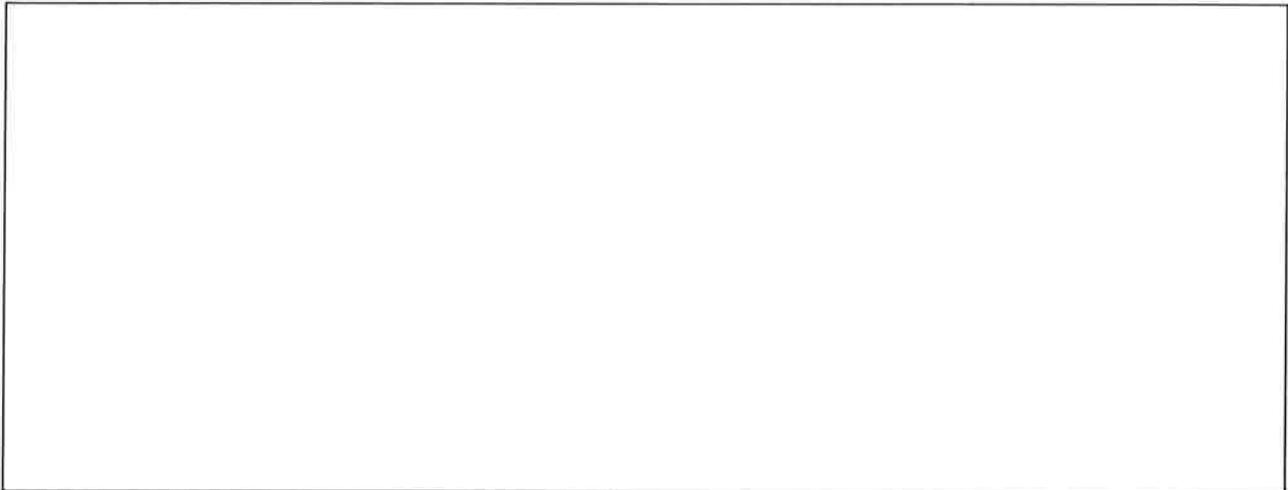
(R645-301-524.730) Weather Conditions.

(Wind Direction & \_\_\_\_\_ Approximate  
Velocity)

(R645-301-524.741) Type of Material Blasted

(Material) \_\_\_\_\_

(R645-301-524.742) Sketches of the blast pattern including number of holes, burden, spacing, decks, and delay pattern.



(R645-301-524.743) Diameter and Depth of Holes.

\_\_\_\_\_

(R645-301-524.744) Types of Explosives Used.

\_\_\_\_\_

(R645-301-524.745) Total Weight of Explosives Used.

\_\_\_\_\_

(R645-301-524.746) Maximum Weight of Explosives Detonated in an Eight (8) Millisecond Period.

\_\_\_\_\_

(R645-301-524.747) Initiation System.

\_\_\_\_\_

(R645-301-524.748) Type and Length of Stemming.

\_\_\_\_\_

(R645-301-524.749) Mats or Other Protection Used.

\_\_\_\_\_

(R645-301-524.750) Seismographic Records and Airblast Information.

\_\_\_\_\_  
(Type of instrument, sensitivity, Certification of Calibration)

(Reading)

\_\_\_\_\_

(Location &

\_\_\_\_\_

Distance)

\_\_\_\_\_

(Name of Person & Firm Analyzing Reading)

(R645-301-524.760) Reason for Unscheduled Blast

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**CHAPTER 4**  
**LAND STATUS, LAND USE, AND POST MINING LAND USE**

## LAND USE

### 4.1 SCOPE

This chapter of the mining and reclamation plan describes the status of lands in and adjacent to the mine plan permit and adjacent areas. Present and post-mining land-uses will also be discussed with emphasis on how mining can be integrated in the multiple land-use of the area.

### 4.2 METHODOLOGY

Information used in preparing this chapter of the mining and reclamation plan has been gathered from published sources and from discussions with the relevant land-management agencies.

### 4.3 LAND STATUS

#### 4.3.1 Mine Plan Area Surface Land Status

Land status within the mine plan area is separated into two areas: private, and federal (Refer to Plate 4-1 in Volume 3).

##### 4.3.1.1 Ownership

PacifiCorp owned 53.35 acres of private land surrounded by federal land of the Manti-LaSal National Forest. Ownership of land was obtained by Beaver Creek Coal Company in October, 1987, through purchase of the mine from the Arch Minerals Company of St. Louis, MO. A legal description of the extent of the **property is given in Chapter 2**. below. Also refer to the Legal and Financial Volume for more details:

~~Beginning point SW corner of NW1/4 SE1/4, Sec. 25, T17S, R6E, SLB&M, thence North 160 rods, thence East 44 rods to center Cottonwood Creek, Southward along creek to a point 76 rods East of the beginning, thence West 76 Rods to the point of beginning.~~

#### **4.3.1.2 Surface Managing Authorities**

Historically and/or presently, the surface lands of the mine plan area have been or are currently managed by the State of Utah, Division of State Lands and United States of America, US Forest Service. Section 36, Township 17 South, Range 6 East, part of the mine plan area, is managed by the Utah Division of State Lands (relinquishment for ML-22603 effective 01/31/1996). Areas within Township 17 South, Range 6 East, Sections 25, 26, 27, 34 and 35, Township 18 South, Range 6 East, Sections 1, 2, and 3, and Township 18 South, Range 7 East are managed by the Manti-LaSal National Forest, US Forest Service. The majority of these lands have been mined out and relinquished. Refer to **Chapter 2** ~~Legal and Financial Volume~~ for lease area, permit area, and adjacent area details.

**Lands held by PacifiCorp are classified by Emery County, the US Forest Service, and the State of Utah as a recreation, forestry and mining area.**

#### **4.3.1.3 Special Use Permits and Leases**

The US Forest Service Manti-LaSal National Forest has issued a special use permit to the Trail Mountain Mine for a right-of-way to the mine property. ~~As discussed previously, the Mine is surrounded by Forest Service land; therefore, the special use permit was required.~~ A copy of the permit can be found in Appendix 4-1.

### **4.3.2 Mineral Ownership**

#### **4.3.2.1 Coal Ownership and Mines**

The Mine is located in an area of intermixed state (relinquished), federal, and fee coal. Plate 4-1 shows the ownership of the area surrounding the mine plan area. Those areas not outlined are unleased federal coal.

#### 4.3.2.2 Coal Leases

PacifiCorp was granted federal coal lease U-082996 for 80 acres, U-49332 for 641.47 acres (partial relinquishment of 261.47 acres accepted as of 01/09/09) 380 acres remain and lease U-64375 for 2,630.81 acres (partial relinquishment of 2,504.01 acres accepted as of 01/09/09) 260 acres remain. **Copies of these mineable leases are located in Appendix 4-2 and 4-2L. Refer to Chapter 2 for additional information pertaining to leases.**

~~Township 17 South, Range 6 East, SLB&M Section 25, (80 acres); T17S. R6E, Sections 25, 26 and 35 (380.00 acres), T17S. R6E, Sections 26, 27 (260.00 acres); Copies of the leases are found in Appendix 4-2.~~

#### 4.3.2.3 Mineral Ownership

Ownership of 53.35 acres of surface and mineral rights is held by the permittee, **refer to Chapter 2 and Plate 4-1 for additional information**

#### 4.3.2.4 Mineral Leases

A copy of the lease agreements can be found in Appendix 4-2.

#### 4.3.2.5 Oil and Gas Wells

No oil and gas wells have been or are presently being drilled on or adjacent to the mine plan area.

#### 4.3.2.6 Oil and Gas Leases

Oil and gas lease are held on the mine plan area. A state lease ML-31104 is held by Placid Oil Company, filed in September, 1974. Leases held on federal land are shown in Table 4-1.

#### 4.4 LAND USE

##### 4.4.1 Regional Land Use

Traditionally land use in the Wasatch Plateau has been mining, grazing, recreation, wildlife habitat and timber harvesting. Generally Land management of the plateau has been controlled by the Manti-LaSal National Forest due to the largest portion of the plateau being within the forest boundaries.

**Table 4-1: Oil and Gas Lease Ownership for Mine Area. (See Plate 4-1)**

Location	Ownership	Lease
<b>T 17 S, Section 24</b>		<b>U-15200</b>
Southland Royalty Company	25%	
Enterprise Gas Company	37½ %	
El Paso Exploration Company	37½ %	
<b>T 17 S, Section 25</b>		<b>U-24355</b>
Hawthorn Oil Company		
<b>T17 S Sections 26 &amp; 35</b>		<b>U-15197</b>
Southland Royalty Company	25 %	
Enterprise Gas Company	37½ %	
El Paso Exploration Company	37½ %	
<b>T 18 S, R 6 E, Section 1</b>		<b>U-23208</b>
Edward Mike Davis	47½ %	
<b>T 18 S, R 6 E, Section 2</b>		<b>U-15195</b>
El Paso Exploration Company	37½ %	
Southland Royalty Company	25 %	
Enterprise Gas Company	37½ %	

#### **4.4.2 Mine Plan Area Land Use**

##### **4.4.2.1 Existing Use**

Existing land uses of the Mine permit and adjacent areas consist of grazing, wild life habitat and recreation. No commercial forest uses have existed on the privately owned or National Forest lands within the permit or adjacent areas. No farming has or is being done on the permit or adjacent areas.

Grazing - The National Forest land within the mine plan area is considered as unsuitable range (Niebergall, 1981). Since 1981 when John Niebergall made the preceding statement, lease U-64375 was added to the mine plan area. Much of this lease, issued in 1990 (2,504.01 acres relinquished effective 01/09/09), is used as rangeland for both domestic livestock and wildlife. Section 36 (relinquished 01/31/1996), owned by the State of Utah, is leased by Emile Luke. Eight cows are allowed on the property from June 21 through September 20 (24 AUM's). The actual land within this section utilized for grazing is probably limited to 120 acres or less in the west portion of the section. The remainder of the area is unsuitable for range due to the cliff-like nature of the area. A map showing the US Forest Service grazing allotments is provided (see Figure 4-3). Livestock are also trailed on the road in Cottonwood Canyon (Niebergall, 1981). Cattle are moved to summer range at the higher elevations above the mine plan area.

It should be noted, that PacifiCorp has provided for the US Forest Service and the Trail Mountain Cattleman's Association, fences and gates at the Roan Canyon location and the adjacent Cottonwood Canyon location. The company has provided a cattle guard and a stock corral at the Cottonwood Canyon location, (see Figure 4-3) to aid the cattlemen in their efforts to trail cattle to and from summer ranges above the permit areas.

Recreation - Recreational use of the area consists primarily of sightseeing by people traveling up Cottonwood Canyon to the Upper Joes Valley area. Limited

hunting also occurs on the small section of the mine plan area on the plateau. Most of the area is characterized by steep and extremely rugged cliffs which are not conducive to recreational uses (Niebergall, 1981). There is no fishing in the canyon near the mine (Niebergall, 1981).

Access to the mine plan area is by the paved road in Cottonwood Canyon. Jeep trails allow access to the mine plan or adjacent areas on the high plateau above the Trail Mountain Mine. Access is gained via road on the upper end of Trail Mountain.

Farming - Farming is not practical within the permit or adjacent area. Farming is impractical due to the steep and rocky terrain, lack of water to irrigate and therefore, no future farm use is expected within the permit or adjacent area.

#### **4.4.2.2 Previous Mining**

Underground Mined Areas - The Johnson mines, located across the canyon from the Mine facilities were active from 1909 to 1948. The Cottonwood Canyon prospects are located across Cottonwood Canyon from the Mine. The Cottonwood Canyon prospects were active from 1946 to 1948. No other known minerals of value have been mined within the permit or adjacent area.

Production from the earlier mines was from the Hiawatha seam by room and pillar mining. An estimated production of 96,000 tons is reported by Doelling (1972) for all mining in the area. Of this, the Cottonwood Canyon mines produced approximately 54,000 tons.

Surface Mined Areas - There have been no previous surface mines located within the mine permit or adjacent areas.

#### **4.4.3 Land Use During Operations**

Land use in the area has not changed greatly in the past 20 to 50 years. The following section will look at the potential effects of the operation on the use of the land. At the present time, the Applicant has no plans to disturb any additional surface area during the mining permit term.

##### **4.4.3.1 Effect of Operation on Land Use**

The Trail Mountain Mine has operated in the Cottonwood Canyon since 1946. Land use in the canyon has adapted to the existence of the mining operation. As described previously, the majority of the mine plan area is not suitable for grazing or forestry. The uses affected are wildlife habitat and recreation. Recreationalists and ranchers use the canyon for access to the upper parts of Cottonwood Canyon and the top of the plateau. Sightseeing and seasonal cattle drives are the only major activity, other than mining, in the lower canyon.

Access up the canyon is not obstructed by the mining operation and facilities. Traffic on the county access road is not a problem. In 1987, three miles of the Cottonwood Canyon road from Highway 29 to the Trail Mountain Mine site was surfaced with six inches of asphalt.

##### **4.4.3.2 Mitigation of Effects of Operation**

The realignment and surfacing of the access road has greatly facilitated traffic flow and has mitigated any erosion or fugitive dust pollution problems.

The mine plan area due to its underground nature will have no adverse impacts other than those which may result through subsidence. Should subsidence occur and alter springs, seeps, or ponds that is used as a watering source for wildlife or cattle, the permittee will commit to mitigating the loss of seeps and springs with the installation of guzzlers. These guzzlers will be fenced to keep out cattle and allow wildlife in.

Manmade and natural stock ponds are provided on the Trail Mountain area as a source of water for grazing cattle. These ponds are supplied by snow runoff or springs. There are several developed springs in the allotment areas that have watering troughs. If subsidence affects ponds, the ponds will be rebuilt with equipment and a bentonite liner will be placed in the affected pond. Should subsidence alter a seep or spring that is supplying a water source to livestock, the permittee will, after consulting with the Forest Service and DOGM, commit to replace or relocate the trough or pond to a suitable range area. The permittee has implemented a subsidence and hydrologic monitoring program whereby, the extent and the effects of subsidence to water resources can be studied, identified, and the appropriate mitigating action taken.

#### **4.5 POST MINING LAND USE**

##### **4.5.1 Mine Plan Area**

Land use following mining will remain essentially the same on a regional basis. A combination of coal mining, grazing, wildlife habitat and recreation will tend to be the typical uses. These uses will be, as previously described, strongly influenced if not controlled by the Manti-LaSal National Forest.

The post mining use of the mine plan areas is proposed as a multiple use of grazing, wildlife habitat, hunting and recreation. All of these uses are compatible with the surrounding area.

##### **4.5.2 Mine Site**

The mine site will be reclaimed to a grazing, wildlife habitat, and recreational use. Rehabilitation of the site will include removal of all buildings and facilities, regrading the tippel pad and sediment pond, removal of the bypass culvert, and reestablishment of stream, soil preparation, and revegetation of the site.

Use of the site will probably be recreational during late spring, summer, and fall and for wildlife grazing during the winter and early spring. In this area, the recreational use should not interfere with the wildlife use due to limited access during the winter months. This will allow for protection of the deer during the crucial period while on their winter range.

#### **4.5.3 Final Surface Configuration**

The graded surface of the mine site will blend existing slopes into the surrounding terrain. The slopes will be stabilized with vegetation, and the erosion hazard reduced. (See Chapter 3.)

### **4.6 BIBLIOGRAPHY**

US Forest Service, 1979. Land Management Plan. Ferron-Price Planning Unit, Manti-LaSal National Forest, Price, Utah.

Niebergall, John-US Forest Service, District Ranger, Manti-LaSal National Forest, Ferron, Utah - Range Improvement and Allotment Description.



**CHAPTER 7  
HYDROLOGY**

All Samples were collected and preserved as previously outlined. The results of the chemical analyses for samples taken from within the mine are presented in Table 7-1.

Mining occurs in the lower Blackhawk Formation, which consists of interbedded layers of sandstone and mudstone separated by mineable and non-minable coal seams. The sandstone beds-fluvial channel systems are generally massive while the mudstone layers are fine textured and have a tendency to swell when wet and decompose into an impervious clay. Because of the aquiclude formed by mudstone layers in the North Horn Formation, recharge to the Blackhawk Formation is limited, even along major fault systems. Due to the lithologic characteristics of the Blackhawk, both vertical and horizontal migration is constricted. ~~Refer to Chapter 7, Hydrology, for a detailed discussion of the Hydrologic Balance.~~

The interception of groundwater varies and is dependent on several factors. One of the most significant is that when the mine enters virgin country, a significant amount of water is liberated. In virtually all cases the amount of water which flows into the mine exceeds the recharge and, in time, the water inflow decreases in volume. If new areas are not mined, the discharge from the mine will decrease accordingly.

Groundwater chemical quality is very good in strata above the Mancos Shale. The USGS reports a range in dissolved solids from 50 to 750 mg/l for samples from 140 springs in the region issuing from the Starpoint Sandstone and overlying formations (Danielson et al., 1981). Danielson et al. (1981) identified the regional trends of decreasing water quality from north to south and west to east across the Wasatch Plateau. Waters percolation through the underlying Mancos Shale quickly deteriorate, with total dissolved solids concentrations frequently exceeding 3000 mg/l.

The quality also decreases vertically because of the influence of marine sediments along with the trend of decreasing quality from north to south. The predominant dissolved chemical constituents of the groundwater from both surface springs and samples collected in the mine are calcium, bicarbonate, magnesium and sulfate. Concentrations of magnesium are normally about one-half the concentration of calcium. Sulfate concentrations are typically higher in water from springs issuing from the Starpoint-Blackhawk aquifer zone or confined aquifers intersected by mine workings. As mentioned earlier water quality degrades from the north to the south and also vertically.

Although the analysis of the overburden samples tested has shown that no toxic or hazardous materials are present, groundwater quality will be protected by handling earth materials and runoff in a manner that minimizes infiltration to the groundwater system. Mine water encountered in the mine, which is not needed for dust suppression or mining, will be discharged according to stipulations in UPDES Permit ~~No. UT-0023728.~~

State and federal regulations (R645-301-727) require that an alternate water supply be provided to replace any water source disrupted, degraded, or diminished by the mining operation. Though the mining operation is unlikely to affect the water supplies in the Trail Mountain area, the permittee will provide this alternate supply if needed.

In the unlikely event of mining adversely affecting a water source, the permittee will review

and select an alternative after considering all the possibilities of each site-specific circumstance. **Moved from Section 3.4.3.1, 3.4.3.2**

Wells and Users - As indicated previously, no wells are known to exist within or adjacent to the mine plan area except for the wells drilled to monitor potential impacts to the Star Point Sandstone aquifer. Principal groundwater use in the general area is restricted to use of wildlife and for stock watering from springs or seeps. Groundwater produced within the mine is used for dust suppression and equipment operation within the mine or discharged under an approved UPDES permit (see Appendix 7).

#### **7.1.4 Groundwater Development and Mine Dewatering**

This section of the report discusses the groundwater supply and usage in the mine plan and adjacent areas as well as the dewatering taking place in the Trail Mountain Mine.

##### **7.1.4.1 Water Supply**

Water required for underground mining operations is supplied from two sources:

1. Underground water from the mine is collected in a sump and recirculated for mining purposes; and
2. Supplemental mine water needs can also be supplied by pumping water from Cottonwood Creek.

Culinary water is supplied from underground sources pumped to a water treatment plant located near the main portal.

Water Rights - A search of water rights from the Utah Division of Water Rights within and adjacent to the mine plan area showed no claimed groundwater rights within two miles.

##### **7.1.4.2 Mine Dewatering**

Generally water encountered within the mine has been in the form of roof leakers through bolt holes and tension cracks positioned parallel to the working face of the mine. As mining progresses downdip, leakers further than 500 feet updip of the working face generally dry up. Only a limited amount of water is made within the mine. Water produced within the mine is used for dust suppression and fire protection within the mine and for the operation of in-mine machinery. Occasionally mine water production will exceed usage because of inactivity of the mine operation, short-lived surges of inflow, etc. As a result, a system has been constructed to allow for discharge of the mine water from the sump to Cottonwood Creek, with an option of routing the discharge through the sediment pond if necessary. This discharge point is approved under an UPDES Discharge Permit and is fitted with a flow meter for accurate quantity measurement. Intercepted groundwater will be monitored, quantified and reported annually in the Hydrologic Monitoring Report (pre-2015).

#### **7.1.5 Effects of Mining on the Groundwater Hydrologic Balance**

As has been noted, the occurrence and quality of water in any region is highly controlled by geology. A structural feature known as the Straight Canyon Syncline may influence the groundwater hydrology in the northwestern corner of the permit area. The axis of the syncline, plunging NE-SW at approximately 3.5°, passes just to the northwest of the permit boundary and is visible on outcrop

at the Joes Valley dam. The syncline is a prominent feature and could provide a conduit from groundwater migration from NE-SW. The only data for this area has been obtained from exploration holes which have been drilled near the syncline axis. No unusual or persistent sources of groundwater at the coal seam horizon were noted in holes TMX-2, TMX-6, and TMX-7 (see Appendix 7). As with any syncline structure, increased amounts of intercepted groundwater could be expected as mining approaches the syncline axis. Rather than rapid inundation which can occur along fault zones, a gradual increase in the amount groundwater entering the mine should be anticipated as mining proceeds down dip below the potentiometric surface toward the syncline axis.

Since excess water in the mine is stored in sumps, settled and pumped out into Cottonwood Canyon Creek, the net loss to the general hydrologic regime would be minor or zero. The entire permit area is within the Cottonwood drainage system. Interbasin transfer will not occur from the interception and discharging of groundwater.

Springs - As noted previously, springs within and surrounding the mine plan area were inventoried in June, 1981 and October 1985. Experience gained from the data collected at nearby mines and from the general area has provided vital information regarding the possible effect of mining on springs.

Plate 7-1 shows the location of all water sources found during the hydrologic inventory of the mine plan and adjacent area. As shown, only a limited number of springs/seeps were found on the east face of Trail Mountain. The springs located were mainly confined to the west slopes of the mountain.

Based on the data collected by PacifiCorp and the Bureau of Mines on the adjacent East Mountain property, mining induced impacts have not been identified. As discussed in Chapter 11, subsidence is expected to have no impact on bedrock-aquifer springs in the vicinity of the Mine.

Four run off fed ponds were also identified during the October 29, 1985 survey. Their locations are shown on Plate 7-1. These ponds, numbered 35-1P, 26-1P, 26-2P and 26-3P, were sampled for water quality during the 1981 survey and occur within the area of potential subsidence. The subsidence effects on the ponds may result in changes in retention capacity if subsidence fractures intercept them; however, water quality is not likely to be adversely affected. Inflows to the mine are projected to be insufficient to require other than occasional dewatering; hence, impacts due to dewatering are projected to be minimal. The water supply for use at the mine (culinary and domestic) is obtained from in-mine sources. Lines (1985) states that mining is not expected to adversely impact water quality in the vicinity of the Trail Mountain Mine.

#### **7.1.6 Mitigation and Control Plans**

As was previously discussed, no significant impacts to the groundwater system are expected from the mining operation. The groundwater monitoring plan (discussed in the following section) will provide a means to follow the possible effect of mining activities on the groundwater system.

Any roads, fences, stock ponds, earth dams, or water troughs which are materially damaged by subsidence will be repaired and regraded to restore them to their pre-subsidence usefulness. Should significant subsidence impacts occur, the applicant will restore to the extent technologically and economically feasible those surface lands that were reduced in reasonably foreseeable use as

### Quantity

Cottonwood Creek above Straight Canyon drains approximately 21.9 square miles. The average channel gradient of Cottonwood Creek above Straight Canyon is 300 feet/mile (5.7 percent). Only a short period of record (October 1978 to present) is available for the USGS stream gaging station (09324200) on Cottonwood Creek above Straight Canyon. Danielson et al. (1981) estimate the average annual precipitation to be on the order of twenty two (22) inches, or 26,000 acre-feet, on the Cottonwood Creek drainage above Straight Canyon. Danielson et al. (1981) also estimate that only two percent of the precipitation on Cottonwood Creek above Straight Canyon leaves the basin as stream flow compared to thirty percent for Huntington Creek above Huntington. The suggested reasons for the wide difference in percent of precipitation contributing to stream flow are: 1) Cottonwood Creek Basin has a greater portion of area with southern exposure with more gradual slopes than Huntington Creek Basin and 2) possible subsurface movement of water through fractures associated with Joe's Valley Fault. About seventy percent of the total discharge at the Cottonwood Creek station above Straight Canyon for the water year 1979 occurred during the snow melt period (April-July).

Sixty years of data are available for the gaging station on Cottonwood Creek near Orangeville (9324500). The drainage area above Orangeville contributing to Cottonwood Creek is approximately 208 square miles. Cottonwood Creek has an average discharge near Orangeville of about ninety-five (95) cfs, or 69,000 acre-feet per year. The maximum and minimum discharges of record on Cottonwood Creek near Orangeville are 7,220 cfs (August 1, 1964) and 1.2 cfs (April 8, 1966), respectively.

The mine adjacent and permit area is drained by minor drainage systems associated with Cottonwood Canyon Creek. Cottonwood Canyon Creek is a major drainage system which borders the eastern limit of the mine plan area. Based on data collected by PacifiCorp, (see 1992 Annual Hydrologic Report) Cottonwood Canyon Creek is an ephemeral stream from its headwaters to the northeast quarter of Section 24 Township 17 South, Range 6 East and intermittent from that point to its confluence with Cottonwood Creek at Straight Canyon. During periods of drought, flow in Cottonwood Canyon Creek is limited to flow emanating from the alluvial deposits at the intersection with Roans Canyon. From the intersection with Roans Canyon to Section 36 the stream loses water to alluvial deposits. The drainage is dry from Section 36 to Section 6 except during spring runoff which normally occurs from late April through June or during precipitation events. Flow in the channel re-emerges in Section 6 and continues to the confluence with Cottonwood Canyon at Straight Canyon.

The construction and upgrading of surface facilities utilized in conjunction with the Mine (yard areas, road, etc.) may result in temporary increases in the suspended sediment concentration of the adjacent stream. However, because of the regulatory requirement that sediment control be provided for all areas of surface disturbance, concentrations should be quickly normalized. **Moved from Section 3.4.3.4**

~~The quality of flow from the headwaters of the San Rafael River Basin is excellent. However, this quality rapidly deteriorates downstream as streams cross shale formations and receive irrigation return flow from Mancos-derived soils. The impact of the mining on this system will be quite limited. The existence of runoff and sediment control structures should minimize the potential for degradation of the quality of stream waters due to runoff from disturbed areas of the Mine. (repeat)~~

### 7.2.3.2 Mine Plan Area Watersheds and Streams, Stream Characteristics, and Watershed Characteristics

A portion of the Cottonwood Creek watershed receives drainage from within the mine plan area. Stream channels from the mine plan area flow to the east toward the Cottonwood Canyon Creek and to the south toward Straight Canyon Creek, a tributary of Cottonwood Creek. Cottonwood Creek is a perennial stream.

The Cottonwood Canyon Creek is a major drainage system where evidence of glaciation exists. From the headwaters to Section 24, Township 17 South, Range 6 East, the canyon is characterized by U-shaped valleys with associated lateral and terminal moraine deposits. Lateral moraine deposits most commonly occur at the intersection with side canyons. Terminal moraine deposits occur at the northwest corner of Section 24 and from this point to near the confluence with Straight Canyon the canyon can be characterized as a V-shaped valley with little evidence of glaciation.

Based on data collected by PacifiCorp, Cottonwood Canyon Creek is an ephemeral stream from its headwaters to Section 24, Township 17 South, Range 6 East, and intermittent from that point to its confluence with Cottonwood Creek at Straight Canyon. The stream becomes intermittent near the intersection of Roans Canyon just below the terminal moraine deposits discussed above. During drought conditions which have been experienced since 1985, flow in Cottonwood Canyon is limited to flow emanating from the Roans Canyon Spring located in Section 24 near the confluence with Roans Canyon. Prior to the drought, flow occurred along the entire reach of Cottonwood Canyon and had to be forded to access East Mountain at the Mill Canyon dugway located in Section 2.

Along with Roans Canyon Spring, another spring referred to as Cottonwood Spring (TM-23) is also associated with the alluvial (glacial) deposits. Cottonwood Spring is located in the canyon bottom within the area of terminal moraine deposits at an elevation higher than that of Roans Spring. With normal precipitation, especially in the form of winter snowpack, runoff would saturate the alluvial deposits and a portion of groundwater would discharge at the location of Cottonwood Spring. During the period of the drought recharge to the alluvial deposits has been limited and the level of groundwater has been reduced to a point below the elevation of the Cottonwood Spring. To verify the extent of the alluvial deposits and to define the hydrologic characteristics, PacifiCorp conducted a hydrologic research project in 1992 which included a series of resistivity lines and the drilling of three surface sites (see Deer Creek/Cottonwood/Des-Bee-Dove Permit, Volume 9 - Appendix F for complete details). At each of the surface sites two wells were completed (except for CCCW-2, see Plate 6-2 for well locations); one in the alluvial deposits and one in the Spring Canyon member of the Star Point Sandstone Formation. Wells completed in the alluvial deposits will be utilized to compare the well hydrographs to those of Cottonwood Canyon Creek and the Star Point Sandstone. Monitoring data will be included in future Annual Hydrologic Monitoring Reports (pre-2015).

Surface water-quality data collected from Cottonwood Canyon Creek by PacifiCorp indicate that the dominant ions are: calcium, magnesium, and bicarbonate. Water quality and quantity data collected during the year are presented in the Annual Report (pre-2015). Total dissolved solids concentrations in the stream vary from about 250 to 300 milligrams per liter in the mine area, with the lower concentrations normally occurring during the high-flow season. Slight variations have been noted between stations located upstream and downstream from the permit area (SW-1, SW-2 and SW-3).

As expected, total suspended solids concentrations in Cottonwood Canyon Creek tend to vary inversely with the flow rate. Concentrations have varied during the period of record from less than 1 milligram per liter to greater than 1000 milligrams per liter.

Topography in the area is very rugged, with elevation varying from 6800 to over 9000 feet above sea level. Slopes within the mine plan area vary from near vertical cliffs to less than 4 percent (2 degrees) on Trail Mountain. Major escarpments occur to the east and south of the mine plan area.

#### **7.2.4 Surface Water Development, Control and Diversion**

Because of the remoteness and the limited amount of surface water in and adjacent to the mine plan area, essentially no development of the surface water has occurred except from some possible stock watering. Cottonwood Creek water is used downstream for irrigation and for power generation. This section deals with the surface water supply in the area as well as the specific runoff and sedimentation control measures planned for the Mine.

##### **7.2.4.1 Water Supply**

Surface water in the mine plan and adjacent area is utilized primarily for stock watering purposes. A listing of surface water rights within the permit and adjacent areas is provided in Table 7-6. (Also see Appendix 7-8 Cottonwood Irrigation Shares.) A review of the files of the Utah Division of Water Rights indicated that additional rights have not been added to the area since that original submittal.

Flow Characteristics - According to Jeppson et al. (1968) the mean annual water yield for the mine plan area is approximately 1.5 inches. Other hydrologic methods (described in Section 7.2.1) were used to determine the mean annual water yield to increase the confidence level of the estimate. According to Grunsky's Rule the mean annual water yield from the mine plan area is 2.0 inches. This was determined using an alpha value of 0.008/in. Water yield studies have found values of 0.007 to 0.009 for un-gaged areas with medium elevations, medium summer rainfall, medium temperature, medium soil, moderate slopes and east exposure. Gaged areas such as Black Mesa and Holbrook Creek, Colorado, and Black Hills, South Dakota, which are similar to the Trail Mountain Mine site, have values ranging from 0.0068 to 0.0090.

According to Ol'deKop's formula (Sellars, 1965), the mean annual water yield from the mine plan area is 2.9 inches. The two methods utilize the information that mean annual precipitation and evapotranspiration over the mine plan area are 16 to 19 inches, respectively (Jeppson et al., 1968).; therefore, estimates of the mean annual

water yield from both Ol'deKop's and Grunsky's formulas compare favorably with the estimate from the Hydrologic Atlas of Utah prepared by Jeppson et al. (1968).

Monthly flows from Cottonwood Canyon Creek were computed as a percentage of annual flow for the water year 1979 (October 1978 to September 1979) to determine the seasonal distribution of flows for streams within and adjacent to the mine plan area. The results are illustrated in Figure 7-7. Although actual monthly percentages will change, the distribution pattern of stream flow is characteristic of watersheds in the western highlands where the majority of annual water yield occurs in the spring and early summer as a result of snowmelt runoff.

Daily discharge measurements for the Cottonwood Canyon Creek were taken only during the three years 1979, 1980 and 1981. Within those years flow varied from 0 to 22 cfs with an average of 1.64 cfs. The average discharges for the respective three years of record were 0.87, 3.33 and 0.72 cfs. The USGS gauging station monitoring was discontinued in September 1981 (additional information on flow characteristics of Cottonwood Canyon Creek, review annual Hydrologic Reports (pre-2015)).

Surface Water Quality - Three surface water sites (referred to as SW-1, SW-2 and SW-3 in Plate 7-2) have been sampled since 1979. Table 7-3 contains a list of the water quality parameters analyzed along with the results of the chemical analyses of surface water samples collected at these three sites. As illustrated in Plate 7-2, SW-1 is located approximately one mile above the mine, SW-2 is located immediately below all mine surface facilities, and SW-3 is located approximately 2 miles below the mine near the confluence of Cottonwood Canyon Creek and Straight Canyon. Additional water quality data have been collected by the USGS at a gaging station on the Cottonwood Canyon Creek located in the SE1/4NE1/4, Section 36, T17S, R6E. This data is compiled and reported in Table 7-4. This station was discontinued in 1981; however, an additional monitoring station, SW-3, was added by the applicant to monitor Cottonwood Creek below the permit area. Results from all the monitoring stations are summarized in the Annual Report (pre-2015).

As depicted in Tables 7-3 and 7-4 surface waters of the mine plan area are of a mixed chemical type (Calcium-magnesium, bicarbonate) and seasonally vary from a stronger magnesium-bicarbonate to a stronger calcium-bicarbonate. A sample

The reclaimed area runoff will be prevented from reaching the restored channel by installation of an earthen berm on the reclamation side of the channel. The berm will direct disturbed runoff to the sedimentation pond. A typical section of the restored channel (and berm) is shown on Figure 7-12.

When the revegetation standards have been met, the second phase of reclamation will begin. It will consist of removal of the sedimentation pond and all remaining culvert sections. The remaining channel area will be restored as in Phase I, and all newly disturbed areas will be reseeded. Additional sediment and/or erosion controls, such as strawbales, silt fence, berms, etc., will be installed if necessary to protect the restored channel and stream.

During reconstruction of the main channel, it is proposed to divert the Cottonwood Creek flow around the mine site. This will be accomplished by installation of a small, temporary dam in the channel with a pump diverting the flow into a flexible culvert (or other conveyance structure), which will discharge either back into the culvert below or into the channel below the pond.

Existing Culverts Beneath County Road - When evaluating the inlets of culverts constructed along the east side of the county road adjacent to the mine site it is expected that the reconstructed channel (west side) will receive the water from these culverts. The original construction information is not available to determine where the outlet of the three culverts will connect into the channel. For that reason, the permittee commits to use the BTCA to place an appropriately sized outlet and erosion protection in the channel at the location of each of the three culverts.

### 7.5.3 Side Canyon Channel

During Phase I of the reclamation, the 48-inch culvert will be removed from the side channel down to its confluence with the restored main channel. The side channel will also be restored and riprapped as described in Appendix 7-3. At the intersection of the side and main channels, 40 feet of 48-inch culvert will be left in place in the side channel. The inlet section and trash rack will also be installed at this location. The reclaimed area will be separated from the restored channels by installation of an earthen berm on the reclamation side of the channels, providing for reclaimed area drainage to the north of the side canyon to flow over the culverted area and to the sediment pond.

During Phase II, the remaining 48-inch culvert will be removed along with the sediment pond and remaining main channel culverts when revegetation standards have been met. The remaining disturbed area will then be reseeded in accordance with the plan.

Design parameters are summarized in Table 7-11 of this Chapter. Riprap, filter blanket and flow designs and calculations are detailed in Appendices 7-3 and 7-4. A typical section of the restored side channel is shown in Figure 7-12, and the overall plan and structure locations are shown on Plates 3-5 and 3-6.



**CHAPTER 8  
SOIL RESOURCES**

potassium content of K = 217 ppm by the standard soil fertility test.

The second soil pit was located in the Grassland Shrub Community on a steep northeast facing slope uphill from the coal loading piles of the disturbed area. This is the mapping unit CoG or RoG.

It is a soil type that has been disturbed by the Mine operations, but only slightly. Some of the lower steep hillside has been cut away to provide clean mine entrances and room for a coal pile. Probably only about 75% or more of the disturbed area is represented by this soil type.

The results of textural analysis are shown in Table 8-3 and of chemical analysis in Table 8-4. The Grassland Shrub soil was relatively shallow, bedrock being encountered at only 19 inches. The A horizon was 5 inches deep and consisted of 71.5% fine soil and 28% larger rock fragments by weight. The fine soil fraction was a loam soil of 40% sand, 35% silt, and 25% clay. Deeper layers increased rapidly in rocky material, silt, and clay fractions. The pH ranged from 8.2 to 8.7 and the salinity from .3 to 4 mmho/cm<sup>2</sup>. Phosphorus and potassium levels were much lower than the streamside soil of the canyon bottom.

## 8.6 USE OF SELECTED OVERBURDEN

Since the site is a previously disturbed site since 1948, and no further disturbance is proposed, no overburden will be handled.

## 8.7 PLANS FOR REMOVAL, STORAGE AND PROTECTION OF SOILS

~~Since the site has was previously disturbed no soils were removed, stored, or protected prior to 1982. Compliance work in 1982–1983, involved the use of an on site borrow area and resulting topsoil storage pile. For any future disturbances, any soils encountered will be removed, stored, and protected.~~

The mine was operational before the 1979 State Act or the 1977 Federal Act. Having been constructed prior to the requirement to save and stockpile topsoil, the soils on the site were used in construction of the roads and pads.

A post-law borrow pit was utilized on site to obtain fill material for the 66" culvert for Cottonwood Creek. Topsoil was salvaged from the pit area, and is stockpiled in a protected area just northwest

of the intake portal for the mine. The pile has been revegetated, and is further protected by installation of a silt fence around the bottom end. Please refer to Appendix 8-1 for details on the borrow area.

No additional area is planned for disturbance, therefore, it is unlikely that any topsoil will be encountered. However, if in the future, during upgrading operations or facility modifications, any salvageable topsoil is found, it will be tested in accordance with the "UDOGM Guidelines for Management of Topsoil and Overburden, Table 1", and if found satisfactory, will be saved and stockpiled in a location acceptable to the regulatory authority.

## 8.8 PLANS FOR REDISTRIBUTION OF SOILS

In the event that the existing soil cannot be revegetated, supplemental soil will have to be hauled in for regrading of the disturbed site. Such soil should be tested for similarity to the existing soils and should equal or exceed the quality of the Riparian soil of Tables 8-1 and 8-2. This is the soil type of 25% or less of the disturbed area.

Once the buildings, mine equipment, coal piles and other structures and disturbances are removed, the existing disturbed area must be graded to the final configuration. If the existing soil is unsuitable for revegetation and supplemental soil must be brought in, a depth of not less than six inches should then be applied and graded in preparation for seeding. Existing soil should prove adequate for plant growth. Refer to Section 3.5.4 for Backfilling and Grading Plan and Section 3.5.5.1 for Soil Preparation.

## 8.9 NUTRIENTS AND SOIL AMENDMENTS

Existing soil or soils hauled in for the restoration of the disturbed soils will have to be supplemented with commercial fertilizers containing nitrogen, phosphorus, and potassium. The exact mixture will have to be determined following tests on the actual soil used, but a broadcast rate of about 50 pounds of phosphorus, 80 pounds nitrogen and 80 pounds of potassium per acre can be expected. Stabilization will be obtained by the use of an erosion control mat.

### **8.10 EFFECTS OF MINING OPERATIONS ON SOILS**

The existing disturbed site has been compacted by heavy equipment and automobiles. Some sections have been subjected to oil, gasoline, and diesel fuel spillage. Crushed coal and coal dust from the coal piles have been mixed and compacted in the existing soil.

### **8.11 MITIGATION AND CONTROL PLANS**

As a previously disturbed site, no soils had originally been saved for protection of the resource. A small amount of topsoil was salvaged during the hydrologic reconstruction on site, and has been stored and protected as shown on Figure 3-1. Should any future disturbance of undisturbed soils of good potential occur, the soils will be removed, stored, and protected.

### **8.12 BIBLIOGRAPHY**

United States Department of Agriculture, U.S. Department of the Interior, and Utah Agricultural Experiment Station, 1970, Soil Survey, Carbon-Emery Area, Utah.



**CHAPTER 9**  
**VEGETATION RESOURCES**

willow stems were planted at intervals of approximately six feet apart on both sides of the North Fork of the Cottonwood Creek for a distance of two miles below the disturbed area of the mine site. This willow shoot enhancement project was conducted by Trail Mountain with the technical supervision of Mr. Larry Dalton of the Division of Wildlife Resources (1986).

## 9.7 REVEGETATION METHODS AND JUSTIFICATIONS

After cessation of coal mining activities at the Mine, disturbed areas will be revegetated. The revegetation plan contains one option; to use the existing soils with amendments. The plan assumes that the existing buildings will be removed, the mine entrances sealed, and the site regraded to the final surface configuration. [Refer to Section 3.5.5 Revegetation Plan for additional information.](#)

Seeding for the Riparian area will follow the rates and species listed in Table 3, Appendix 9-1 and seeding for the Grassland-Shrub area is listed in Table 2A, Appendix 9-1. (See Reclamation Plan Seedbed Preparation: Grassland and Riparian Appendix 9-1.)

## 9.8 REVEGETATION MONITORING

The vegetation composition of the reseeded areas will be compared to that in the reference areas. Ninety percent stocking rate is acceptable under the present regulations. Subsequent reseeding for each year will be done until cover and productivity are within 90% of the approved reference areas. [Refer to Section 3.5.5.4 for additional information.](#)