

**MINING AND RECLAMATION PLAN
SUFÇO MINE
AMENDMENT**

OPERATED BY



**CANYON FUEL COMPANY, LLC
Sufco Mine**

REDLINE/STRIKE OUT

**South Fork Quitcupah 2R2S Block “A”
JULY 2012
Revised January 2013**



Canyon Fuel
Company, LLC.
Sufco Mine

A Subsidiary of Arch Western Bituminous Group, LLC.

Incoming
C0410002 #4243 & ✓

Ken May, General Manager
597 South SR 24
Salina, UT 84654
(435) 286-4400 - Office
(435) 286-4499- Fax

January 4, 2013

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

File in:

- Confidential
- Shelf
- Expandable

Date Folder 01082013 C/0410002

Incoming

RECEIVED

JAN 08 2013

DIV. OF OIL, GAS & MINING

Re: South Fork Quitchupah 2R2S Block "A" Amendment, 4th and Final Submittal, to the Canyon Fuel Company, LLC, Sufco Mine, Permit Number C/041/0002

Dear Permit Supervisor:

Please find enclosed with this letter the Sufco Mine permit revision to modify the current Sufco monitoring and mitigation plan for undermining the South Fork of Quitchupah 2R2S Block "A" portion of the stream channel. We have included Three copies of the modified text and plates in redline/strike through format along with completed C1 and C2 forms.

Two clean copies of the pages with modifications have also been included with this submittal for inclusion in the permit once the modification is approved.

This resubmittal has been revised to address the deficiencies itemized in the Division letter dated December 06, 2012 and received by Sufco on December 13, 2012.

The deficiencies and responses are:

1. **R645-301.731.224:** The downstream surface water monitoring point 006D should be added to Figure 7-9 in the MRP and included in the gain/loss surveys to be completed as part of the mitigation plan. (AAA)

Response:

Item #1 was addressed by adding monitoring point 006D to Figure 7-9, page 7-51K in the MRP and in the new Mining and Mitigation Plan for Undermining the South Fork Quitchupah 2R2S Block "A". A gain/loss survey that includes 006D has been added to the MRP as Appendix 3-14.

2. **R645-301.731.530:** Water Right 94-113 was found to be a small undeveloped seep. The PHC recommended a total of six springs be monitored along the reach of the South Fork of Quitchupah. The seep associated with Water Right No. 94-113, was not included in this group. The location of this seep is approximately 500 feet off the northwest edge of the 2R2S panel (refer to Plate 7-2Av6). Because this is a state appropriated water right and located within the angle of draw where subsidence cracks are possible, please include this seep in the water monitoring protocol. (AAA)

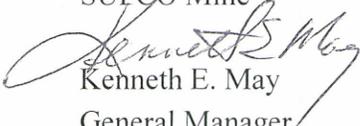
Response:

Item #2 was addressed by adding Water Right 94-113 to Table 7-2 Water Monitoring Program, Page 7-42A in the MRP and modifying Plate 7-3.

The Permittee was required to develop a data recovery plan and Memorandum of Agreement (MOA) in coordination with the Forest Service and the Utah State Historic Preservation Office (USHPO) for the 42SV3464 rock shelter site. A cultural resource investigation for the 42SV3464 rock shelter was requested and approved between the U.S. Forest Service, Utah State Historic Preservation Office (SHPO), EnviroWest, LLC and Canyon Fuel Company, LLC since the shelter appeared to have been disturbed. Testing of the rock shelter for significance was conducted by EnviroWest and Fishlake National Forest Archaeologist in the fall of 2012. A copy of the cultural resource investigation testing report and the Determination of Significance and Effect form are located in Appendix 4-2 in the Confidential folder of the M&RP. While the 42SV3464 rock shelter site was initially evaluated as being eligible for listing in the National Register of Historic Places, subsequent testing found it to be ineligible for listing due to disturbance and a data recovery plan and MOA are not required for mitigation of the site. Appendix 4-6 has been deleted from the amendment.

If you have any questions regarding the information contained in this letter or within the permit modification, please give Mike Davis a call at (435) 286-4421.

Sincerely,
CANYON FUEL COMPANY, LLC
SUFCO Mine


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: SUFCO MINE

Permit Number:

C/041/0002

Title: Final - South Fork Quitcupah 2R2S Block "A"

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

Modification of the Monitoring & Mitigation plan for the South Fork Quitcupah 2R2S Block "A" portion of the stream channel.

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

- | | |
|---|---|
| <input type="checkbox"/> Yes <input checked="" 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 type="checkbox"/> Yes <input checked="" type="checkbox"/> No | 7. Does the application require or include ownership, control, right-of-entry, or compliance information? |
| <input type="checkbox"/> Yes <input checked="" 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? |

Explain: _____

- | | |
|---|--|
| <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 checked="" type="checkbox"/> Yes <input 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 checked="" type="checkbox"/> Yes <input 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 checked="" type="checkbox"/> Yes <input 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 checked="" type="checkbox"/> Yes <input 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? |
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | 24. Does the application include confidential information and is it clearly marked and separated in the plan? |

Please attach three (3) review copies of the application. If the mine is on or adjacent to Forest Service land please submit four (4) 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.

KENNETH E. MAY

GENERAL MANAGER

1/7/13

Kenneth E. May

Print Name

Position

Date

Signature (Right-click above choose certify then have notary sign below)

Subscribed and sworn to before me this 7 day of January, 2013

Notary Public: Jacquelyn Nebeker, state of Utah.

My commission Expires: _____

Commission Number: _____

Address: _____

City: _____

State: _____

Zip: _____

ss: _____



JACQUELYN NEBEKER

**Notary Public
State Of Utah**

**My Commission Expires 3/24/2015
Commission# 606049**

For Office Use Only:

Assigned Tracking
Number:

Received by Oil, Gas & Mining

RECEIVED

JAN 08 2013

DIV. OF OIL, GAS & MINING

CHAPTER 1
GENERAL CONTENTS

The legal description of the SUFACO coal leases:

Federal Coal Lease U-28297 - (2,631.98~~98~~716.51 acres) - Approved January 1979
Modified January 2012

T. 21 S., R. 5 E., SLM, Utah
Sec. 32, lots 1-4, N1/2S1/2
Sec. 33, lot 1, NW1/4SW1/4
T. 22 S., R. 5 E., SLM, Utah
~~Sec. 4, lot 4, SW1/4NW1/4, W1/2SW1/4~~
~~Sec. 5, all W1/2W1/2;~~
Sec. 7, S1/2NE1/4, E1/2SW1/4, W1/2SE1/4;
~~Sec. 8, all W1/2NW1/4.~~
~~Sec. 17, NE1/4, N1/2NW1/4~~
~~Sec. 18, NE1/4, E1/2NW1/4~~

Federal Coal Lease U-062453 - (480 acres) - Approved March 1962

T. 21 S., R. 5 E., SLM, Utah
Sec. 28, SW1/4SW1/4
Sec. 29, SE1/4SE1/4
Sec. 32, N1/2
Sec. 33, W1/2NW1/4

Federal Coal Lease U-0149084 - (240 acres) - Approved June 1966

T. 22 S., R. 4 E., SLM, Utah
Sec. 12, NE1/4 and N1/2SE1/4

Federal Coal Lease SL-062583 - (3,079.83 acres) - Approved September 1941
Modified January 1973
Modified December 2009

T. 21 S., R. 4 E., SLM, Utah
Sec. 36, S1/2
T. 21 S., R. 5 E., SLM, Utah
Sec. 31, all;
T. 22 S., R. 4 E., SLM, Utah
Sec. 1, lots 1 to 4 incl. S1/2N1/2, S1/2
Sec. 2, SE1/4, S1/2SW1/4;
Sec. 3, SE1/4SE1/4;
Sec. 10, E1/2NE1/4, NE1/4SE1/4;
Sec. 11, N1/2, N1/2S1/2;
Sec. 12, NW1/4
T. 22 S., R. 5 E., SLM, Utah
Sec. 6, all;
Sec. 7, N1/2NE1/4, E1/2NW1/4

Federal Coal Lease U-47080 - (1,953.73 acres) - Approved October 1981
Modified December 2009

T. 21 S., R. 4 E., SLM, Utah

Sec. 25, all;
Sec. 35, E1/2, E1/2SW1/4;
Sec. 36, N1/2.
T. 21 S., R. 5 E., SLM, Utah
Sec. 30, lots 2-4, W1/2SE1/4
T. 22 S., R. 4 E., SLM, Utah
Sec. 2, lots 1-4, S1/2NE1/4, S1/2NW1/4, N1/2SW1/4;
Sec. 3, NE1/4SE1/4.

Federal Coal Lease U-63214 - (40,695.468,826.34 acres) - Approved July 1989
Modified June 1999
Modified December 2009
Modified May 2011

Tract 1:

T. 21 S., R. 4 E., SLM, Utah
Sec. 12, E1/2SE1/4
Sec. 13, E1/2NE1/4, S1/2
Sec. 14, E1/2SW1/4, SE1/4
Sec. 23, E1/2, E1/2W1/2
Sec. 24, all.
T. 21 S., R. 5 E., SLM, Utah
Sec. 15, W1/2
Secs. 16-21, all;
Sec. 22, W1/2
Sec. 26, W1/2NW1/4SW1/4, SW1/4SW1/4
Sec. 27, all;
Sec. 28, N1/2, N1/2SW1/4, SE1/4SW1/4, SE1/4
Sec. 29, E1/2NE1/4, NE1/4SE1/4
Sec. 30, lot 1, N1/2NE1/4
Sec. 33, ~~lots 2-4~~, NE1/4, E1/2NW1/4, NE1/4SW1/4, N1/2SE1/4
Sec. 34, ~~all~~, NW1/4NE1/4, NW1/4, NW1/4SW1/4.
~~Sec. 35, lots 1, 2, W1/2NW1/4, N1/2SW1/4.~~
~~T. 22 S., R. 5 E., SLB&M, Utah~~
~~Sec. 3, lots 1-4, S1/2N1/2, NE1/4SW1/4, S1/2SW1/4, N1/2SE1/4,~~
~~SW1/4SE1/4~~
~~Sec. 4, lots 1, 2, S1/2NE1/4, SE1/4SE1/4~~
~~Sec. 9, NE1/4NE1/4~~
~~Sec. 10, W1/2NE1/4, NW1/4, N1/2SW1/4.~~

Tract 2:

T. 21 S., R. 5 E., SLM, Utah
Sec. 10, SE1/4NW1/4, E1/2SW1/4, E1/2E1/2SW1/4SW1/4,
E1/2E1/2NW1/4SW1/4, E1/2E1/2SW1/4NW1/4.

Tract 3:

T. 21 S., R. 4 E., SLM, Utah
Sec. 26, E1/2, E1/2SW1/4;
Sec. 35, NW1/4, W1/2SW1/4.

Federal Coal Lease UTU-76195 - (5,694.66 acres) - Approved October 1999
Modified December 2006

- T. 21 S., R. 5 E., SLM
 - Sec. 2, lots 3,4, S1/2SW1/4, SW1/4SE1/4
 - Sec. 10, E1/2
 - Sec. 11, all
 - Sec. 12, S1/2SW1/4, NW1/4SW1/4
 - Sec. 13, NW1/4, S1/2
 - Sec. 14, all
 - Sec. 15, E1/2
 - Sec. 22, E1/2
 - Sec. 23-24, all
 - Sec. 25, N1/2, N1/2S1/2
 - Sec. 26, N1/2, NE1/4SW1/4, E1/2NW1/4SW1/4, SE1/4
- T. 21 S., R. 6 E., SLM
 - Sec. 19, lots 3-4, E1/2SW1/4
 - Sec. 30, lots 1-3, E1/2NW1/4, NE1/4SW1/4

State of Utah Coal Lease ML 49443-OBA - (2,134.19 acres) - Approved October 2004

- T. 21 S., R. 5 E., SLB&M
 - Sec. 4: Lots 1, 2, 3, 4, S1/2S1/2
 - Sec. 5: Lots 1, 2, 3, 4, S1/2S1/2
 - Sec. 7: Lots 2, 3, 4, S1/2NE1/4, SE1/4
 - Sec. 8: All
 - Sec. 9: All

Canyon Fuel Company, LLC acquired the right to entry on these properties in the merger described in Section 111 hereinabove.

In addition, the SUFACO Mine permit area includes certain fee lands owned by Canyon Fuel Company, LLC as follows:

- T. 21 S., R. 5 E., SLB&M, Utah
 - Sec. 29, SW1/4, NW1/4, W1/2NE1/4, W1/2SE1/4
 - Sec. 30, S1/2NE1/4, E1/2SE1/4
 - containing 640.00 acres
- T. 22 S., R. 4 E., SLB&M, Utah
 - Sec. 18, NW1/4NE1/4
 - containing 40 acres

The name of the owner of these fee lands changed from Coastal States Energy Company to Canyon Fuel Company, LLC as a result of the merger transaction described in Section 111 hereinabove.

The SUFACO Mine also uses certain Forest Service lands in its operation for a spring collection system, pumphouse, water transmission line, sanitary discharge line, sanitary drainfield, access

road to the sediment pond, and 25 KV powerline. These USFS special use permit areas are shown on Plate 5-6 through portions of:

T. 22 S., R. 4 E., SLB&M, Utah
Sec. 12, S1/2
containing 15.32 acres

The name of the permittee changed from Southern Utah Fuel Company to Canyon Fuel Company, LLC pursuant to the merger described in Section 111 herein above.

The total lease area includes ~~24,775.66~~20,991.07 acres of Federal coal leases, 2,134.19 acres of State of Utah coal leases, 640 acres of fee coal leases, the 40 acres waste rock disposal site and 15.32 acres under U.S. Forest Service special use permit for a total of ~~27,605.17~~23,820.58 acres.

115 Status of Unsuitability Claims

To the best knowledge of Canyon Fuel Company, LLC, no portion of the area to be permitted is designated, or under study for being designated, unsuitable for mining.

Since the SUFACO Mine was in production before passage of the Surface Mining Control and Reclamation Act of 1977, the unsuitability criteria were not applied to the existing surface facilities.

Canyon Fuel Company, LLC does not propose to conduct coal mining or reclamation operations within 300 feet of any occupied dwelling. Coal mining and reclamation operations have been or will be conducted within 100 feet of a public road, see Section 5.2.1.1 for details. Forest Service approval to conduct coal mining and reclamation operations within 100 feet of the Link Canyon forest service road is located in Appendix 1-1 and the newspaper advertisement for public comment is located in Appendix 1-3.

116 Permit Term

The following information is presented to identify permit term requirements and stipulations. Canyon Fuel Company will be operating the SUFACO Mine with continuous miner and longwall

mining methods. Although the Mining and Reclamation Permit Application covers the next five-year period of mining, information is presented below for the life of the mining operation.

| | | |
|----|------------------------------------|--|
| 1. | First coal produced | 1941 |
| 2. | Termination of mining activity | December, 2016 August, 2025 |
| 3. | Horizontal extent of mine workings | 27,605.17 23,820.58 acres (Life of mine) |
| 4. | Vertical extent of mine workings | Surface to 2,000 feet deep (Life of mine) |

The anticipated total acreage to be affected during the five years of operation by underground mining activities is 1,500 acres. The estimated number of total surface acres to be affected over the entire mining operation is 48.432 acres.

| <u>PERMITTED DISTURBED AREA BOUNDARY</u> | <u>ACTUAL AREA CURRENTLY DISTURBED TO BE RECLAIMED</u> | <u>SITE DESCRIPTION</u> |
|--|--|--|
| 30.210 | 17.405 | Mine Site, East Spring Canyon |
| 0.967 | 0.39 | Spring Collection Field, Convulsion Canyon |
| 0.220 | 0.075 | Pump House, Convulsion Canyon |
| 0.784 | 0.40 | Leach Field, Convulsion Canyon |
| 1.595 | 0.193 | Water Tank, East Spring Canyon |
| 0.286 | 0.017 | 3 East Portals |
| 1.774 | 0.70 | 4 East Portals |
| 0.302 | 0.017 | South Portals |
| 0.396 | 0.017 | Quitcupah Portals |
| 0.287 | 0.18 | Link Canyon Substation No. 1 |
| 0.245 | 0.12 | Link Canyon Substation No. 2 |
| 0.380 | 0.18 | Link Canyon Portal |
| 10.986 | 8.733 | Waste Rock Disposal Site |
| 0.000 | 0.00 | North Water Mitigation Area |
| <u>0.000</u> | <u>0.00</u> | Quitcupah Fan and Shaft Site |
| 48.432 | 28.427 | Totals |

The legal description of the SUFCO permit area:

Mine Site Facility, Water Tank, South Portals, Spring Collection Field, Pump House, Pipeline, Leachfield (Approximately 64.403 acres)

T. 22 S., R. 4 E., SLBM, Utah

Section 12: A Portion of the following:

E1/2NW1/4, SW1/4NW1/4NE1/4, S1/2

CHAPTER 3

BIOLOGY

LIST OF PLATES

Plate

- 3-1 Plant Communities and Reference Areas
- 3-2 Elk Range
- 3-3 Deer Range & Raptor Nests

LIST OF APPENDICES

(Appendices appear in Volume 5)

Appendix

- 3-1 Report of 1983 Field Investigations
- 3-2 Aquatic Resource Inventory of Southern Utah Fuel Company Permit Area
- 3-3 Wildlife Assessment of the Southern Utah Fuel Company Mining Property and Adjacent Areas
- 3-4 Raptor and General Avifauna Studies
- 3-5 Fauna of Southeastern Utah and Life Requisites Regarding their Ecosystems
- 3-6 Vegetation Information Guidelines, Appendix A
- 3-7 Power Line Correspondence
- 3-8 Bat Survey for the SUFCO Mine
- 3-9 Vegetation and Wildlife of the Pines Tract Project.
- 3-10 Monitoring and Mitigation Plan for Mining Under the East Fork of Box Canyon
- 3-11 Muddy Creek Technical Report-Wildlife
- 3-12 Mexican Spotted Owl Survey Muddy Tract
- 3-13 Vegetation and Wildlife of the West Coal Lease Modifications
- 3-14 Monitoring and Mitigation Plan for Undermining the South Fork of Quitcupah 2R2S Block "A"

Table 3-1

**Federally Listed and Proposed Endangered Species in Utah
 Sevier and Emery Counties
 January 2005 – (Revised) March 29, 2011**

| <u>Plants</u> | | Status |
|--------------------------|--|--------------|
| Barneby Reed-Mustard | <u>Schoenocrambe barnebyi</u> | E |
| Heliotrope Milk-Vetch | <u>Astragalus montii</u> | T |
| Jones Cycladenia | <u>Cycladenis humilis var. jonesii</u> | T |
| Last Chance Townsendia | <u>Townsendia aprica</u> | T |
| Maguire Daisy | <u>Erigeron maguirei</u> | T |
| San Rafael Cactus | <u>Pediocactus despainii</u> | E |
| Wright Fishhook Cactus | <u>Sclerocactus wrightiae</u> | E |
| Winkler Cactus | <u>Pediocactus winkleri</u> | T |
| <u>Mammals</u> | | |
| Black-Footed Ferret | <u>Mustela nigripes</u> | E-Extirpated |
| Utah Prairie Dog | <u>Cynomys parvidens</u> | T |

Brown (Grizzly) Bear Ursus arctos T-Extirpated

Canada Lynx Lynx canadensis T

Gray Wolf Canis lupus E

Birds

~~Bald Eagle Haliaeetus leucocephalus T~~

Mexican Spotted Owl Strix occidentalis lucida T

Southwestern Willow Flycatcher Empidonax traillii extimus E

Greater Sage-grouse Centrocercus urophasianus C

Yellow-billed Cuckoo Coccyzus americanus C

Fish

Bonytail Chub Gila elegans E

Colorado Pikeminnow Ptychocheilus lucius E

Humpback Chub Gila cypha E

Razorback Sucker Xyrauchen texanus E

Reptiles

None listed in the Sevier and Emery Counties

Snails

None listed in the Sevier and Emery Counties

E - Endangered T - Threatened **Extirpated - No longer occur in Utah** C - Candidate

For additional information contact: U. S. Fish and Wildlife Service, 2078 Administration Building,
1745 West 1700 South, Salt Lake City, Utah 84204-5110

Telephone: Commercial (801) ~~524-5001~~ **975-330**

Table 3-2

~~Native~~ Utah Wildlife Species of Special Interest
 Sevier and Emery Counties
 January 2005 (~~Revised~~) March 29, 2011

| <u>Mammals</u> | | State Status |
|----------------------------------|--|---------------------|
| Brown (Grizzly) Bear | <u>Ursus arctos</u> ^{2,4} | EX S-ESA |
| Fisher | <u>Martes pennanti</u> | EX |
| Gray Wolf | <u>Canis lupus</u> ¹ | EX S-ESA |
| Black-footed Ferret | <u>Mustela nigripes</u> ^{1,4} | EN S-ESA |
| Utah Prairie Dog | <u>Cynomys parvidens</u> ² | T |
| Wolverine | <u>Gulo gulo</u> | T |
| Spotted Bat | <u>Euderma maculatum</u> | SP |
| Allen's Big-eared Bat | <u>Idionycteris phyllotis</u> | SD |
| Fringed Myotis | <u>Myotis thysanodes</u> | SD SPC |
| Dwarf Shrew | <u>Sorex nanus</u> | SD |
| Desert Shrew | <u>Notiosorex crawfordi</u> | SD |

| | | |
|--------------------------------|--------------------------------------|----|
| Abert's Squirrel | <u>Sciurus aberti navajo</u> | SD |
| Belding ground Squirrel | <u>Spermophilus beldingi</u> | SD |
| Thirteen-lined Ground Squirrel | <u>Spermophilus tridecemlineatus</u> | SD |
| Spotted Ground Squirrel | <u>Spermophilus spilosoma</u> | SD |
| Wyoming Ground Squirrel | <u>Spermophilus elegans</u> | SD |
| Yellow Pine Chipmunk | <u>Tamias amoenus</u> | SD |
| Rock Pocket Mouse | <u>Chaetodipus intermedius</u> | SD |
| Olive-backed Pocket Mouse | <u>Perognathus fasciatus</u> | SD |
| Merriam's Kangaroo Rat | <u>Dipodomys merriami</u> | SD |
| Chisel-toothed Kangaroo Rat | <u>Dipodomys microps celsus</u> | SD |
| Cactus Mouse | <u>Peromyscus eremicus</u> | SD |
| Southern Grasshopper Mouse | <u>Onychomys torridus</u> | SD |
| Marten | <u>Martes americana</u> | SD |
| Pika | <u>Ochotona princeps</u> | SD |
| Ringtail | <u>Bassariscus astutus</u> | SD |
| Northern Flying Squirrel | <u>Glaucomys sabrinus</u> | SD |

| | | |
|---------------------------|---------------------------------------|----------------------|
| Western Red Bat | <u>Lasiurus blossevillii</u> | SP/SD |
| Big Free-tailed Bat | <u>Nyctinomops macrotis</u> | SP/SD ^{SPC} |
| Brazilian Free-tailed Bat | <u>Tadarida brasiliensis mexicana</u> | SP/SD |
| Townsend's Big-eared Bat | <u>Plecotus townsendii</u> | SP/SD ^{SPC} |
| Desert Kangaroo Rat | <u>Dipodomys deserti</u> | SP/SD |
| Northern Rock Mouse | <u>Peromyscus nasutus</u> | SP/SD |
| Stephen's Woodrat | <u>Neotoma stephensi</u> | SP/SD |
| Virgin River Montane Vole | <u>Microtus montanus rivularis</u> | SP/SD |
| Mexican Vole | <u>Microtus mexicanus</u> | SP/SD |
| Northern River Otter | <u>Lutra canadensis</u> | SP/SD |
| North American Lynx | <u>Felis lynx canadensis</u> | SP/SD |
| Canada Lynx | Lynx canadensis ² | FS-ESA |
| Kit Fox | <u>Vulpes macrotis</u> | SPC |
| White-tailed Prairie-dog | <u>Cynomys leucurus</u> | SPC |
| Pygmy Rabbit | <u>Brachylagus idahoensis</u> | SPC |

Birds

| | | |
|--------------------------------|--|---------|
| Passenger Pigeon | <u>Ectopistes migratorius</u> | E |
| Southwestern Willow Flycatcher | <u>Empidonax traillii extimus</u> ¹ | ENS-ESA |
| Bald Eagle | <u>Haliaeetus leucocephalus</u> | ∓SPC |
| Ferruginous Hawk | <u>Buteo regalis</u> | ∓SPC |
| Yellow-billed Cuckoo | <u>Coccyzus americanus occidentalis</u> ³ | ∓S-ESA |
| Spotted (Mexican) Owl | <u>Strix occidentalis lucida</u> ² | ∓S-ESA |
| Northern Goshawk | <u>Accipiter gentilis</u> | SPCS |
| Swainson's Hawk | <u>Buteo swainsoni</u> | SP |
| Caspian Tern | <u>Sterna caspia</u> | SP |
| Black Tern | <u>Chlidonias niger</u> | SP |
| Burrowing Owl | <u>Athene cunicularia</u> | SPC |
| Common Yellowthroat | <u>Geothlypis trichas</u> | SP |
| Short-eared Owl | <u>Asio flammeus</u> | SPC |
| American White Pelican | <u>Pelecanus erythrorhynchos</u> | SDSPC |
| California Condor | <u>Gymnogyps californianus</u> | SD |
| Osprey | <u>Pandion haliaetus</u> | SD |

| | | |
|------------------------|---|------------|
| Sharp-tailed Grouse | <u>Tympanuchus phasianellus columbianus</u> | SD |
| Williamson's Sapsucker | <u>Sphyrapicus thyroideus</u> | SD |
| Three-toed Woodpecker | <u>Picoides tridactylus</u> | SDSPC |
| Greater Sage-Grouse | <u>Centrocercus urophasianus</u> ³ | SP/SDS-ESA |
| Mountain Plover | <u>Charadrius montanus</u> ² | SP/SD |
| Long-billed Curlew | <u>Numenius americanus</u> | SP/SDSPC |
| Black Swift | <u>Cypseloides niger</u> | SP/SDSPC |
| Lewis's Woodpecker | <u>Melanerpes lewis</u> | SP/SDSPC |
| Crissal Thrasher | <u>Toxostoma crissale</u> | SP/SD |
| Bell's Vireo | <u>Vireo bellii</u> | SP/SD |
| Blue Grosbeak | <u>Guiraca caerulea</u> | SP/SD |
| Grasshopper Sparrow | <u>Ammodramus savannarum</u> | SP/SD |
| Bobolink | <u>Dolichonyx oryzivorus</u> | SP/SD |
| <u>Fish</u> | | |
| Utah Lake Sculpin | <u>Cottus echinatus</u> | E |
| Bonytail | <u>Gila elegans</u> ¹ | ENS-ESA |

| | | |
|--------------------------|--|---------|
| Colorado Squawfish | <u>Ptychocheilus lucius</u> ⁴ | EN |
| Humpback Chub | <u>Gila cypha</u> ¹ | ENS-ESA |
| Razorback Sucker | <u>Xyrauchen texanus</u> ¹ | ENS-ESA |
| Woundfin | <u>Plagopterus argentissimus</u> ⁴ | EN |
| Virgin River Chub | <u>Gila seminuda</u> ⁴ | EN |
| June Sucker | <u>Chasmistes liorus</u> ⁴ | EN |
| Lahontan Cutthroat Trout | <u>Oncorhynchus clarki henshawi</u> ² | T |
| Roundtail Chub | <u>Gila robusta</u> | TCS |
| Leatherside Chub | <u>Gila copei</u> | SP |
| Flannelmouth Sucker | <u>Catostomus latipinnis</u> | SPCS |
| Bluehead Sucker | <u>Catostomus discobolus</u> | SPCS |
| Bonneville Cisco | <u>Prosopium gemmiferum</u> | SD |
| Bonneville Whitefish | <u>Prosopium spilonotus</u> | SD |
| Bear Lake Whitefish | <u>Prosopium abyssicola</u> | SD |
| Bear Lake Sculpin | <u>Cottus extensus</u> | SD |
| Desert Sucker | <u>Catostomus clarki</u> | SD |

| | | |
|--------------------------------|---|-------|
| Colorado River Cutthroat Trout | <u>Oncorhynchus clarki pleuriticus</u> | €CS |
| Bonneville Cutthroat Trout | <u>Oncorhynchus clarki utah</u> | €CS |
| Virgin Spinedace | <u>Lepidomeda mollispinis mollispinis</u> | G |
| Least Chub | <u>lotichthys phlegethontis²</u> | G |
| Colorado Pikeminnow | <u>Ptychocheilus lucius¹</u> | S-ESA |
| Southern Leatherside Chub | <u>Lepicomeda aliciae</u> | SPC |

Reptiles and Amphibians

| | | |
|-------------------------|--|-----|
| Relict Leopard Frog | <u>Rana onca</u> | E |
| Banded Gila Monster | <u>Heloderma suspectus cinctum</u> | EN |
| Desert Tortoise | <u>Gopherus agassizii²</u> | EN |
| Arizona Toad | <u>Bufo microscaphus microscaphus</u> | SP |
| Western (Boreal) Toad | <u>Bufo boreas boreas³</u> | SPC |
| Lowland Leopard Frog | <u>Rana yavapaiensis</u> | SP |
| Utah Mountain Kingsnake | <u>Lampropeltis pyromelana infralabialis</u> | SP |
| Utah Milk Snake | <u>Lampropeltis triangulum taylori</u> | SP |

| | | |
|-----------------------------------|---|----|
| Desert Iguana | <u>Dipsosaurus dorsalis</u> | SD |
| Utah Banded Gecko | <u>Coleonyx variegatus utahensis</u> | SD |
| Utah Night Lizard | <u>Xantusia vigilis utahensis</u> | SD |
| Desert Night Lizard | <u>Xantusia vigilis vigilis</u> | SD |
| Mojave Zebra-tailed Lizard | <u>Callisaurus draconoides rhodostictus</u> | SD |
| Pacific Chorus Frog | <u>Pseudacris regilla</u> | SD |
| California Kingsnake | <u>Lampropeltis getula californiae</u> | SD |
| Southwestern Black-headed Snake | <u>Tantilla hobartsmithi</u> | SD |
| Desert Glossy Snake | <u>Arizona elegans eburnata</u> | SD |
| Painted Desert Glossy Snake | <u>Arizona elegans philipi</u> | SD |
| Sonora Lyre Snake | <u>Trimorphodon biscutatus lambda</u> | SD |
| Utah Blind Snake | <u>Leptotyphlops humilis utahensis</u> | SD |
| Mojave Patch-nosed Snake | <u>Salvadora hexalepis mojavensis</u> | SD |
| Southwestern Speckled Rattlesnake | <u>Crotalus mitchellii pyrrhus</u> | SD |
| Mojave Rattlesnake | <u>Crotalus scutulatus scutulatus</u> | SD |
| Mojave Desert Sidewinder | <u>Crotalus cerastes cerastes</u> | SD |

| | | |
|--------------------------|--|-------|
| Western Chuckwalla | <u>Sauromalus obesus obesus</u> | SP/SD |
| Glen Canyon Chuckwalla | <u>Sauromalus obesus multiforminatus</u> | SP/SD |
| Many-lined Skink | <u>Eumeces multivirgatus gaigeae</u> | SP/SD |
| Plateau Striped Whiptail | <u>Cnemidophorus velox</u> | SP/SD |
| Great Plains Rat Snake | <u>Elaphe guttata emoryi</u> | SP/SD |
| Smooth Green Snake | <u>Opheodrys vernalis</u> | SP/SD |
| Spotted Frog | <u>Rana pretiosa</u> ³ | G |
| Cornsnake | <u>Elaphe guttata</u> | SPC |
| Great Plains Toad | <u>Bufo cognatus</u> | SPC |

MOLLUSK

| | | |
|-------------------------|--|---|
| Kanab Ambersnail | <u>Oxyloma haydeni kanabensis</u> ⁴ | E |
| Fish Springs Pond Snail | <u>Stagnicola pilsbryi</u> | E |
| Utah Valvatasnail | <u>Valvata utahensis</u> ⁴ | E |
| California Floater | <u>Anodota californiensis</u> | T |
| Thickshell Pondsnail | | |
| [Utah Band Snail] | <u>Stagnicola utahensis</u> | T |

| | | |
|--------------------------------------|---|-------|
| Round Mouth Valvata | <u>Valvata humeralis</u> | SP |
| Clinton Cave Snail | <u>Pristiloma subrupicola</u> | SD |
| Eureka Mountainsnail | <u>Oreohelix eurekaensis eurekaensis</u> | SD |
| Lyrate Mountainsnail | <u>Oreohelix haydeni haydeni</u> | SD |
| Ogden Rocky Mountainsnail | <u>Oreohelix peripherica wasatchensis⁹</u> | SD |
| Wet-rock Physa | | |
| {Zion Canyon Snail} | <u>Physella zionis</u> | SD |
| Yavapai Mountainsnail | <u>Oreohelix yavapai</u> | SD |
| Brian Head Mountainsnail | <u>Oreohelix parowanensis</u> | SP/SD |
| Fat-whorled Pondsnaill | <u>Stagnicola bonnevillensis⁹</u> | SP/SD |
| Utah Physa | | |
| {Utah Bubble Snail} | <u>Physella utahensis</u> | SP/SD |
| Uinta Mountainsnail | <u>Oreohelix eurekaensis uinta</u> | SP/SD |
| Desert Spring Snail | <u>Pyrgulopsis deserta</u> | SP/SD |
| Fish Lake Physa Snail | <u>Physella microstriata</u> | SP/SD |
| Carinate Glenwood Pyrg | <u>Pyrgulopsis inopinata</u> | SPC |
| Otter Creek Pyrg | <u>Pyrgulopsis fusca</u> | SPC |

Smooth Glenwood Pyrg

Pyrgulopsis chamberlini

SPC

None of these species are located in the mine lease area.

¹Species is federally listed as Endangered

²Species is federally listed as Threatened

³Species is federally listed as Candidate

⁴Species is federally listed as Extirpated

Key to State Status Field

Symbol

Definition

S-ESA

Federally-listed or candidate species under the Endangered Species Act.

SPC

Wildlife species of concern.

CS

Species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing.

~~E - Extinct: Any wildlife species that has disappeared in the world.~~

~~EX - Extirpated: Any wildlife species that has disappeared from Utah since 1800.~~

~~EN - Endangered: Any wildlife species or subspecies which is threatened with extirpation from Utah or extinction resulting from very low or declining numbers, alteration and/or reduction of habitat, detrimental environmental changes, or any combination of the above. Continued long-term survival is unlikely without implementation of special measures.~~

~~T - Threatened: Any wildlife species or subspecies which is likely to an endangered species within the foreseeable future throughout all or a significant part of its range in Utah or the world.~~

~~SP - Special Concern: Any wildlife species or subspecies which has experienced a substantial decrease in population, distribution and/or habitat availability.~~

~~SD - Special Concern: Any wildlife species or subspecies which occurs in limited areas and/or numbers due to a restricted or specialized habitat.~~

~~SP/SD - Special Concern: Any wildlife species or subspecies which has both a declining population and a limited range.~~

~~C - Conservation: Any wildlife species or subspecies, except those species currently listed under the Endangered Species Act as Threatened or Endangered, that meets the state criteria of Endangered, Threatened or of Special Concern, but is currently receiving sufficient special management under a Conservation Agreement developed and/or implemented by the state to preclude its listing above. In the event that the conservation agreement is not implemented, the species will be elevated to appropriate category.~~

Utah Division of Wildlife Resources, 1596 West North Temple, Salt Lake City, Utah 84116-3195

Table 3-3

USDA-FS Region 4 Sensitive Species

Fishlake and Manti-LaSal

January 1999 July 27, 2011 update

| <u>Plants</u> | | <u>Status</u> |
|------------------------------|--|---------------|
| Link Canyon Trail Columbine | <u>Aquilegia flavescens var. rubicunda</u> | S |
| Cruetzfeldt-flower Cryptanth | <u>Cryptantha creutzfeldii</u> | S |
| Carrington Daisy | <u>Erigeron carringtoniae</u> | S |
| Canyon Sweetvetch | <u>Hedysarum occidentale var. canone</u> | S |
| Maguire Campion | <u>Silene petersonii</u> | S |
| Musinea Groundsel | <u>Senecio musinensis</u> | S |
| Arizona Willow | <u>Salix arizonica</u> | S |
| Wonderland Alice Flower | <u>Aliciella caespitosa</u> | S |
| Chatterley Onion | <u>Allium geyeri var. chatterleyi</u> | S |
| Sweet-flower Rock Jasmine | <u>Androsace chamaejasme ssp. Carinata</u> | S |
| Bicknell milkvetch | <u>Astragalus consobrinus</u> | S |

| | | |
|---------------------------|---|---|
| Isely's Milkvetch | <u>Astragalus iselyi</u> | S |
| Tushar Paintbrush | <u>Castilleja parvula var. parvula</u> | S |
| Pinnate Spring-parsley | <u>Cymopterus beckii</u> | S |
| Abajo Peak Draba | <u>Draba abajoensis</u> | S |
| Mt. Belknap Draba | <u>Draba ramulosa</u> | S |
| Creeping Draba | <u>Draba sobolifera</u> | S |
| Nevada Willowherb | <u>Epilobium nevadense</u> | S |
| Abajo Daisy | <u>Erigeron abajoensis</u> | S |
| Kachina Daisy | <u>Erigeron kachinensis</u> | S |
| Maquire Daisy | <u>Erigeron maquirei</u> | S |
| LaSal Daisy | <u>Erigeron mancus</u> | S |
| Elsinore Buckwheat | <u>Eriogonum batemanii var. ostlundii</u> | S |
| Canyonlands Lomatium | <u>Lomatium latilobum</u> | S |
| Fish Lake Naiad | <u>Najas caespitosa</u> | S |
| Beaver Mountain Groundsel | <u>Packera castoreus</u> | S |
| Little Penstemon | <u>Penstemon parvus</u> | S |

| | | |
|----------------------|--|---|
| Ward Beardtongue | <u>Penstemon wardii</u> | S |
| Bicknell Thelesperma | <u>Thelesperma subnudum var. alpinum</u> | S |
| Barneby Woody Aster | <u>Tonestus kingii var. barnebyana</u> | S |
| Sevier Townsendia | <u>Townsendia jonesii var. lutea</u> | S |

Mammals

| | | |
|---|--|---|
| Townsend's Western Big-eared Bat | <u>Corynothinus townsedii townsendii</u> | S |
| Spotted Bat | <u>Euderma maculatum</u> | S |
| Bighorn Sheep | <u>Ovis canadensis</u> | S |
| Pygmy Rabbit | <u>Brachylagus idahoensis</u> | S |

Birds

| | | |
|-----------------------------------|----------------------------------|---|
| Northern Goshawk | <u>Accipiter gentilis</u> | S |
| Flammulated Owl | <u>Otus flammeolus</u> | S |
| Northern Three-toed Woodpecker | <u>Picoides tridactylus</u> | S |
| Bald Eagle | <u>Haliaeetus leucocephalus</u> | S |
| Greater Sage-grouse | <u>Centrocercus urophasianus</u> | S |

| | | |
|--------------------------------|--|---|
| Peregrine Falcon | <u>Falco peregrinus anatum</u> | S |
| Yellow-billed Cuckoo | <u>Coccyzus americanus</u> | S |
| <u>Fish</u> | | |
| Colorado River Cutthroat Trout | <u>Oncorhynchus clarki pleuriticus</u> | S |
| Bonneville Cutthroat Trout | <u>Oncorhynchus clarki utah</u> | S |
| Southern Leatherside Chub | <u>Lepidomeda aliciae</u> | S |
| <u>Amphibians</u> | | |
| Spotted Frog | <u>Rana pretiosa</u> | S |
| Boreal Toad | <u>Bufo boreas</u> | S |

S - Sensitive: Any species which, although still occurring in numbers adequate for survival, has been greatly depleted or occurring in limited areas and/or numbers due to a restricted or specialized habitat.

USDA-Manti-LaSal National Forest, 599 Price River Dr., Price , Utah 84501

CHAPTER 4
LAND USE AND AIR QUALITY

The Applicant agrees, however, to notify the regulatory authority and the Utah State Historical Preservation Office (SHPO) of previously unidentified cultural resources discovered in the course of mining operations. The Applicant also agrees to have any such cultural resources evaluated in terms of National Register of Historic Places eligibility criteria.

West Coal Lease Modification Areas

Cultural and Historic Information. Cultural resource information and maps identifying cultural and historical study areas are located in Appendix 4-2 in the Confidential folder of the M&RP. EarthTouch, Inc. conducted an intensive evaluation of the West Coal Lease Modification Areas.

The results of the cultural resource inventory for the project resulted in the identification of 15 cultural resource sites, which included three previously recorded sites (42SV1301, 42SV1386 and 42SV2688), and 12 new sites (42SV3207-3215 and 42SV3246-3248). Overall, the identified cultural resource sites consist of small- to moderate-sized lithic scatters and small rock shelters/overhangs, some with associated pictographs. Of the 15 sites identified within the West Coal Lease Modification Areas, six sites are recommended eligible for the National Register of Historic Places. These sites include 42SV3209, 42SV3211, 42SV3212, 42SV3213, 42SV3247 and 42SV3248 which consist of small rock shelters and rock shelters with pictographs. Site 42SV3209 will be the only site undermined under the present mine plan. This shelter is more of a terrace overhang that extends 6 meters long, with a 1.5 meter overhang or width.

South Fork of Quitchupah 2R2S Block "A" Area

Cultural and Historic Information. Cultural resource information and maps identifying cultural and historical study areas are located in Appendix 4-2 in the Confidential folder of the M&RP. Canyon Environmental conducted an evaluation of the South Fork of Quitchupah in and adjacent to the 2R2S Block "A" panel Area.

The results of the cultural resource inventory for the project resulted in the identification of 4 cultural resource sites, which included one previously recorded site (42SV2690), and 3 new sites (42SV3462, 42SV3463 and 42S3464). Overall, the identified cultural resource sites consist of lithic

scatters and a small rock shelter/overhang. Of the 4 sites identified within the South Fork of Quitchupah Area, two sites are recommended eligible for the National Register of Historic Places. These sites include 42SV2690 which consists of a lithic scatter and 42SV3464 which consists of a lithic scatter associated with a small rock shelter. Both sites will be undermined under the present mine plan. This shelter is more of a terrace overhang that measures approximately 1.5 meters high and 4 meters wide at the opening and extends 1.5 meters beneath the rock to a tapered edge. The shelter shows signs of modern disturbance and it appears that some of the fill material has been disturbed by minor looting activities.

A cultural resource investigation plan for the 42SV3464 rock shelter was requested and approved between the U.S. Forest Service, Utah State Historic Preservation Office (SHPO), EnviroWest, LLC and Canyon Fuel Company, LLC since the shelter appeared to have been disturbed. Testing of the rock shelter for significance was conducted by EnviroWest and Fishlake National Forest Archaeologist in the fall of 2012. While the site was initially evaluated as being eligible for listing in the National Register of Historic Places, subsequent testing has found it to be ineligible for listing due to disturbance. A copy of the cultural resource investigation testing report and the Determination of Significance and Effect form are located in Appendix 4-2 in the Confidential folder of the M&RP.

No further testing of the 42SV2690 lithic scatter was required. In accordance with previous commitments the mine has made in previous sections of this M&RP, protection of eligible cultural resources will be in accordance with regulatory authority and Utah SHPO requirements. The Applicant will also instruct its employees that it is a violation of federal and state laws to collect individual artifacts or to otherwise disturb cultural resources.

The Applicant agrees to notify the regulatory authority and the Utah State Historical Preservation Office (SHPO) of previously unidentified cultural resources discovered in the course of mining operations. The Applicant also agrees to have any such cultural resources evaluated in terms of National Register of Historic Places eligibility criteria.

CHAPTER 5
ENGINEERING

stream channel or reduction in stream flows were noted as a result of undermining that portion of Burnout Canyon using the approved mining schedule.

A weekly report will be submitted via e-mail to the Division detailing the results of the inspections. The reports will include, but not necessarily be limited to: a map illustrating the current location of the longwall face; descriptions and dates of field activities; noted changes in stream and local geomorphology; location, width, frequency of cracks; and a description of repairs, if any, conducted. If the prescribed inspections cannot be conducted, the reason for the missed inspection and a record of the attempt to conduct the inspection will be submitted to the Division in the weekly report. The Division will be notified immediately after mining-induced cracks, if any, are found in the East Fork stream channel and the steps taken or planned to be taken as mitigation. Thereafter, the Division will be advised of continuing mitigation efforts, if needed, in the weekly report.

A copy of the October 2003 "Monitoring and Mitigation Plan for Mining Under the East Fork of Box Canyon" prepared by the Division and reviewed and accepted by the Forest with some modifications has been included in Appendix 3-10. The preceding paragraphs have been prepared based on this plan. Sufco will meet all of the monitoring and mitigation responsibilities described in the plan as it pertains to the undermining of the East Fork of Box Canyon.

South Fork of Quitchupah 2R2S Block 'A' Subsidence Monitoring and Mitigation

Portions of the South Fork of Quitchupah ~~where alluvial and the Price River Formation cover over lying the Castlegate Sandstone exceeds a thickness of 10 feet~~ will be undermined and subsided as longwall panel 2R2S is extracted. A monitoring and mitigation plan that is more intensive than the general ~~permit~~ Mining and Reclamation Plan area has been proposed for monitoring surface and ground water flows, subsidence cracks and repair of the cracks in the portions of the South Fork of Quitchupah channel to be undermined. The subsidence portion of the monitoring and mitigation ~~plan~~ program is discussed in detail in the following text.

Prior to the initiation of undermining and subsidence, a pre-subsidence survey of the stream channel will be conducted in the portion of South Fork of Quitchupah to a location above the gate roads associated with that flows over the 2R2S panel and associated gate roads. The survey will consist of a gain/loss survey of the condition of flow within the stream channel paying particular attention to surface flows and ground water discharge, soil conditions, and the general channel geomorphology of the area. A similar study was performed in the past but all stream measurements were not conducted on the same date. The second gain/loss survey will be completed on a single day at or near base flow conditions late in the summer or early fall of 2011. The mine will attempt, as part of this second survey, to occupy the same monitoring sites in the panel area as those chosen in the initial survey. The monitoring of surface and ground water flows are discussed in greater detail in Section 7.3.1.2.

The subsidence monitoring plan for the South Fork of Quitchupah will include frequent inspection of the stream channel during and after active subsidence. While mining is occurring under the stream channel, and within the 15-degree angle-of-draw above the active longwall face, that area of the channel will be inspected every two weeks semi-weekly for subsidence cracks or other related features. As the longwall face advances and the 15-degree angle-of-draw area follows, the portions of the channel that now lie outside the 15-degree angle-of-draw will be monitored for subsidence features on a quarterly basis for two years following the cessation of subsidence related effects, if any, due to mining.

Mitigation of cracks that would appear to interrupt or divert flows from the stream channel will be sealed immediately with bentonite an appropriate impermeable grout or, in some cases, native materials. Sufco will use hand placement methods when sealing cracks with bentonite, with an adequate volume of bentonite, in powder, granular, and/or chip form, to seal small cracks. The bentonite may be placed by pouring it directly into the crack and hydrating with stream water or, if in an actively flowing portion of the stream, temporarily diverting the flow around successive portions of the crack using native soils and placing the bentonite in the exposed section of the crack until the crack is sealed. Sufco will attempt to seal cracks with the least intrusive methods (typically hand placement of grout or native materials) first. The sealing material may be placed by pouring it directly

into the crack or, if cracks occur in an actively flowing portion of the stream, the stream may be temporarily diverted using native materials (or a designed flume if necessary to maintain the flow) until the crack is sealed. If cracks are present in channel walls defined by soil, the soil cracks will be hand filled using a native soil/bentonite mix. The sealing of the channel floor and walls will be accomplished with hand tools such as shovel, picks, trowels, etc. ~~In the unlikely event that cracks too large to be sealed through the efforts of one or two persons in one day do occur and it appears there is a danger of water being diverted from the channel for an extended period of time, arrangements will be made to get additional help to the site as soon as possible.~~

As a backup plan, in the unlikely event that cracks too large to be sealed through the efforts of one or two persons in one day do occur and it appears there is a danger of water being diverted from the channel for an extended period of time, the stream will be temporarily diverting using native materials and a pipe to carry the flow over the crack to maintain the channel flow. Arrangements will be made to get a contractor to the site as soon as possible to repair the crack after consultation with the Forest Service.

There may be sections of the stream channel that may require more intensive mitigation efforts to restore surface flows in the creek. These efforts could include the drilling of closely spaced shallow boreholes in and adjacent to the stream channel and the injection of an acceptable impermeable grout into the alluvium or bedrock. The work will be accomplished either using hand tools or low impact equipment to minimize surface disturbance. Existing roads and turnouts will be used as staging areas to locate larger equipment and supplies. Any hoses or lines will be transported from the staging areas to the nearby work sites either by hand, the use of pack animals, or by helicopter. This work will be done with a contractor selected after consultation with the Forest Service.

Additionally, it may be required to remove loose rock from the channel floor, either where the channel flows across thin-bedded bedrock or where large rock have fallen into the channel and is impeding flows. In the instance of the former, past experience has shown this can occur in the upper Blackhawk Formation and is easily repaired by removing enough of the broken channel surface to again expose the stream flow. In the instance of the later, removal of large rocks could be

accomplished by drilling and then fracturing the rock into smaller fragments more easily moved to locations where they are not impeding flow. This work may be completed using available pneumatic or hydraulic tools that do not require road or pad building disturbances. In the unlikely event that large boulders do need to be moved, pumps and tanks necessary to complete the work will be located in pre-disturbed areas, such as roads or turnouts, and hoses will be walked into the work area.

A copy of the 2012 "Monitoring and Mitigation Plan for Undermining the South Fork of Quitcupah 2R2S Block "A" has been included in Appendix 3-14. The preceding paragraphs have been prepared based on this plan. Sufco will meet all of the monitoring and mitigation responsibilities described in the plan as it pertains to the undermining of the South Fork of Quitcupah 2R2S Block "A".

Sufco will conduct longwall mining operations in such a manner as to minimize surface disturbance while mining within the 15-degree angle-of-draw area that includes the South Fork stream channel. This will be accomplished by advancing the longwall on a schedule where mining will not be suspended for a period to exceed 48 hours.

A bi-weekly (once every two weeks) report on the impacts to stream flow and required mitigation, if any, will be submitted via e-mail to the Division and the forest detailing the results of the inspections while mining is occurring under the stream channel. The reports will include, but not necessarily be limited to: a map illustrating the current location of the longwall face; descriptions and dates of field activities; noted changes in stream and local geomorphology; location, width, frequency of cracks; and a description of repairs, if any, conducted. If the prescribed inspections cannot be conducted, the reason for the missed inspection and a record of the attempt to conduct the inspection will be submitted to the Division and the forest in the report. The Division and the forest will be notified immediately after mining-induced cracks, if any, are found in the South Fork stream channel and the steps taken or planned to be taken as mitigation. Thereafter, the Division and the forest will be advised of continuing mitigation efforts, if needed, in the report.

Though not anticipated, short segments of Cowboy Creek could be subsided in the SITLA Muddy Tract. If this is anticipated to occur, Sufco, will submit a plan for mitigation to address, if it occurs, adverse impacts to Cowboy Creek. With the approval of the Division and concurrence of the Forest, Sufco will instigate a flow monitoring plan similar to the plan implemented prior to the undermining of the East Fork of Box Canyon. If mitigation of surface cracks are required, methods similar to those proposed and implemented in the East Fork of Box Canyon as described above could be used.

Mining within the area of the East Fork of the Box Canyon, South Fork of Quitcupah and within the area of Cowboy Canyon in the SITLA Muddy Tract will be conducted in accordance with State and Federal rules and regulations and the requirements and stipulations presented in the BLM's Conditions of Approval of the Resource Recovery and Protection Plan (July 31, 2003) located in Appendix 1-2. A survey of the water quality and quantity of surface and groundwater, including State appropriated waters, within the SITLA Muddy Tract has been completed. The results of the area survey are included in the PHC for the SITLA Muddy Tract and included in Appendix 7-20. Ground and surface waters in the tract that have attached rights are listed in Appendix 7-1.

A discussion regarding the methods Sufco would employ to mitigate and replace an adversely affected State appropriated water supply is provided in Chapter 7, Section 7.3.1.8.

5.2.5.2 Subsidence Control

Adopted Control Measures. As indicated above, SUFACO Mine has adopted subsidence-control measures in areas where surface resources are to remain protected. These controls consist primarily of leaving support pillars in place in those areas designated on Plates 5-10A, 5-10B & 5-10C as not planned for subsidence. Based on experience and data collected from the lease area, the design of support pillars for those areas where subsidence is not planned has been based on the following equations:

$$SF = SD/OS \quad (5-1)$$

where SF = safety factor against pillar failure (fraction)

$$SD = \text{support strength density (psi)} \\ = (Y_c)(1-ER)$$

Y_c = average compressive yield strength of the coal (psi)
= 3090 psi for the Upper Hiawatha seam

ER = extraction ratio (fraction)
= $1 - (A_p/A_t)$

A_p = pillar area (ft²)

A_t = area supported by pillar (ft²)

OS = overburden stress (psi)
= $(d)(D_o)/144$

d = overburden depth (ft)

D_o = overburden density (lb/ft³)
= 160 lb/ft³ for the lease area

Based on these equations and data, the support pillar designs summarized in Table 5-3 have been derived. This equation does not take into account either size effect or shape effects and is based on a one-dimensional stress field. Historically this equation has provided good results when used in areas where a number of uniform pillars are extracted. One area (5 North panels) of the mine experienced pillar failure when the area was flooded with water after mining of the panels had been completed. This particular area was mined using a double pass technique and the mining height was from 14 to 18 feet. The resulting pillars varied from 25 feet x 25 feet to 40 feet x 40 feet. The underlying floor was a weak mudstone that lost its cohesive strength when wet. When the 1R5N and 2R5N panels were flooded the underlying mudstone became saturated and lost its cohesive strength. This allowed the pillars in the area with SF < 2.5 to fail, because frictional confinement on the bottom of the pillar was lost. To prevent reoccurrence the Applicant will commit to not flood areas of the mine that have small pillars and a weak mudstone floor in areas where subsidence is to be prevented.

Compliance With Control Plan. SUFACO Mine will comply with all provisions of the approved subsidence control plan.

CHAPTER 7
HYDROLOGY

TABLE OF CONTENTS (Continued)

| Section | Page |
|---|------|
| 7.6.3.1 Maintenance of Siltation Structures | 7-88 |
| 7.6.3.2 Removal of Siltation Structures | 7-88 |
| 7.6.4 Structure Removal | 7-89 |
| 7.6.5 Permanent Casing and Sealing of Wells | 7-89 |
| References | 7-90 |

LIST OF FIGURES

| Figure | Page |
|---|-------|
| 7-1 Upper Price River Formation Hydrographs | 7-6 |
| 7-2 Castlegate Sandstone Hydrographs | 7-9 |
| 7-3 Blackhawk Formation Hydrographs | 7-11 |
| 7-4 Surface Drainage Patterns | 7-18 |
| 7-5 Streamflow Probability of Selected Streams | 7-20 |
| 7-6 Mine Discharge and Coal Production Rates | 7-35 |
| 7-7 Abandoned Mining Equipment Locations | 7-38G |
| 7-8 East Fork Box Monitoring Locations | 7-51C |
| 7-9 Monitoring Stations in the South Fork of Quitcupah Creek Area | 7-51K |

LIST OF TABLES

| Table | Page |
|--|-------|
| 7-1 Observation Well Completion Summary | 7-4 |
| 7-1A Flow Observations in Link Canyon Water Monitoring Sites | 7-38A |
| 7-2 Water Monitoring Program | 7-41 |
| 7-3 Field and Laboratory Measurement Protocol | 7-43 |
| 7-4 Groundwater Operational Water Quality Parameters | 7-44 |
| 7-5 Surface Water Operational Water Quality Parameters | 7-45 |

LIST OF APPENDICES (Continued)
(Appendices appear in Volumes 7 and 8)

Appendix

- 7-20 Investigation of Surface and Groundwater Systems in the SITLA Muddy Tract Area, Sevier County, Utah: Probable Hydrologic Consequences of Coal Mining in the SITLA Muddy Tract and Recommendations for Surface and Groundwater Monitoring
- 7-21 Muddy Tract Hydrologic Baseline Data (Includes SITLA Tract baseline data)
- 7-22 Investigation Plan for Springs Pines 105, Joes Mill Pond, Pines 310, and 311
- 7-23 Overflow Pond Calculations
- 7-24 Investigation of Surface and Groundwater Systems in the West Lease Modifications Area, Sevier County, Utah: Probable Hydrologic Consequences of Coal Mining in the West Lease Modifications and Recommendations for Surface and Groundwater Monitoring
- 7-25 North Water Mitigation Plan
- 7-26 Probable Hydrologic Consequences of Longwall Coal Mining of 2R2S Block "A" at the Canyon Fuel Company, LLC Sufco Mine, Salina, Utah

TABLE 7-2
Water Monitoring Program

| <u>Monitoring Wells</u> | <u>Protocol</u> | <u>Comments</u> |
|-------------------------|-----------------|---|
| US-80-2 | A | Screened in Castlegate Sandstone |
| US-80-4 | B | Screened in Castlegate Sandstone |
| 89-20-2W | A | Screened in Castlegate Sandstone |
| US-79-13 | B | Screened in Blackhawk Formation |
| US-81-3 | A | Screened in Blackhawk Formation |
| US-81-4 | A | Screened in Blackhawk Formation |
| 01-8-1 | A | Screened in Blackhawk Formation |
| <u>Streams</u> | | |
| SUFCA 006 | C,2 | Upper South Fork Quitchupah Creek |
| SUFCA 006A | F,1 | Upper South Fork Quitchupah Creek |
| SUFCA 006B | F,1 | Upper South Fork Quitchupah Creek |
| SUFCA 006C | F,1 | Upper South Fork Quitchupah Creek |
| SUFCA 006D | F,1 | Upper South Fork Quitchupah Creek |
| SUFCA 007 | C,2 | Upper North Fork Quitchupah Creek |
| SUFCA 041 | C,2 | Lower Quitchupah Creek |
| SUFCA 042 | C,2 | Lower North Fork Quitchupah Creek |
| SUFCA 046 | C,2 | Upper Quitchupah Creek |
| SUFCA 047A | C,2 | Lower East Spring Canyon Creek |
| SUFCA 090 | C,1 | Upper Box Canyon Creek |
| Pines 106 | C,2 | Upper East Fork Box Canyon |
| Pines 302 | C,1 | Muddy Creek-Last Water Creek Confluence |
| Pines 403 | C,2 | Lower Box Canyon Creek |
| Pines 405 | C,1 | Muddy Creek - Box Creek Confluence |
| Pines 406b* | C,1 | Lower Muddy Creek |
| Pines 407 | C,1 | Box Canyon Creek |
| Pines 408 | C,1 | East Fork Box Canyon Creek |
| USFS-109 | C,1 | Upper Main Fork of Box Canyon Creek |
| Link 001 | C,2 | Link Canyon Drainage |
| Link 002 | C,2 | Link Canyon Drainage |
| FP-1 | G,6 | East Fork of Main Fork of Box Canyon |
| FP-2 | G,6 | East Fork of East Fork of Box Canyon |
| M-STR4 | C,1 | Cowboy Creek |

*Monitoring point Pines 406 was moved downstream to the USGS monitoring point in 1999 and renumbered as Pines 406b. The point is located in the NW1/4NE1/4, Sec. 21, T21S. R6E.

TABLE 7-2 (Continued)
Water Monitoring Program

| <u>Springs</u> | <u>Protocol</u> | <u>Comments</u> |
|------------------|-----------------|-----------------------|
| SUFCO 001 | D,3 | Blackhawk Formation |
| SUFCO 047 | D,4 | Star Point Sandstone |
| SUFCO 057A | D,3 | North Horn Formation |
| SUFCO 089 | E,3 | Castlegate Sandstone |
| GW-8 | D,5 | Price River Formation |
| GW-9 | D,5 | Price River Formation |
| GW-13 | D,3 | North Horn Formation |
| GW-20 | D,5 | Castlegate Sandstone |
| GW-21 | D,3 | Castlegate Sandstone |
| Pines 100 | D,4 | Castlegate Sandstone |
| Pines 105 | D,3 | Castlegate Sandstone |
| Pines 206 | D,5 | Blackhawk Formation |
| Pines 209 | D,5 | Blackhawk Formation |
| Pines 212 | D,5 | Blackhawk Formation |
| Pines 214 | D,5 | Blackhawk Formation |
| Pines 218 | D,3 | Castlegate Sandstone |
| Pines 303 | D,3 | Blackhawk Formation |
| Pines 310 | D,7 | Castlegate Sandstone |
| Pines 311 | D,7 | Castlegate Sandstone |
| Link Portal-West | D,4 | Link Canyon Portal |
| Link Portal-East | D,4 | Link Canyon Portal |
| M-SP01 | D,3 | Price River Formation |
| M-SP02 | D,3 | Price River Formation |
| M-SP08 | D,3 | North Horn Formation |
| M-SP18 | D,3 | Price River Formation |
| M-SP39 | D,3 | Price River Formation |
| M-SP53 | D,3 | North Horn Formation |
| Mud Spring | D,5 | Price River Formation |
| Broad Hollow | D,5 | Blackhawk Formation |
| Spring 006A | H,3 | Price River Formation |
| Roberts Spring | H,3 | Price River Formation |
| RS-A | H,3 | Price River Formation |
| RS-B | H,3 | Price River Formation |

TABLE 7-2 (Continued)
Water Monitoring Program

| <u>Springs</u> | <u>Protocol</u> | <u>Comments</u> |
|----------------|-----------------|-----------------------|
| Wedge Spring | H,3 | Castlegate Sandstone |
| Amanda Spring | H,3 | Castlegate Sandstone |
| 94-113 Seep | H,3 | Price River Formation |

TABLE 7-3
Field and Laboratory Measurement Protocol

Water level and flow measurements

- A Monitoring well: quarterly water level measurement
- B Monitoring well: annual water level measurement (3rd quarter)
- C Stream: quarterly discharge measurements
- D Spring: quarterly discharge measurements
- E Spring Pool: quarterly water level measurement
- F Stream: Bi-weekly measurements while mining is occurring under the stream in 2013, thereafter quarterly for two years.
- G Stream: identify perennial portion of stream on or near October 1 of each year.
- H Spring: Quarterly measurements while mining is occurring under the 2R2S panel stream in 2013, thereafter quarterly for two years.

Water quality

- 1 Stream: quarterly surface water quality field measurements
- 2 Stream: quarterly surface water quality operational laboratory measurements
- 3 Spring: quarterly groundwater quality field measurements
- 4 Spring: quarterly groundwater quality operational laboratory measurements
- 5 Spring: groundwater quality operational laboratory measurements quarterly for two (2) years, then reverting to quarterly water quality field measurements
- 6 Stream: flow measurements only, no water quality samples required.
- 7 Spring: initially ground water field measurements June 2006 through December 2006 as accessible then quarterly groundwater field measurements thereafter.

essentially no tritium. Modern surface waters contain abundant tritium. They visited this site again in June 1996 and located several springs in the drainage several hundred feet above where samples are collected and classified the site as a spring-monitoring site. Nevertheless, Mayo now agrees with SUFCO that this site should be considered a surface water site for monitoring purposes because, at times, this drainage has flow which is contributed by snow melt, precipitation, or sediment pond discharge.

Monitoring sites are sampled three times per year. Surface water monitoring data are submitted to UDOGM by the end of the quarter following sampling. Monitoring data are submitted in an annual summary by March 31 of the subsequent year. UPDES reporting requirements will be met for the three UPDES discharge sites at the mine (see Appendix 7-7).

To better understand the effects that mining will have, if any, on the stream flows within Box Canyon, surface water monitoring sites Pines-407 and Pines-408 will be monitored for stream flows in gallons per minute once every week during the months of June, July, August, September, and October in 1999. Starting in the year 2000, sites 407 and 408 will be monitored once a month in July, August, September, and October for a five year period. If analysis of the data shows no significant changes during this time period, monitoring at these points will be eliminated from the water monitoring program on Table 7-2. Flow measurements at these two sites will be obtained on the same day. Also, the operator will endeavor to obtain the required samples at least five days after the last precipitation event in the drainage area.

To better understand the effects that mining will have, if any, on the stream flows within the South Fork of Quitcupah, surface water monitoring sites SUFCO 006A and SUFCO 006B will be monitored quarterly starting in 2010 for stream flows in gallons per minute and once every two weeks when accessible while mining is occurring within the 15 degree angle-of-draw of the stream channel. **Two additional surface water monitoring sites will be monitored quarterly, SUFCO 006C starting in 2011 and SUFCO 006D starting in 2012.** Once mining has been completed within the angle-of draw, the sites will be monitored on a quarterly basis for two years after mining has progressed past the 15 degree angle-of-draw. If analysis of the data shows no significant changes during this time period, monitoring at these points will be eliminated from the water monitoring program on Table 7-2. Flow measurements at these ~~two~~**four** sites will be obtained on the same day.

1. Determine if ground water discharge in the area of Pines 105 and Joes Mill Pond springs continue to discharge to the alluvium;
2. Monitor and evaluate the effects of mining on the surface and subsurface water in the Pines 310 and Pines 311 spring areas; and
3. Determine the potential for completing and operating ground water wells in the spring areas as part of the spring site mitigation activities.

The piezometers/wells completed as part of this project will be monitored on a bi-weekly basis through December 2006 or as accessible. Transducers with data loggers will be placed in several of the piezometers to record data on a more continuous basis. The monitoring frequency of the piezometers/wells after December 2006 will be dependant upon the results of the drilling investigation and the impacts to springs Pines 310, 311, 105, and the Joes Mill Pond of mining the 6LPE panel in the fall and winter of 2006.

A report detailing the results of the drilling and piezometer/ well installation and completion will be submitted to the Division by the end of October 2006. Water level data collected from the piezometers/wells will be reported to the Division electronically within two weeks at the end of each the month through December 2006. The Division will also be notified within three days via e-mail or telephone of significant changes to ground water elevations in Pines 310, 311, 105 spring areas as the 6LPE longwall panel is mined. A report compiling the water level data and interpretation of the data will be submitted to the Division by the end of January 2007.

Based on the findings of the investigation, Sufco will submit to the Division either additional plans (if water is not found in the Pines 105 and Joes Mill Pond area, additional bedrock drilling may be required to locate a suitable source of ground water) or a final plan for mitigation of the effected spring areas.

South Fork of Quitcupah 2R2S Block "A" Monitoring and Mitigation Plan

A monitoring and mitigation plan that is more intensive than the general Mining and Reclamation Plan area has been proposed for monitoring water flows, subsidence cracks, and repair of the cracks in the portions of the South Fork of Quitcupah channel to be undermined. This plan is outlined below.

Prior to the initiation of undermining and subsidence, a pre-subsidence survey of the stream channel will be conducted in the portion of South Fork of Quitchupah that flows over the 2R2S Block "A" panel and associated gate roads. The survey will consist of a gain/loss survey of flow within the stream channel paying particular attention to surface flows and ground water discharge, soil conditions, and the general channel geomorphology. A similar study was performed in the past but all stream measurements were not conducted on the same date. The second gain/loss survey will be completed on a single day at or near base flow conditions late in the summer or early fall of 2011. The mine will attempt, as part of this second survey, to occupy the same monitoring sites in the panel area as those chosen in the initial survey.

Two weeks before and then once every two weeks after subsidence mining begins, the measuring locations occupied during the gain/loss survey will be reoccupied and flow measurements of the stream flow will be obtained. The approximate locations of these sites are illustrated on Figure 7-9. The once every other week flow measurements will be supplemented by visual observations of flow performed twice a week or once every three to four days. Flow/no flow conditions will be described on these days. If no flow or diminished flows are noted, the appropriate mine and Forest personnel will be contacted and the mitigation plan to restore flows will be implemented.

Semi-weekly flow observations and visual inspections will continue for at least 12 weeks, or as conditions allow, after the completion of mining under the stream channel. The bi-weekly (once every two weeks) stream flow monitoring will continue for at least four weeks, or as conditions and monitoring results indicate necessary, after the completion of subsidence mining under the stream channel. The monitoring plan will then change to quarterly flow and field parameter measurements for two years at four sites: one upstream of the panel, one within the panel, and two downstream of the panel. The location of these new temporary monitoring sites are listed in Table 7-2 and shown on Plate 7-3 and labeled as sites 006A, 006B, 006C and 006D. Additional flow monitoring may be needed to determine specific locations where flow is being lost, and treatments are needed.

The subsidence monitoring plan for the South Fork of Quitchupah will include frequent inspection of the stream channel during and after active subsidence. While mining is occurring under the stream channel, and within the 15-degree angle-of-draw above the active longwall face, that area of the channel will be inspected semi-weekly for subsidence cracks or other related features.

As the longwall face advances and the 15-degree angle-of-draw area follows, the portions of the channel that now lie outside the 15-degree angle-of-draw will be monitored for subsidence features on a quarterly basis for two years following the cessation of subsidence related effects, if any, due to mining.

Mitigation of cracks that interrupt or divert flows from the stream channel will be sealed immediately with an appropriate impermeable grout or, in some cases, native materials. Sufco will attempt to seal cracks with the least intrusive methods (typically hand placement of grout or native materials) first. The sealing material may be placed by pouring it directly into the crack or, if cracks occur in an actively flowing portion of the stream, the stream may be temporarily diverted using native materials (or a designed flume if necessary to maintain the flow) until the crack is sealed. If cracks are present in channel walls defined by soil, the soil cracks may be hand filled using a native soil/bentonite mix. The sealing of the channel floor and walls will be accomplished with hand tools such as shovel, picks, trowels, etc.

As a backup plan, in the unlikely event that cracks too large to be sealed through the efforts of one or two persons in one day do occur and it appears there is a danger of water being diverted from the channel for an extended period of time, the stream will be temporarily diverted using native materials and a pipe to carry the flow over the crack to maintain the channel flow. Arrangements will be made to get a contractor to the site as soon as possible to repair the crack after consultation with the Forest Service.

There may be sections of the stream channel that may require more intensive mitigation efforts to restore surface flows in the creek. These efforts could include the drilling of closely spaced shallow boreholes in and adjacent to the stream channel and the injection of an acceptable impermeable grout into the alluvium or bedrock. The work will be accomplished either using hand tools or low impact equipment to minimize surface disturbance. Existing roads and turnouts will be used as staging areas to locate larger equipment and supplies. Any hoses or lines will be transported from the staging areas to the nearby work sites either by hand, the use of pack animals, or by helicopter. This work will be done with a contractor selected after consultation with the Forest Service.

Additionally, it may be required to remove loose rock from the channel floor, either where the channel flows across thin-bedded bedrock or where large rock have fallen into the channel and

is impeding flows. In the instance of the former, past experience has shown this can occur in the upper Blackhawk Formation and is easily repaired by removing enough of the broken channel surface to again expose the stream flow. In the instance of the later, removal of large rocks could be accomplished by drilling and then fracturing the rock into smaller fragments more easily moved to locations where they are not impeding flow. This work may be completed using available pneumatic or hydraulic tools that do not require road or pad building disturbances. In the unlikely event that large boulders do need to be moved, pumps and tanks necessary to complete the work will be located in pre-disturbed areas, such as roads or turnouts, and hoses will be walked into the work area.

Sufco will conduct longwall mining operations in such a manner as to minimize surface disturbance while mining within the 15-degree angle-of-draw area that includes the South Fork stream channel. This will be accomplished by advancing the longwall on a schedule where mining will not be suspended for a period to exceed 48 hours.

A copy of the 2012 "Monitoring and Mitigation Plan for Undermining the South Fork of Quitcupah 2R2S Block "A" has been included in Appendix 3-14. The preceding paragraphs have been prepared based on this plan. Sufco will meet all of the monitoring and mitigation responsibilities described in the plan as it pertains to the undermining of the South Fork of Quitcupah 2R2S Block "A".

A bi-weekly (once every two weeks) report on the impacts to stream flow and required mitigation, if any, will be submitted via e-mail to the Division and the Forest detailing the results of the inspections while mining is occurring under the stream channel. The reports will include, but not necessarily be limited to: a map illustrating the current location of the longwall face; descriptions and dates of field activities; noted changes in stream and local geomorphology; location, width, frequency of cracks; and a description of repairs, if any, conducted. If the prescribed inspections cannot be conducted, the reason for the missed inspection and a record of the attempt to conduct the inspection will be submitted to Division and the Forest in the report. Division and the Forest will be notified immediately after mining-induced cracks, if any, are found in the South Fork stream channel and the steps taken or planned to be taken as mitigation. Thereafter, Division and the Forest will be advised of continuing mitigation efforts, if needed, in the report.

~~Sufco anticipates undermining and subsidizing a portion of the South Fork of Quitcupah beginning in 2013 when the mine starts longwalling panel 2R2S. A surface and ground water monitoring and mitigation program more intensive than the general monitoring plan described previously in this Section will be initiated in this area prior to subsidence occurring within the 15-degree angle-of-draw of the stream channel. This monitoring program will include conducting a pre-mining subsidence survey of the portion of the South Fork of Quitcupah over the 2R2S panel that will be undermined and will incorporate a gain/loss survey of the stream channel from a location above the gate road of the 2R2S panel. Besides the existing South Fork of Quitcupah monitoring site (SUFCA 006), two additional temporary monitoring sites (SUFCA 006A, and SUFCA 006B) have been identified above and below the portion of the South Fork where the monitoring of surface and/or ground water flows, and general geomorphology will occur. These new temporary monitoring sites are listed in Table 7-2 and their locations are shown on Plate 7-3. Stream monitoring sites will be monitored specifically for stream flow.~~

~~The surface and/or ground water flows at these stations will be monitored on a bi-weekly basis while mining is occurring within the 15 degree angle-of-draw of the stream channel. Once mining has been completed within the angle-of draw, the sites will be monitored on a quarterly basis for two years after mining has progressed past the 15 degree angle-of-draw. Table 7-2 presents the monitoring site numbers, monitoring parameters, and the frequency of monitoring. A report on the impacts, if any, to the stream or ground water flows, general geomorphology, location of the longwall, etc., will be provided via e-mail to the Division while mining is occurring under the stream channel.~~

~~Monitoring for subsidence cracks within the stream channel of the South Fork of Quitcupah Creek will also be part of this intensive monitoring and mitigation plan. The details of the mitigation plan are discussed in greater detail in Section 5.2.5.1 of this M&RP. The subsidence monitoring program will consist of inspecting the stream channel floor within the active 15 degree angle-of-draw on a bi-weekly basis. Mining induced subsidence effects, such as cracks, slumps, offsets, etc., will be identified, mapped, and a brief narrative of the effects will be recorded and forwarded to the Division. A report will be provided via e-mail to the Division on the results of the subsidence monitoring and mitigation activities while mining is occurring under the stream. A summary report to the Division documenting the pre- and post-mining conditions of the stream channel will be submitted 90 days after subsidence monitoring is complete for the 2R2S panel. This report will include a description of all activities and work conducted by Sufco for stream~~

~~channel evaluation and mitigation. All identified impacts and mitigation efforts will be documented. The results of mitigation, if performed, will be discussed.~~

Prior to implementation of any mining-induced subsidence mitigation efforts in the stream channel as described in Chapter 5, a Stream Alteration Permit will be obtained from the Utah Division of Water Rights. Sufco will have the alteration permit(s) prior to undermining the South Fork of Quitcupah stream channel since the mitigation efforts will occur as soon as possible after a need for mitigation is determined.

~~Every reasonable attempt will be made by Sufco to implement and follow the monitoring program schedule. If access is limited due to snow or inclement weather, the mine's effort to access the area will be documented in the report to the Division. The time of the access attempt, weather conditions, and reason(s) for failing to monitor the South Fork of Quitcupah sites will be provided in the report.~~

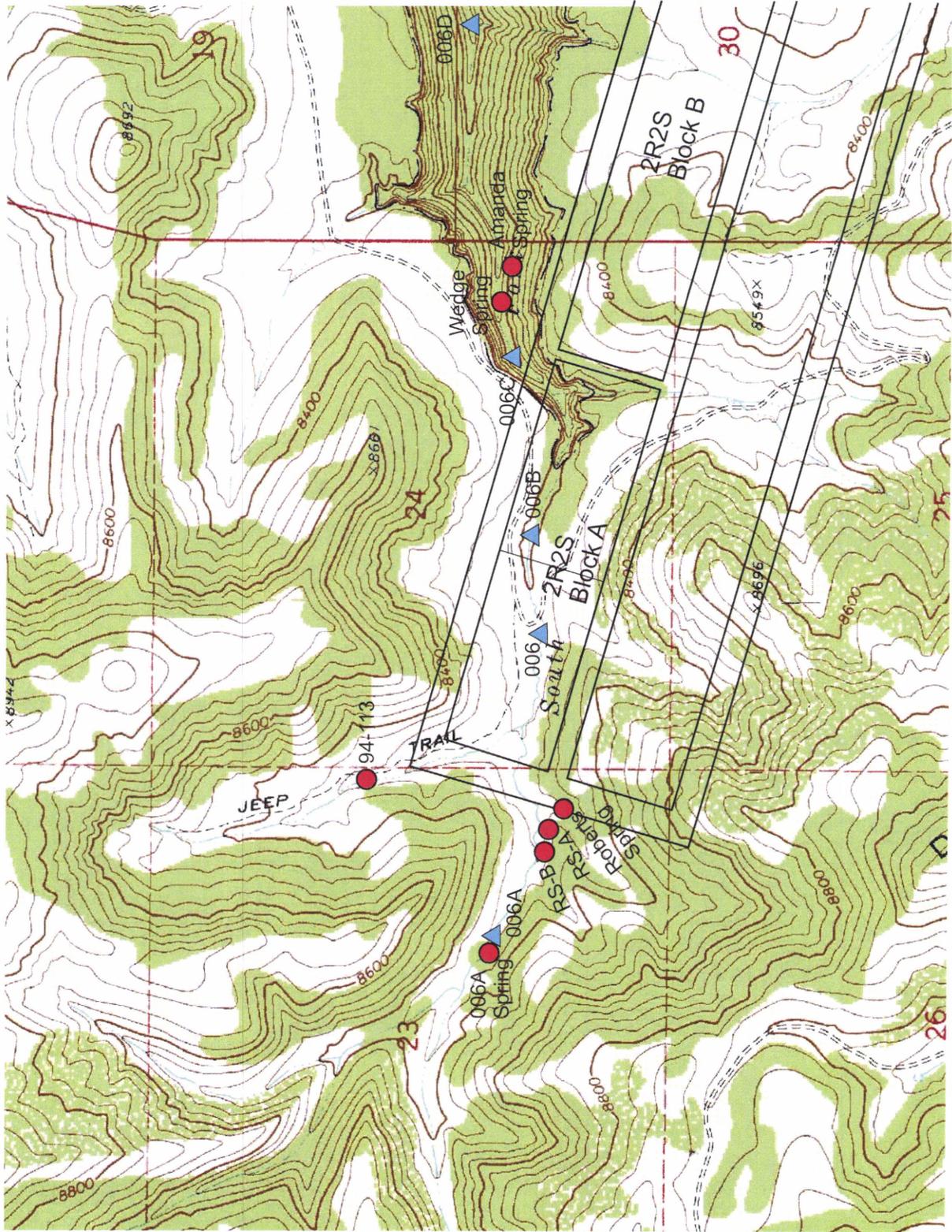


Figure 7-9 Monitoring stations in the South Fork of Quitcupah Creek area.

7.3.1.3 Acid- and Toxic-Forming Materials

Results of monitoring of mine discharge, surface, and groundwater, indicate that no impact to these waters from acid- and toxic-forming materials has been found in the permit and adjacent areas (Section 7.2.8.3). Parameters defining acid- and toxic-forming materials continue to be monitored as described in Volume 3 of this M&RP. In the event that acid- or toxic-forming materials are identified, they will be disposed of in the waste rock disposal area. The treatment of these materials will be handled as indicated in Volume 3 of this M&RP.

7.3.1.4 Transfer of Wells

Before final release of bond, exploration or monitoring wells will be sealed in a safe and environmentally sound manner in accordance with R645-301-631, R645-301-738, and R645-301-765. Ownership of wells will be transferred only with prior approval of the UDOGM. The conditions of such a transfer will comply with State and local laws. SUFCO will remain responsible for the management of the well until bond release in accordance with R645-301-529, R645-301-551, R645-301-631, R645-301-738, and R645-301-765.

7.3.1.5 Discharges

APPENDIX 3-14

Monitoring and Mitigation Plan for Undermining
the South Fork of Quitchupah 2R2S Block "A"

Monitoring and Mitigation Plan for Undermining the South Fork of Quitchupah 2R2S Block "A"

Implementation of the following mitigation plan will quickly identify surface disturbance or impacts from subsidence fractures intercepting spring and stream flows. Frequent monitoring will establish the degree of impacts to water resources, vegetation, wildlife and other uses.

The monitoring and mitigation plan adopted by the mine will provide sufficient data for all stakeholders associated with these resources and lands to make a determination of the degree of impacts. Information and data will be collected before the area is mined, throughout the mining period, and after mining is past. Monitoring and data collection will continue until the mine, Division and Forest agree that mining impacts, if any, have occurred, have been mitigated, and no further impacts are anticipated.

Hydrological and Subsidence Mitigation Plan for Undermining the South Fork of Quitchupah 2R2S Block "A"

Subsidence R645-301-525.454

- Conduct pre- and post-mining surveys of the undermining the South Fork of Quitchupah 2R2S Block "A" stream channel over panel 2R2S. The mine will conduct a post-mining survey during 2015. This post-mining survey must apply the same procedures as the survey conducted in 2012.
 - o Conduct a stream channel profile survey from 006A above the 2R2S Panel to 006D located below the panel.
 - o Establish at least 4 stations to portray stream flow, vegetation, soils, etc. GPS coordinates shall be obtained for each site. Each site must be documented with fixed photo points that can be reproduced during subsequent monitoring intervals. Four sites include 006, 006A, 006B and 006C.
 - o Establish location of perennial flow, gaining/losing reaches of the stream channel from site 006A to 006D.
 - o Qualified botanist must participate in the survey of the channel.
 - Identify major representative plant species along the stream channel and riparian and spring areas.
 - o Survey and mention all animal species present:
 - Macroinvertebrate presence at monitoring stations along the stream channel and riparian and spring areas.
 - All other animal species along the stream channel and riparian and spring areas.
- Water monitoring shall be conducted prior to mining under the stream channel.

- While mining under the channel, promptly identify subsidence-induced fractures, dewatering, diminution of water quality, and movement of the stream channel.

- Semi-weekly visual inspections for fractures, stream channel and flow observations while mining within the angle-of-draw of the stream channel. Monitor flow and channel bi-weekly while in the angle of draw. Continue monitoring quarterly for 2-year period after no subsidence, interception, diminution or diversions are identified. However, additional surface and/or groundwater samples will be collected for total iron if a visible iron precipitate is noted within the stream channel or originating from the springs and seep.

- Stockponds 94-115 and 94-116 will be monitored prior to mining and while mining within the angle-of-draw of the stream channel.

- Conduct uninterrupted longwall mining progression, except for normally scheduled maintenance, while under the 15-degree angle-of-draw of the stream channel.

- Provide a bi-weekly (once every two weeks) report to DOGM and the Fishlake National Forest via e-mail. Identify any changes in surface expression, dates, any fracturing of surface (location, width, spacing, etc.), any repairs, and location of longwall.

- If the applicant cannot gain access to the site, due to weather conditions, etc., attempts must be documented.

- Mitigate subsidence cracks and fractures identified within the stream channel wet bank. Access must be limited to methods that would not cause additional effects to the aquatic ecosystem.

- o Mitigation of cracks that interrupt or divert flows from the stream channel will be sealed immediately with an appropriate impermeable grout or, in some cases, native materials. Sufco will attempt to seal cracks with the least intrusive methods (typically hand placement of grout or native materials) first. The sealing material may be placed by pouring it directly into the crack or, if cracks occur in an actively flowing portion of the stream, the stream may be temporarily diverted using native materials (or a designed flume if necessary to maintain the flow) until the crack is sealed. If cracks are present in channel walls defined by soil, the soil cracks may be hand filled using a native soil/bentonite mix. The sealing of the channel floor and walls will be accomplished with hand tools such as shovel, picks, trowels, etc.
- o As a backup plan, in the unlikely event that cracks too large to be sealed through the efforts of one or two persons in one day do occur and it appears there is a danger of water being diverted from the channel for an extended period of time, the stream will be temporarily diverted using native materials and a pipe to carry the flow over the crack to maintain the channel flow. Arrangements will be made to get a contractor to the site as soon as possible to repair the crack after consultation with the Forest Service.
- o There may be sections of the stream channel that may require more intensive mitigation efforts to restore surface flows in the creek. These

efforts could include the drilling of closely spaced shallow boreholes in and adjacent to the stream channel and the injection of an acceptable impermeable grout into the alluvium or bedrock. The work will be accomplished either using hand tools or low impact equipment to minimize surface disturbance. Existing roads and turnouts will be used as staging areas to locate larger equipment and supplies. Any hoses or lines will be transported from the staging areas to the nearby worksites either by hand, the use of pack animals, or by helicopter. This work will be done with a contractor selected after consultation with the Forest Service.

- The applicant will be required to abide by the mitigation outlined in the approved MRP.
- Comply with federal and State rules and regulations.
 - o Refer to Conditions of Approval of the Resource Recovery and Protection Plan (R2P2), (June 8, 2011).
 - o A stream alteration permit is required by Utah Division of Water Rights for any stream channel construction activities. The mine will obtain a stream alteration permit prior to construction activities within the stream channel.

Water Rights Replacement of State Appropriated Water Supplies (R645-301-731.530)(MRP page 7-58A)

- The mine will promptly provide alternate sources of water, replace or compensate any State appropriated water supply that is contaminated, diminished or interrupted by mining operations for:
 - o Wildlife
 - o Cattle
 - o Drinking water
- Calculate the amount of diminished flows from monitoring data.

Hydrologic and Subsidence Summary Report

- The mine will submit a summary report to the Division documenting the pre- and post-mining conditions of springs and stream channels. The report will describe all activities and work conducted by the mine for site evaluation and mitigation. Further, the report will identify if impacts have occurred, and if mitigation activities have prevented material damage to resources. The report will be due 90 days after subsidence monitoring is complete for the 2R2S Block "A" panel section. The Division will provide a copy of the report to the Fishlake National Forest.

Biology Monitoring Plan for Undermining the South Fork of Quitchupah 2R2S Block "A"

The mine will follow the basics of the Division's Guidelines. A qualified botanist will survey the stream channel and associated spring areas starting from 006A above the 2R2S Panel to 006C located below the panel. A qualified biologist will survey the baseline populations of the macroinvertebrate within the portion of the stream channel to be subsided.

Stream channel and spring geomorphology and vegetation.

The following information will be collected prior to mining:

- Stream channel geomorphology – at a minimum define:
 - Geologic/surface substrate of stream bottom.
 - Width of stream channel at water-monitoring locations.
- Spring and surrounding area geomorphology – at a minimum define:
 - Geologic/surface substrate of spring area where the water discharges.
 - Geologic/surface substrate of the spring *tributary* where water converges from the discharge site(s) and forms a *tributary* of the South Fork Quitchupah stream.
 - Width of the spring *tributary* at the location where the consultant surveys vegetation.
- Stream channel and spring vegetation communities – at a minimum:
 - Survey all stream and spring monitoring locations.
 - Define vegetation communities at all monitoring locations.
 - Inventory map of vegetation communities at all monitoring locations.
- Stream channel and spring area threatened, endangered, candidate, and sensitive species. Survey all TEC and Sensitive species. Provide population location and individual numbers for each population.
- Stream channel and spring area vegetation community condition – at a minimum:
 - Describe condition along steam bank. Concentrate observations at all monitoring locations.
 - Describe condition at all spring locations. Concentrate observations at all monitoring locations as well as discharge sites if different from monitoring locations.
 - Provide photographs of communities along stream channel, on hillsides flanking the steam channel, and at spring locations. Take photographs at established photo points.
 - Describe effects of erosion along stream channel, on hillsides flanking the steam channel, and at spring locations. Numerically rate erosion effects. For example, 1=extreme erosion, 2=high erosion, 3=moderate erosion, 4=slight erosion, 5=no erosion.
 - Repeat vegetation community condition observations two times a year (beginning and end of growing seasons) for the first two years and the fifth year following undermining. Refer to schedule below.

- Provide two copies of the survey reports to DOGM. Include one copy in DOGM Annual Reports. The Division will provide the second copies to the Fishlake National Forest.
 - Baseline data prior to undermining: 2012 report in the 2013 Annual Report.
 - 1st year data following undermining: 2014 report in the 2015 Annual Report.
 - 2nd year data following undermining: 2015 report in the 2016 Annual Report.
 - 5th year data following undermining: 2018 report in the 2019 Annual Report.

Stream channel macroinvertebrate:

- Stream channel macroinvertebrate baseline survey and the fifth year following undermining. Refer to schedule below. The survey must include – at a minimum:
 - Three monitoring sites.
 - Organism species and number (#/m²).
 - Contractor must use an approved survey protocol.
- Provide two copies of the survey reports and maps to DOGM. Include one copy in the DOGM Annual Reports. The Division will provide the second copy to the Fishlake National Forest.
 - Baseline data prior to undermining: 2012 report in the 2013 Annual Report.
 - 5th year data following undermining: 2018 report in the 2019 Annual Report.

The mine operator will implement, if necessary, a revegetation/mitigation plan as determined by DOGM in consultation with the USFS.

Cultural Resource Monitoring Plan for undermining the South Fork of Quitcupah 2R2S Block “A” panel (2012)

Cultural and Historic information summary is located in M&RP, pages 4-12 to 4-12A. Cultural resource information and maps identifying cultural and historical study areas are located in Appendix 4-2 in the Confidential folder of the M&RP. No extraordinary monitoring, outside of that which is already required by the regulatory authorities and SHPO throughout the permit area, is required for the 2R2S Block "A" panel area.

The mine will provide two copies of an Executive Summary of monitoring results to the Division. One copy will be included in the mine’s Annual Report. The Division will provide the second copy to the Fishlake National Forest.
