



**Canyon Fuel
Company, LLC**

A Subsidiary of Bowie Resources Partner, LLC

C0410002

#5570

Sufco Mine

John D. Byars
General Manager
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Salina, Utah 84654
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January 3, 2018

RECEIVED

JAN 10 2018

DIV. OF OIL, GAS & MINING

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

Re: Clean Copies of 3 Right 4 East Panel(s) Amendment, Task ID#5570, Canyon Fuel Company, LLC,
Sufco Mine, Permit Number C/041/0002

Dear Sirs:

Please find enclosed with this letter two copies of an amendment to the Sufco Mine Permit to provide more specific information for the 3 Right 4 East panel(s).

The 3 Right 4 East Panel(s) are located on existing leases U-63214 and U-62453 which are part of the Quitchupah Tract/Lease. Mining of this panel(s) will straddle Leases U-63214 and U-62453 which are referred to as the Quitchupah Tract/Lease throughout the M&RP in text, appendices and on drawings. Both leases were issued to the permittee in 1989, the tract was originally delineated in 1982. The mine plan is shown on Plate 5-7 and mining will occur only in the Upper Hiawatha coal seam. Overburden is approximately 900 feet or more. An environmental assessment was prepared for Lease U-63214 in 1988 and an EIS for the Quitchupah Tract in 1983, a variety of information from these assessments are included in the existing M&RP.

No surface disturbance is anticipated beyond the potential for subsidence. Stan Welch with EPS, Inc. prepared a vegetation map of the Quitchupah Lease, which is included as Plate 3-1 (earlier documents listed the map as Map 8-1). A wildlife study was completed as "Wildlife Assessment of the Sufco Mining Property and Adjacent Area, Sevier County, Utah" incorporated in the 1980's as Appendix 3-3. As were an aquatic and avifauna study included as Appendix 3-2 and 3-4 (Confidential) respectively.

The panel(s) have been approved for mining as included previously on Plates 5-7, 5-10, 5-10C, 5-11, 7-2A & B, and 7-3. The orientation of the panel(s) has changed in this submittal.

Water data has been collected in the South Fork of Quitchupah Creek at monitoring site Sufco 06D above the panel(s) since 2012. Sufco monitoring site 007 above the panel(s) and site 042 below the panel(s) have been monitored since 1979 in the North Fork of Quitchupah Creek. The closest monitoring location is Sufco 021 (1979) which became UPDES Outfall 003A in 1999. The data has been recorded in the DOGM database. There are no water monitoring locations immediately adjacent to the panel(s). Locations of monitoring locations are shown on Plate 7-3. A discussion of a study adjacent to the proposed mining panel is discussed in Section 7.2.8.3, the information from the study was submitted to the Division in the 1991 annual report. Chapter 7 text discusses hydrologic information for the area of the proposed 3 Right 4 East panel(s).

Sufco Mine

The first CHIA we have located for the Quitchupah Creek was first written in 1989, a second CHIA was prepared in 2005.

Appendix 7-17 of the Sufco permit contains the PHC for the Quitchupah Tract/Lease area. There are several ponds, troughs and guzzlers north and east of the panel(s). Of the ponds Rock and Johnson ponds have been monitored for mining impacts annually for at least 16 years by Sufco personnel. The guzzlers and troughs are randomly monitored by cattlemen and Forest Service personnel. Although there are Forest Service water rights for streams and creeks that may feed the ponds, the rights are not specifically assigned to the ponds themselves according to Utah Division of Water Right files.

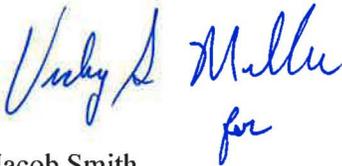
Pagination has been adjusted to fit into the approved permit for incorporation into the existing permit.

The Golden Eagle Take Permit has been received, email to Jeff Salow and Jeff Jewkes (USFS) and Todd Miller (UDOGM) and has been included in Appendix 3-15.

The archeological survey concurrence letter has been included in Appendix 4-2 of the permit.

We appreciate your cooperation in completing the review and final approval of this project. If you have questions or need additional information please contact Vicky Miller at (435)286-4481.

CANYON FUEL COMPANY
SUFco Mine

A handwritten signature in blue ink that reads "Vicky S. Miller" with "for" written below it.

Jacob Smith
Technical Services 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: Clean Copies of Amendment to MRP to Address the Mining of the 3Right 4East Panel(s), Task ID#5570

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

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

- Yes No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ increase decrease.
- Yes No 2. Is the application submitted as a result of a Division Order? DO# _____
- Yes No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes No 4. Does the application include operations in hydrologic basins other than as currently approved?
- Yes No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
- Yes No 6. Does the application require or include public notice publication?
- Yes No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
- Yes No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
- Yes No 9. Is the application submitted as a result of a Violation? NOV # _____
- Yes No 10. Is the application submitted as a result of other laws or regulations or policies?

Explain: _____

- Yes No 11. Does the application affect the surface landowner or change the post mining land use?
- Yes No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
- Yes No 13. Does the application require or include collection and reporting of any baseline information?
- Yes No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
- Yes No 15. Does the application require or include soil removal, storage or placement?
- Yes No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
- Yes No 17. Does the application require or include construction, modification, or removal of surface facilities?
- Yes No 18. Does the application require or include water monitoring, sediment or drainage control measures?
- Yes No 19. Does the application require or include certified designs, maps or calculation?
- Yes No 20. Does the application require or include subsidence control or monitoring?
- Yes No 21. Have reclamation costs for bonding been provided?
- Yes No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
- Yes No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

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

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

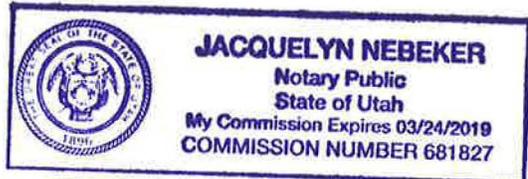
Jacob D. Smith
Print Name

[Signature], Engr. Major, 1/3/2018
Sign Name, Position, Date

Subscribed and sworn to before me this 3 day of January, 2018

[Signature]
Notary Public

My commission Expires: _____, 20____ }
Attest: State of _____ } ss:
County of _____



<p>For Office Use Only:</p>	<p>Assigned Tracking Number:</p>	<p>Received by Oil, Gas & Mining</p> <p style="font-size: 1.2em; color: blue; font-weight: bold;">RECEIVED</p> <p style="color: red; font-weight: bold;">JAN 10 2018</p> <p style="color: blue; font-weight: bold;">DIV. OF OIL, GAS & MINING</p>
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APPLICATION FOR COAL PERMIT PROCESSING

Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: Canyon Fuel Company, LLC

Mine: Sufco Mine

Permit Number: C/041/002

Title: Clean Copies of Amendment to MRP to Address the Mining of the 3Right 4East Panel(s), Task ID#5570

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 1, Page 1-iii
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 1, add information to the back of Appendix 1-4
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 2, Pages 2-ii, iii, iv and 2-9
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 2, add information to the back of Appendix 2-7
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 3, TOC, Pages 3-10 thru 3-14A, 3-48A thru 3-48D
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 4, Pages 4-1 thru 4-12
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 5, Pages 5-vi, 5-22, 5-23, 5-39F and 5-39G
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Plates 5-2C, 5-7, 5-10** (replaces Plate 5-10A) and 5-11**
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 6, Pages 6-iii, 6-4 and 6-5
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Pages 7-v and 7-38H
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Plates 7-2 (replaces Plate 7-2A)** and 7-3
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Appendix 3-4, Raptor Nests Plate
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Appendix 3-15, 3R4E Reports
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Appendix 4-2, Cultural and Historical Resources Reports
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Appendix 6-4, 3 Right 4 East Panel
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.

January 3, 2018 - Plates with ** were approved and included in a previous submittal.

Received by Oil, Gas & Mining

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CHAPTER 1
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LIST OF APPENDICES

(Appendices appear in Volume 4)

Appendix

- 1-1 Legal Right-of-Entry Documents
- 1-2 Lease Documents
- 1-3 Newspaper Advertisement
- 1-4 Filing Fee Receipt

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APPENDIX 1-4
Filing Fee Receipt

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8K 816 (REDIFORM)

RECEIPT Date 19 July 1989 No 4289
 Received From Southern Utah Fuel Company
 Address _____
 Dollars \$ 5.⁰⁰
 For Quitchupah Lease Addition
Permit Fee

ACCOUNT		HOW PAID	
AMT. OF ACCOUNT		CASH	<u>5.⁰⁰</u>
AMT. PAID		CHECK	
BALANCE DUE		MONEY ORDER	

BY Donald Paulsen Jett

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CHAPTER 2

SOILS

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| 2-2 | Soil Types Pines Tract |
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LIST OF APPENDICES

(Appendices appear in Volume 4)

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- 2-4 Submittal of Drainage Plan and Slope Stability for Reclamation for Convulsion Canyon Mine, Sergeant, Hauskins & Beckwith
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- 2-9 Link Canyon Portal Vegetation, Aquatic Fauna, and Soil Investigations
- 2-10 Muddy Tract Soils Types

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Pines Tract

The general description of the soils within the Pines Tract is provided in Appendix 2-8.

SITLA Muddy Tract

The general description of the soils within the SITLA Muddy Tract is provided in Appendix 2-10.

3 Right 4 East - Quitchupah Tract

The general description of the soils within in the Quitchupah Tract is provided in the Supplemental Environmental Assessment prepared by UDOGM October 27, 1989, included in Appendix 2-7. No surface disturbance as in the construction of facilities, etc. is associated with the mining of the 3 Right 4 East panel(s).

2.2.2.4 Soil Productivity

In areas where soil disturbance has resulted from mining activities, the soils have lost their native identities. In most cases the soils have been quite thoroughly mixed. As a result, soil textures and horizons have been altered. Textures are now primarily loams and silty clay loams; depths over indurated material or shale are generally greater than 30 inches, except along "cut" slopes of the mountain where geologic strata are exposed.

As a result of this disturbance in "fill" areas, the potential for reclamation has been enhanced. The soils are deeper and the resulting textures are more desirable for plant growth.

Saturation percentages are unavailable. When the original sampling and analyses of soils for the portal yard area were completed, saturation percentage was not required by the regulatory agencies.

Electrical conductivity and other analytical data for soils of the disturbed area, soil types O, W, T, and X, are found in Tables 51, 56, 53, 57, and 58, of Appendix 2-2, respectively. These data reveal a high percentage of rock fragments which may limit fertility for both topsoil and subsoil. Vegetation associated with these soils regarding soil productivity are presented (as recommended by the Soil Conservation Service) in Appendix 2-2 and discussed in Chapter 3 of the Mining Reclamation Plan (MR&P).

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2.2.3 Prime Farmland Soil Characterization

No prime farmland exists in the permit area (see Section 2.2.1).

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APPENDIX 2-7

Quitcupah Tract Supplemental Environmental Assessment 1989

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State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Norman H. Bangert
Governor
Dee C. Hansen
Executive Director
Dianne R. Nielson, Ph.D.
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84103-1203
801-538-5340

October 27, 1989

Mr. Peter A. Rutledge, Chief
Division of Federal Programs
Western Field Operations
Office of Surface Mining
Brooks Towers, 1020 15th Street
Denver, Colorado 80202

Dear Mr.  Rutledge:

Re: Environmental Assessment and State Decision Document (Technical Analysis and Supporting Documentation), Quitchupah Lease Tract Addition, Southern Utah Fuel Company, Convulsion Canyon Mine, ACT/041/002, Folder #2, Sevier County, Utah

Enclosed are the above-referenced materials for the Quitchupah Lease Tract Addition at the Convulsion Canyon Mine in Sevier County, Utah. Southern Utah Fuel Company has requested that this lease addition be approved as soon as possible to maintain production at the mine. Therefore, it is my hope that your office will expedite in every manner possible the approval of this permit.

If there is anything the Division can do to assist your office in processing this permit action, please contact me or Lowell Braxton.

Best regards,



Dianne R. Nielson
Director

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RVS/djh
Enclosures
cc: K. Frame, SUFCO
L. Braxton, DOGM
R. Smith, DOGM
AT64/127

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

QUITCHUPAH LEASE TRACT ADDITION

CONVULSION CANYON MINE
SOUTHERN UTAH FUEL COMPANY
ACT/041/002
SEVIER COUNTY, UTAH

INCORPORATED

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Prepared by

Utah Division of Oil, Gas and Mining

and

United States Department of the Interior
Office of Surface Mining
Reclamation and Enforcement

October 27, 1989

PURPOSE AND NEED

The Utah Division of Oil, Gas and Mining (DOGGM) and the Office of Surface Mining Reclamation and Enforcement (OSM) received a Permit Application Package (PAP) for the mining of leased federal coal within the Quitchupah Lease Tract at the Southern Utah Fuel Company's (SUFCO) Convulsion Canyon Mine on July 3, 1989. OSM determined that the proposed operation described in the Quitchupah Lease Tract PAP required approval of a mining plan by the Assistant Secretary - Land and Minerals Management. Pursuant to the Mineral Leasing Act of 1920, as amended, section 523 of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), and 30 CFR 746.14, the Assistant Secretary must approve, approve with conditions, or disapprove the mining plan for the mining of Federal coal as proposed in the PAP. This document assesses the effects of the proposed mining operations within the Quitchupah Lease Tract and alternative actions available to the Assistant Secretary to determine if approval, approval with conditions, or disapproval of the mining plan will have impacts on the human environment. This document supplements the May 1987 Environmental Assessment (EA) for the Convulsion Canyon Mine. Certain portions of this EA summarize detailed discussions from the May 1987 EA where either the descriptions of the Affected Environment or discussion of Impact Analysis have not changed.

The Convulsion Canyon underground coal mine is located in Sevier County, Utah, approximately 30 miles east of Salina, Utah. The mine has been in operation since 1941. The Quitchupah Lease Tract contains 9,905 acres of leased Federal coal within Federal Lease U-63214. No new surface disturbance is proposed. Coal within the Quitchupah Lease Tract will be accessed from existing underground entries in the Convulsion Canyon Mine. Approximately 86 million tons of coal will be mined from this lease tract during the 30 years following permit approval.

Coal is shipped by truck from the mine to Salina or Levan, Utah, where it is further shipped to buyers by truck or rail. Employment at the mine (300 jobs) and in support services (900 jobs) remains at a total of approximately 1,200 persons.

ALTERNATIVES

Alternative 1, Approval Without Special Federal Conditions

The Assistant Secretary-Land and Minerals Management may approve the mining plan in accordance with the recommendation of DOGGM. This is the preferred alternative.

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Alternative 2, Disapproval

The Assistant Secretary-Land and Minerals Management may disapprove the mining plan which would have the same effect as taking no action.

Alternative 3, Approval With Special Federal Conditions

The Assistant Secretary-Land and Minerals Management may approve the mining plan with special Federal conditions in addition to those attached to Utah Permit ACT/041/002 by DOGM.

The analysis of Alternative 1, Approval Without Special Federal Conditions, did not result in the identification of any impacts that could or should be mitigated beyond that mitigation proposed in the PAP and by Utah DOGM's conditions of approval. Therefore, this alternative is not analyzed further.

AFFECTED ENVIRONMENT

Topography and Geology

The proposed permit area is in the Wasatch Plateau Coal Field, which underlies a major portion of the Wasatch Plateau in Utah. The topography consists of gently rolling surface on the Wasatch Plateau and steep V-shaped canyons with horizontal sandstone ledges at elevations from approximately 6,900 to 9,100 feet.

The major geologic formations of the area are the Blackhawk, Price River, and North Horn Formations. The strata which outcrops within and adjacent to the proposed permit area consists of alternating clays, shales, and sandstones which range from upper Cretaceous to Tertiary in age. The Blackhawk Formation is the coal bearing formation with three coal bearing seams present within the lower 200 feet of this formation: (1) the Upper Hiawatha seam, (2) the Lower Hiawatha seam, and (3) the Duncan seam. The Upper Hiawatha seam and portions of the Lower Hiawatha seam are the economically extractable targets within the proposed permit area. The overburden above the Upper Hiawatha seam in the permit area ranges from 0 feet at the coal outcrop to approximately 1,500 feet near Little Drum Mountain.

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Climate and Air Quality

The climate of the proposed permit area is typical of canyon areas of central Utah. Summer temperatures range from 40 degrees to 95 degrees (°F) and winter temperatures average 25 degrees. The average annual precipitation is 12 inches. Winds in the mine area are affected by the area's topography, although general wind directions in the region are from the north-northeast in the winter and south-southwest in the summer.

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

Surface Water

Surface waters within the proposed Quitchupah Lease Tract permit area drain into the North Fork of Quitchupah Creek, the South Fork of Quitchupah Creek, Dry Fork, Link Canyon, and Box Canyon. All surface water eventually flows to Muddy Creek; a tributary to the Dirty Devil River and hence, to the Colorado River.

The North Fork of Quitchupah Creek, the South Fork of Quitchupah Creek, and Box Canyon are considered perennial. All other drainages are intermittent. Water quality data indicate streams within the proposed permit area are within Utah Water Quality Standards.

Nine stock ponds that intercept surface runoff are located within the proposed permit area.

Mine inflow that is encountered in the Quitchupah Lease Tract would be conveyed to the previously approved discharge location at the Convulsion Canyon Mine. Discharge would be to the main channel of Quitchupah Creek. To date, mine water discharge has met Utah Water Quality Standards.

Subsidence buffer zones, based on a 21 degree angle of draw, would be established to protect the three perennial streams. Only main entry accesses would be developed beneath the streams within the buffer zones. Pillars would be sized to achieve a safety factor of 2.0 to maintain channel integrity.

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Ground Water

The U.S. Geological Survey has identified ten springs occurring within the proposed Quitchupah Lease Tract permit area. Five springs occur in the Castlegate Sandstone and five springs occur in the Price River Formation. All springs are considered to have high resource value due to the general dry nature of the proposed permit area.

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The Castlegate Sandstone and Price River Formation are extensively exposed within the proposed permit area and are most likely recharged locally from precipitation. Recharge to the Star Point Sandstone and Blackhawk Formation is presumed to occur along naturally occurring faults and fractures. Ground-water flow is assumed to follow the northwesterly dip of the rocks.

Soils

The soils found in the proposed permit area were formed from weathering of clay, sandstone, and limestone. Four soil orders were found to exist in the area. They are alfisols, entisols, inceptisols, and mollisols. Alfisols were formed on side slopes ranging from 15 to 35 percent. Predominant vegetation consists of Douglas fir, spruce, black sagebrush, and wildrye. Entisols and inceptisols were formed on steep slopes of 60 percent or greater. Predominant vegetation is pinyon-juniper, black sagebrush, grasses, and mountain mahogany. Mollisols are found on lesser slopes ranging from 0-15 percent. Typical vegetation is ponderosa, aspen, mountain mahogany, rabbitbrush, and pinyon-juniper (see Volume 5, pp. 13-35, Map B, PAP).

The pH and EC of the soil range from approximately 5.3 to 8.6 and 0.24 to 9.6 millimhos, respectively. Soil textures are from sandy loam to clay. The A horizon ranges from as little as two inches thick in the alfisols, entisols, and inceptisols, to as deep as 12 inches thick in the mollisols (see Volume 5, table 37-59, PAP).

Vegetation

Vegetation types contained within the proposed permit area and adjacent areas include the pinyon-juniper, ponderosa pine, fir and aspen types of the boreal forest biome, and the sagebrush/grass, black sagebrush, and mountain sagebrush types of the desert shrub biome.

No plant species federally listed as Threatened or Endangered (T&E) have been found to occur on the proposed permit area, nor has a literature survey indicated the potential for any such occurrences (letter from Field Supervisor, Endangered Species Office, U.S. Fish and Wildlife Service, May 15, 1985; Environmental Assessment for Coastal States Energy Company, Coal Lease Application U-63214, Quitchupah Tract, October, 1988).

Fish and Wildlife

The proposed permit area consists of a variety of habitat types and, therefore, supports a wide variety of wildlife species. Economically important and high interest species include elk, mule deer, black bear, coyote, mountain lion, mountain cottontail, and several furbearing species. Bird species of high interest that are present in the area include the golden eagle, blue grouse, ruffed grouse, western bluebird, and Grace's warbler. Golden eagle, prairie falcon, and Cooper's hawk nests have been found in or near the proposed permit area.

No fisheries exist within the proposed permit area.

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No species officially designated as T&E have been found to reside in the proposed permit area (letter from Field Supervisor, Endangered Species Office, U.S. Fish and Wildlife Service, May 15, 1985, Environmental Assessment for Coastal States Energy Company, Coal Lease Application U-63214, Quitchupah Tract, October 1988). Bald eagles may pass through the area during their annual migration, but none nest or winter in the proposed permit area.

Golden eagles have historically nested within the proposed permit area along the Castlegate Sandstone escarpment. However, mine development plans indicate a subsidence buffer zone will be established outside the escarpment to maintain escarpment integrity. Pillars will be sized to achieve a safety factor of 2.0 to prevent escarpment failure.

Land Use

Land uses in the proposed permit area include mining, logging, livestock grazing, wildlife habitat, watershed, oil and gas exploration, and recreation. Most of these uses have existed since the early 1900's and would be expected to continue without disruption by continued mining in the Quitchupah Lease Tract.

Cultural Resources

More than 10 percent (960 acres) of the proposed Quitchupah Lease Tract permit area has been surveyed for cultural resources. Survey results indicate the area was used lightly in prehistoric times. The U.S. Forest Service concluded in 1988 (letter from Forest Supervisor, Six State Historic Preservation Offices, September 9, 1988; Environmental Assessment for Coastal States Energy Company, Coal Lease Application U-63214, Quitchupah Tract, October 1988) that cultural resource concerns would probably be generally minimal in complexity and that mitigation in the event of future surface-disturbing projects would also be somewhat minimal in difficulty.

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Transportation

There are three roads that are used in connection with the surface facilities: Mine Access Road, East Side Road, and the Old Woman Plateau Road. The main Mine Access Road is a paved Sevier County Road (Class B) which extends from Interstate Highway 70 to the guardhouse at the minesite. SUFCO is responsible for the maintenance of the stretch of road in the proposed permit area, 350 feet from the guardhouse north to the surface facilities area. The County Access Road would be left at the conclusion of mining.

Three unimproved access roads occur within the proposed permit area. If roads are impacted by mining-induced subsidence, they would be restored by SUFCO.

Socioeconomics

Currently, SUFCO employs 300 personnel at the mine. Current production (2 MTY) and employment is projected to remain relatively stable through the next five years, but is dependent on market conditions.

According to the company, the following list represents the residential status of employees:

<u>Location</u>	<u>1980 Census Population</u>	<u>Number Employees</u>	<u>Percent</u>
Sevier County			
Salina	3,615	80	27
Richfield	8,062	45	15
Aurora	874	39	13
Redmond	619	23	8
Sanpete County			
Gunnison	2,431	36	12
Other (rural Sevier and Sanpete County)		77	25
Total		300	100

IMPACT ANALYSIS

IMPACTS OF ALTERNATIVE 1, APPROVAL WITHOUT SPECIAL FEDERAL CONDITIONS.

Mining operations within the Quitchupah Lease Tract would not encompass additional surface disturbance. Thus, only mining-induced subsidence would potentially impact surface resources. In areas of double-seam longwall mining (approximately 805 acres), surface lands may be lowered by as much as 12 feet. In areas of single seam mining, surface lands will be lowered proportionately less. Approximately 1,403 acres would be first mined only and 5,757 acres developed as single-seam longwall panels for a total of 7,160 acres of single-seam mining only in the Upper Hiawatha seam.

Mining-induced lowering of surface lands within remote plateau areas elsewhere in the Wasatch Plateau Coal Field has not resulted in observable impacts. Accordingly, the lowering of surface lands within the Quitchupah Lease Tract would most likely not result in adverse impacts.

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Surface Water

Mining operations within the Quitchupah Lease Tract would not encompass additional surface disturbance. Thus, only mining beneath perennial streams would potentially impact surface water.

Mining development plans incorporate adequately designed buffer zones for areas beneath perennial streams to maintain channel integrity. Accordingly, the development of main access entries beneath perennial streams pose low risk for causing adverse impacts to surface water.

Ground Water

Mining operations within the Quitchupah Lease Tract may result in the extension and expansion of the existing fracture system and upward propagation of new fractures. Inasmuch as vertical and lateral migration of ground water appears to be partially controlled by fracture conduits, readjustment or realignment in the conduit system would inevitably produce changes in the configuration of ground-water flow. Potential changes include increased flow rates along fractures that have "opened", and diverting flow along new fractures or within permeable lithologies. Subsurface flow diversion may cause the depletion of water in certain localized aquifers and potential loss of flow to springs that would be undermined. Increased flow rates along fractures would reduce ground-water residence time and potentially improve water quality.

Overburden thickness averages 1,000 feet within the Quitchupah Lease Tract and therefore, diversion of spring flow is considered to be at an overall low risk. The mining plan incorporates proposals to replace water if spring flow is reduced due to mining-induced subsidence.

Following cessation of operations, the lower parts of the mine workings would become flooded. Since the northwest portion of the Quitchupah Lease Tract is approximately 500 feet lower than the portals, the potential for complete mine flooding is low because the hydraulic head generated as flooding proceeds would increase until the hydraulic properties of the roof, floor and rib are exceeded, and flow within the rocks initiates. Thus, mine flooding would result in recharging of regional aquifer storage and re-establishment of the natural ground-water system that operated prior to mining. The potential for postmining portal discharge is considered low.

Based on information presented in the PAP, mining within the Quitchupah Lease Tract should not have an adverse impact on ground-water resources.

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Soils

No further surface disturbance is associated with the Quitchupah Lease Tract.

Previous analyses of soil materials indicated no acid- or toxic-forming materials are present within the surface disturbed areas of the Convulsion Canyon Mine (Environmental Assessment, Convulsion Canyon Mine, Souther Utah Fuel Company, May 1987).

Vegetation

No further surface disturbance is associated with the Quitchupah Lease Tract.

Past mining activities at the Convulsion Canyon Mine surface facilities have altered and/or removed 17 acres of native vegetation. The life-of-mine operations will not cause long-term adverse impacts because (1) adequate revegetation with native species is practical as proposed, (2) all of the mine-related disturbance has occurred, and (3) all disturbed areas will be revegetated.

Fish and Wildlife

Mining operations within the Quitchupah Lease Tract would not encompass additional surface disturbance.

Mining development plans incorporate adequately designed subsidence buffer zones for areas outside the Castlegate Sandstone escarpment to maintain cliff integrity and thereby, prevent adverse impacts to raptor nesting habitat. Accordingly, mining within the Quitchupah Lease Tract should not have an adverse impact on raptors.

Cultural Resources

Mining operations within the Quitchupah Lease Tract would not encompass additional surface disturbance. Cultural resource surveys indicate the proposed permit area was lightly used by prehistoric people.

The U.S. Forest Service and State Historic Preservation Officer have determined that mining-induced subsidence will have minimal impact on cultural resources.

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Socioeconomics

The major project related impact cited by local officials is SUFCO's transportation of coal through the town of Salina. Coal is currently being hauled from the site by 26 to 40 ton capacity trucks at an average rate of 11 per hour, running 20 hours a day, six days a week. The coal is hauled to rail facilities in Salina and Levan, Utah (80 miles one way) or directly to consumers. As a result, there has been a continual need to maintain the road network in the area. Local officials are attempting to facilitate plans for a rail line in the valley to minimize truck haulage of coal.

No adverse impacts are anticipated due to the continued operation of the Convulsion Canyon Mine. Transportation impacts are the major concern to local officials. At present, the mine is a major employer in the area and helps provide stability to the local and regional economy. Cumulative forecasts, however, indicate that some communities will have to further prepare for growth as a result of future energy development projects.

Long-Term Impacts

Long-term impacts that would occur are expected to be minor and include possible subsidence on some parts of the permit area and possible loss of spring flow in the area.

IMPACTS OF ALTERNATIVE 2, DISAPPROVAL

If the Quitchupah Lease Tract mining plan is disapproved, the impacts described for Alternative 1, Approval Without Special Federal Conditions, would not occur. If the mining plan is disapproved, SUFCO would not be able to mine this Federal coal. This would curtail the amount of coal that the company would be able to produce and may result in mine closure at an earlier date when existing permitted coal resources are depleted. One of the most noticeable impacts of mine closure would be a permanent loss of 300 direct and induced secondary jobs in the surrounding region. Local payrolls, retail purchases, and tax collections would also decline. In the long term, closure could result in a decline in local population. The largest share of the losses would be concentrated in Sevier and Sanpete Counties.

Further, this alternative would result in approximately 86 million tons of coal not being mined. However, this alternative would avoid additional subsidence in unmined areas and continued impacts to water, air and land resources. SUFCO would have the option of resubmitting another mining plan for this lease in the future.

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PREVIOUS ENVIRONMENTAL IMPACT STATEMENTS AND ENVIRONMENTAL ASSESSMENTS

Environmental studies on the Convulsion Canyon Mine and Quitchupah Lease Tract prepared by Federal agencies include the following documents:

Bureau of Land Management, 1983, "Uinta-Southeastern Utah Coal Region, Final Environmental Impact Statement."

Office of Surface Mining Reclamation and Enforcement, 1987, "Environmental Assessment, Convulsion Canyon Mine, Southern Utah Fuel Company."

U.S. Forest Service and Bureau of Land Management, 1988, "Environmental Assessment for Coastal States Energy Company, Coal Lease Application U-63214 Quitchupah Tract."

CONSULTATION

State Historic Preservation Officer
U.S. Forest Service
U.S. Fish and Wildlife Service
Bureau of Land Management
U.S. Geological Survey

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CHAPTER 3

BIOLOGY

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- 3-4 Raptor and General Avifauna Studies
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Known raptor nests are shown on Plate 3-3, refer to Section 3.3.3.3 for additional raptor information.

Information about raptors specific to the Pines Tract Project area is provided in the VWP report (Appendix 3-9). Information about raptors specific to the Muddy Tract area is provided in the Cirrus report (Appendix 3-11). Information about raptors specific to the West Coal Lease Modifications and the area of the 2016 2RWL sinkhole repair are summarized in Appendix 3-13 and Section 3.2.2.2.

3 Right 4 East Panel(s) - Township 21 South, Range 5 East

A helicopter survey to locate raptors and migratory bird species was conducted in 1982 and 1988 by UDWR, USFWS, BLM, and USFS. In 1988 ten golden eagle nests were located within the Quitcupah lease boundary, two were active, two were tended and the remaining six were inactive. One active nest and two inactive nests were located in Section 33 (Dry Fork Canyon) during these surveys. During a conversation with Jeff Jewkes it was reported that the raptor nests in the canyon located in Section 33 were surveyed in 2014, 2015 and 2016 by the DWR. One of the three nests in the canyon was active in 2015, and the same nest appeared tended in 2014 and 2016. The other nests were inactive during the three-year survey period. The nests in Dry Canyon were re-surveyed in 2017, in April, May and June, during the surveys the nests were inactive. An application for a "nest take permit" for nests 793, 794 and 795 was submitted to the USFWS and received on December 21, 2017. An e-mail from the USFWS documenting the schedule of review and the potential date of issuance of the "nest take permit." and a copy of the permit are included in Appendix 3-15. The permittee will have the obligation of following the requirements of the USFWS Permit Number: MB41502C-0. The permit contains a more specific description of qualifiers and requirements for monitoring which will be followed by the permittee (Appendix 3-15). A condensed version of the permit requirements follows: Contact electrical utility company that has power pole retrofit needs; Ensure the retrofitting of 22 electrical power poles; Complete power pole retrofits in the 2019 or as close to that as possible. Monitor the 3 Golden eagle nests approximately once a month during the nesting season (January 1 through August 31) to determine occupancy, productivity and success beginning with the 2018 nesting season and continuing annually thru the 2019 and 2020 Golden eagle nesting seasons until it is determined if the nests are being used. The location of the three nests is shown on a confidential raptor nest drawing within Appendix 3-15 of this M&RP. The Manti-La Sal biologist and the UDOGM biologist received a copy of the permit containing the requirements and stipulations associated with the "nest take permit" by e-mail on December 21, 2017. In 2017 during the raptor surveys of the mine area, including the 3R4E and 4R4E mining panels, the Raptor Survey Guidelines (DOGM, 2010) were followed. The active mining areas with the potential to subside are surveyed in or before the first

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year of mining and until subsidence movement, as determined by the mine's annual subsidence survey, has ceased. Subsidence survey data is provided to DOGM annually for their files.

Other than golden eagles, no TES species are known to inhabit the area of the panel. According to the DWR in a 1989 assessment the southern portion of the lease area is considered crucial winter range for deer and elk.

Although no surface facilities are planned for construction above the 3 Right 4 East underground panel, as requested by the Manti-La Sal Forest Biologist and Forest Service Supervisor the following standard has been included in the requirements pertaining exclusively to the lands above the 3 Right 4th East underground panel. "To protect sage-grouse habitat, locate new appurtenant surface facilities outside priority habitat management areas, unless no technically feasible alternative exists. If new appurtenant surface facilities cannot be located outside of priority habitat management areas, locate them with and existing disturbed areas, if possible. If location with and existing disturbed area is not possible, the construct new facilities to minimize disturbed area while meeting mine safety standards and requirements in the established mine-plan approval process and locate the facilities in and area least harmful to greater sage-grouse habitat based on vegetation topography, or other habitat features. (Greater Sage-grouse Record of Decision, GRSG-M-CML-ST-093)"

Elk

The elk herd (#14) is a significant wildlife resource to the citizens of Utah and there is considerable hunting pressure. Winter and summer range is in generally good conditions, but drought is an immediate concern (Big Game Annual Report, 1991).

Although the potential area of impact is not critical to the continued existence and perpetuation of the herd, it is important to maintenance of current population levels, and portions of the entire lease area are used annually on a seasonal basis. The aspen areas of Duncan Mountain serve as calving areas for the small herd, (10-20 animals observed during the 1980 summer in that area) but based on pellet counts (WIL, Table 7) the major portion of the lease area is utilized in late fall, winter, and early spring.

In May, while there was still snow on the ground, considerable fresh elk sign (pellets and tracks) was found around the Acord Lakes. By June 5, 1980, when access was available to the other areas, elk tracks were concentrated in the ponderosa, mahogany, aspen and manzanita communities along the ridges and rims of the canyon, plus in the canyons such as Duncan's Draw and Lizonbee Springs. During the summer the elk and elk signs were sighted near the top of Duncan Mountain and at the head of the South Fork of Quitcupah. It seems that the elk in

question do not always winter on the rims nor the plateau but in the lower elevation areas to the southeast. This observation was substantiated by a conversation with a local forest ranger out of Richfield. The amount of snow is probably the determinant, with the elk wintering wherever there is available forage from the rim to the low brush areas in the southeast.

The fact that elk utilize the entire area of concern during some time of the year means that all aspects and timing of the actions must be considered. However, since the SUFCA Mine has been operational since the early 1940's and since there are no plans for additional surface facilities other than ventilation portals along the cliffs, there should be little additional disturbance to the elk. The animals have already accommodated the human disturbance associated with the mining and hauling of coal.

Information about elk winter-range and migration routes specific to the Pines Tract Project area is provided in the VWP report (Appendix 3-9). Information about elk winter-range and migration specific to the Muddy Tract area is provided in the Cirrus report (Appendix 3-11). Information about elk winter-range and migration specific to the West Coal Lease Modifications and the area of the 2016 2RWL sinkhole repair are summarized in Appendix 3-13.

3 Right 4 East Panel(s)

The southern portion of the lease area is considered crucial winter range for deer and elk. The escarpment in the southeastern portion of the tract which lies between Quitcupah Canyon and Link Canyon is know as a elk migration route, providing access to and from the winter range from the plateau top.

Mule Deer

Mule deer on the mine area are considered part of Herd Unit 43 by the UDWR. The animals in the environs of concern utilize the entire assessment area but seasonally concentrate in and more heavily utilize specific habitat types.

During the summer the mule deer generally utilize all of the habitats near watering areas. The most heavily used communities were the sage, mountain brush and the composite of aspen, mountain mahogany, manzanita and ponderosa. This is as expected since there is considerably more browse in these communities than in the others sampled.

With the onset of fall and winter the mule deer latitudinally migrate. Initially (late fall and early winter) they concentrate on the plateau area where they intermingle with the elk but when the snow gets too deep for them to traverse they move into the low elevation sage, and pinyon juniper areas

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to the southwest. The wintering areas for mule deer make them susceptible to road strikes in the vicinity of the haul and access road for the SUFCA Mine and Interstate 70.

Information about mule deer winter-range and migration routes specific to the Pines Tract Project area is provided in the VWP report (Appendix 3-9). Information about mule deer winter-range and migration specific to the Muddy Tract area is provided in the Cirrus report (Appendix 3-11). Information about mule deer winter-range and migration specific to the West Coal Lease Modifications and the area of the 2016 2RWL sinkhole repair are summarized in Appendix 3-13.

Cougar

The entire SUFCA Mine area provides substantial value, and year long habitat for cougar. The animal ranges throughout the area as evidenced by a sighting one third of the way down the slope in Quitcupah Canyon, one half mile below the confluence of South Fork, and tracks in the mud near Jack Adley's Monument, Broad Hollow, and in the dust of the road near Acord Lakes. Though animals range throughout the area, their movements are often dictated by migration patterns of their primary food source (mule deer) and human disturbance. Concern must be given to the cougars particularly when the females are accompanied by their young who are learning to hunt and survive. This is considered a sensitive period for cougars and it is best if disturbance is minimized during this time. However, this period in their life cycle is difficult to determine for cougars since they are known to reproduce year round.

Bobcat

The mine and adjacent areas provide substantial value habitats for bobcats, who were evidenced, by sightings and tracks, to occupy or use all terrestrial habitats on the entire area of potential impact. Sensitive periods would be late February when parturition occurs, May and June when young bobcats are first exploring and learning to hunt. Bobcats are not as secretive as cougar, making them less likely to avoid the high human disturbance areas and making them more vulnerable to open human harassment and illegal killing. Since this is an ongoing mining operation, pressures on bobcats should be unchanged.

Black Bear

Bear tracks were observed in Broad Hollow, but Forest Service personnel indicated to us that most of the bear sightings occurred on White Mountain. At best black bear are not abundant nor are they active year round. Sensitive periods in the life cycle of the black bear are February and March when the cubs are born and when they accompany their mother on initial foraging expeditions during early summer. Since parturition occurs within the winter den and since disturbance in the black bear habitat will be limited to subsidence, this sensitive period will be little impacted by the proposed action.

Mountain Cottontail

The entire mine area provides substantial value, and year long habitats for cottontail rabbits. The young are born between April and July which is considered a sensitive period, but the proposed actions will in all probability not seriously alter the reproductive potential of the population. Hunting pressure will likely not increase, nor will illegal kills. However, this would not matter since hunted rabbit populations are more healthy and stable than non-hunted populations. Subsidence could potentially cause death from caving burrows and disrupt reproduction for a short time.

Snowshoe Hare

The snowshoe hare is present in and dependent upon the limited spruce-fir vegetation habitat of the mine area year round. The sensitive period for reproduction is from April 1 to August 15. Subsidence will not impact the above ground dweller as it does subterranean inhabitants. Little change in snowshoe hare populations will result from the proposed actions. Hunting pressure, legal and illegal, will be the most influential activity of man upon snowshoe hares, but will be of little far reaching impact.

Fur bearers

Limited portions of the mine and adjacent areas provide substantial value habitats for a few species categorized by management agencies as fur bearers: ermine, long-tailed weasel, badger and the striped skunk. The breeding and rearing activities of these non-migratory species occurs within the area and their dens and burrow systems are important to maintenance of their populations, but it is unlikely that the proposed actions will seriously impact them for any length of time. Subsidence will be localized and new burrows will be built or old ones reconstructed after it occurs. These species are widespread and adaptable to the activities of man.

Small Mammals

Small mammals represent a significant part of the ecosystem. The majority are herbivores and are the primary source of food for higher trophic levels, particularly raptorial birds, canids and felids. The potential exists for caving burrows in and/or changing burrow continuity due to fracturing of the strata. Should this occur, it is likely that young mammals in the nest would be crushed or cut off from parental care. Although this would temporarily alter the population density and age structure, recovery would be imminent and rapid. The 1997 Bat Survey for the SUFCA Mine conducted by J. Mark Perkins & Joshua R. Peterson is included in Appendix 3-8.

Information about small mammals specific to the Pines Tract Project area is provided in the VWP report (Appendix 3-9). General information about small mammals specific to the Muddy Tract area is provided in the Cirrus report (Appendix 3-11). General information about small mammals specific

to the West Coal Lease Modifications and the area of the 2016 2RWL sinkhole repair are summarized in Appendix 3-13 and Section 3.2.2.2.

Threatened and Endangered Plant and Wildlife Species. Passage of the Endangered Species Act of 1973 (Public Law 23-20S) provided the legal basis for establishment of lists of endangered and threatened plant species. Such lists were prepared under direction of the Smithsonian Institution, and were published subsequently in the Federal Register (40: 2782 427924, 1975; and 41: 2452 4 24572, 1976). The region under investigation was included in a report on threatened and endangered species of the Central Coal lands of Utah (Welsh 1976). An inventory of endangered wildlife species performed in 1989 by the Division of Wildlife Resources recorded no species within the proposed permit area (conversation with Pamela Hill, DWR, Cedar City, 1991). Table 3-1 provides a list of Federally listed Threatened and Endangered Species that have been identified in the Utah counties in which Sufco lies. However, this list does not necessarily indicate these species are found within the mine permit boundaries.

A survey of the literature has failed to indicate the presence of any endangered or threatened plant species in the area. This lack of critical or unique species is supported by the field surveys of the lease areas. The region was searched by walking parallel transects on a quarter-section by quarter-section basis, with each community type within each quarter-section being traversed. No endangered or threatened species were encountered in the lease area or in the adjacent areas.

There are no federally listed threatened or endangered fish species inhabiting the aquatic habitat.

A discussion about threatened, endangered or otherwise sensitive plant and animal species of the Pines Tract Project area is given in Appendix 3-9. A discussion about threatened, endangered or otherwise sensitive plant and animal species of the Muddy Tract area is provided in the Cirrus report (Appendix 3-11). A discussion about threatened, endangered or otherwise sensitive plant and animal species of the West Coal Lease Modifications and the area of the 2016 2RWL sinkhole repair are summarized in Appendix 3-13 and Section 3.2.2.2.

Willows intermixed with the remainder of the seedlings will be planted adjacent to the reclaimed channel and within the protective riprap. Willow cuttings from existing plants in the drainage will be cut and planted early in the first spring following reclamation construction activities. The slopes away from the channel will be reseeded with the standard seed mix at prescribed rates of application where coverage consists of at least 50 to 100 seeds per square foot. The seed mix for the Link Canyon Portal will not include alfalfa seed. Horsetail and clematis occur naturally in the area and will be allowed to invade the reclaimed area. Plugs of existing sedges in the eastern portal area will be obtained and transplanted to the reclaimed western portal.

Reclamation of the portal access road and portal area will include transplanting Creeping Oregon Grape. Creeping Oregon Grape will be transplanted to the topsoil pile during site construction and it is anticipated a portion of these plants will be used during reclamation of the access road.

3 Right 4 East Panel(s)

Pertaining exclusively to the potential subsidence disturbance associated with the 3 Right 4th East mining panel the following will apply:

- * The mortality of ponderosa pines on the surface above the panel will be monitored during the annual subsidence survey while the panel is being mined and during the annual subsidence survey two years following the completion of mining.
- * Should a seed mix be required to be used on soil filled subsidence cracks or to replace a ponderosa pine(s), the following seed mix will be used. Soils used to fill subsidence cracks which receive seed will not receive mulch or fertilizer.

3Right 4th East Seed Mixture		
Scientific Name	Common Name	Rate PLS/Ac
TREE & SHRUBS		
<i>Artemisia tridentata</i>	Big sagebrush	0.10
<i>Pinus ponderosa</i>	Ponderosa Pine	0.50
GRASSES		
<i>Bromus carinatus</i>	Mountain brome	2.00
<i>Elymus smithii</i>	Western wheatgrass	2.00
<i>Elymus spicatus</i>	Bluebunch wheatgrass	2.00
<i>Elymus trachycaulus</i>	Slender wheatgrass	1.50
TOTALS		8.1

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Refer to Section 5.2.5.2 (Correction of Material Damage) for additional information.

2RWL Sinkhole Repair and Reclamation: At the request of the Fishlake Forest the seed mix for reclamation of the site in 2016 included the following seed mix which was broadcast in October immediately following the placement of soil and pocking/gouging of the site. Mulch was not used to discourage impact from livestock and large mammal browsing the mulch on the reclaimed sinkhole area. Refer to Sections 5.2.1.1 and 5.4.1.1 of Chapter 5 for additional information.

<u>Scientific Name</u>	<u>Common Name</u>	<u>PLS lbs/acre</u>
Elymus trachycaulus	Slender Wheatgrass	3
Achnatherum nelsonii	Columbia needle grass	1
Elymus glaucus	Blue Wildrye	1
Aster glaucodes	Blueleaf Aster	0.25
Sanguisorbia minor	Small burnet	1
Lupinus argenteus	Silvery lupine	1
Total		7.25

“Natural colonization of native species is often allowed to occur on sites where the seeds of desirable plants exist in the soil seed bank or on adjacent lands. ... it may be the preferred management action on sites where native seed sources are available....” (USDA Forest Service Proceedings RMRS-P38.2005) There is an expectation that shrubs species in the area of sinkhole will invade the seeded area, since a shrub seed was not included in the seed mix recommended by the Forest Service. In addition, the topsoil from the sinkhole was stockpiled and replaced in a very short time and likely contains sagebrush and rabbit brush seed.

Success Standards (Part of Forest Service Quitcupah Grazing Allotment). Due to the disturbance associated with the sinkhole being so small and through consultation with the USFS and DOGM the density standard of shrubs/tree has been agreed upon to be zero (0) for the site (Email communication Appendix 3-13). To determine the success of the revegetation seeding (2016) in either 2021/2022 the ground cover and production of living plants on the revegetated area will be at least 60% of that of the 100' square reference area immediately adjacent to the reclaimed sink hole on the northern edge of the reclaimed site (refer to Plate 3-1 and Appendix 3-13 for location). The reference area will be evaluated during the same year for comparison. If the vegetative cover and production is less than 60%, the site will be reseeded.

If a change in use is required due to the sinkhole acting as a pond, it will be re-permitted. If there

is no change in the designated use of the sinkhole, in 2026 the ground cover and production of living plants on the revegetated area will be at least equal to that of the 100' square reference area to enable bond release. The reference area will be evaluated during the same year for comparison. If the production is not equal to the reference area the permittee will determine a course of action in consultation with biologists from the Fishlake National Forest and the Division.

Sinkhole Geology, Soils, Slope and Vegetation

The sinkhole is in area where the geologic formations transition from the Castlegate Sandstone formation to the Price River formation. According the Ecological Site Description (NRCS) the site contains Rizno Skos soils and further describes the soil as follows. "The soils in this site are very shallow to shallow and well to excessively drained. These soils are typically eolian deposits over residum derived dominantly from sandstone and interbedded shale. The soil temperature and moisture regimes are mesic and aridic respectively. Surface and subsurface textures are generally fine sands, fine sandy loams and loamy sands." The location of the sinkhole and reference area is relatively flat and slightly sloping to the west. Vegetation for the area on a large scale is shown on Plate 3-1, the qualified persons who did these studies are referenced on Plate 3-1. The information from Plate 3-1 has been enlarged on the figure included in Appendix 3-13. More specific description of the vegetation for the sinkhole and its immediately adjacent reference area is sagebrush, grasses and forbs with Ponderosa pines growing within a couple hundred feet of the western edge of the sinkhole and reference area site (see photos Appendix 3-13).

Method Used for Planting and Seeding. The entire disturbed area will be revegetated using various seeding methods such as hydroseeding, broadcasting or drilling. The best available economically feasible technology will be used at the time of seeding. The tree and shrub seedlings will be planted in clumps to maximize edge effect and provide more adequate cover for wildlife. At least five clumps per acre (consisting of 100 seedlings per clump) will be planted at intervals ensuring that 35 to 50 percent of each acre is covered.

Mulching Techniques. The mixture and application rate will be:

- 2000 lbs. of mulch per acre
- 100 lbs. of nitrogen per acre
- 100 lbs. of phosphorus per acre

The slopes and overfill areas will involve scarification and/or construction of small terraces on the slopes. The prepared slope will tend to hold moisture and to allow for places where plants can grow.

If hydro-seeding is used, first seed, tackifier and wood fiber mulch (400 lbs/acre) will be mixed in a water slurry and applied. The mulch acts as a buffer to protect the seed from damage while spraying and as a visual indicator to verify the area covered. Next, fertilizer, tackifier, and wood fiber mulch (2000 lbs/acre) will be mixed in a water slurry and applied. The seedlings of shrubs and trees will be placed through the hydro-mulch material.

The pond area should be reclaimed using similar methodology at the conclusion of the mining operation. See Section 3.5.5 for additional discussion.

CHAPTER 4

LAND USE AND AIR QUALITY

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CHAPTER 4 LAND USE AND AIR QUALITY

4.10 Land Use

This section of the permit application includes descriptions of the premining and proposed postmining land use(s).

4.1.1 Environmental Description

A statement of the conditions and capabilities of the land to be affected by coal mining and reclamation operations follows in this section.

4.1.1.1 Premining Land Use

The surface lands within the lease and permit areas (except for 640 acres privately owned) are owned by the U.S. Government and are either parts of the Fishlake National Forest, the Manti-La Sal National Forest or lands administered by the Bureau of Land Management. These lands have been inventoried by the respective regulatory agencies who are responsible for the administration and use of these government lands. Federal comprehensive land use plans have been prepared by the U.S. Forest Service Offices.

Land Use Map. Plates 4-1A & 4-1B presents these Federal comprehensive land use plans information in the lease and permit areas.

Land Capability. The SUFCO Mine area's recreational use (excluding hunting) is approximately 427 days annually. Most of this use is dispersed among horseback riding, snowmobiling, hiking, camping, four wheeling and fuel wood gathering (Billy Dye, Ferron Ranger District; Bob Tuttle, Fishlake National Forest).

The major plant communities in the SUFCO Mine area are identified in Section 3.2.1.1.

The pinyon/juniper woodland occurs on steep unstable slopes and is considered unsuitable for grazing although it is grazed within the allotment. The vegetation condition within the pinyon/juniper woodland type was considered good. Forage production (mainly Indian rice-grass and bluebunch wheatgrass) is low. Arnold et. al. (1964), Jameson and Dodd (1964), and Jameson (1971) found that as tree canopy increased, understory vegetation decreased. Phillips (1965) found that mature stands with a 74 per unit crown canopy produced 96 pounds of forage per acre while stands with 1-2 percent cover produced from 418-577 pounds per acre. Lewis et. al. (1965-1967) found production values between 40 and 460 pounds per acre in stands sampled.

Areas where trees had been removed produced as much as 900 pounds per acre. Canopy cover of pinyon and juniper in the SUFCA Mine Quitchupah lease area fairly dense and forage production in the type would generally be less than 100 lbs./acre in an average year. Assuming 50 percent utilization and 25 lbs./animal/day, it would take 15 acres to carry an animal for a month (WESTECH, 1978).

A large part of the flatter upland area is dominated by sagebrush/ grassland. The U.S. Forest Service (unpublished, 1971) has mapped this area as suitable rangeland with vegetation condition. The sagebrush/grassland type within the SUFCA Mine Quitchupah lease area is the most desirable type for grazing, producing the most available forage per acre for livestock. It generally has lower vegetation condition than other types indicating it receives heavier grazing pressure. Three transects established in 1971 by the U.S. Forest Service on the SUFCA Mine Quitchupah lease area averaged 1100 lbs/acre (dry weight). Of this, about 940 lbs/acre was perennial grasses and sedges. The transects established, however, are in areas where shrub coverage is low and forage production would probably be lower for most of the sagebrush/grassland type where shrub coverage is higher. For this type, it would take 2-3 acres to carry an animal for a month. The U.S. Forest Service estimates a carrying capacity of 0.5 animal units per month (AUM) per acre (B. Bass personal correspondence, 1979).

The aspen type is an important producer of forage for big game and domestic stock. A high percentage of the production is forbs which makes this type more desirable to big game and sheep. Mature aspen with a herbaceous understory in good to excellent condition will produce from 1,000 to 1,800 lbs/acre air dry forage (Lewis, 1971). The U.S. Forest Service estimates that in this area, aspen type produces 1,000 to 1,500 lbs/acre with 0.6 to 0.65 AUM/acre (M. Stubbs personal correspondence, 1979). Most of the aspen stands in the SUFCA Mine Quitchupah lease area serial with vegetation condition (U.S. Forest Service, unpublished, 1971).

The ponderosa pine, mountain shrub and coniferous forest types are generally lower forage producers although the extent of these types on the study area makes them an important component of the grazing system. Portions of these types, especially along the steep canyon walls, have been rated unsuitable for grazing and receive little grazing pressure due to limited accessibility to livestock. Areas of these types on more gentle slopes receive heavier grazing as indicated by lower vegetation condition. These areas provide some forage for livestock and are valuable forage producers for big game. Julander (1955) estimated forage production for mountain brush and oak types. He found that the mountain brush type produced 723 lbs/acre (green weight) of which 11 lbs/acre were grasses. He found that grasses are preferred forage for cattle and are

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selected as their key forage species. Where grasses were unavailable, however, cattle used forb and shrub species resulting in competition with big game species.

Valley bottoms receive little grazing pressure except in the vicinity of water sources where pressure is locally heavy. Valley bottoms are generally narrow and represent limited available forage. Steep slopes receive limited grazing pressure from livestock because of the steep inclines and lack of water. Flatter mesa tops and rolling terrain receive heavier pressure because of easier movement by livestock and more available forage. Grazing pressure is heaviest around water sources in these more accessible areas.

Very little of the SUFCA Mine area is in vegetation communities capable of producing timber products. The pinyon/juniper woodland community generally occurs on steep, unstable slopes making it undesirable for accessibility.

The coniferous forest type also occurs on steep slopes and generally in small stands. Economics of harvesting these stands would result in a high cost/benefit ratio. Other than very limited consumption for posts and poles, this type receives no use in the area as a timber producer. Christmas tree cutting, however, is higher in this community type than others in the area.

The ponderosa pine type is the only vegetation community receiving substantial use for timber production. This type generally occurs on flatter sandy sites and is readily accessible. Large, mature (250 + years) trees have been harvested on a selective basis. Pine regeneration in cut over stands is sparse and mountain mahogany and manzanita appear to be increasing in the understory. Within the SUFCA Mine Quitcupah lease area approximately 528 thousand board feet (MBF) have been harvested between 1977 and 1978 with average volumes of 1.3 average net volume/acre (M. Stubbs personal correspondence, 1979). Quaking aspen stands receive limited local pressure for posts and poles.

The vegetation communities supported in the Pines Tract area and SITLA Muddy Tract area are discussed in Chapter 3 of this M&RP.

Land Use Description. The leased areas lie within the Manti-La Sal and Fishlake National Forests and are subject to the Land and Resource Management plans prepared by the agency. These plans identify the principle use of the lease areas as rangeland with small areas set aside for timber harvesting and as general big game range. Recreation in the lease areas includes camping, firewood gathering, hunting, some snowmobiling, and sight seeing from late spring to late fall. Yearly recreation use is light, but during deer and elk hunts, use is extremely heavy.

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There are no developed or inventoried recreation campgrounds on the lease areas. The mining operation will not impact any of these uses and will preserve the uses into the postmining period.

The timber on the lease areas are open grown Ponderosa pine. All commercial stands occur on the benches. Trees are of low quality because of the poor tree growing site. Cutting is limited to older over-matured trees and occurs infrequently. No adverse timber impacts are anticipated.

The aesthetic value of the area has been categorized by the U.S. Forest Service as follows: "The mesa rim and deep canyons can be seen as background from Emery (Dog Valley). They are classified as distinctive with variety. Activity from the proposal will not be visually evident from the valley. The lease area is seen as middle ground from a few remote spots on the Duncan Mountain Road. This scene area is presently classified in Sensitivity Level 2 (Average Sensitivity). The visual objective as recommended by the Land Use Plan is 2 (Modification). This permits activities to visually dominate the characteristic landscape. Very few people visit the area and those that do, come for something other than scenic attractions."

With the inclusion of the Pines Tract into the SUFCO lease and permit areas "changes in the existing landscape could include escarpment failures. This is not expected to change the visual character of the region."

A portion of the surface area is grazed by cattle under the Quitchupah Grazing Association allotment (Fishlake National Forest). The allotment covers approximately 43,156 acres, it presently supports 813 head of cattle from June 11 through September 30, for a total of 2,981 cow months (Bob Tuttle, Fishlake National Forest).

The Emery allotment (Manti-La Sal Forest) supports 1,300 head of cattle. This allotment is under an intensive rest-rotation management system, placing the cattle in the mine area for approximately one month a year. Several ranches in Emery County are dependent on the allotment. Structural range improvements include one watering trough (spring fed) and two cattle guards on the access route into the lease.

The number of hunters in the Salina Planning Unit increased 122 percent from 1969 to 1972 (U.S. Forest Service, 1976). In Deer Unit #43/45 (Salina) 9,383 hunters were recorded afield during the 1990 hunting season. The Fishlake Elk Herd Unit #14 hosted 4,027 hunters during the 1990 season. Additional hunter use information reported by the Utah Division of Wildlife Resources can be found in the Utah Big Game Annual Report for 1991 (Appendix 4-1).

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Pines Tract Area

The existing land uses in the Pines Tract area include: timber production, livestock grazing, wildlife habitat, recreation, transportation corridors and underground coal mining (SUFCA Mine). The existing land uses not previously discussed are the transportation corridors and underground coal mining (SUFCA Mine, Quitcupah Lease). The roads/transportation corridors are generally single-lane native surface forest development roads which are passable during the drier months of the year. The forest development roads connect with local roads that access major highways.

In the late 1970s two Roadless Area Review and Evaluation (RARE) II areas were inventoried. Neither area was designated as wilderness, nor were they classified as roadless or semi-primitive recreation management areas under the Forest Plan in 1986 (Pines Tract Project EIS, 1999).

The Pines grazing unit is part of the Emery C&H grazing allotment. The Pines unit supports 1,387 head of cattle during the early grazing season. Eight ponds for livestock and wildlife use have been developed in the Pines Tract area (see Chapter 3, Appendix 3-9, Figure 2 - Springs, Seeps and Riparian Areas). The Link Canyon troughs and the Joe Mill ponds are the most reliable sources of developed water within the tract area.

The limited amount of perennial water within the analysis area reduces the potential for many species of fish to be present. However, Muddy Creek and the lower portion of Box Canyon Creek support fish populations.

The Sevier County Zoning Resolution designates the area as GRF-1. The primary uses designated for GRF-1 areas include gravel pits, clay pits, rock quarries, oil and gas wells, mines, mineral reduction, processing structures and facilities. There are no oil or gas leases associated with the Pines Tract area.

Muddy Tract Area

The existing land uses in the SITLA Muddy Tract area include: timber production, livestock grazing, wildlife habitat, recreation, transportation corridors and underground coal mining (SUFCA Mine). The roads/transportation corridors are generally single-lane native surface forest development and maintenance roads which are passable during the drier months of the year. The roads are classified by the Forest as Level 2 roads and generally no restrictions are placed on these roads for public use. The Forest does recommend the use of high clearance vehicles for most of the roads in the SITLA Muddy Tract area and to avoid use when the road surfaces are wet. However, if the permittee is using the roads for other than periodic monitoring, special use permits must be

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obtained from the Forest. Many of the forest development roads connect with local roads that access major highways.

In the late 1970s two Roadless Area Review and Evaluation (RARE) II areas within the SITLA Muddy Tract region were inventoried. Neither area was designated as wilderness, nor were they classified as roadless or semi-primitive recreation management areas under the 1986 Forest Plan Revision (Pines Tract Project EIS, 1999). Recent re-inventories (July 2004) of Roadless Areas by the Manti LaSal National Forest as part of their Forest Plan Revision to be completed by the end of 2006 have included nearly all of the SITLA Muddy Tract as potentially "roadless". This designation excludes the existing Forest Development Roads 044, 2033, and 010 that lie within the eastern and northern portions of the SITLA Muddy Tract. Only a small segment of land west and north of the Main Fork of Box Canyon and western SITLA Muddy Tract boundary, east of Forest Road 044, and south of the southern boundary of sections 2, 3, and 4 of T 21 S., R 5 E., SLM is identified as not being included in the proposed roadless area. Currently, the Forest typically administers most of the areas identified as having "roadless" characteristics as though the areas were officially accepted as roadless. This action is being taken to preserve, where possible, unroaded characteristics of portions of the Forest.

The SITLA Muddy Tract area is part of the Emery C&H grazing allotment. The SITLA Muddy Tract unit supports 1,387 head of cattle during the early grazing season. Three ponds for livestock and wildlife use have been developed in the SITLA Muddy Tract area.

The limited amount of perennial water within the analysis area reduces the potential for many species of fish to be present. However, Muddy Creek and the lower portion of Box Canyon Creek support fish populations.

There are no oil or gas leases associated with the SITLA Muddy Tract area.

3 Right 4 East Panel(s)

In the area of the Quitchupah lease two major cultural resource surveys were completed, one in 1977 (AERC) and one in 1983 by Centuries Research, Incorporated. The nature of the cultural resources found indicates that the area was used very lightly in prehistoric times, and mostly for flaking and hunting.

In 1992 a cultural survey (UT-92-AF-381f) was performed by AERC on the north canyon rim above North Fork Quitchupah Creek. Three sites were identified, one in each of two adjoining sections and one straddling the section line of the two. According to SHPO and National Register of Historic

Place, these sites have not been listed with the National Register (Beth Karpinski, Archeologist, Tetra Tech, December 15, 2016). The sites are north of the 3R4E panel(s), but lie over existing mains.

Cultural and paleontological resources above the 3 Right 4 East panel and within the potential subsidence angle-of-draw will be surveyed and the reported findings will be submitted to the Manti-La Sal Forest Archeologist for processing for clearance. A copy in the reports are located in confidential Appendix 4-2. Due to heavier snows in 2016/2017 the survey will be delayed until the area can be accessed. Longwall mining of this panel will not be started until the archeological clearances have been obtained.

During the 2017 Class III cultural survey two of the previously recorded sites were re-inventoried, one was determined to be eligible (42SV2310), the other was not eligible (42SV2309). Improved GPS equipment has placed the eligible site over the mine entries with the potential for 8" of subsidence. "The site does not have any architectural or unique features...The site is stable with no significant impact or threats currently facing it.....The observed surface scatter is the result of ...eroding...anchored lee side dune." The recommendation as eligible is due to the "potential for intact buried cultural deposits" (Tetra Tech, June 23, 2017, Appendix 4-2). Two additional sites were found and two IOs were located, none of these sites were determined to be eligible during this survey.

Based on reports from local mines the general rarity of significant vertebrate fossil particularly in the Castlegate Sandstone supports the lack of potential to expose or damage paleontological resources due to escarpment subsidence impacts. (Paleontology Resource Appraisal 2017, Appendix 4-2).

Land uses include mining, firewood collection, livestock grazing, wildlife habitat, watershed, exploration and recreation. These uses existed in the early 1900's and would be expected to continue without disruption by continued mining in the lease tract.

Cultural and Historic Resources Information. Cultural resource information and maps identifying cultural and historical study areas are located in Appendix 4-2. An intensive cultural resource evaluation of five coal exploration well locations has been conducted on the Quitcupah Lease by Dr. Richard Hauck of AERC (see Appendix 4-2). As part of this evaluation he also made a record search at the State Historic Preservation office and the National Register of Historic Places. No sites were found that would be effected by the drilling activity. A ten percent cultural resource potential survey was completed by Les Sikle, Forest Archeologist, Manti-La Sal National

Forest. A copy of his report is included in Appendix 4-2 along with the Utah State Historical Society's concurrence letter.

An intensive cultural resource evaluation of a proposed breakout, substation and power line in the Link Canyon Locality conducted by Dr. Richard Hauck of AERC is included in Appendix 4-2. No cultural or paleontological resources were observed within the proposed Link Canyon development area during the archaeological survey.

A cultural resource evaluation of the Link Canyon Mine portals area in Link Canyon was conducted by John Senulis of Senco-Phoenix. A copy of his report is included in Appendix 4-2. The conclusion of his evaluation of the portal site was that no cultural or paleontological resources are present. Many of his conclusions were based on work previously performed in the immediate portal area and surrounding areas by Dames and Moore, AERC, JBR, and the BLM.

There are no cemeteries, public parks, historic places, or areas within the boundaries of any units of the National System of Trails or the Wild and Scenic Rivers System located in areas to be affected by the SUFSCO Mine (See Appendix 4-6 for a description). The Applicant agrees, however, to notify the regulatory authority and the Utah State Historical Society 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. 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.

150 Acre Incidental Boundary Change

Cultural and Historic Information. Cultural resource information and maps identifying cultural and historical study areas are located in Appendix 4-2. Dr. Richard Hauck of AERC conducted an intensive evaluation of the 150 acre IBC. Four new sites were discovered and recorded during the evaluation. All the sites are located on or near the east rim of Box Canyon. The sites include two significant rock shelters (42SV 2492 and 42SV 2495), a significant ceramic scatter (42SV 2493), and a non-significant kill-butcherer locus (42SV 2494).

Site 42 SV 2492 - The site consists of a rock shelter. This site is considered to be a significant resource and excellent potential for National Register classification. The site is 15 meter wide with a sandstone arched roof and is susceptible to surface subsidence.

Site 42 SV 2493 - The site consists of ceramic scatter occupying an area of 20 to 30 meters on the bedrock top at the canyon rim. This site is considered to be a significant resource

and has the potential for National Register classification. This site is not considered to be at-risk or susceptible to surface subsidence.

Site 42 SV 2494 - The site consists of a dispersed scatter of debris and lithic tool fragments and is situated on the bedrock on the east rim overlooking Box Canyon. This site is not considered to be a significant resources and lacks potential for National Register classification.

Site 42 SV 2495 - The site consists of a scatter of debris primarily on the north facing slope below the base of a shallow shelter under a sandstone ledge. The site is considered to be a significant resource and has limited potential for National Register classification. This site is not considered to be at-risk or susceptible to surface subsidence.

The Applicant agrees, however, to notify the regulatory authority and the Utah State Historical Society 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. 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.

Pines Tract Area

Cultural and Historic Information. Cultural resource information and maps identifying cultural and historical study areas are located in Appendix 4-2. Dr. Richard Hauck of AERC made a record search at the State Historic Preservation office, National Register of Historic Places and conducted field investigations under state project numbers UT-96-AF-0443f and UT-97-AF-0598f. AERC coordinated the research and field investigations with SHPO.

Information concerning the potential of specific sites as to being either in the subsidence zone or out of the zone or being evaluated or unevaluated is contained in the Memorandum of Agreement between Federal and State agencies.

The monitoring, treatment plans and mitigation of the cultural resource sites will be in accordance with the Memorandum of Agreement (MOA) 00-MU-11041000-017, and any amendment to it, between the USFS - Manti-La Sal, USHPO, the Advisory Council on Historic Places, UDOGM, and the SUFCA Mine located in Appendix 4-5.

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Sufco intends to undermine portions of the East Fork of Box Canyon beginning in the Fall of 2003 as they extract coal from the 3LPE and 4LPE longwall panels. This change in the mining plan will change the required monitoring schedule in accordance with the Memorandum of Agreement for site 42SV2430/ML-3446 - Elusive Peacock which will be undermined under the 3LPE longwall panel. In accordance with pages 11-12 of the MOA the required monitoring schedule of this site will change from Monitor Schedule A (Sites in areas that will be mined using full-support methods) to Monitor Schedule B (Sites in areas which will be mined under and subsided) requiring the implementation of additional monitoring of the site. Monitoring results will be provided in DOGM Annual Reports. (2003, 2004, 2005, 2006, and indefinitely until movement ceases)

Historic properties documented in the Pines Tract area include 42SV2424, a sawmill, and site 42SV2391 a complex of trash scatters. Both sites are considered ineligible for the NRHP.

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.

Muddy Creek Coal Tract Area

Cultural and Historic Information. Cultural resource information and maps identifying cultural and historical study areas are located in Appendix 4-2. Cirrus Ecological Solutions, LC conducted an intensive evaluation of the Muddy Tract Area. Thirty-four sites were documented during the evaluation. Refer to Confidential Appendix 4-2, "Muddy Creek Technical Report, Heritage Resources".

The three sites located in the SITLA Muddy Tract lease area are located on or near the east rim of Box Canyon. The sites include two significant lithic scatters (42SV2554 and 42SV2597), and a non-significant lithic scatter (42SV2594). None of these three sites will be undermined under the present mine plan.

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.

Results from USDA Manti-La Sal National Forest, Price Ranger District, Project #ML-02-1033, Utah State Project #U-02-MM-0311f, s, b, p.

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Site #	Site Type	Evaluation (Cirrus Ecological Solutions, LC)	Undermined/potential for impact by mining	Date Surveyed
42SV2584*	LS, RS,C	Significant	No/Not expected	1966(PI 1976)
42SV2596	LS, RS	Non-significant	No/Not expected	1966(PI 1976)
42SV2597	LS	Non-significant	No/Not expected	1966
42SV2554	LS	Significant	No/Not expected	1966
42SV2492	LS	Non-significant	No/Not expected	1966

LS - Lithic Scatter RS- Rock Shelter C-Ceramics

* Re-recorded on IMACS form, lumped ML#s 2281 and 2282 with this.

Site 42SV2584 and 42SV2596 lie within the boundary of the SITLA lease expansion (Section 32, T 20 S, R 5 E). According to a report prepared for the Manti-La Sal Forest by Cirrus Ecological Solutions, LC, site 42SV2584 is considered significant, while 42SV2596 is considered non-significant. In the current Sufco five year mine plan no mining is planned beneath either location and they do not lie within the angle-of-draw (Plate 5-10A), therefore no impact is anticipated to either site. Should the mine plan change where the eligible site could be impacted, the permittee will coordinate with DOGM and the USFS prior to mining.

Sites 42SV2584 and 42SV2596 were reevaluated by USFS archeologist in 2015. On 11/20/15, SHPO concurred with the USFS recommendation that site 42SV2584 be determined eligible and 42SV2596 be determined not eligible. A copy of the SHPO concurrence letter is located in Appendix 4-2 (Confidential) of the M&RP.

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.

2RWL Sinkhole - In 2016 an additional cultural resource review/inventory was performed by Tetra Tech a consulting firm, for the area of the sinkhole. The inventory included information from the EarthTouch report previously mentioned and from other previously prepared reports. A copy of the inventory results have been included in Appendix 4-2. Within the inventory area, no cultural resources had been recorded. Thus, no impacts were anticipated during the repair of the sinkhole. Clearance for the repair of the sinkhole was given by SHPO from documentation prepared by Tetra Tech and Jessica Montcalm of the Division of Oil, Gas and Mining. The area of the sink hole is part of the West Lease Modification Area previously permitted in 2011. An EA prepared for the West Lease Modification is located in Appendix 3-13.

3 Right 4 East - Quitchupah Tract

In 1989 more than 960 acres of the tract had been surveyed for cultural resources. The survey indicated that the area was used lightly in prehistoric times (Environmental Assessment, Coal Lease U-63214, October 1988). The U.S. Forest Service and State Historic Preservation Officer determined that mining induced subsidence will have minimal impact on cultural resources (UDOGM Environmental Assessment, October 27, 1989).

South Fork of Quitchupah Area of 2R2S Block "A" and 3R2S Block "B"

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.

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- 5-4 Post-Reclamation Cross Sections
- 5-5 Existing Surface and Subsurface Facilities and Features
- 5-6 Land Ownership and Permit Area Map
- 5-7 Upper Hiawatha Mine Plan - 5 Year Projection
- 5-8 Lower Hiawatha Mine Plan - 5 Year Projection
- 5-9 Transportation Facility Cross Sections
- 5-10 Potential Subsidence Limits Sufco Mine
- 5-10C Potential Subsidence Limits - SITLA Muddy Tract & Greens Hollow Tract (Confidential)
- 5-11 Overburden Isopach Map

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Appendix

- 5-1 Primary Road Certification
- 5-2 Approximate Original Contour Variance Request
- 5-3 Sevier County Landfill Disposal Agreement

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the SUFACO Mine has been for construction projects and for removal of dislodged boulders that roll into the surface facility area. These blasts have been under the 5 pound exemption in most cases, and have been conducted under the direction of a certified blaster. Any future blasting associated with mining and reclamation activities that may be needed will be conducted in accordance with R645-301-524. All underground blasting activities at the mine are conducted under the direction of a MSHA certified blaster.

5.2.5 Subsidence

SUFACO began operations which caused surface subsidence in June 1976. At that time, continuous miners were used to extract coal from pillars which were developed as part of a retreating panel. The panels were approximately 650 feet wide and varied in length up to 2,500 feet. The average mining height in this initial area of pillar extraction approached 11 feet and the extraction ratio averaged about 80 percent.

The resulting subsidence from the initial retreat mining averaged about 4 feet in plateau areas where the overburden was approximately 900 feet thick. In areas where panel boundaries were outside the escarpment created by (i.e., not overlain by) the Castlegate Sandstone, subsidence increased with the decreasing overburden thickness and the decreasing strength of the overlying rock. The maximum subsidence in this first area of pillar extraction was 8.5 feet in an area not overlain by the Castlegate Sandstone where the overburden thickness was only about 600 feet.

Longwall mining was introduced at the SUFACO Mine in October 1985, when a longwall system was added. Longwall panels have ranged in width from 540 feet to 1000 feet and up to 17,000 feet in length. Mining heights have varied from 8.5 feet to 13.5 feet with the longwall system.

Subsidence above the longwall panels has historically averaged about 4 feet. Overburden thickness above the longwall panels has typically been greater than above the room-and-pillar panels. The maximum subsidence caused by longwall mining to date has been 7 feet.

Several draw angle surveys have been performed at the mine over the past fourteen years. These surveys have been oriented both parallel and perpendicular to the long axis of the panel. Data collected over continuous-miner areas to date indicate that the average draw angle is 15 degrees. Individual measurements over continuous-miner areas have ranged from 10 to 21 degrees. New longwall draw angle data obtained in 1995 indicates an angle of 15 degrees for the longwall areas.

Draw angle study completed in 1999 over 13L4E LW panel indicates 15 degrees is valid. Summary results of the LW panel studies are shown in Figures 5-0A and 5-0B.

Tension cracks have occurred over most of the subsidence areas. These cracks tend to be most pronounced in areas where pillars have been extracted (as compared to areas overlying longwall panels). The lengths of the cracks vary from a few feet to nearly 200 feet. Most are oriented either parallel to the natural jointing pattern or parallel to the boundaries of the underground excavation. Cracks with the longest continuous length appear to be natural joints which have been intensified by subsidence action. Vertical displacement along the cracks is uncommon and horizontal displacement varies from hairline to several inches in width. Follow-up observations of individual tension cracks indicate that the cracks tend to close (either partially or fully) following initial development (see Appendix 5-4).

Monitoring data collected to date indicate that subsidence above the SUFCO Mine occurs rapidly after initial movement. Approximately 80 percent of maximum subsidence occurs within about four months. The remainder of subsidence occurs slowly over a period of a few years. These monitoring data have been presented and summarized annually in reports submitted to the UDOGM by SUFCO Mine. Refer to Appendix 5-13 for description of 2RWL repaired sinkhole, Section 5.2.1.1 and Section 5.4.1.1 provide additional information.

3 Right 4 East Panel(s)

Mining of this panel(s) will straddle Leases U-63214 and U-62453 which are referred to as the Quitchupah Tract throughout the M&RP in text, appendices and on drawings. Both leases were issued to the permittee in 1989, the tract was originally delineated in 1982. The mine plan is shown on Plate 5-7, mining will occur only in the Upper Hiawatha coal seam. Overburden is approximately 900 feet or more. An environmental assessment was prepared for Lease U-63214 in 1988 and an EIS for the Quitchupah Tract in 1983, a variety of information from these assessments are included in the existing M&RP.

5.2.5.1 Subsidence Control Plan

Potential Areas of Subsidence. Structures that are present above the existing or planned mine workings that may be affected by mining are shown on Plate 5-5. Renewable resource lands within the lease and permit areas are shown on Plate 4-1.

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.

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3 Right 4 East Panel(s)

Should cracks develop in the surface above the panel (s) the sealing of these cracks will be done with inert materials such as soil, rock, road base, etc. and seeded with the mix in Section 3. 4.1.2 (3 Right 4 East Panel(s)). A drawing showing the potential subsidence with the mining of the 3R4E panel is located in Appendix 6-4 (Confidential). Potential subsidence beneath the 42SV2310 archeological site could be 0 to 8 inches (Appendix 6-4 and 4-2) . Refer to Section 5.2.5.2 (Correction of Material Damage) and Section 7.2.8.3 for additional information.

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 5-10 & 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 = 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

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6-4	3 Right 4 East Panel (Confidential)

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3 Right 4 East Panel(s)

Refer to Section 5.2.1.1 for reference to various maps, including those containing topography of the 3 Right 4 East panel. Additional geology maps requested by the Manti-La Sal forest geologist are located in Appendix 6-4 (Confidential). The maps are of subsidence, geology and overburden superimposed over the panel(s) mine plan and cross-sections of longwall panel within the coal seam. The information on the geology maps within Appendix 6-4 with the label "Panel 3R4E" are specific and more comprehensive than generalized information presented within this chapter.

The Applicant has a Resource Recovery and Protection Plan (R2P2) on file with the Bureau of Land Management. This R2P2 contains a detailed description of the two mineable coal seams on the SUFCA Mine leasehold. The overlying Duncan Seam is not considered mineable (see Section 5.2.2).

There is a plugged and abandoned gas well located in Section 23, T21S, R5E in the Pines Tract. No other oil or gas wells are known to exist within a quarter mile of the mine area. No other water wells have been drilled in the lease area except those drilled by the applicant for the purpose of monitoring the groundwater.

6.2.3 Geologic Determinations

The information required by UDOGM to make a determination of the acid or toxic forming characteristics of the site strata is presented in Section 6.2.4.3 of this M&RP.

The information required by UDOGM to make a determination as to whether the reclamation plan, described in Section 5.40, can be accomplished is presented in Section 6.2.4.

The information required to prepare the subsidence control program is addressed in Section 6.2.4.

6.2.4 Geologic Information

6.2.4.1 Regional Setting

The SUFCA Mine is located beneath the Old Woman Plateau, 20 miles east of Salina, Utah. The Old Woman Plateau lies in the Wasatch Plateau Subprovince of the Colorado Plateau Physiographic Province.

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Stratigraphy. All rock units within the SUFCO Mine property boundaries are sedimentary (Plate 6-1 and Figure 6-1). No igneous or metamorphic units are found in the area. Most exposed, consolidated sedimentary rocks in the area were deposited during the Cretaceous Age of the Mesozoic Era. The uppermost North Horn Formation is Upper Cretaceous to lower Tertiary (Paleocene) in age. The oldest unit is the Upper Cretaceous Masuk Member of the Mancos Shale, which is overlain in order of increasingly younger rocks, by the Star Point Sandstone Member of the Blackhawk Formation; the Upper Blackhawk Formation, the Castlegate Sandstone, the Price River Formation and the overlying North Horn Formation (Figure 6-1).

Mancos Shale-Masuk Member

The Masuk Member of the Mancos Shale has been mapped throughout eastern Utah and western Colorado. The Masuk Member crops out along the entire eastern edge of the Wasatch Plateau and varies in thickness from 300 to 1,300 feet (Davis, and Doelling, 1976). It thins from north to south and from east to west. The Masuk is probably 500 to 600 feet thick in the North Fork of Quitcupah Canyon on the east side of the mine property.

The Masuk Member of the Mancos Shale is the lowest rock unit exposed and consists of blue-gray fissile claystone or silty claystone which weathers light blue-gray to light tan. The unit contains thin calcareous sandy or silty interbeds which increase in frequency toward the top of the unit. The interbeds are usually light tan to yellow, and in places their weathering gives the Masuk a light tan cast. The Member forms the lower slopes of the Convulsion and North Fork Quitcupah Canyons on the south and east sides of the mine property. It forms steep, barren, easily eroded slopes with occasional ledges of more resistant fine-grained sandstone, siltstone, or sandy claystone.

Star Point Sandstone

Exposures of the Star Point Sandstone form a broad, arcuate band crossing eastern Utah and extending into eastern Wyoming, where it is roughly correlative to the Shannon Sandstone of the Cody Shale, and into southwestern Colorado and northeastern New Mexico, where its equivalent is the Point Lookout Sandstone (McGookey, 1973). The Star Point in Utah is almost continuously exposed for about 100 miles along the eastern edge of the Wasatch Plateau (Spieker, 1931).

The unit ranges in thickness to more than 1,000 feet in the Pleasant Valley area in the northern part of the Wasatch Plateau. Eastward, it intertongues and grades with the Mancos Shale until it is absent as a unit near Sunnyside in the Bookcliffs. The unit thins southward along the Wasatch Plateau, and the lowermost units of the Star Point grade into the underlying Masuk Shale (Spieker,

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7-9	Link Canyon Watershed

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3 Right 4 East Panel(s)

In 1986/1987 an experimental practice of subsidizing escarpments on the west side of Quitchupah Canyon containing the North Fork of Quitchupah Creek in Section 32, Township 21 South, Range 5 East and Section 5, Township 22 South, Range 5 East was approved by the Division. The planned 3 Right 4 East panel straddles Sections 28, 29, 32 and 33, Township 21 South, Range 5 East on the east side of Quitchupah Canyon. The planned panel (northern) and the experimental area (southern) are both in Section 32, across the canyon from one another. The objective of the practice was to ascertain whether or not the escarpment could be undermined by a longwall while causing minimal surface damage.

In 1991 a report was written discussing the observations, the information collected was submitted to the Division in annual reports. The escarpment test area was monitored visually, by photography and by reliable survey measurements for horizontal and vertical movement. The conclusion of the report state the "One independent block of rock fell during subsidence and a few tension cracks were created along the cliff face. No other visible signs of mining were found even though the surface elevations were reduced several feet."

Because spalling is considered a natural feature of the Castlegate Formation it is anticipated that cliff spalling may occur, since the entire area of the Quitchupah Canyon escarpment is heavily fractured by natural jointing and in some areas is highly sculpted where the combined effects of jointing and erosion are the most severe. The slopes are littered with block of stone which have eroded way from the Castlegate and other small sandstone members to the Blackhawk Formation. The channel grade in the North Fork of Quitchupah Creek which lies to the west of the panel to be mined should be sufficient to allow the flow to continue should rocks from spalling enter the creek channel. It is not anticipated that enough rock from spalling will enter the North Fork to block flow, but the surface flow at water monitoring site 042 downstream of the panel will be checked during the mining of the 3 Right 4 East panel to determine if an action is required. There are no known groundwater sites in the area of the 3 Right 4 East panel.

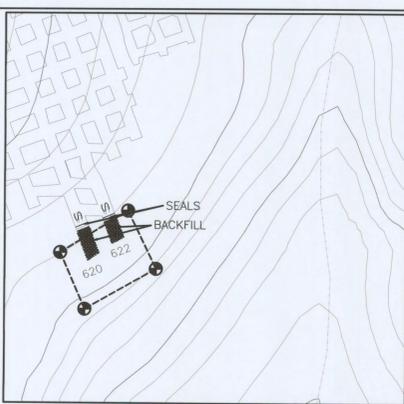
7.2.9 Cumulative Hydrologic Impact Assessment (CHIA)

A Cumulative Hydrologic Impact Assessment to include the permit and adjacent areas is to be prepared by the UDOGM.

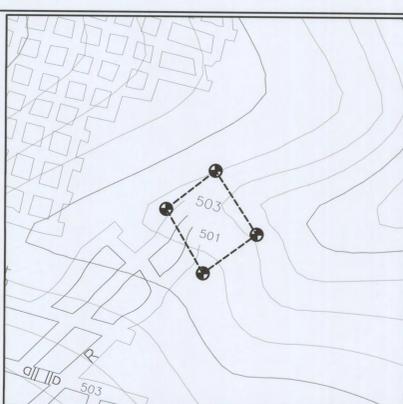
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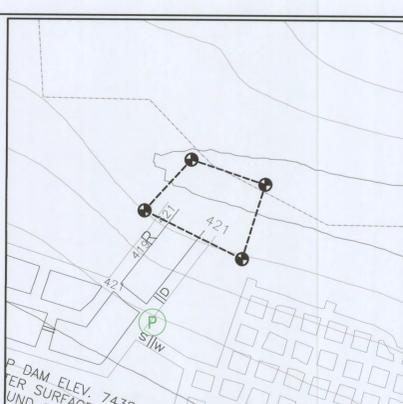
DIV. OF OIL & GAS



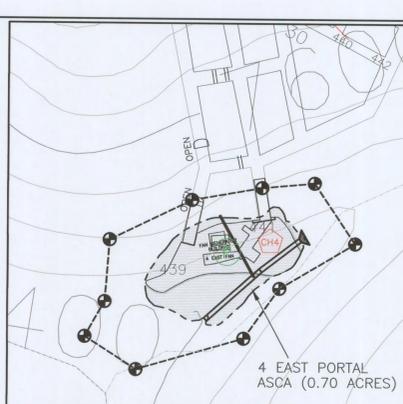
SOUTH PORTALS
SCALE: 1" = 100'



3 EAST PORTALS
SCALE: 1" = 100'

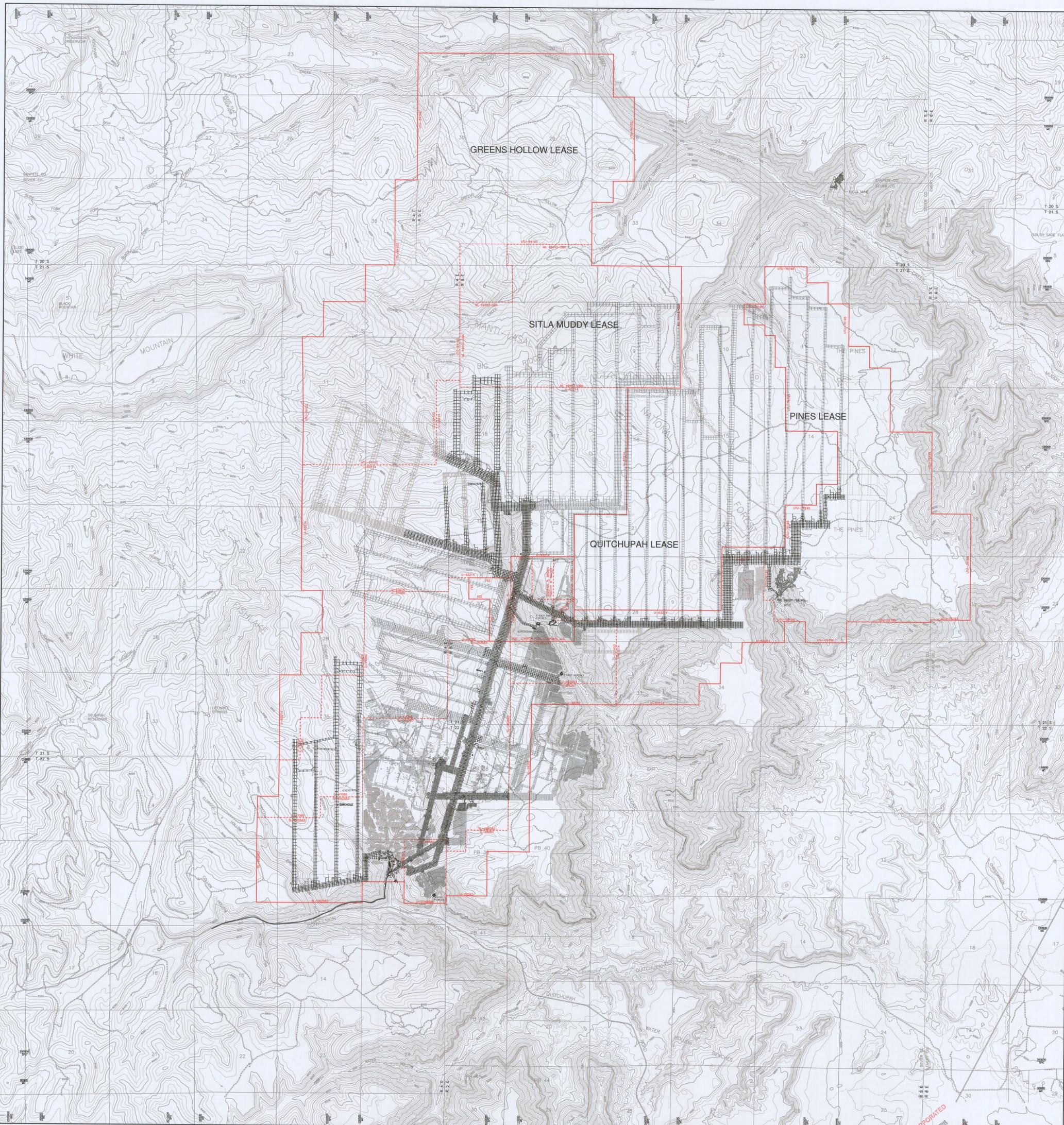


QUITCHUPAH PORTALS
SCALE: 1" = 100'



4 EAST FAN PORTALS
SCALE: 1" = 100'

SURFACE PORTAL FACILITIES - PRE MINING AND POST MINING TOPOGRAPHY



EXPLANATION

- SUFCO EXTERIOR LEASE BOUNDARY
- SUFCO INTERIOR LEASE BOUNDARY
- MINE COORDINATES
- STATE PLANE COORDINATES
- STREAM
- ESCARPMENT
- OUTCROP
- PERENNIAL STREAM
- DISTURBED AREA BOUNDARY
- DISTURBED AREA BOUNDARY MARKER
- DRAIN LINE
- ALTERNATE SEDIMENT CONTROL AREA (ASCA)



I CERTIFY THE ITEMS SHOWN ON THIS DRAWING ARE ACCURATE TO THE BEST OF MY KNOWLEDGE



REVISIONS				
NO.	DATE	REQ. BY	DWG. BY	REMARKS
10	05/02/25	VM	T.R.B.	ADDED 70 ACRE PLAIN AREA FOR S WEST
11	07/23/26	VM	J.R.C.	ADDED GREENS HOLLOW S SOUTH FORK LEASE BOUNDARY
12	12/23/26	VM	T.E.M.	REMOVED SOUTH FORK LEASE BOUNDARY
13	4/12/2017	VM	B.R.	GREENS HOLLOW

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JAN 17 2018
Canyon Fuel Gas & Mining

Canyon Fuel Company, LLC
SUFCO Mine
597 South St 24 - Safford, UT 84654
(435) 286-4880 Phone
(435) 286-4599 Fax

DETAIL OF PORTAL SURFACE FACILITIES

NO. DATE	SCALE: 1" = 2,000'	DATE: 10/18/2017	DRAWN BY: B.D.H.	DESIGNED BY: M.L.D.	CHECKED BY:	SHEET NO.:
FILE NAME: H:\SURVING\SRP\PLATES\PLATE 5-2C.dwg	PROJECT NUMBER: ###	DATE: 10/18/2017	SCALE: 1" = 2,000'	DATE: 10/18/2017	DRAWN BY: B.D.H.	DESIGNED BY: M.L.D.

GREENS HOLLOW LEASE

SITLA MUDDY LEASE

PINES LEASE

QUITCHUPAH LEASE

FUTURE LOWER HIAWATHA POINT OF ACCESS FROM UPPER HIAWATHA

RICCI MINE

LINK CANYON MINE

EXPLANATION

- SUFCO EXTERIOR LEASE BOUNDARY
- SUFCO INTERIOR LEASE BOUNDARY
- ESCARPMENT
- OUTCROP

MINING LEGEND

- REMAINING 2017
- 1ST QUARTER 2018
- 2ND QUARTER 2018
- 3RD QUARTER 2018
- 4TH QUARTER 2018
- 2019
- 2020
- 2021
- 2022



I CERTIFY THE ITEMS SHOWN ON THIS DRAWING ARE ACCURATE TO THE BEST OF MY KNOWLEDGE.



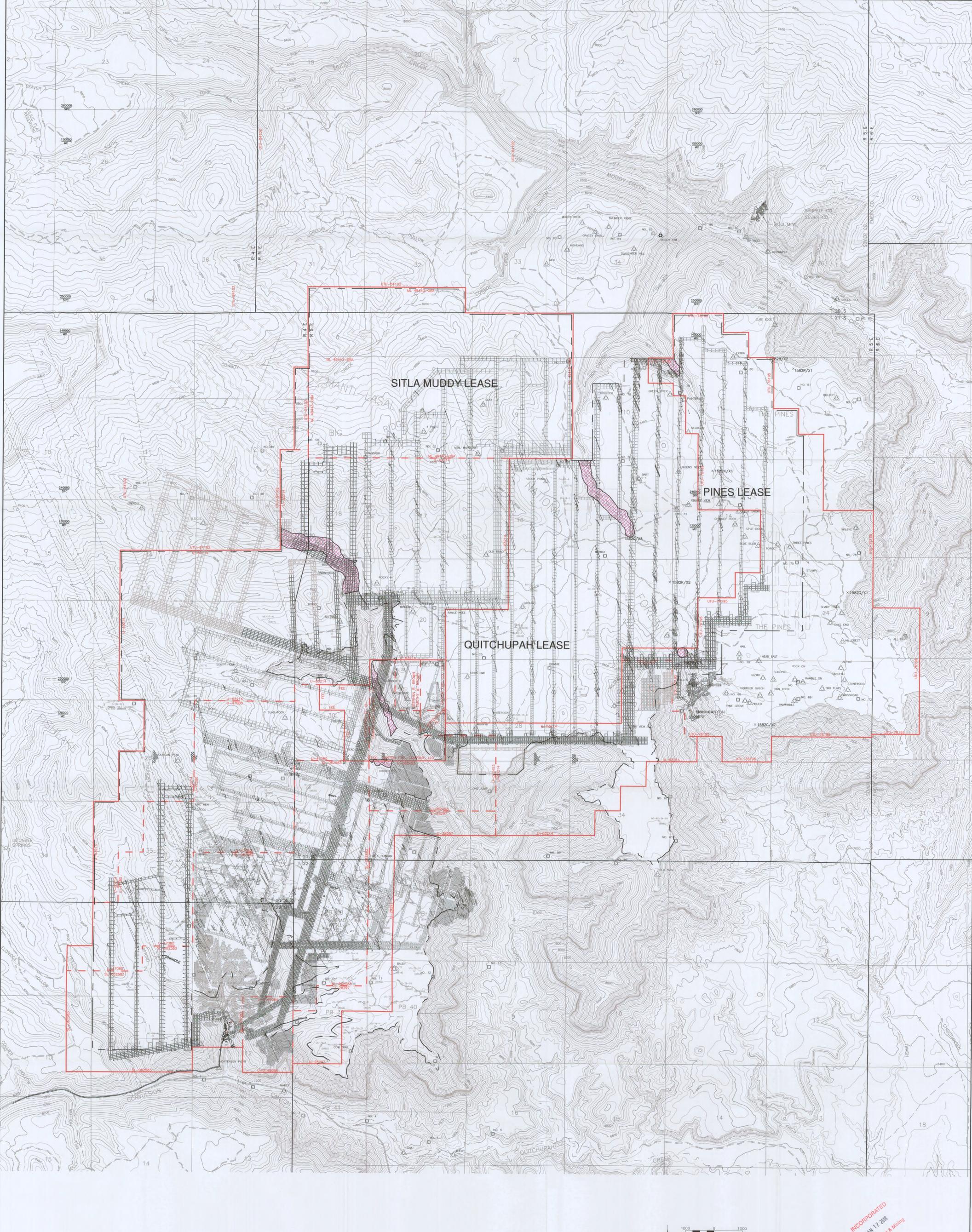
NO.		DATE		REV. BY		D.W. BY		REVISIONS		REMARKS	
12	4/13/2017	V.M.	B.R.								GREENS HOLLOW
13	12/19/2017	B.B.	B.R.								ADD 4TH QUARTER

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SUFCO MINE PLAN 5 YEAR PROJECTION

FILE NO.	DATE	SCALE	DATE	PROJECT NUMBER	SHEET NO.
###	###	1" = 1,500'	03/01/2000	###	PLATE 5-7



EXPLANATION

- SUFCO EXTERIOR LEASE BOUNDARY
- - - SUFCO INTERIOR LEASE BOUNDARY
- M.C. MINE COORDINATES
- S.P.C. STATE PLANE COORDINATES
- ▲ CONTROL POINT
- AERIAL TARGET
- LIMIT OF POTENTIAL SUBSIDENCE
- ▨ UNDERGROUND PERENNIAL STREAM AND PROTECTED CULTURAL SITE BUFFER CORRIDOR



I CERTIFY THE ITEMS SHOWN ON THIS DRAWING ARE ACCURATE TO THE BEST OF MY KNOWLEDGE



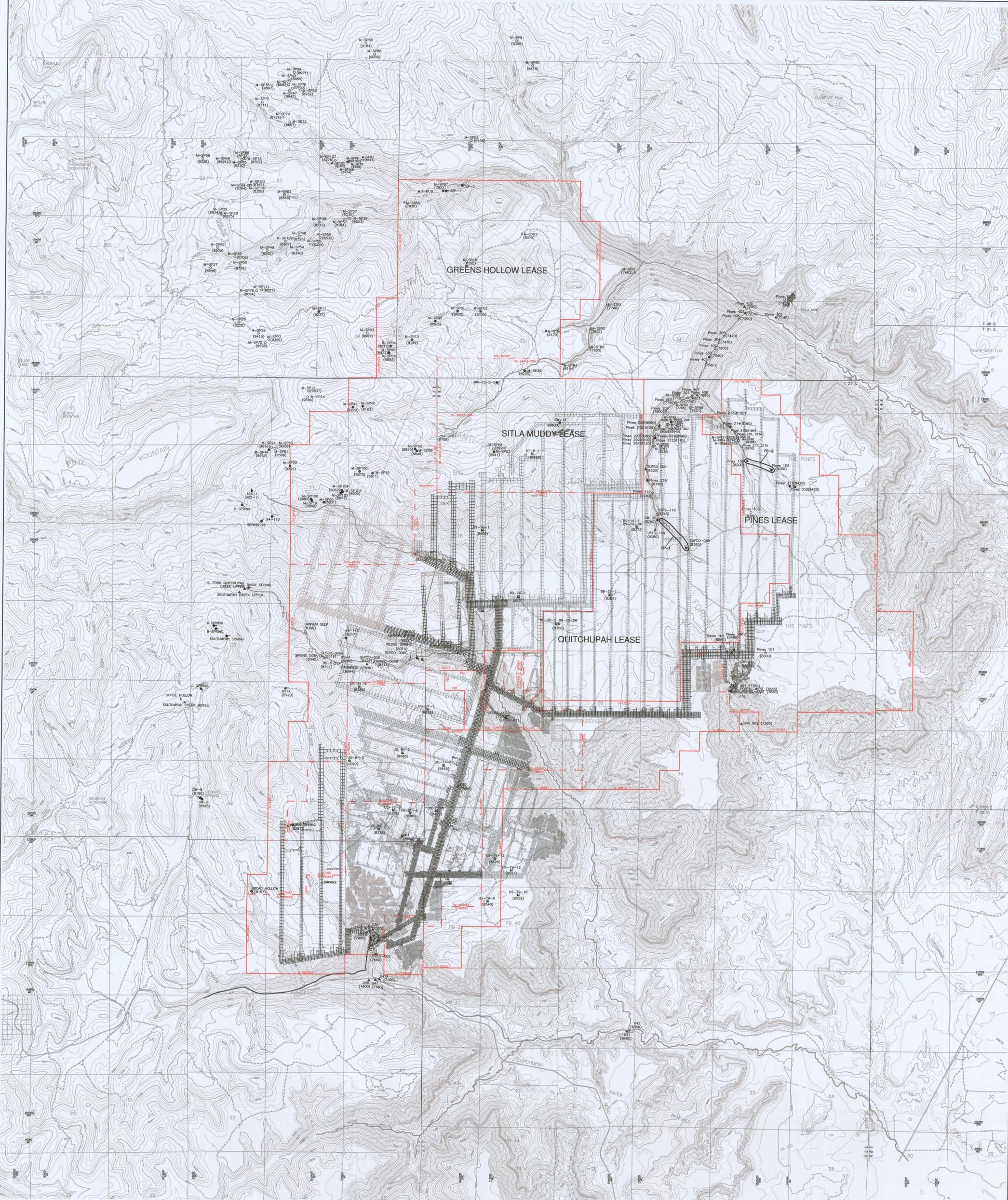
REVISIONS			
NO.	DATE	REV. BY	DWG. BY
14	08/19/15	V.M.	J.K.M.
15	10/11/2017	V.M.	J.R.

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JAN 17 2018

Canyon Fuel Company, LLC
SUFCO Mine
597 South SR 24 - Saldo, UT 84654
(435) 286-4980 Phone
(435) 286-4499 Fax

POTENTIAL SUBSIDENCE LIMITS

SCALE: 1" = 1000'
DATE: 03/28/17
DRAWN BY: J.G.C.
ENGINEER: V.M.
SHEET NO.: LEGAL PLATE 5-10



NOTES:
 1. HISTORIC STREAM, SPRING AND WELL MONITORING SITES ARE OLD BASELINE MONITORING SITES OR SITES THAT HAVE BEEN DISCONTINUED OR MINED THROUGH THAT ARE NOT CURRENTLY BEING MONITORED.

EXPLANATION

- SUFCO MINE EXTERIOR LEASE BOUNDARY
- - - SUFCO MINE INTERIOR LEASE BOUNDARY
- MINE COORDINATES
- STATE PLANE COORDINATES
- HISTORIC STREAM
- STREAM MONITORING
- HISTORIC MONITORING WELL
- MONITORING WELL SITE
- HISTORIC SPRING MONITORING SITE
- SPRING MONITORING
- UPDES MONITORING POINT
- IN MINE MONITORING SITE
- (7600) ELEVATION OF SITE
- PERENNIAL FLOW LOCATION MONITORING POINT
- PERENNIAL FLOWS
- SPRING NOT MONITORED



I CERTIFY THE ITEMS SHOWN ON THIS DRAWING ARE ACCURATE TO THE BEST OF MY KNOWLEDGE.



REVISIONS			
NO.	DATE	REQ. BY / DWS. BY	REMARKS
13	03/02/2015	VM / TRD	ADDED TO ASSESS RISK AREA FOR S WEST
20	07/14/2016	VM / J.S.C.	ADD GREENS HOLLOW & SOUTH FORK LEASE
21	12/15/2016	VM / T.M.	REMOVED SOUTH FORK LEASE BOUNDARY
22	04/12/2017	VM / J.S.C.	REMOVED SOUTH FORK LEASE BOUNDARY
23	9/19/17	VM / B.R.	ADDED PINES MONITORING

INCORPORATED
 JAN 12 2018
 Div. of Oil, Gas & Mining

Canyon Fuel Company, LLC
SUFCO Mine
 597 South 204 W • Salt Lake City, UT 84054
 (435) 286-4880 Phone
 (435) 286-4493 Fax

HYDROLOGIC MONITORING STATIONS

REV. BY: VM/STW	SCALE: 1" = 1,000'	DATE: 10/26/2006	DRAWN BY: AMB/TRB	ENGINEER: J.D.B.	CHECKED BY: VM	SHEET NO: 7-3
SHT SET: ###	PROJECT NUMBER: ###	FILE NAME: H:\DRAWINGS\MPV\PLATES\PLATE 7-3.dwg				