

February 28, 2018

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: 4 Right 4 East Panel Amendment, Canyon Fuel Company, LLC, Sufco Mine, Permit Number
C/041/0002

Dear Sirs:

Please find enclosed with this letter a copy of an amendment to the Sufco Mine Permit in response to deficiencies regarding the 4 Right 4 East panel. The 4 Right 4 East Panel is located on the existing lease U-63214 which is part of the Quitchupah Tract/Lease. See Plate 5-7 for additional information regarding its location.

Subsidence monitoring and mitigation information as well as sage grouse habitat information regarding the 4R4E panel was added to page 3-12 of the MRP. Also, plate numbers were corrected on page 7-19.

The chapter text submitted will contain redline/strikeout text and in most chapters only the pages where changes have occurred have been submitted. In addition, text existing in the M&RP that pertains to the panel(s) location has been highlighted in yellow text for ease of review is part of this submittal. Pagination will be adjusted to fit into the approved permit once the amendment has been reviewed and accepted for incorporation into the existing 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 Bryant Bunnell (435) 286-4490 or Vicky Miller at (435) 286-4481.

CANYON FUEL COMPANY
SUFSCO Mine



for

Jacob Smith
Technical Services Manager

Encl.

cc: DOGM Correspondence File

APPLICATION FOR COAL PERMIT PROCESSING

Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: Canyon Fuel Company, LLC

Mine: Sufco Mine, Amendment to MRP to Address the Mining of 4 Right 4 East Panel(s)

Permit Number: C/041/0002

Title: _____

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

<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 2, Pages 2-iv and 2-8
<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, Pages 3-v, 3-4, 3-10, 3-12, 3-31, 3-32, 3-33, 3-48A
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 4, Pages 4-12, 4-13
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 5, Pages 5-vi, 5-vii, 5-23, 5-24, 5-27, 5-28, 5-31, 5-39G
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<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 5, Plates 5-2C, 5-7, 5-10, 5-11
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 6, Pages 6-iii, 6-4
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Pages 7-vi, 7-vii, 7-18, 7-19
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Plates 7-2, 7-3
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<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 3, add information to Appendix 3-4
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 3, add information to Appendix 3-15
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 4, add information to Appendix 4-2
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 5, Plate 5-10C
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 6, add information to Appendix 6-4
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Plate 7-10
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<p>Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.</p> 	<p>Received by Oil, Gas & Mining</p>
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APPLICATION FOR COAL PERMIT PROCESSING

Permit Change New Permit Renewal Exploration Bond Release Transfer

Permittee: Canyon Fuel Company, LLC

Mine: Sufco Mine, Amendment to MRP to Address the Mining of 4 Right 4 East Panel(s)

Permit Number: C/041/0002

Title: Amendment to MRP to Address the Mining of 4 Right 4 East Panel(s)

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 one (1) review copy of the application.

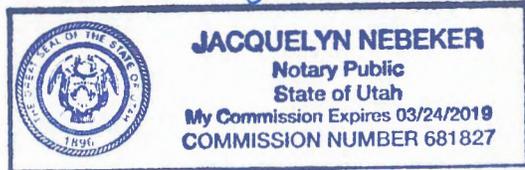
I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Jacob D. Smith
Print Name

JDS AB, Engr. Mgr., 2/28/18
Sign Name, Position, Date

Subscribed and sworn to before me this 28 day of February, 2018

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



For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining

CHAPTER 1
GENERAL CONTENTS

United States of America
Department of Interior
Bureau of Land Management
Price Coal Office
125 South 600 West
Price, Utah 84501

112.700 MSHA Numbers

Mine ID No. 42-00089, Waste Rock ID No. 1211-UT-09-00089-01.

112.800 Interest in Contiguous Lands

The applicant owns or controls, directly or indirectly, no legal or equitable interest in any lands contiguous to the permit area.

112.900 Certification of Submitted Information

Canyon Fuel Company, LLC hereby attests that the information contained in this permit document is true and correct to the best of their knowledge.

113 Violation Information

For violation information refer to Table 1-2 in the General Chapter 1 binder for Canyon Fuel Company, LLC prepared for the operations.

114 Right-of-Entry Information

Copies of documents granting the legal right to enter and begin underground coal mining activities have not changed with the acquisition. They can be found in Appendix 1.1 Mining and Reclamation Plan for the SUFCO Mine, which is unmodified by this Notice of Change in Ownership and Control Information.

The right to enter the leaseholds conveyed by the Federal Coal Leases is conferred to the lessee by the Mineral Leasing Act of 1920 and the leases themselves. Copies of Federal Coal Leases U-47080, U-28297, U-62453, U-149084, U-63214, UTU-76195, UTU-91108 (ROW) ,SL-062583, and State of Utah Coal Lease ML 49443-OBA which grant the right to enter and conduct underground mining operations on the leased premises are presented in Appendix 1-2 Mining and Reclamation Plan for the SUFACO Mine. Appendix 1-2 is unmodified by this Notice of Change in Ownership and Control Information.

Federal Coal Lease SL-062583 grants the right to use lands for the construction and utilization of surface facilities necessary for underground coal mining.

BLM Lease UTU-84102 is in the process of being issued to Sufco. Once the lease/tract is issued to Canyon Fuel Company, LLC a copy of the documents will be incorporated into Appendix 1-2.

The legal description of the SUFACO coal leases:

Federal Coal Lease U-28297 - (716.51 acres +/-) - Approved January 1979
Modified January 2012

T. 21 S., R. 5 E., SLM, Utah
Sec. 32, lot 1, N1/2S1/2
Sec. 33, NW1/4SW1/4

T. 22 S., R. 5 E., SLM, Utah
Sec. 5, W1/2W1/2;
Sec. 7, S1/2NE1 /4, E1/2SW1/4, W1/2SE1/4;
Sec. 8, W1/2NW1/4.

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

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

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

Sec. 2, lots 1-4, S1/2NE1/4, S1/2NW1/4, N1/2SW1/4;

Sec. 3, NE1/4SE1/4

Federal Coal Lease U-63214 - (6336.34 acres +/-) - Approved July 1989

Modified June 1999, December 2009, May 2011, January 2017

Tract 1:

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

Sec. 12, E1/2SE1/4

Sec. 13, E1/2NE1/4, S1/2

Sec. 14, E1/2SW1/4, SE1/4

Sec. 23, E1/2, E1/2W1/2

Sec. 24, all.

T. 21 S., R. 5 E., SLM, Utah

Sec. 16, W1/2NW1/4, W1/2SW1/4, W1/2E1/2NW1/4, W1/2E1/2SW1/4

Sec. 17-19, all

Sec. 20, NE1/4, W1/2 SE1/4, SW1/4, NW1/4

Sec. 21, W1/2NW1/4, W1/2E1/2NW1/4

Sec. 26, W1/2NW1/4SW1/4, SW1/4SW1/4

Sec. 27, NE1/4, SE1/4, S1/2SW1/4, S1/2N1/2SW1/4

Sec. 28, S1/2SE1/4, S1/2N1/2SE1/4, S1/2N1/2SW1/4, SE1/4SW1/4

Sec. 29, S1/2NE1/4SE1/4

Sec. 30, lot 1, N1/2NE1/4

Sec. 33, NE1/4, E1/2NW1/4, NE1/4SW1/4, N1/2SE1/4

Sec. 34, NW1/4NE1/4, NW1/4, NW1/4SW1/4.

Tract 3:

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

Sec. 26, E1/2, E1/2SW1/4;

Sec. 35, NW1/4, W1/2SW1/4.

CHAPTER 2

SOILS

LIST OF APPENDICES

(Appendices appear in Volume 4)

Appendix

- 2-1 Prime Farmland Determination Documents
- 2-2 Report of Studies of Vegetation and Soils for SUFCO Mine
- 2-3 Water and Soil Data Report
- 2-4 Submittal of Drainage Plan and Slope Stability for Reclamation for Convulsion Canyon Mine, Sergeant, Hauskins & Beckwith
- 2-5 Final Reclamation Cut and Fill Quantities
- 2-6 Link Canyon Substation Soils Investigation
- 2-7 ~~(Revisions have eliminated this appendix)~~ Quitchupah Tract Supplemental Environmental Assessment 1989 and Environmental Assessment for Costal States Energy Company, Coal Lease Application U-63214 Quitchupah Tract
- 2-8 Pines Tract Soils Types
- 2-9 Link Canyon Portal Vegetation, Aquatic Fauna, and Soil Investigations
- 2-10 Muddy Tract Soils Types

CHAPTER 2

SOILS

2.10 Introduction

This chapter and Volume 3 of this M&RP contains all pertinent information relating to identification, management, and reclamation activities associated with the soil resources present in the disturbed area of the SUFCO Mine.

2.20 Environmental Description

The SUFCO Mine area lies in central Utah at the southern end of the Wasatch Plateau. Topography is dominated by plateaus separated by deeply incised canyons. Canyon walls are generally composed of laterally continuous (several thousand feet) ledge-forming sandstones, interbedded with slope forming shales and siltstones. Topography in the SUFCO Mine area ranges from 6500 to about 9,000 feet above sea level. Soils are generally not cultivated due to their thin nature, shortage of irrigation water, and a short growing season. Residual and colluvial soils are present at the SUFCO Mine surface facilities area. These soils have formed from residual sandstone and shale particles that mixed as they migrated down slope. Soils are usually very shallow, consisting predominantly of sand and silty sand loams which have high percolation rates. The soils are highly susceptible to wind erosion. The inherent erosion hazard from water is low. Rock outcrops consist of alternating layers of sandstone and shale. Subordinate amounts of coal and limestone are also present. The landscape is steep and rocky with massive sandstone ledges, and siltstone/shale slopes. Surface and subsurface layers are often rocky.

2.2.1 Prime Farmland Investigation

No prime farmland exists in the SUFCO Mine disturbed area, Link Canyon disturbed area, or in any of its lease areas. Mining activities will not impact prime farmland. In compliance with R645-302-313, a pre-application investigation was conducted by the Applicant to determine if any prime farmland would be impacted by the project. Based on the federal criteria for determining the presence or absence of prime farmland, the Convulsion Canyon area, Link Canyon, the Pines Tract area, and the SITLA Muddy Tract area cannot be classified as prime farmland. Consultation with Dr. Theron B. Hutchings, State Soil Scientist for the Soil Conservation Service, substantiated the absence of prime farmland in the Convulsion Canyon and Link Canyon areas. (Appendix 2-1).

2.2.2 Soil Survey

A Level I soil survey of the entire SUFCO Mine disturbed area, including the Link Canyon Substations No. 1 and 2, has been conducted. Soil survey data are presented in Appendix 2-2 for the majority of the permit area, Appendix 2-6 for the Link Canyon Substation areas, and are herein summarized in Sections 2.2.2.1 through 2.2.2.3. Survey data includes the following information: taxonomic classification, horizon name and depth, dry and moist color, texture (percent sand, silt, and clay), class, structure, percent rock fragments and organic matter, pH, effervescence, EC, and solubility of calcium, magnesium, and sodium (Appendices 2-2, and 2-6). A cross-reference list of map unit, soil taxonomic classification, and sample site appears in pages 17 through 19 of Appendix 2-2.

A site specific soil survey will be completed for the Overflow Pond prior to disturbance and this information will be utilized in determining topsoil salvage depth. The results of this soil survey will be included in the as-built addendum to be included in Appendix 2-2.

An Order 2 soil survey has been completed for the Link Canyon Substation No. 1 disturbed area and is included in Appendix 2-2. Additionally, an Order 1 soil survey was conducted of the substation Nos. 1 and 2 pad areas and the results are included in Appendix 2-6.

An Order 3 soil survey has been conducted for the Pines Tract and the results are included in Appendix 2-8. (Plate 2-2)

An Order 3 soil survey has been conducted for the SITLA Muddy Tract and the results are included in Appendix 2-10. (Plate 2-3) Soils associated with the 70 Acre BLM Right of Way are part of the Order 3 soil survey located in Appendix 2-10.

2.2.2.1 Soils Map

Plates 2-1 and 2-2 delineates the soil types present in the disturbed and adjacent areas.

2.2.2.2 Soil Identification

Soils present in the narrow V-shaped East Spring Canyon, which lie within and immediately adjacent to the disturbed area of the SUFCO Mine have been identified, characterized, and their spatial occurrences documented (Appendix 2-2). Four soil types are present in the disturbed area, and are herein referred to as soil types O, W, T, and X (Plate 2-1). Soil type O is a loamy-skeletal, mixed, frigid Ustic Torriorthent. Soil W is a loamy-skeletal, mixed, frigid Typic Xerothent. Soil type T is a loamy-skeletal, mixed, frigid, Calcixerollic Xerochrept. Soil X is a complex composed of both a clayey-skeletal, mixed, frigid, shallow Lithic Calcixeroll, and a fine, mixed, frigid Mollic Haploxeralf.

Analytical and field methodology utilized in characterizing these soil types and their soil horizons are found in pages 13 and 14 of Appendix 2-2. Soils were classified to family unit using the Soil Conservation Service's classification system (Johnson, 1975).

2.2.2.3 Soil Description

Soil Type O

Soil type O is found at the north end of the disturbed area, in the area of the confluence of the Mud Spring Hollow and East Spring Canyon drainages (Plate 2-1). The taxonomic classifications of Soil O are that of a loamy-skeletal, mixed, frigid Ustic Torriorthent. This soil is found on slopes with grades of 60 percent or greater; consists of well-drained soils that have formed from residuum and colluvium; and supports Pinyon, Juniper, and Mountain Mahogany vegetative growth. The water holding capacity is 3.5 inches.

A description of the soils located in the Link Canyon Mine Portals area is provided in Appendix 2-9. The description of the soils was prepared by Dan Larsen, a soils scientist with EIS Environmental and Engineering Consultants.

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.

4 Right 4 East - Quitchupah Tract

A general description of the soils associated with the Quitchupah Tract is provided in the Supplemental Environmental Assessment prepared by UDOGM October 27, 1989 and Environmental Assessment prepared by the USDA (1988), included in Appendix 2-7. The soils above the 4 Right panel support sagebrush, grassland, mountain brush and Pinyon/Juniper, with islands of quaking aspen and scattered pines. The mining of the 4 Right panel has the potential for subsidence, refer to Sections 3.1.4.2, 5.2.5.1 and 5.2.5.2 for subsidence repair and revegetation commitments. No other disturbance to surface soil other than potential subsidence is anticipated or planned (i.e. construction).

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).

2.2.3 Prime Farmland Soil Characterization

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

2.2.4 Substitute Topsoil

During final reclamation suitable growth medium/substitute topsoil will be collected at potential locations such as the upper sediment pond dam, the fill slope above the upper sediment pond and soil resources used to construct the original surface pad. The applicant has no sound method for calculating the quantity of growth medium/substitute topsoil available from these potential locations. The preconstruction topography is poor or non-existent and a record of the quantity of material used for the construction of these locations is not available. A random composite sample will be taken for approximately every 2,000 tons as the soil is collected to determine suitability as growth medium/substitute topsoil. The soil resources will be supplemented as described in Section 2.4.3.

2.30 Operation Plan

2.3.1 General Requirements

2.3.1.1 Removing and Storing Soil Methods

APPENDIX 2-7

Quitcupah Tract Supplemental Environmental Assessment 1989



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Norman H. Bangertter
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 84163-1203
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

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

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 DOGM. This is the preferred alternative.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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

LIST OF APPENDICES

(Appendices appear in Volume 5)

Appendix

- 3-1 Report of 1983 Field Investigations
- 3-2 Aquatic Resource Inventory of Southern Utah Fuel Company Permit Area
- 3-3 Wildlife Assessment of the Southern Utah Fuel Company Mining Property and Adjacent Areas
- 3-4 **Raptor and General Avifauna Studies**
- 3-5 Fauna of Southeastern Utah and Life Requisites Regarding their Ecosystems
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- 3-7 Power Line Correspondence
- 3-8 Bat Survey for the SUFCO Mine
- 3-9 Vegetation and Wildlife of the Pines Tract Project.
- 3-10 Monitoring and Mitigation Plan for Mining Under the East Fork of Box Canyon
- 3-11 Muddy Creek Technical Report-Wildlife
- 3-12 Mexican Spotted Owl Survey Muddy Tract
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- 3-15 **3R4E & 4R4E Reports (Confidential)**

CHAPTER 3 BIOLOGY

3.10 Introduction

This chapter presents a description of the biological resources found on the SUFCO Mine site. The mine is located approximately 30 miles east of Salina, Utah.

Several consultant reports will be referenced in this M&RP, so for simplicity purposes the report titles will appear as the following abbreviations:

- EPS - Report of Studies of Vegetation and Soils for SUFCO Mine - 1980 (Appendix 2-2)
- INV - Report of 1983 Field Investigations - 1983 (Appendix 3-1)
- AQU - Aquatic Resource Inventory of Southern Utah Fuel Company Permit Area - 1980 (Appendix 3-2)
- WIL - Wildlife Assessment of the Southern Utah Fuel Company Mining Property and Adjacent Areas - 1980 (Appendix 3-3)
- RAP - Raptor and General Avifauna Studies - 1980 (Appendix 3-4)
- FSW - Fauna of Southeastern Utah and Life Requisites Regarding their Ecosystems - 1990 (Appendix 3-5)
- VWP - Vegetation and Wildlife of the Pines Tract Project - 1999 (Appendix 3-9).

Reports in the appendices are provided only to present Baseline Data in support of the Mining and Reclamation Plan. Proposals or recommendation presented by consultants were duly considered in preparation of the Mining and Reclamation Plan chapter commitments but not all of them were determined to be appropriate or advisable.

3.1.1 Vegetative, Fish and Wildlife Resources

Vegetative, fish and wildlife resource conditions in and adjacent to the SUFCO Mine are discussed in Section 3.20.

snowberry, and sagebrush. Grasses and forbs are very sparse and include several native species." (Blumer, 1979)

The plant communities identified within the proposed permit area are (see Plate 3-1):

- Sagebrush-grass
- Grass-black sagebrush
- Mountain Brush (oak, serviceberry, mountain mahogany, etc.)
- Aspen
- Aspen-oak
- Aspen-Douglas fir-limber pine
- Mountain mahogany-oak-ponderosa pine
- Douglas fir-spruce-limber pine
- Pinyon-juniper-mountain mahogany
- Limber pine
- Ponderosa pine-mountain mahogany-manzanita
- Pinyon-juniper-Douglas fir
- Wiregrass-foxtail-haplopappus
- Douglas fir-spruce-limber pine-aspen
- Limber pine-mountain mahogany-serviceberry
- Mountain mahogany
- Pinyon-juniper
- Douglas fir & other
- Riparian
- Ponderosa pine-douglas fir-aspen-serviceberry
- Grassland-perennial forbs
- Sagebrush
- Mountain brush
- Conifer timber
- Mixed
- Barren ground
- Aspen-deciduous forest

Additional plant communities are designated on Plate 3-1.

Field sampling of these plant communities was initially done in July of 1983 and the findings were documented in the INV report. A Level II riparian inventory has been conducted along portions of East Fork of Box Canyon (USDA-USFS, 1993). The plant communities and reference areas are outlined on Plate 3-1. In 1999, another vegetation (and wildlife) report (VWP) was prepared for the proposed mine expansion called the Pines Tract Project. Vegetation communities were described and shown on a map included in that document, most of which are also listed in the plant communities shown above. The vegetation types in the SITLA Muddy Tract were identified by Cirrus and reported in EIS documents for the entire BLM and SITLA Muddy Tract. The vegetation types in the SITLA Muddy Tract are illustrated on Plate 3-1. This plate will be updated in the appropriate season of 2006 to more clearly indicate types and extent of vegetation in the SITLA Muddy Tract. As of October 2005, the available Forest Service information used to create the map is essentially correct but Sufco has agreed the vegetation boundaries and descriptions can be further refined. The work to be performed in 2006 will include the evaluation of available aerial photos of the area by a qualified person who then will create an updated vegetation map of the tract. The updated version of the plate will be submitted to the Division before the end of 2006.

A description of the potential impacts of mining on vegetation is included in Section 3.3.3.3 of this permit.

4 Right 4 East Panel(s)

At approximately 11:30 AM on April 24, 2017 a walking survey of the surface above and immediately adjacent to the panel was conducted by a qualified CFC employee. Vegetation types ~~to~~ were documented ~~vegetation types contained~~ within the potential subsidence impact area above the 4R4E panel and adjacent areas (See the 4R4E Projected Subsidence Map in Appendix 6-4). ~~These~~ The vegetation types found during the survey include the pinyon-juniper, sagebrush/grass, and mountain sagebrush types of the desert shrub biome. These findings ~~are~~ ~~verified~~ coincide with data found in an environmental assessment and a supplemental environmental assessment completed in 1988 and 1989 respectively. Appendix 2-7 contains the aforementioned EA and supplemental EA associated with the Quitchupah Lease. Refer to Plates 5-6 and 5-7 of the M&RP for information regarding the location of both the Quitchupah Lease and the 4R4E panel. The findings of the walking survey also coincides with data shown on Plate 3-1.

In October of 1988 an environmental assessment of the Quitchupah Lease area was performed by personnel from the Forest Service and Bureau of Land Management. During the assessment 6 Golden Eagle nests were located.

The SUFACO Mine portions of the annual raptor surveys conducted by UDWR are located in Appendix 3-4 in the Sufco Mine MRP Confidential file. Future annual raptor surveys will be submitted each year in the annual report to the Division.

Most raptor nest locations are located outside the current planned mining subsidence areas. Any raptor nest that has a potential to be disturbed by subsidence will be evaluated with DWR and FWS. An appropriate plan of action will be developed on a case by case basis.

The Prairie Falcon has also been reported by U.S. Forest Service and Bureau of Land Management personnel for the planning unit that encompasses the SUFACO Mine area.

The Quitchupah Drainage, of which Link Canyon is a tributary, was identified in the Quitchupah Creek Road DEIS (2001) as not likely to contain Mexican Spotted Owls and dedicated surveys were not necessary. However, the Manti-La Sal National Forest reported that a Mexican Spotted Owl survey of the area was being conducted as part of their Muddy Creek EIS Data Adequacy study. Results of surveys conducted in 2002 and 2003 indicated no Mexican Spotted Owls were found in the Link Canyon Portal area or the Muddy Tract area (Appendix 3-12). Additionally, Sufco does not plan to conduct construction activities during the nesting and rearing times (February 1 through August 31) of the owl.

The lack of permanently running water has an effect on raptors. Many species, such as accipiters, appear to rely on streams and the associated riparian vegetation (Hennessy, 1978).

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.

4 Right 4 East Panel(s)

The 4R4E panel is located in sections 27 and 34, Township 21 South, Range 5 East. It is located in Dry Fork Canyon perpendicular and west of the North Fork of Quitchupah Creek. 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 Quitchupah lease boundary, two were active, two were tended and the remaining six were inactive. There were no nests located within a 0.5 mile radius around the current location of the 4R4E panel during these surveys. The nests in Dry Fork Canyon were re-surveyed in April, May and June of 2017. Four inactive Golden Eagle nests were found (793GoEa, 794GoEa, 795GoEa, 315GoEa) within a 1.5 mile radius around the 4R4E panel. These surveys show that there are no active or in-active nests within 0.25 miles from the area of potential subsidence above the 4 Right 4 East panel (See the 4R4E Projected Subsidence Map in Appendix 6-4). The permittee will perform raptor surveys before during and after mining as required by the division. These reports will be submitted annually to the division. The 2017 raptor survey reports are found in Appendix 3-4 and 3-15. Areas surveyed in these reports designated for the 3 Right 4 East panel also apply to the 4 Right 4 East panel.

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.

4 Right 4 East Panel(s)

The 4R4E panel is located in the southern portion of the Quitcupah Lease (See Plates 5-6 and 5-7 of the M&RP). The panel is located ~~just outside of~~ within what is considered crucial or critical winter range for deer and elk. The escarpment in the southeastern portion of the tract which lies between Quitcupah Canyon and Link Canyon is known as an elk migration route, providing access to and from the winter range from the plateau top (See Plates 3-2 and 3-3 of the M&RP). The permittee is obligated to monitor and mitigate subsidence that poses a risk to livestock and wildlife as soon as feasibly possible. This will be done according to the subsidence monitoring plan (See Section 5.2.5.1) and mitigation commitments (See Sections 3.3.3.3 and 3.4.1.2) within the MRP. An effort will be made by the permittee to monitor subsidence between 60 and 90 days following completion of the 4R4E longwall panel or as soon as access is feasible. The permittee recognizes that this time constraint commitment only applies to the 4R4E panel.

4 Right 4 East Panel(s) - Greater Sage-Grouse

Data provided to the public by the Utah Division of Wildlife Resources (UDWR) shows approximately 30,000 acres of designated sage grouse habitat north of where the 4R4E panel is located. A small portion of the panel is located in this area, but the majority of the panel lies outside of the designated habitat boundary. After consulting with UDWR, division (DOGM) personnel determined that the proposed 4R4E panel is not likely to have an impact on sage grouse lekking, nesting, or brood-rearing activity.

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.

3-14A

Habitats of Unusually High Value. The area of potential impact contains a variety of important habitats for several species that are considered of "high interest" to various management agencies because these species are of economic or recreational value. There are ten recognizable vegetation habitats from a faunal standpoint: chaparral (ponderosa pine, curl-leaf mountain mahogany, manzanita, aspen), spruce-fir (englemann spruce, douglas fir, sub-alpine fir, white-fir), aspen, sagebrush, mountain brush (oak, curl-leaf mountain mahogany, smooth-leaf mountain mahogany, service berry sagebrush), streamside, pinyon-juniper, ponderosa pine, grass, and scotch pine-spruce. Conifer, aspen, high sage and meadow areas on Duncan Mountain are used as summer range and calving areas for elk and summer range for mule deer. Ponderosa pine along ridge tops are heavily used by elk during the late winter, early spring and occasionally during the summer. The cliff areas harbor mountain lion, bobcat and bear. Mountain brush habitats are heavily utilized by deer and elk during the winter and spring. Deer and elk winter on the lower elevation areas, particularly in the vegetation communities traversed by the access road (WIL, pgs. 2-3, Appendix 3-3).

Literature and field data were summarized for all terrestrial vertebrates of concern, and the species categorized to determine habitat affinities and high interest species status. These results are reported in tabular form (WIL, Tables 3 through 5, Appendix 3-3). They are listed according to their various ecological classifications. All species whose ranges appear to overlap any or all of the potential area of impact are listed. Generally speaking, the project area could potentially be inhabited by 64 mammalian, 8 amphibian and 14 reptilian species (Wasatch Plateau, Appendix 3-5). Some of these are considered high interest species for the habitats and local area of concern.

Since the immediate area of the mine portal, access roads, loading and storage facilities has already been lost as habitat, concern will be given to revegetation with species that will not only benefit, but promote wildlife.

The cliffs in Quitchupah Canyon are habitat for cougar. The observed animals seem to use them for denning activities. Therefore care has been taken to avoid placement of portal openings where there are caves or other natural denning sites. There are a limited number of trails going from the

plateau area through the cliffs to the valley floor to the southeast. It appears that these trails are important to elk migration from summer to winter range, and therefore construction of ventilation portals has not been allowed to interrupt this limited number of access routes.

No endangered or threatened mammal species occur within the mine boundary as recorded in a study performed by H. Duane Smith and Clyde L. Pritchett (WIL, Appendix 3-3).

A peregrine falcon eyrie existed in 1997 about one half mile from the site but during aerial surveys conducted in 1998 and 1999 no falcons were sighted. Discussion about threatened, endangered or otherwise sensitive plant and animal species of the Pines Tract Project area is given in Appendix 3-9.

The disturbed area of the Link Canyon Mine Portals contains approximately 0.05 acres (2000 square feet) of riparian vegetation typified by willow, alder, stinging nettle, rose, horsetail, carex, Kentucky Bluegrass, rush, and clematis (Zobell, 2000). A vegetation study of the western portal area was conducted by Mt. Nebo Scientific in July 2002 and September 2013. The 2002 report of this study includes a detailed map of the western portal area vegetation. A copy of the reports are included in Appendix 2-9. The vegetation is supported by discharge from the abandoned Link Canyon Mine and subsurface moisture within the Link Canyon Drainage. Only the western-most portal area will be disturbed as part of Sufco's plan to re-open Link Canyon portals to establish an escape-way and ventilation for mining in the Pines Tract and access to the Link Canyon substation. The natural discharge of water from the portals will be maintained at rates similar to those that existed prior to reopening of the western portal. Only water from the existing abandoned works will be allowed to discharge from the portals. Thus, no harm due to a reduction in flow is anticipated to the riparian areas downstream of the portals. Additionally, the discharges from the portals have the potential to remain after the western Link Canyon Portal is reclaimed.

A vegetation study was performed by Keith Zobell from 2000 through 2013(discontinued). The reports identified the vegetation and their associated vigor at the Link Canyon Mine portal which has been similar for the past thirteen years. The primary impacts to the vegetation have been from grazing and drought conditions. Discharge for the portal has been discussed in these reports, the

water discharge has been low to non-existent the majority of the years. The drainage adjacent to the portals runs with waters associated with storm events. Refer to Appendix 2-9 for a copy of the study information collected in 2013, study information from previous years is located in the annual reports for the corresponding years.

Species of High Federal or State Interest. The species of interest to the state of Utah are listed on Table 3-2. The species are divided into eight categories (extinct, extirpated, endangered, threatened, declining populations, limited distribution, declining populations/limited distribution and conservation). The Western Bluebird classified as sensitive, appears to be restricted to the Ponderosa Pine as a nesting bird. It can be locally common and its habitat is widespread over the state. It therefore does not represent any special problem in the lease area.

Sensitive Species of High Federal Interest. The species of interest to the federal Forest Service are listed on Table 3-3. The species are all sensitive as determined by the FS MLS Sensitive Species List and have the potential to occur within the permit area.

The Link Trail Columbine is the only Forest Service Region 4 sensitive species known to exist on the mine areas called the Pines Tract and Muddy Tract. SUFCO monitors populations of the Link Trail Columbine within the East Fork of the Box Canyon where it has been determined that mining might negatively affect the populations within the permit area. A discussion about threatened, endangered or otherwise sensitive plant and animal species of the Pines Tract Project area and Muddy tract is given in Appendices 3-9 and 3-11.

150-Acre Incidental Boundary Change. Sensitive species listed in Table 3-3 may be found within the boundary area. Species of most concern are the Link Trail columbine, Northern Goshawk, Northern Three-Toed Woodpecker, Flammulated Owl, and the Spotted Bat.

- Link Trail columbine - No populations have been found within the 150 acre IBC area. The boundary area is located on a plateau. Adjacent to the boundary area is Box Canyon that has suitable habit for this vegetation. A survey of the canyon will be conducted to locate representative populations of the columbine. The

was also a part of an Environmental Assessment in 1981 as part of the lease application package.

3.2.2.3 Fish and Wildlife Service Review

If requested, the applicant authorizes the release of information pertaining to Section 3.2.2 and 3.3.3 to the U.S. Fish and Wildlife Service Regional and Field office for their review.

3.2.3 Maps and Aerial Photographs

The lease area was mapped by use of a mosaic of aerial photographs and assured by ground inspection. Vegetation sampling locations/reference areas are shown on Plate 3-1.

3.2.3.1 Location and Boundary of Proposed Reference Area

The locations of the vegetative reference areas are found on Plate 3-1. Area 13 shown on Plate 3-1 is to be used as a mapping unit only and not a reference area or validation site. Site 12 will be used as the reference area for the minesite sedimentation pond area.

3.2.3.2 Elevations and Locations of Monitoring Stations

Raptor nest locations and elk and deer range are shown on Plate 3-2 and 3-3. The permit area contains no fish monitoring stations.

3.2.3.3 Facilities for Protection and Enhancement

Sections 3.3.3.3 and 3.5.8.5 contain additional discussion pertaining to protective measures taken by the applicant in behalf of wildlife.

Power lines within the SUFCO Mine permit area were modified during the summer of 1981 to comply with the guidelines of REA Bulletin 61-10, "Power Line Contacts by Eagles and Other Large Birds" (see Plate 5-5 for the power pole locations).

3.2.3.4 Vegetation Type and Plant Communities

Vegetative types and plant communities are outlined on Plate 3-1 of this application.

Table 3-3

USDA-FS Region 4 Sensitive Species - Fishlake and Manti-LaSal
 February 2013-June 2016

<u>Plants</u>		<u>Status</u>
Link Trail Columbine	<u>Aquilegia flavescens var. rubicunda</u>	K
Cruetzfeldt-flower Cryptanth	<u>Cryptantha creutzfeldii</u>	K
Carrington Daisy	<u>Erigeron carringtoniae</u>	K
Canyon Sweetvetch	<u>Hedysarum occidentale var. canone</u>	K
Maguire Campion	<u>Silene petersonii</u>	K/P
Musinea Groundsel	<u>Senecio musinensis</u>	K
Arizona Willow	<u>Salix arizonica</u>	K
Wonderland Alice Flower	<u>Aliciella caespitosa</u>	K
Chatterley Onion	<u>Allium geyeri var. chatterleyi</u>	K
Sweet-flower Rock Jasmine	<u>Androsace chamaejasme ssp. Carinata</u>	K
Bicknell Milkvetch	<u>Astragalus consobrinus</u>	K/P
Isely's Milkvetch	<u>Astragalus iselyi</u>	K
Deseret Milkvetch	<u>Astragalus desereticus</u>	P
Heliotrope Milkvetch	<u>Astragalus limnocharis var. montii</u>	K
Tushar Paintbrush	<u>Castilleja parvula var. parvula</u>	K
Pinnate Spring-parsley	<u>Cymopterus beckii</u>	K
Abajo Peak Draba	<u>Draba abajoensis</u>	K
Mt. Belknap Draba	<u>Draba ramulosa</u>	K
Creeping Draba	<u>Draba sobolifera</u>	K
Nevada Willowherb	<u>Epilobium nevadense</u>	K
Abajo Daisy	<u>Erigeron abajoensis</u>	K
Kachina Daisy	<u>Erigeron kachinensis</u>	K
Maguire Daisy	<u>Erigeron maguirei</u>	K
LaSal Daisy	<u>Erigeron mancus</u>	K
Elsinore Buckwheat	<u>Eriogonum batemanii var. ostlundii</u>	K
Canyonlands Lomatium	<u>Lomatium latilobum</u>	K
Fish Lake Naiad	<u>Nafas caespitosa</u>	K
Beaver Mountain Groundsel	<u>Packera castoreus</u>	K
Little Penstemon	<u>Penstemon parvus</u>	K
Ward Beardtongue	<u>Penstemon wardii</u>	K

Bicknell Thelesperma	<u>Thelesperma subnudum var. alpinum</u>	K
Barneby Woody Aster	<u>Tonestus kingii var. barnebyana</u>	K
Sevier Townsendia	<u>Townsendia jonesii var. lutea</u>	K
Last Chance Townsendia	<u>Townsendia aprica</u>	K
San Rafael Cactus	<u>Pediocactus despainii</u>	K
Winkler Cactus	<u>Pediocactus winkleri</u>	P
Clay Phacelia	<u>Phacelia argillacea</u>	P
Ute Ladies' Tresses Orchid	<u>Spiranthes diluvialis</u>	K

Mammals

Townsend's Western Big-eared Bat	<u>Corynothinus townsedii townsendii</u>	K
Spotted Bat	<u>Euderma maculatum</u>	K
Bighorn Sheep	<u>Ovis canadensis</u>	K
Pygmy Rabbit	<u>Brachylagus idahoensis</u>	K
Utah Prairie Dog	<u>Cynomys parvidens</u>	K

Birds

Northern Goshawk	<u>Accipiter gentilis</u>	K
Flammulated Owl	<u>Otus flammeolus</u>	K
Northern Three-toed Woodpecker	<u>Picoides tridactylus</u>	K
Bald Eagle	<u>Haliaeetus leucocephalus</u>	K
Greater Sage-grouse	<u>Centrocercus urophasianus</u>	K
Peregrine Falcon	<u>Falco peregrinus anatum</u>	K
Yellow-billed Cuckoo	<u>Coccyzus americanus</u>	K/P
Southwestern Willow Flycatcher	<u>Empidonax traillii extimus</u>	K
Mexican Spotted Owl	<u>Strix occidentalis lucida</u>	K

Fish

Colorado River Cutthroat Trout	<u>Oncorhynchus clarki pleuriticus</u>	K
Bonneville Cutthroat Trout	<u>Oncorhynchus clarki utah</u>	K
Southern Leatherside Chub	<u>Lepidomeda aliciae</u>	K
Greenback Cutthroat Trout	<u>Oncorhynchus clarki stomiua</u>	K

Amphibians

Columbia Spotted Frog	<u>Rana luteiventris</u>	K
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Boreal Toad

: Bufo boreas

K

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

K - Known distribution species and or habitat

P - Suspected species or potential habitat

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Noise, created from operation of the mine, is not expected to increase in the existing areas of disturbance associated with the mining activity, not even with the addition of any ventilation intake portals along the cliffs. These portals are only for intake air. The ~~present~~ existing exhaust fans are at the mine site and at the 4 East Portal in Quitchupah Canyon (for location refer to Plate 5-2C).

Efforts have already been made to minimize wildlife loss and/or harassment associated with operation of the mine. Speed limits are set and posted on the county controlled access road to the mine to alert drivers to the presence of wildlife. Although the danger of road strikes is more harmful to wildlife than transportation vehicles, there is the potential for loss of human life and equipment damage. Therefore avoiding collisions has become a practical company policy. Wildlife crossing areas or sites of limited visibility are adequately marked. The applicant has instituted the use of a commuter bus to reduce traffic and emissions on the access road from Salina, Utah to the mine. SUFCO prohibits the discharge of firearms by employees on the road in East Spring Canyon (portal site). In conjunction with this restriction, the Applicant has initiated an employee education program to reduce harassment and disturbance of wildlife during sensitive stages in their life history.

Perhaps the most promising mitigation action is that of enhancement or maintenance of wildlife habitat. Enhancing wildlife habitat away from the mine area will improve habitat, possibly increase wildlife numbers, and attract wildlife away from impacted areas. Since much of the area is public domain, wildlife habitat enhancement is a viable management tool. However, any such effort should be carefully coordinated among appropriate regulatory agencies. Some examples of these measures include:

1. Development of springs, wells or other water supplies outside the mine area.
2. Fencing of developed water sources to restrict cattle trampling of vegetation, control erosion, and provide non-game habitat;
3. Altered livestock management policies, to avoid potential competition with wildlife.
4. Control of other human-related impacts, including recreation and timber harvest.

Revegetation of disturbed areas, as part of the reclamation effort, will include a mixture of grasses, forbs, shrubs and trees.

The total disturbed area acreage to be revegetated is small enough that fencing is considered to be an economically feasible means of protection, if deemed necessary. If grazing animals do prove

3.3.3.1 Minimized Disturbance to Endangered or Threatened Species

The applicant will apply all methods necessary to minimize disturbances or any adverse effects to species listed on Tables 3-1 and 3-2. Potentially adverse impact on wildlife and related environmental values will be avoided or minimized through the implementation of mitigation measures. The Applicant will operate and maintain all transportation systems and support facilities under its control in a manner that minimizes impacts.

3.3.3.2 Species and Habitats

All species and habitats within the permit area will be protected to the best of the applicants ability. Wildlife habitat protection will be considered in the construction of all future facilities. For additional information, see Section 3.3.3.3.

3.3.3.3 Protective Measures

The county access road traverses known deer winter range where deer feed along and readily cross the road making them vulnerable to the coal hauling trucks. Although deer can habituate to traffic thus reducing road strikes, more deaths occur than are desirable.

In the construction of the ventilation portals along canyon walls consideration is given to potential cougar denning and resting sites. When portals are opened to the outside from the underground mine and not from the outside in, little actual habitat is lost to the wildlife of the area.

During breeding seasons, disturbance by man can negatively affect reproductive success by disrupting territorial selection or defense, interrupting courtship displays and disturbing mating animals.

Young animals need to be undisturbed during parturition, lactation and the early rearing process. It is during this time that young animals gain the strength and ability to elude predators and man. Undisturbed habitats allow the young animals to develop in a relatively unstressed situation and to utilize habitats that are secure from predators.

The company will make every effort to educate all employees associated with the SUFCO Mine operation to the intricate values of the wildlife resources associated with the mine area. Each employee will be advised not to unnecessarily or without proper permits or licenses harass or take any wildlife. It is especially important that wildlife not be harassed during sensitive periods in their life history. During winter, wildlife are often in a delicate energy state and unnecessary disturbance by man causes them to use up critical and limited energy reserves that may result in mortality. In less severe cases the fetus being carried by gestating mammals may be reabsorbed or aborted thus reducing reproductive success and productivity of the population. Surface activities are curtailed from November 1 through April 1, and between May 1 and July 1 in the calving area, except in the portal areas, so as not to disturb wintering elk. Employees will be encouraged to report violators to the proper company and management authorities for reprimand or prosecution. Employees should be impressed that they as hunting and recreation users stand to gain the most by preserving what they have in proximity to their places of work and abode.

Livestock and wildlife will be protected from the effects of mining related subsidence to the extent possible. Surface cracks that open to the point of creating a physical hazard to livestock and wildlife will be mitigated. This mitigation may include but not limited to backfilling the cracks with available local native materials and soil, partially backfilling with imported fill, or simply reshaping of the nearby ground surface to lessen the offset or abruptness of the crack faces and depth. The repaired areas will then be reseeded with a seed mix appropriate to the area and one approved by the Division and land owner/agency. Several such mitigation efforts have already been successfully conducted in the Quitcupah and Pines Tract areas.

Subsidence induced seismicity has not been noted to have an adverse impact on livestock or wildlife in the existing mined portions of the Sufco permit area. It is not anticipated the impact to wildlife and livestock due to mining induced seismicity will change or increase as the permit area is expanded into new lease areas.

Areas with suitable habitat for raptor nesting that have a potential to be disturbed by subsidence caused by mining will be surveyed using aerial or ground surveys prior to mining. Raptor nests that have a potential to be disturbed by subsidence will be evaluated with the Division of Oil Gas and Mining and with DWR/FWS if required. Following the evaluation an appropriate plan of action will be developed on a case by case basis. The applicant will obtain any permits necessary for disturbance of the nest if this is the course of action decided upon.

A summary of the information reported in the raptor survey (annual) and the survey will be provided to the Division within three months following the receipt and review of the survey by the permittee. The summary will include a drawing correlating the surveyed nest locations with the areas of potential subsidence anticipated at the time of report submittal.

The Link Canyon Substation No. 1 pad area has an old historic golden eagle nest (#31) that was not found during the 1997 Raptor Survey and a tended falcon scrape (#33) within the buffer zone. These two nests will not be disturbed with the planned mining activity. To protect these nests during the construction of the Substation No. 1 pad the nests will be avoided, and the timing of the construction activity will be after the nesting period of August 15, 1998.

In Link Canyon during the 1998 Raptor Survey a new tended golden eagle nest was found (#321) and the other old historic golden eagle nest sites (#31, and #32) and the falcon scrape (#33) were not found.

In Link Canyon during the 1999 Raptor Survey the golden eagle nest (#321) was inactive and the other old historic golden eagle nest sites (#31, and #32) and the falcon scrape (#33) were not found. Golden eagle site #32 was renumbered in the 1999 survey as #799 and the old historic site #31 shown next to the Link Canyon road and Substation No. 1 pad was deleted.

To protect these nests during the construction of the Substation No. 2 pad the nests will be avoided. The timing of the construction activity started on October 15, 1999 with the construction of a small 20'x 30' pad for drilling the power cable boreholes out from within the mine, casing the boreholes, and pulling power cables into the boreholes. The construction of the proposed Substation No. 2 pad and substation will be started right after the drilling and power cables are completed in February, weather permitting. Construction activities began before and continues into the nesting season, any birds wanting to use these old nests in the area would be able to choose if they can tolerate the disturbance. These nests will be monitored during the construction period to see if they are being used.

After the Link Canyon Substation is in place very little mining activity will occur in the area with only emergency maintenance and monthly electrical inspections required. This maintenance and inspection activity will be similar to general public access on the road. Minor maintenance and monthly inspections will only require a pickup truck, ATV or snowmobile going up the canyon for access to the substation. Any major maintenance requiring heavy construction equipment will

require monitoring from December 1 to April 15 for big game winter range and from January 1 to August 15 for raptors and will require a clearance from the DWR and USFS.

Construction associated with the reopening of the western Link Canyon Mine portal, will require minimizing activities that disturb big game from December 1 to April 15. Construction activities from January 1 to August 15 will require a clearance from the DWR and US Fish and Wildlife Service because of potential disturbance to nesting raptors. This proposed project is located in a MMA (Minerals Management Area) in the Manti-La Sal forest plan (Figure 3-15, Management Area Direction, Manti-La Sal National Forest Pines Tract Project, Final Environmental Impact Statement, January 1999). A GWR (General Big-Game Winter Range) Management Unit is located adjacent to the MMA Management Unit. Although this direction does not apply to the adjacent MMA Management Unit where the current proposal is located, the Manti-La Sal National Forest Record of Decision considered this management direction. Direction for operations in adjacent GWR Management Units calls for minimizing potential conflicts. The current proposal will have negligible effects to wintering big game because there will be very little activity at the site following the initial short-term construction activity (pages 14-15, Manti-La Sal National Forest, SUFCO Mine Link Canyon Portal Record of Decision, Oct. 10, 2002). The area will be surveyed for raptor nests. If any are found within the prescribed buffer zone, they will be monitored for activity and work at the portal site will occur following the same guidelines as those described for the Link Canyon Substation.

Mining within the SITLA Muddy Tract will be limited to underground activities; no surface disturbance, other than exploration drilling, is anticipated in this area. Exploration drilling is typically handled by the Division under a separate permit application process. No known raptor nests are known to exist within the SITLA Muddy tract where subsidence will occur. However, if future raptor monitoring finds any raptor nest that has a potential to be disturbed by subsidence, the nest and potential damage will be evaluated with DWR and FWS. An appropriate plan of action will be developed on a case by case basis. The Division of Oil Gas and Mining will be informed in advance when such an evaluation is necessary. The applicant will obtain any permits necessary for disturbance of the nest if this is the course of action decided upon.

Generally, vegetation within the lease and permit areas outside of disturbed areas is protected from mining related impacts, such as subsidence, by the depth of overburden and depth of soil. Experience in mining the Pines and Quitchupah leases has shown that upland vegetation does not appear to be significantly affected by subsidence. Cracks that form in the soil tend to heal quickly and the majority of the vegetation in the area of surface cracks does not appear to be suffering

from undue stress. The only cases of damage to vegetation related to mining appears to occur when subsidence cracks form in areas where a brittle sandstone body is near the surface with little soil cover and a crack either visibly bifurcates a plants root system or opens wide enough for soils and small plants to fall into. In a few locations, tree roots have been weakened by surface cracks and have resulted in the trees toppling shortly after the cracking occurs. This impact appears to be typically limited to areas near a canyon rim such as in the West and East Forks of Box Canyon. In areas where there are at least a few feet of soils over bedrock, such as in the previously mined portions of the Quitcupah Lease, this phenomenon has not been observed. Significant impacts to upland vegetation from subsidence are not anticipated in the SITLA Muddy Tract since most of the tract area has a relatively thick mantle of soils.

The depth of overburden in the SITLA Muddy Tract ranges from 900 to nearly 2200 feet. Areas projected to be undermined are covered by a minimum of 1000 feet to a maximum of 2100 feet. Most of the vegetation in the tract is found to be growing in the Price River and the North Horn Formations where the depth of cover is at least 1000 feet. Where these formations are exposed to mining induced subsidence in the Sufco area, the formations tend to react more plastic than brittle and subsidence crack formation is often muted. Subsidence cracks in thick soils and heavily weathered bedrock near the ground surface will frequently heal or fill in a relatively short period of time. Because of the depth and type of cover, Sufco anticipates there will be little impact to upland vegetation due to the subsidence. Subsidence cracks that form that are determined to be a safety hazard will be mitigated as discussed previously in this section.

The applicant has implemented a program to monitor the effect of subsidence on the vegetative communities. The applicant uses color infrared photography (CIR) to document changes to vegetation. This CIR coverage was begun in 1987 and will be updated at least every 5 years.

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.

4 Right 4 East Panel(s)

Should a seed mix be required to be used on soil filled subsidence cracks the seed mix previously used for the sinkhole repair and reclamation project will be used. See section 3.4.1.2 for information regarding the sinkhole project seedmix. Soils used to fill subsidence cracks which receive seed will not receive mulch or fertilizer. 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

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 SUFCO 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 SUFCO 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 SUFCO 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 SUFCO 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 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 SUFCO 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 SUFCO Mine Quitchupah 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.

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 SUFCA 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."

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 impacted were anticipated during the repair of the sinkhole. Clearance for the repair of the sinkhole was give 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.

4 Right 4 East - Quitchupah Tract

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 (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).

During the 2017 Paleontology Resource Appraisal of the 4 Right area the Castlegate and Price River formations were determined to have little potential for the preservation of vertebrate fossils. 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).

Because the Mine has no plans to cause surface disturbance within the project area, a Class III cultural resource inventory was only required by the USFS in areas with a high potential for subsidence where cultural resources existed and could be adversely impacted. Historically, the areas include canyon walls and their associated rims. The inventory was conducted in portions of Sections 27 and 34. Two new sites were recorded adjacent to the 4 Right panel in Section 27

(42SV3786 and 42SV3787) neither was considered to be eligible to be listed by SHPO as recommended by the USFS. The cultural resource inventory and SHPO concurrence letter agreeing with USFS in not listing the new sites are located in Appendix 4-2 (Confidential). Two isolated objects were also located in Section 34 during the inventory. There are no known cultural and paleontological resources above the 4 Right 4 East panel and within the potential subsidence angle-of-draw.

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.

CHAPTER 5
ENGINEERING

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- 5-5 Experimental Coal Mining Program Approval
- 5-6 Leach Field Permit
- 5-7 Slope Stability Analysis
- 5-8 Access Road Stability Evaluation - Dames & Moore, 1981
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- 5-11 Upper Mine Yard Details
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- 5-14 4R4E Panel Location

- o No subsidence or caving operations will be conducted to affect any portion of the right-of-way of this road within 100 feet of the underground entry system,
- o Surface activities will be conducted in a manner that will not block the road, and
- o Water bars have been constructed on that portion of the road bordering the disturbed area adjacent to the mine surface facilities. Regular inspections of that portion of the road are conducted by mine personnel to ensure that erosion does not become a problem. In the event that material damage due to erosion as a result of mining activities is discovered on or along the side of this road, SUFCA Mine will repair this damage and implement additional runoff-control measures as needed.

Subsidence from underground mining operations may affect public-access dirt roads throughout the lease and permit areas . As part of the subsidence monitoring program, these roads will be regularly inspected. If material damage occurs to these roads as a result of mine subsidence, the roads will be repaired by SUFCA Mine.

Mining Sequence and Planned Subsidence. The mine plan for the SUFCA Mine is presented in Plate 5-7 (Upper Hiawatha seam) and Plate 5-8 (Lower Hiawatha seam). These maps show the boundaries of all areas proposed to be affected over the estimated total life of the coal mining and reclamation operations, including the size, sequence, and timing of mining of subareas to be affected beyond the present permit term. No surface disturbances are currently anticipated within the permit area beyond that presented in this M&RP.

Plates 5-7 and 5-8 also shows the location and extent of underground workings in which planned-subsidence mining methods will be used as well as areas where measures will be taken to prevent, control, or minimize subsidence and subsidence-related damage. The location of the waste-rock disposal area in relation to the underground mine workings, is discussed in Volume 3 of this M&RP.

Land Surface Configuration. Slope measurements for undisturbed areas adjacent to disturbed areas associated with the mine are shown on Plate 5-2A&B. Surface facilities at the site have been in existence since 1941. Pre-mining topographic maps do not exist. Therefore, the slope

will not allow mining to occur at the minimum height without putting quality at unacceptable levels. Much of the seam height in these areas is between 4-6 feet. Reserves are also lost to burn in these areas as a result of several promontories in the area which allow greater exposure of the outcrop to the atmosphere.

Mining is not planned on the northern portion of the SITLA Muddy Tract Lease ML 49443-OBA in the Upper Hiawatha Seam as a result of a sand channel and seam height that will not allow mining to occur.

The Lower Hiawatha seam will be mined in the northwest portion of the lease area where the interburden thickness between the Upper and Lower Hiawatha seams exceeds 30 feet. The mine plans are columnized or stacked where both seams are to be extracted. The Duncan seam does not contain sufficient minable reserves to warrant mining within the lease area.

The Duncan seam occurs about 100 to 130 feet above the Upper Hiawatha seam in a small portion of lease U-28297. The unsplit area of the Duncan seam is of small extent, probably less than 50 acres. Federal Lease U-28297 grants Canyon Fuel Company, LLC SUFCO Mine only the right to mine the Upper Hiawatha seam.

The Quitchupah Tract Resource Recovery and Protection Plan (R2P2) for Canyon Fuel Company, LLC SUFCO Mine is on file with the Bureau of Land Management. The R2P2 contains detailed mine plan and reserve calculations for all of the Quitchupah Tract leases operated by Canyon Fuel Company, LLC SUFCO Mine.

The Pines Tract Resource Recovery and Protection Plan (R2P2) for Canyon Fuel Company, LLC SUFCO Mine is on file with the Bureau of Land Management. The R2P2 contains detailed mine plan and reserve calculations for the Pines Tract lease operated by Canyon Fuel Company, LLC SUFCO Mine.

The SITLA Muddy Tract Plan of Operations Resource Recovery and Protection Plan (R2P2) for Canyon Fuel Company, LLC SUFCO Mine is on file with the State of Utah, School and Institutional

Trust Lands Administration. The Plan of Operations Resource Recovery and Protection Plan (R2P2) contains detailed mine plan and reserve calculations for the SITLA Muddy Tract lease operated by Canyon Fuel Company, LLC SUFCO Mine.

5.2.3 Mining Methods

A combination of room-and-pillar and longwall mining methods are used in the SUFCO Mine. The use of these two mining methods has been selected to maximize coal recovery and enhance production rates within the specific geologic constraints of the lease area.

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.

4 Right 4 East Panel(s)

The 4R4E panel is located within Lease U-63214 which is referred to as the Quitchupah Tract throughout the M&RP text, appendices and drawings. This lease was issued to the permittee in 1989, the tract was originally delineated in 1982. See Appendix 5-14, Plate 5-6, and Plate 5-7 for the 4R4E mine plan, lease locations, and mine timing respectively. Mining will occur only in the Upper Hiawatha coal seam. Overburden ranges approximately from 300-900 feet. The projected subsidence across the 4R4E panel ranges from 1-5 feet and the projected average subsidence is approximately 2 feet. See the 4R4E Projected Subsidence Map in Appendix 6-4. No surface disturbance, new surface

facilities or infrastructure will be associated with the mining of the 4R4E panel therefore no bonding with be needed.

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.

Mining Methods. As noted in Section 5.2.3, both room-and-pillar and longwall mining methods are used in the SUFCA Mine. The size, sequence, and timing for the development of the underground workings are shown on Plates 5-7 and 5-8.

Physical Conditions Affecting Subsidence. A detailed description of the physical conditions in the lease and permit areas that influence subsidence (i.e., overburden lithology and thickness, coal seam thickness, etc.) is provided in Chapter 6.

Subsidence Control Measures. Most of the land within the lease area will eventually be affected by subsidence. Anticipated areas of subsidence and those areas planned for protection from subsidence are shown on Plates 5-10 A, ~~5-10B~~ & 5-10C. The primary areas where subsidence is not anticipated are the areas overlying the pre-1977 workings in Lease SL-062583 shown on Plate 5-1 (referred to herein as the "Old Mine") and certain lease areas underlying Quitcupah Canyon, Box Canyon, and Muddy Creek.

The "Old Mine" area was mined in such a manner that coal pillars were left for support throughout the entire workings. Since these pillars are large enough to support the overburden and further mining is not anticipated in these workings, the surface area above the workings should not experience any subsidence.

Where perennial streams are not undermined they will be protected from subsidence by establishing stream buffer corridors within the mine from which only limited coal recovery will occur. Support pillars will be left in these locations to preclude subsidence. Underground stream buffers will only be crossed to the extent necessary to allow access to reserves. This access will consist of entries and cross cuts with support pillars. Entries that cross through the underground stream buffer corridors with less than 300 feet of cover will be sealed and/or backfilled upon abandonment using the best available technology to prevent disturbance of the overlying streams.

Protected cultural resource sites (~~see Plates 5-10AC, 5-10BC & 5-10CC located in the Sufco Mine MRP Confidential file~~) will be designed to include a buffer zone to protect the area from the effects of subsidence caused by underground full extraction mining. The width of the corridor will be

calculated as follows: the depth of overburden to the coal seam will first be established. This depth will be multiplied by $\tan 15^\circ$ to obtain the distance underground mining needs to be away from the area to not cause subsidence effects. An additional 25 foot buffer will be added to this calculated distance to account for minor irregularities in the course of the stream or cultural resource site.

Surface structures overlying the area to be subsided consist of trails, unimproved dirt roads, fences, runoff catchment ponds, and streams. The applicant will repair any subsidence caused damage to these or other structures to the extent economically and technically feasible, and will comply with R645-301-525.160 and R645-301-525.230. Additional mediation and remedial measures are described in Section 5.2.5.2 Subsidence Control.

Monitoring within the lease area has shown that subsidence rarely exceeds 50 percent of the mining height where the overburden thickness is greater than 800 feet. This overburden thickness is generally achieved above the rim of the Castlegate Sandstone (see Plates 5-10 A, ~~5-10B~~ & 5-10C). Topography above the Castlegate Sandstone is gently sloping while that within and below the sandstone outcrop contains cliffs and steep slopes. With the exception of the experimental mining practice described below, future subsidence is typically planned only for those areas above the rim of the Castlegate Sandstone where the overburden thickness exceeds 800 feet.

Experimental Mining and Subsidence. To protect the environmental resources associated with escarpments, SUFCO Mine currently has a general policy of precluding subsidence below the rim of the Castlegate Sandstone. This requires that significant quantities of coal remain unrecovered.

Pillars were extracted from room-and-pillar workings beneath two areas of escarpment. The location of these areas is shown on Plate 5-1. These areas involved a 5,000-foot section of escarpment on Federal lease (SL-062583) in East Spring Canyon (1977-78) and 2,000 feet of escarpment on Fee property (1983-88) on the east side of Quitcupah Canyon. The East

Three longwall panels were completed in 1987 as part of the project. The area of proposed escarpment subsidence (the "Experimental Mining Practice" area) is shown on Plate 5-1. The north ends of two of the longwall panels extended beyond the escarpment toward the canyon. The third longwall panel was located entirely beyond the cliff beneath the canyon wall.

To date, monitoring efforts associated with the experimental mining practice have established that subsidence has occurred in a predictable manner varying from one foot to seven feet with minimal surface disturbance. One of the independent sandstone blocks fell from the escarpment 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 have dropped several feet in some areas of the experiment. Monitoring stations have moved horizontally from a few tenths of a foot to nearly three feet. Post-mining monitoring of the surface above the longwall panels is continuing. A report which describes the experimental project and its results in greater detail has been prepared for submittal to the UDOGM.

Subsidence Monitoring. In 1976 (i.e., prior to the onset of subsidence), SUFCO Mine began collecting baseline topographic data from the lease area using conventional survey methods. The use of conventional survey methods for subsidence monitoring continued until 1985 (i.e., at the beginning of longwall mining), when the lease area was flown to establish a set of baseline photography and a grid of surface elevations. Where possible, elevations were photogrammetrically determined from this baseline photography on an approximate 200-foot grid. These original horizontal and vertical data, together with the original conventional-survey data, serve as the comparative database for determining ground movement in subsequent years. A baseline was also established to monitor changes in vegetative cover with the use of color infrared aerial photography (CIR). The first baseline was done in 1987 for the existing leases. The baseline for the Quitchupah lease was flown in 1988 with CIR. The applicant will follow up with CIR coverage of the leases at least every five years. The CIR photographs are stored at the SUFCO Mine. CIR photography was taken in 1990, 1995, 1999, 2003 (East Fork Box Canyon only), and 2004. The next projected CIR flight dates will be in 2008, 2013, and 2018.

Additional aerial photography of the lease area is currently obtained on an annual basis. New elevations are then determined at each of the previously-selected horizontal coordinates and the differences between the original and the new elevation measurements are used to generate a subsidence contour map. This map and supporting narrative are submitted annually to the UDOGM in the form of a subsidence report. This subsidence report outlines the history of subsidence at SUFCO Mine as well as the status of subsidence during the previous year.

Numerous control points have been established within the lease area to assist in the subsidence surveys (see Plates 5-10 A, ~~5-10B~~ & 5-10C). Current (2005) coordinates and elevations of these control points are provided in Table 5-2. Additional control points will be added as necessary when existing points become influenced by subsidence. Future points will typically consist of 3-foot lengths of No. 4 rebar embedded in concrete with a stamped brass cap for identification. Since geologic and mining uncertainties often force a change in planned mining sequences, future control points will be installed only after the mine panels are in their development phase.

All subsidence areas will be monitored and reported in the Annual Subsidence Report for a minimum of three years after no additional subsidence is detected within the area. The applicant will map and report areas 3 and 4 in the 1993 Subsidence Report as required by Division Order #93A issued May 11, 1993.

A annual monitoring program was developed to analyze the subsidence cracks related to undermining of the West Fork of Box Canyon. Mining in the area in 1999 did produce visible fracturing at the surface on both the northwest and southeast walls of the canyon in this area. The monitoring program includes measuring the offset and/or width of portions of selected subsidence cracks. Similar data will also be collected from specified segments of subsidence cracks that have occurred away from the walls of the canyon and do not appear to be influenced by the lack of bedrock support created by the canyon. Information gathered from this monitoring program, along with previous studies that SUFCO has performed, will be used to predict the effects of subsidence within other areas of the Pines Tract and other areas of the

mine where similar geomorphologic and geologic conditions occur. This program was developed and implemented by the Fall of 2000. Subsidence cracks in the area of the West Fork of Box Canyon were surveyed for their location. However, in the years 2000 through 2003 the width and/or offset of the cracks were not measured or the records were not kept. Width and/or offset measurements were made in the Fall of 2004 and will again be made in the Fall of 2005 and every year thereafter. It is believed by the permittee that any change in the width of the cracks can easily be tracked on an annual basis rather than a semi-annual basis. The permittee has observed that most subsidence cracks that develop in the mining area do not change significantly after the first 4 to 6 months following their creation. The crack measurement records will be reported in the mines annual report. Subsidence cracks in the area of the West Fork of Box Canyon are located in Longwall area 10 that has been mined out since 2001, and the area is now assumed to be dormant. 2008 will be the last year these cracks will be monitored since there will not be anymore movement in this area.

Anticipated Effects of Subsidence. Future subsidence in the lease area is anticipated to be similar to that which has occurred in the past. Subsidence is expected to average about 4 feet above longwall panels, with a draw angle of about 15 degrees. Tension cracks are expected to occur in areas of subsidence with these cracks healing to some degree following formation. Tension cracks are anticipated to be less pronounced above longwall workings than above continuous-miner workings.

Previous surveys have indicated that no substantial damage has occurred to vegetation as a result of subsidence within the lease area. The only effects observed have been exposed plant roots where tension cracks have formed.

It is anticipated that subsiding under portions of East Fork Box Canyon and South Fork Quitcupah will result in a slight flattening of the stream gradient, which will increase pooling of the stream through a stretch of several hundred feet of the stream. Cracks will also likely develop across the East Fork Box Canyon Creek directly above the longwall panels and along the gate roads. These crack zones will form shortly after undermining of the stream bed. They are anticipated to be 1 to 2 inches or less in width with these cracks healing to some degree following formation. Details of

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.

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, SUFCO 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 A, ~~5-10B~~ & 5-10C as not planned for subsidence. Based on experience and data collected from the lease area, the design of support pillars for those areas where subsidence is not planned has been based on the following equations:

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

where SF = safety factor against pillar failure (fraction)

SD = 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)

$$\begin{aligned} \text{OS} &= \text{overburden stress (psi)} \\ &= (d)(D_o)/144 \end{aligned}$$

$$d = \text{overburden depth (ft)}$$

$$\begin{aligned} D_o &= \text{overburden density (lb/ft}^3\text{)} \\ &= 160 \text{ lb/ft}^3 \text{ for the lease area} \end{aligned}$$

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

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

Correction of Material Damage. SUFCO Mine will try to plan mining operations so that no material damage occurs as a result of subsidence in the lease area. However, should material damage occur, SUFCO Mine will correct any material damage resulting from subsidence caused to surface lands to the extent technologically and economically feasible by restoring the land to a condition capable

of maintaining the value and reasonably foreseeable uses which it was capable of supporting before the subsidence. In addition, SUFCO Mine will either correct material surface damage resulting from subsidence caused to any structure or facilities by repairing the damage or compensate the owner of such structures or facilities in the full amount of the diminution in value resulting from the subsidence.

Protection of Significant Surface Resources. None of the following exist within the area of potential subsidence associated with the SUFCO Mine:

- o Public buildings or facilities,
- o Churches, schools, and hospitals,
- o Impoundments with a storage capacity of 20 acre-feet or more or bodies of water with a volume of 20 acre-feet or more,
- o Aquifers or bodies of water that serve as a significant water source for any public water supply system, or
- o Urbanized areas, cities, towns, or communities.

Hence, no special control measures are required to preclude subsidence impacts to these resources.

5.2.5.3 Public Notice of Proposed Mining

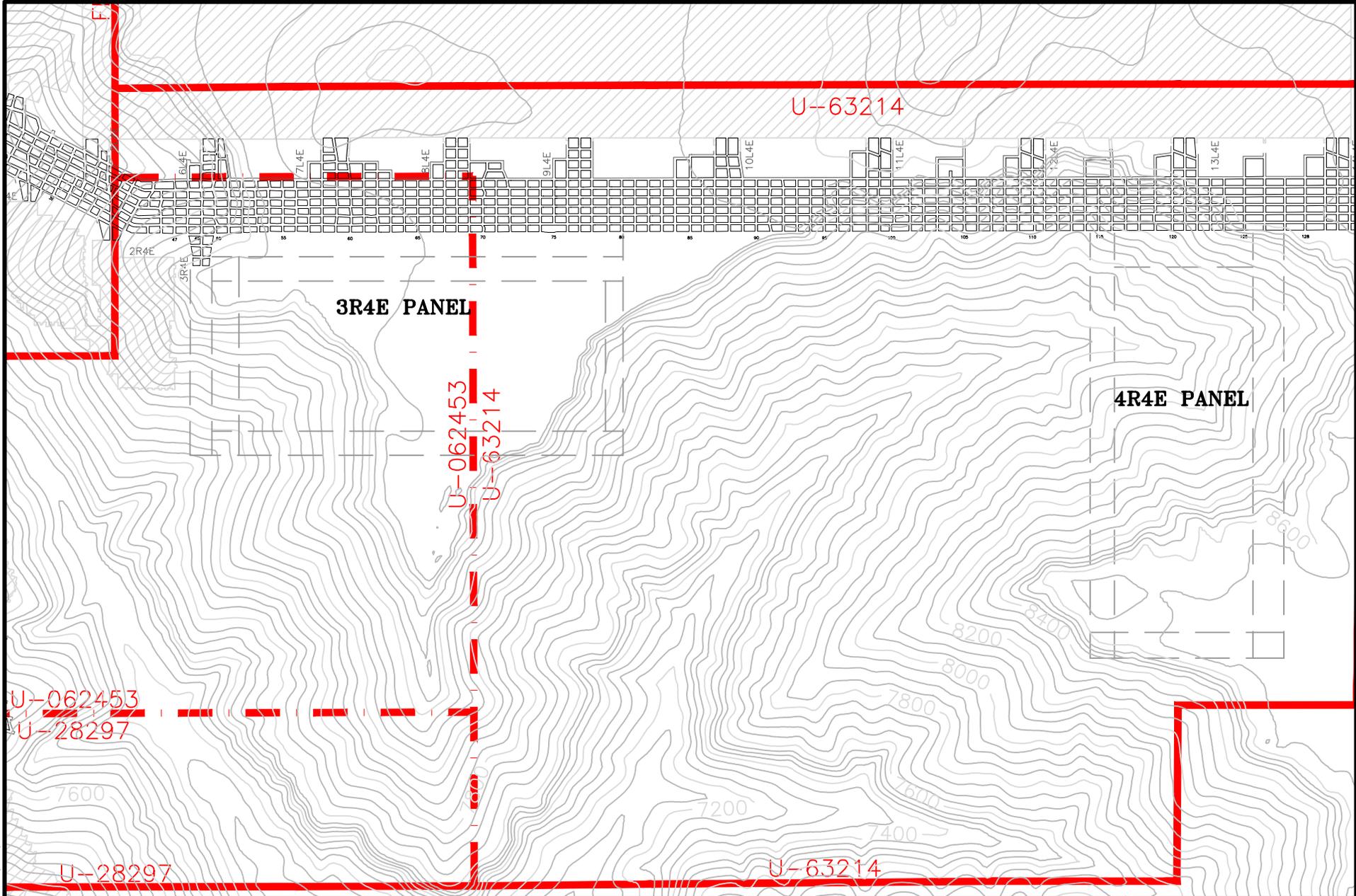
Should new lease areas be added to the SUFCO Mine, a public notice of proposed mining will be mailed to all owners and occupants of the affected surface property and structures above the proposed underground workings. This notification will include identification of specific areas in which mining will occur, dates that specific areas will be undermined, and the location or locations where SUFCO Mine's subsidence control plan may be examined.

5.2.6 Mine Facilities

5.2.6.1 Mine Structures and Facilities

Appendix 5-14

4R4E Panel Location



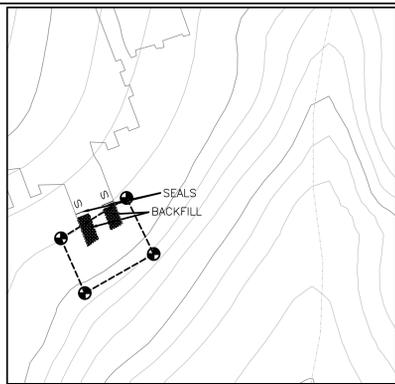
Aarom Richards: 10/25/2017 9:11 AM



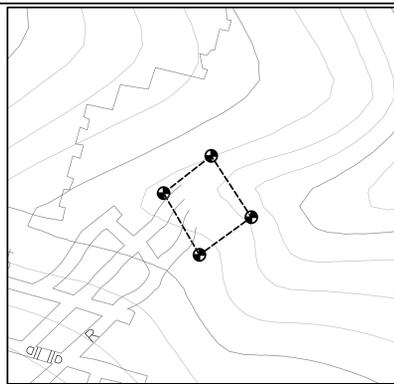
Canyon Fuel Company, LLC
SUFCO Mine
 597 South SR 24 - Salina, UT 84654
 (435) 286-4880 Phone
 (435) 286-4499 Fax

SUFCO MINE		
4R4E PANEL LAYOUT		
SCALE: 1" = 1000'	DATE: 9/25/2017	DRAWN BY: AMR
ENGINEER: AMR	CHECKED BY: BB	PROJ:
FILE NAME: J:\Mine Plans\2018\Budget\22nd Run\SufProd18_22ndRun.dwg		

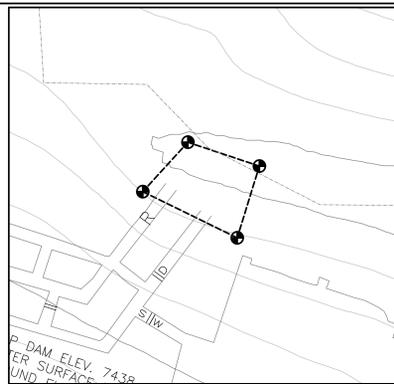
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1



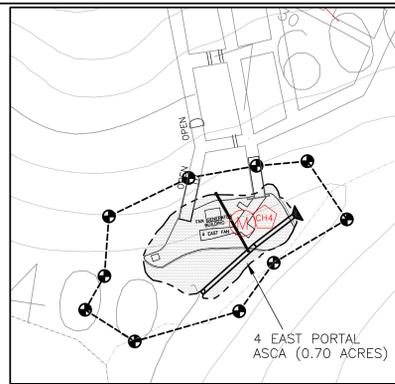
SOUTH PORTALS
SCALE: 1" = 100'



3 EAST PORTALS
SCALE: 1" = 100'

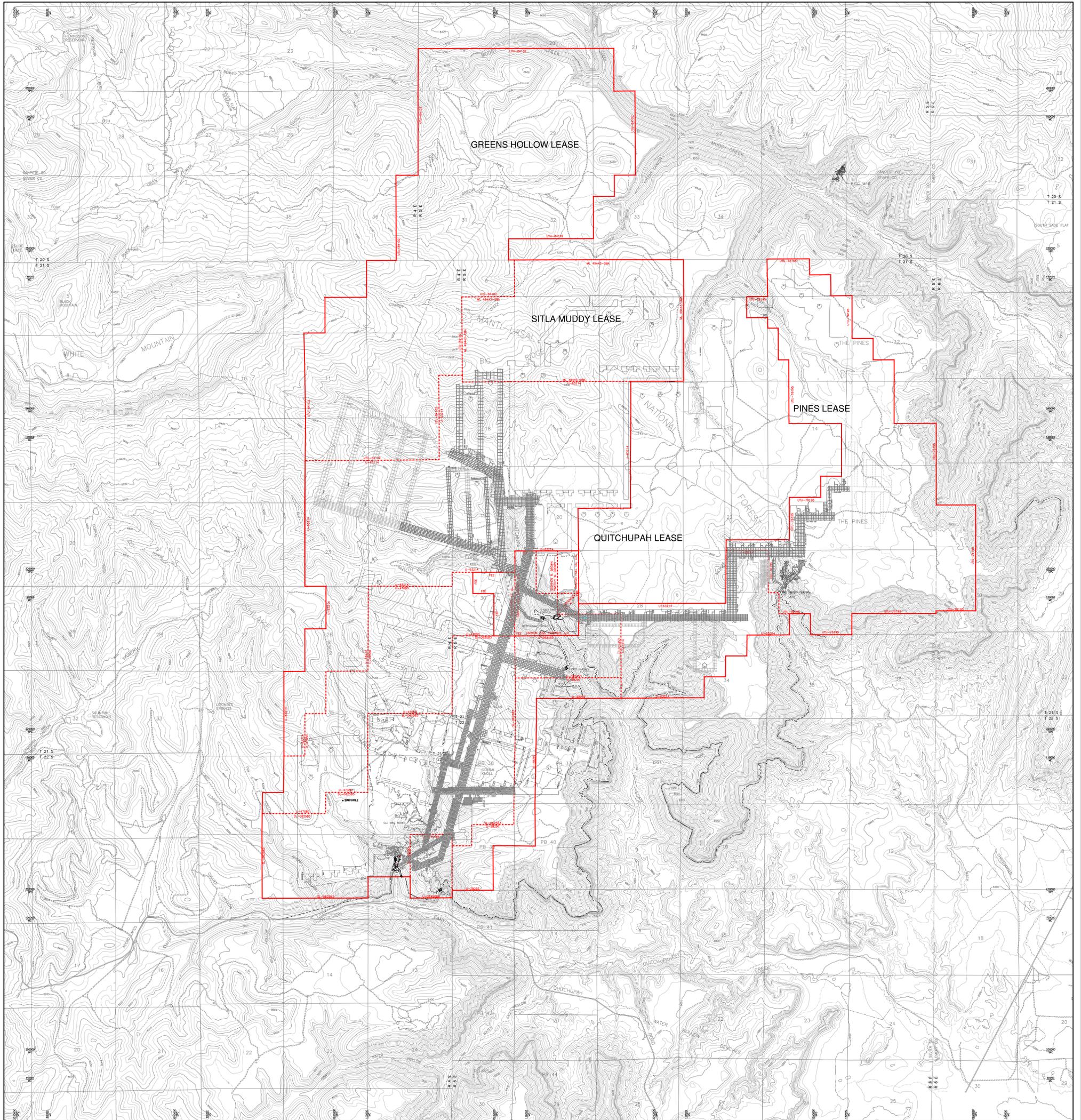


QUITCHUPAH PORTALS
SCALE: 1" = 100'



4 EAST FAN PORTALS
SCALE: 1" = 100'

SURFACE PORTAL FACILITIES – PRE MINING AND POST MINING TOPOGRAPHY

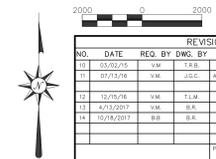


EXPLANATION

- 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.

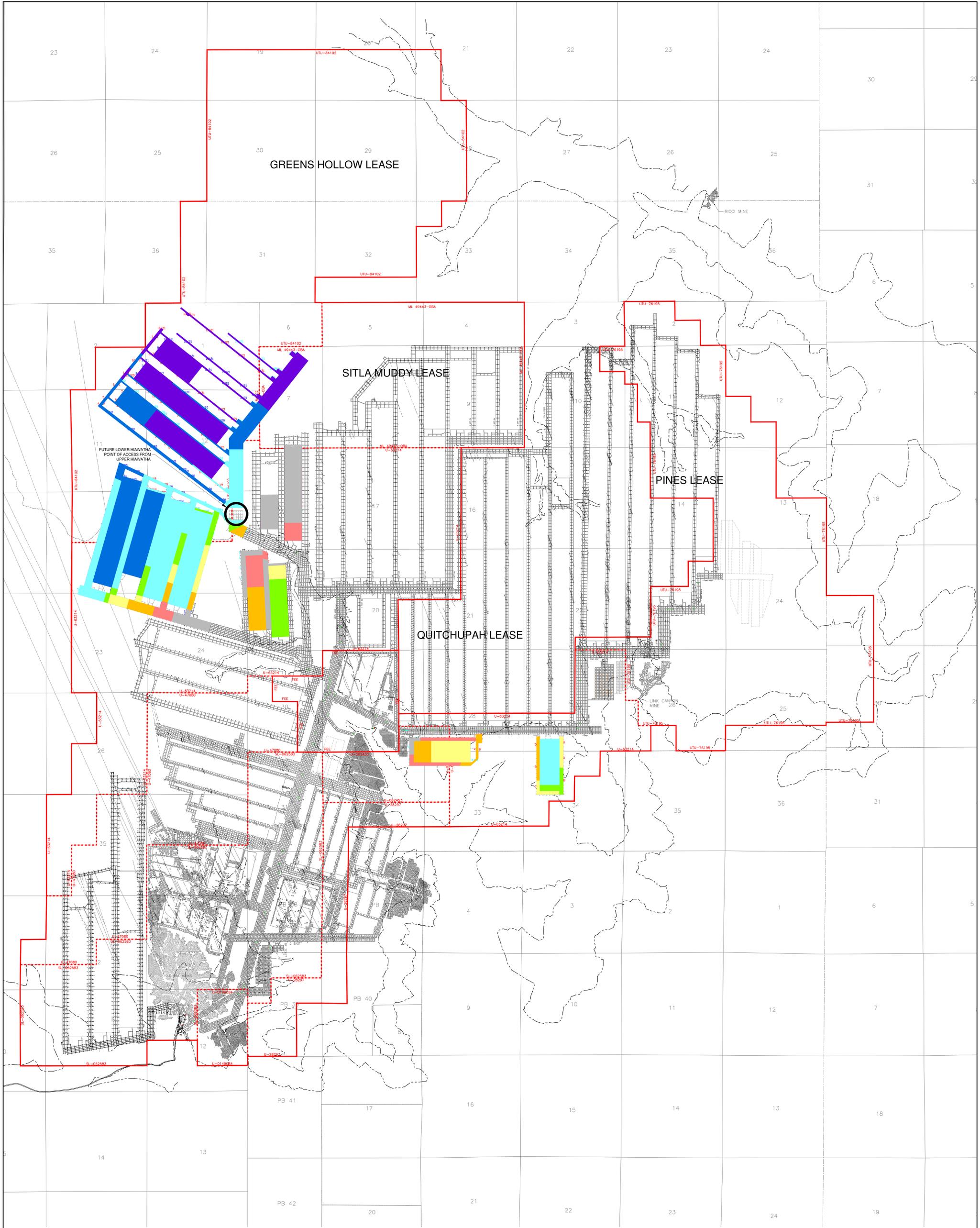


REVISIONS				
NO.	DATE	REV. BY	REMARKS	
10	03/02/23	VM	J.R.B.	ADDED TO ADD 5.0-A AREA FOR 3 WEST
11	07/13/23	VM	J.L.C.	ADDED GREENS HOLLOW & SOUTH FORK LEASE BOUNDARY
12	12/15/23	VM	J.L.W.	REMOVED SOUTH FORK LEASE BOUNDARY
13	4/13/2024	VM	B.K.	GREENS HOLLOW
14	10/18/2024	BB	B.K.	ADD WEST FORK

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SUFCA Mine
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 (435) 286-4880 Phone
 (435) 286-4499 Fax

DETAIL OF PORTAL SURFACE FACILITIES

SCALE: 1" = 2,000' (03/01/2000)
 DATE: 03/01/2000
 DRAWN BY: B.D.H.
 ENGINEER: M.L.D.
 SHEET NO.: PLATE 5-2C



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

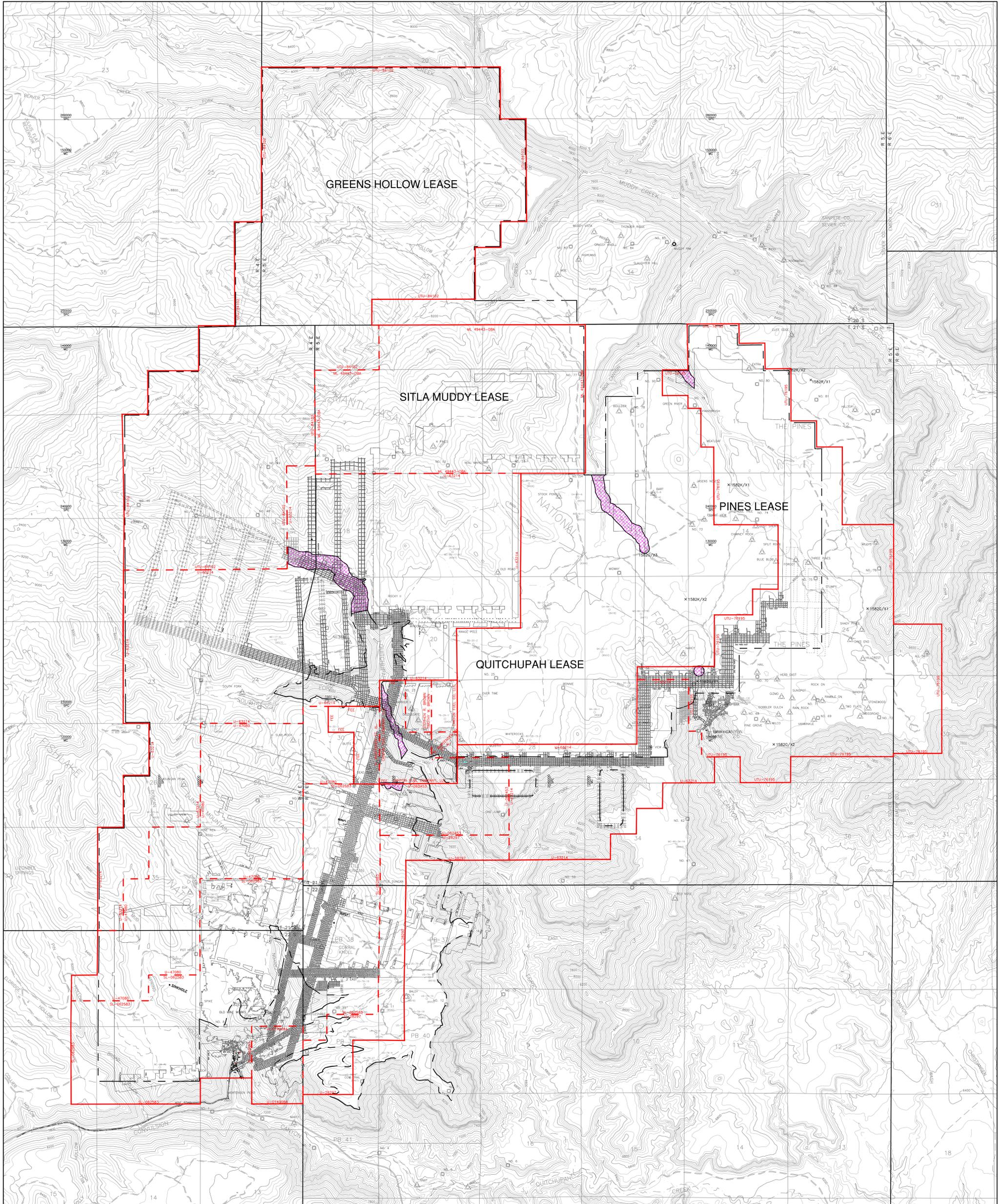


NO.		DATE		REVISED BY		REVISIONS		REMARKS	
1	4/13/2017	J.M.	S.K.						GREENS HOLLOW
2	10/23/2017	B.B.	B.K.						Add 4th Qtr Panel

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**SUFCO MINE PLAN
5 YEAR PROJECTION**

FILE NO.	SCALE	DATE	DRAWN BY	ENGINEER	CHECKED BY	SHEET NO.
JM-2017-01	1" = 1,500'	03/01/2000	J.G.C.	J.G.C.	VM	PLATE 5-7
PROJECT NUMBER	FILE NAME	PROJECT NUMBER	FILE NAME	PROJECT NUMBER	FILE NAME	PROJECT NUMBER
###	###	###	###	###	###	###

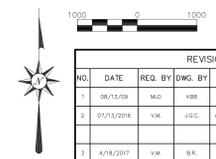


EXPLANATION

- SUFCO EXTERIOR LEASE BOUNDARY
- - - - - SUFCO INTERIOR LEASE BOUNDARY
- + + + + + MINE COORDINATES
- - - - - 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

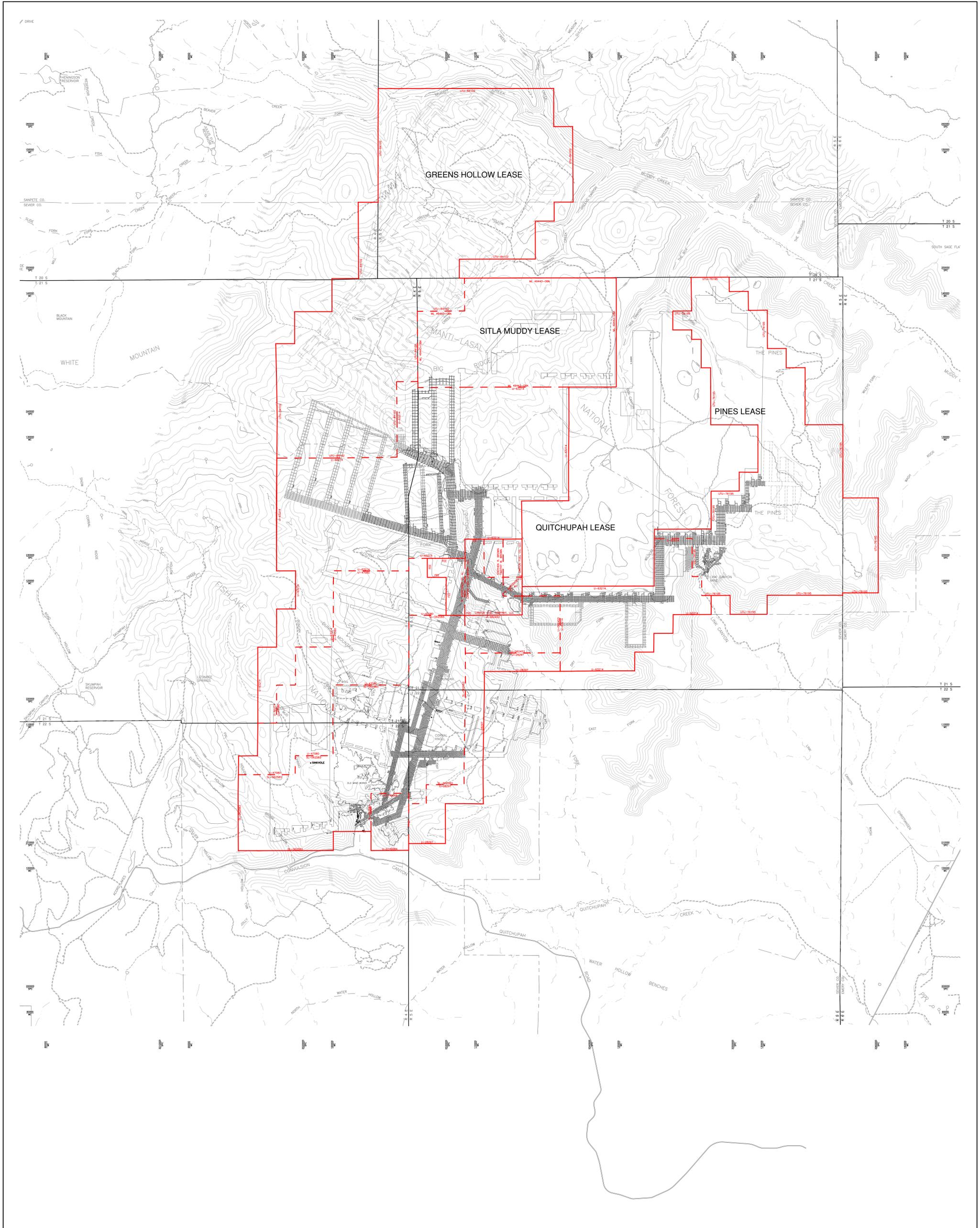


REVISIONS			
NO.	DATE	REQ. BY	DWG. BY
1	08/13/09	MJD	KMB
2	07/13/2016	VM	J.S.C.
3	4/18/2017	VM	B.R.
4	12/06/2017	VM	B.R.

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POTENTIAL SUBSIDENCE LIMITS
SITLA MUDDY & GREENS HOLLOW TRACT

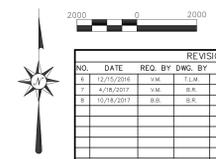
SCALE: 1" = 1000'
DATE: 08/13/09
DRAWN BY: JMB
ENGINEER: JMB
SHEET NO.: 5-10



- EXPLANATION**
- SUFCO EXTERIOR LEASE BOUNDARY
 - - - - SUFCO INTERIOR LEASE BOUNDARY
 - MINE COORDINATES
 - STATE PLANE COORDINATES



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



REVISIONS				
NO.	DATE	REQ. BY	DWG. BY	REMARKS
1	12/15/2016	VM	J.L.W.	REMOVE SOUTH FORK LEASE BOUNDARY
2	4/7/8/2017	VM	B.K.	GREENS HOLLOW
3	10/18/2017	BB	B.K.	ADD WIDE PAVES

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OVERBURDEN ISOPACH MAP

FILE NO.	DATE	DRAWN BY	ENGINEER	CHECKED BY	SHEET NO.
JOB#-SUFCO	01/20/2005	BCH/IRB	JDB	VM	PLATE 5-11
PROJECT NUMBER	FILE NAME	H:\URAWINGS\WRP\PLATES\PLATE 5-11.dwg			
###	###				

CHAPTER 6

GEOLOGY

LIST OF PLATES

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- 6-1 Geology and Drillhole Location Map With Proposed Drill Holes
- 6-2 Geologic Cross Section A-A'
- 6-3 Geologic Cross Section B-B'
- 6-4 Geologic Cross Section C-C'

LIST OF APPENDICES

(Appendices appear in Volume 6)

Appendix

- 6-1 Drill Logs (**Confidential**)
- 6-2 Chemical Analyses
- 6-3 Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining
- 6-4 4 East Panels (Confidential)**

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 SUFCO 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.

4 Right 4 East Panel(s)

The 4R4E panel is located within Lease U-63214 which is referred to as the Quitchupah Tract. This tract is located within the southern region of the Wasatch Plateau which lies within the Basin and Range-Colorado Plateau Province. The topography of the tract consists of a flat plateau that is deeply dissected by narrow canyons. The coal seams crop out in the southeastern portion of the tract along the steep escarpments of Quitchupah Canyon, Dry Fork Canyon, East Fork Canyon and Link Canyon. The 4R4E panel is located in Dry Fork Canyon. See Appendix 5-14, Plate 5-6, and Plate 5-7 for the 4R4E mine plan, lease locations, and mine timing respectively. Mining will occur only in the Upper Hiawatha coal seam. Overburden ranges approximately from 300-900 feet. The projected subsidence across the 4R4E panel ranges from 1-5 feet and the projected average subsidence is approximately 2 feet. See the 4R4E Projected Subsidence Map in Appendix 6-4.

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.

CHAPTER 7

HYDROLOGY

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- 7-6 East Spring Canyon Drainage Details
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- 7-2 Hydrometrics Reports
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- 7-4 Water Quality Data Summaries
- 7-5 Climatological Data
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- 7-8 1980 Valley Engineering, Inc. Report
- 7-9 1979 Merrick and Company Report
- 7-10 Hydrologic Design Methods

7.20 Environmental Description

7.2.1 General Requirements

This section presents a description of the premining hydrologic resources within the permit area and adjacent areas that may be affected or impacted by the proposed coal mining and reclamation operation.

7.2.2 Cross Sections and Maps

7.2.2.1 Location and Extent of Subsurface Water

Groundwater occurs in perched zones of limited areal extent within the lease area. The PHC studies conducted by Mayo and Associates (Appendix 7-17 and Appendix 7-18) have determined that none of the formations down through the Blackhawk support a continuous aquifer. According to Mayo's research all of the aquifers within the permit area and adjacent areas are perched and discontinuous so it is not possible to represent a potentiometric surface for the area.

Seasonal variations in well water levels are discussed in Section 7.2.4.1.

7.2.2.2 Location of Surface Water Bodies

A map showing the location of surface water bodies (such as streams, ponds, and springs) for which water rights exist or for which there are pending water rights applications is provided as Plate 7-2. A listing of water rights data (names, locations and ownership) is presented in Appendix 7-1. Other than for the indicated springs, no water rights exist for groundwater in the permit and adjacent areas.

7.2.2.3 Locations of Monitoring Stations

Surface water and groundwater monitoring stations associated with the SUFCO operation are located as shown on Plate 7-3. Approximate surface elevations of the monitoring stations are also indicated on Plate 7-3.

7.2.2.4 Location and Depth of Water Wells

No water-supply wells exist in the permit or adjacent areas. Groundwater monitoring wells in the area are located as shown on Plate 7-3. Depths of these wells and other completion details are summarized in Table 7-1.

7.2.2.5 Surface Topography

Surface topographic features in the permit and adjacent areas are shown on the base maps used for Plate 7-3.

7.2.3 Sampling and Analysis

All water samples collected for use in this M&RP have been analyzed according to methods in either the "Standard Methods for the Examination of Water and Wastewater" or 40 CFR parts 136 and 434. Where feasible, these same references have been used as the basis for sample collection.

7.2.4 Baseline Information

Surface water, groundwater, and climatic resource information is presented in this section to assist in determining the baseline hydrologic conditions which exist in the area of the mine. This information provides a basis to determine if mining operations have had, or can be expected to have, a significant impact on the hydrologic balance of the area.

7.2.4.1 Groundwater Information

This section presents a discussion of baseline groundwater conditions in the mine area. A discussion of the groundwater conditions in the SUFCO lease area is presented in this section and appended by Appendix 7-17. A discussion of groundwater conditions in the Pines Tract is presented in Appendix 7-18 of this Chapter. A discussion of groundwater conditions in the West Coal Lease Modifications is presented in Appendix 7-24 of this Chapter. A discussion of groundwater conditions at the waste rock disposal site is provided in Volume 3 of this M&RP. The locations of wells and springs in the mine area are presented on Plate 7-3. The wells in the mine area are all water monitoring wells, not water supply wells. Water rights for the mine and

adjacent areas are addressed in Section 7.2.2.2 of this M&RP. With the exception of the potable use of source 94-87 by SUFCO, all other groundwater use (seeps and springs) is confined to stock watering. The hydrology in the area of the 2RWL sinkhole are discussed in the PHC located in Appendix 7-24.

Castlegate Sandstone. The Castlegate Sandstone consists of an estimated 120 to 260 feet of medium to coarse-grained sandstone with a few thin interbedded mudstones or shales near the base. The sandstone is conglomeratic, forms prominent cliffs along the outcrop, and is well cemented with calcarious cement.

A limited number of springs issue from the Castlegate Sandstone in the Quitchupah lease area, with flow generally less than 1 gpm. In the Pines Tract area, several springs issue from and near the base of the Castlegate Sandstone. The waters from these springs feed the Main Fork and East Fork of Box Canyon Creek. Base flow from these springs is generally less than 1 to 2 gpm with a few flowing at rates of 5 to 6 gpm.

Based on information from the exploration drill holes and observation wells in the lease area, the Castlegate Sandstone contains small quantities of groundwater. No significant quantities of groundwater (more than 2 gpm) were encountered in any of the exploration holes nor was groundwater identified in all drill holes.

Of the observation wells completed in the Castlegate Sandstone in the lease area, two (US-77-9 and 89-16-1W) have been dry during their entire period of record. Two additional wells (US-77-8 and 89-20-2W) have only a brief period of record (due to lack of water or time since installation, respectively). Hydrographs of the remaining two Castlegate Sandstone observation wells (US-80-2 and US-80-4) are presented in Figure 7-2. Water-level data for all wells are provided in Appendix 7-3. Seasonal fluctuations of groundwater levels in these wells have typically been less than one foot.

Coal exploration holes drilled in and near the Pines Tract by the USGS, have geophysical logs indicating similar conditions for the Castlegate Sandstone. Exploration Hole W-TP-4-EW found fluids present at a depth of 82 feet below ground surface, within the Castlegate Sandstone.

averaged 0.11 and 0.01 mg/l, respectively. None of the chemical data have exhibited consistent seasonal trends.

Historical data collected from stations SUFACO-047 and SUFACO-062 are considered representative of the Blackhawk-Star Point aquifer. Although station SUFACO-047 consists of seepage collected from alluvium and used for the mine domestic water supply, it is regarded as being fed by outflow from the adjacent Blackhawk-Star Point aquifer. Station SUFACO-062 represents inflow to the mine from the surrounding Blackhawk Formation.

Groundwater from these two sources is a calcium bicarbonate type, with historical TDS concentrations averaging 373 to 492 mg/l and pH values averaging 7.2 to 7.5. Between the two sources, average total iron concentrations range from 0.08 to 0.15 mg/l while average dissolved iron concentrations are both equal to 0.02 mg/l. Total manganese concentrations average 0.05 to 0.06 mg/l between the two sources, while dissolved manganese concentrations average 0.02 to 0.05 mg/l. The data have not exhibited consistent seasonal trends.

As a general point of comparison, the ground water quality analyses were compared to the primary drinking water standards (40 CFR 141) and the secondary drinking water standards (40 CFR 143).

These comparisons indicate that there were no exceedances of the primary drinking water standards for any of the groundwater samples. Exceedances of the secondary drinking water standards were found in groundwater samples only for sulfate and TDS concentrations (with recommended standards of 250 mg/l and 500 mg/l, respectively). All of the sulfate exceedances and most of the TDS exceedances occurred in groundwater collected from monitoring wells at the waste-rock disposal site. These exceedances are probably due to the natural dissolution of marine salts known to exist in the local strata (Waddell et al., 1981).

4R4E Panel - The area of the panel was initially surveyed for surface and ground water resources in the late 1980's and early 1990's to provide information for the USFS and BLM Environmental Assessment of the Quitcupah Lease (U-63214) and the US Geological Survey Water Resources Investigation Report 90-4084. At approximately 11:30 AM on April 24, 2017 a walking survey

of the surface above and immediately adjacent to the panel was conducted by a qualified CFC employee to locate surface and groundwater resources. The day was cloudy with a temperature of approximately 50 °F and wind ranging from approximately 5-10 mph. There were no surface or groundwater sources identified during the survey. ~~in any of the surveys. Several exploration wells were drilled, in 2017, water was not encountered during the drilling.~~ Two exploration wells were drilled in August of 2017 near the 4R4E panel. The head geologist over the drilling project reported that no water was encountered in either well while drilling. See table 7-11 below for drill hole locations, completion dates and other information. See **Plate 7-10** for the 4R4E drillhole logs and **7-11** for the drillhole location map . The closest known surface water is an established natural pond approximately 3/4 mile northwest of the panel in T21S, R5E, Section 28.

Table 7-11

SUFCO 2017 DRILLHOLE INFORMATION - 4 RIGHT 4 EAST PANEL AREA								
Drill Hole ID	Date Completed	UTM Z12 WGS 84 Utah State Plane SLB Nad 27				Collar Elev (ft)	TD (ft)	Water Encountered
		EAST	NORTH	EAST	NORTH			
17-34-1	8/14/17	469641.30	4311077.10	2042787.07	223975.43	8620.15	1018	No water encountered, drilled with no circulation
17-34-2	8/9/17	470248.20	4311437.40	2044772.46	225168.69	8659.34	1037	No water encountered, drilled with no circulation

Figure 7-6, it is estimated that long-term discharge of groundwater from the mine will average approximately 2.6 cfs (1,200 gpm).

It should be noted that the discharge of mine water to a stream probably results only in a local increase in flow and not a basin-wide increase. As noted on Plate 6-1, the Mancos Shale outcrops in the North Fork of Quitchupah Creek just upstream from the mine-water discharge point and in Quitchupah Creek above the confluence with East Spring Canyon. The shales of this formation have a low permeability (Waddell et al., 1981), thus forcing groundwater to the surface as streamflow. Thus, although the discharge of water from the mine may result in a local loss of groundwater and gain in surface water, this discharge does not disrupt the hydrologic balance of the basin.

The long-term mean mine discharge to North Fork Quitchupah Creek is 980 gpm and discharge varies between 460 and 1760 gpm. The mean upstream flow during high-flow conditions (June) is 2,650 gpm and during low-flow conditions (October) the flow is 290 gpm. Thus, mine discharge represents a mean increase in creek discharge of 37% and 337% for June and October, respectively. The mean low flow discharge measured at site 042, 5 miles downstream from the mine discharge point, is 950 gpm. This suggests that the lower reaches of North Fork Quitchupah Creek could go dry in late summer and early fall without the contribution of mine water to the stream.

Subsidence has occurred in the lease area (Plate 5-10). More subsidence is expected to occur in the future as longwall mining progresses. Fractures that remain open or fill with permeable material would locally increase the hydraulic conductivity of the strata. However, when tension fractures intercept mudstones or shale units that contain bentonitic or montmorillonite clays, these fractures become sealed, stopping vertical flow (Thiros and Cordy, 1991). When tension fractures intercept strata that are more brittle or less amenable to sealing by clays, such as the Castlegate Sandstone, these fractures will heal naturally by filling in with silt and organic material such as sticks, pine needles, pine cones, and pine cone fragments. This natural healing could take longer to seal the cracks with the potential to impact water resources for a period of time. A discussion of the potential impacts to water resources due to subsidence is provided in Section 7.2.8.3 of this

M&RP and in Appendix 7-17. DeGraff (Appendix 5-4) indicates that tension cracks in the lease area typically heal quickly. There are no sustained above normal inflows in the mine due to mining or subsidence. Thus, most fractures in the lease area appear to become sealed in a relatively short period of time. Intersection of locally perched aquifers by subsidence cracks could divert groundwater from a spring. Water will not be lost from a specific basin, but may become diverted within the basin.

The discharge from the abandoned Link Canyon Mine was to be maintained during and after utilization of the western portal for Sufco Mine access. The water naturally discharging from the abandoned mine is not considered to be a UPDES mine discharge point by the Utah Division of Water Quality so long as the water is not contaminated or comes in contact with Sufco mining related activities. The initial plan by Sufco was to maintain the flow of water from the flooded old works to the abandoned eastern portal and out the rehabilitated western portal. However, when the old works were accessed, both from inside the Sufco Mine and the surface, very little water was encountered and the old works did not appear to be flooded. The majority of water encountered during rehabilitation efforts was located just inside the western portal. A small pond of water had formed behind a roof fall in the old mine. It was apparent that shallow ground water or surface water entered the mine just in by the portals and upgradient of the roof fall, forming the small pond. Once the roof fall was removed and the water drained, water ceased discharging from the western portal. The volume of water discharging from the eastern portal area also appeared to decrease. It further appears that most of the water that currently seeps into the old workings near the portal evaporates before it can accumulate and discharge out the western portal. Small volumes of runoff and ground water still accumulates in the eastern portal area and can be seen in the spring and fall discharging over the rock ledges below the portal.

The riparian vegetation in the area of the Link Canyon portals is feed not only by the discharge from this portal but also by subsurface flow discharged by springs above the mine in the Castlegate Sandstone. Thus, the riparian vegetation above and below the west portal was sustained during site construction by subsurface flows from the upgradient springs and flows from the east portal.

Sedimentation Pond Sludge Plan. Sludge contained in the sediment ponds will be cleaned from the ponds and temporarily stockpiled upstream of the pond to allow water to drain from the sludge back into the pond. The sludge will be sampled for acid and toxic forming substances prior to be transported to the waste rock disposal site. Sedimentation pond sludge will be incorporated into the fill as described in Part 3.2.6 of Volume 3.

7.3.1.2 Water Monitoring

Groundwater Monitoring. Groundwater monitoring is proposed to be conducted in the SUFCO permit and adjacent areas according to the water monitoring plans presented in Tables 7-2 through 7-5A and for the rock waste disposal site in Section 4.7.2 in Volume 3 of this M&RP. These tables are based on the studies done by Mayo and Associates (Appendices 7-17 and 7-18) and supersede previous plans.

The location of the monitoring points are presented on Plate 7-3. The location of the monitoring wells for the rock waste disposal site are presented on Map 2, Volume 3 of this M&RP. The monitoring plans were developed based on information presented in the PHC determinations, the baseline hydrologic data, and the geology chapter of this M&RP.

The monitoring programs provide data that are reviewed and compared to the baseline data. Any significant changes are evaluated to determine their impact on the hydrologic balance. These comparisons have taken the form of reports prepared by Hydrometrics early in the permit term (1978-1987). Results of these evaluations are submitted periodically to the UDOGM. The annual Water Quality Report submitted to the Division contains the monitoring data.

Baseline data collected for the Pines Tract area included performing field surveys to identify existing springs. Additionally, springs identified in the USGS publication "Hydrology and Effects of Mining in the Quitcupah and Pines -Coal Lease Tracts, Central Utah " (Thiros and Cordy, 1991) were searched for and, when found, included in the baseline survey. Those springs identified and found within the Pines Tract in the above referenced publication are labeled on Plate 7-3 with the

bicarbonate and carbonate alkalinity are included in the operational monitoring plans. Contributions to alkalinity from hydroxide, silicate, borate, and organic ligands are trivial.

- Mayo did not include dissolved iron and dissolved manganese in the operational monitoring plan because iron and manganese do not readily exist in dissolved form in basic (pH>7) waters but exist instead as hydroxide complexes. All waters in the lease area are basic. Measurements of total iron and manganese quantify both the dissolved and complex forms of these elements.

Equipment, structures, and other devices used in conjunction with monitoring the quality and quantity of the surface water in the permit and adjacent areas have been installed, maintained, and operated in accordance with accepted procedures. This equipment will be removed by SUFCO when no longer needed.

Stock Water Ponds

Several stock watering ponds are located in the Pines Tract and Quitchupah Lease area. Surface cracking due to mining related subsidence within the Quitchupah Lease has apparently adversely affected a few of the ponds. Action has been taken by SUFCO in the past to mitigate the damage, including applying bentonitic seals to the pond floors and hauling water for livestock. However, ranchers and State and Federal agencies have erroneously claimed that subsidence has adversely affected several ponds outside of the mining areas. In order to more adequately monitor the effects of mining on the stock watering ponds, SUFCO has been negotiating with DOGM, USFS, and the local rancher's association to create a workable monitoring plan for the ponds that can be agreed upon by all participants. DOGM has taken the lead in this process, and as of May 2000, a plan had not yet been finalized. In the interim, SUFCO commits to visiting the ponds within the Pines Tract and Quitchupah Lease area as soon as they are accessible in the spring of each year (typically late April to early May), photographing the condition of each pond, observe the pond for evidence of cracking, estimate the depth and surface area of water contained in the pond, inspect the immediate drainage

area for evidence of surface cracking, note general soil moisture conditions, and note the general condition of the pond. Additional monitoring visits will be made in the late summer (late July to early August) and in the fall (late September to early October) of each year. This information will be kept on file at the mine.

It is assumed a new monitoring plan can be agreed upon by the State, USFS, and rancher's association and will be in place prior to the end of 2000. This plan will include the aforementioned monitoring efforts, as well as determining the functionality and water holding capacity of each potentially affected pond and the determination of the water shed area for each pond. Mitigation requirements in the event of proven mine related effects will also be agreed upon as part of the new monitoring plan.

East Fork of Box Canyon Monitoring and Mitigation Plan

Sufco anticipates undermining and subsiding a portion of the East Fork of Box Canyon beginning in November of 2003 when the mine starts longwalling panel 3LPE. Additional subsidence under the East Fork will occur when the 4LPE panel is mined in 2005. A surface and ground water monitoring and mitigation program more intensive than the general monitoring plan described previously in this Section will be initiated in this area prior to subsidence occurring within the 15-degree angle-of-draw of the stream channel. This monitoring program has included conducting a pre-mining subsidence survey of the East Fork of Box Canyon over the 3LPE and 4LPE panels that incorporated video taping the stream channel from Joe's Mill Ponds downstream to a point above the western-most gate road of the 3LPE panel. The purpose of the video will be to provide a visual record of the stream channel prior to subsidence. Fourteen sites were identified within the portion of the East Fork video taped where the monitoring of surface and/or ground water flows, channel width, channel substrate, vegetation, soils, and general geomorphology will occur. The general area in which these sites will be located are illustrated on Figure 7-8.

Stream monitoring sites will be monitored specifically for stream flow, channel width, channel substrate changes, and channel convergence. The geology of spring sources will be identified and described. The substrate of the spring tributary where water discharged from the spring

The locations of water rights for current users of surface water flowing into, out of, and within the permit and adjacent areas is provided on Plate 7-2. Discharges associated with the permit and adjacent areas are located as presented on Plate 7-3.

The locations of each water diversion, collection, conveyance, treatment, storage, and discharge facility to be used in the East Spring Canyon area are presented on Plate 7-6. Similar information for the waste-rock disposal site is presented in Volume 3 of this M&RP. Similar information for the Link Canyon Substation No. 1 and No. 2 facility areas is presented on Plates 5-2D and 5-2E. Similar information for the Link Canyon Portal facility area is presented on Plate 5-2F.

Locations and elevations of each station to be used for water monitoring during coal mining and reclamation operations are presented on Plate 7-3.

The construction details and cross sections for the concrete sediment trap are located in the "Alternate #1 Drainage Facilities and Sediment Control Plan" (Appendix 7-8). The existing topography and cross sections for the primary sedimentation pond are located on Plates 7-4 and 7-5. The design topography and cross sections for the overflow pond are located on Plates 7-4A and 7-5A. The design topography and cross sections for the waste rock disposal site sedimentation pond are located in Volume 3 of this M&RP.

Other Cross Sections and Maps. Other relevant cross sections or maps are presented and discussed in Chapter 5 of this M&RP.

7.3.1.8 Water Rights and Replacement

Ground and surface water rights do exist within the Sufco Mine lease area. Mitigation has been performed at stock pond locations where claims have been made that the available surface water has been impacted by subsidence. Mitigation at these locations has been performed by the placement of bentonite in the bottom of stock ponds and by hauling replacement water to the ponds for livestock use during summer months.

The Permittee will mitigate and replace the water supply of any land owner or adversely affected State appropriated water if such a water supply proves to be contaminated, diminished or interrupted as a result of mining operations. First, a determination will be made by the Division in accordance with R645-301-731.800 as to whether or not material damage has occurred. Then, in accordance with Regulation R645-301-525.510, the operator will correct any material damage resulting from subsidence caused to surface lands (which includes water rights), to the extent technologically and economically feasible. Negotiations will be held immediately with the impacted party to determine the appropriate mitigation activities. The restoration of water flows to impacted sources will be accomplished using the Best Technology Currently Available (BTCA). These activities may include, but not necessarily be limited to: piping or trucking water to the location of the loss; sealing surface fractures to prevent further losses (i.e., stream floors on bed rock or in shallow alluvium), and; construction of a ground water well and the installation of pumps to restore flows. If the above efforts are not successful, then the operator will explore the transferring of water rights to the injured party in flow equal to the determined loss and/or monetary reimbursement for proven material damages.

The water supply in the East Fork of Box Canyon is of special concern to Sufco and the regulatory authorities. In an effort to protect the minimal surface flows in this area, an intense monitoring and mitigation plan will be implemented prior to full extraction mining taking place under the East Fork. If changes in the quantity and quality of the water in the East Fork are noted, the Division will be immediately notified. A determination of the amount of water, if any, that is lost due to mining activities will be made using surface and ground water flow and climatic data. If a loss of flow is confirmed, the loss will be addressed as described in the proceeding text of this section.

7.3.2 Sediment Control Measures

The existing sediment control measures within the permit area have been designed, constructed, and maintained to prevent additional contributions of sediment to streamflow or to runoff outside the permit area. In addition, they have been designed to meet applicable effluent limitations, and minimize erosion to the extent possible.

Mining in the Trail Mountain Area, Central Utah. U.S. Geological Survey Water-Supply Paper 2259. Washington, D.C.

Mayo and Associates, 1997a, Investigation of surface and groundwater systems in the vicinity of the SUFCO Mine, Sevier County, Utah: Probable hydrologic consequences of coal mining at the SUFCO Mine and recommendations for surface and groundwater monitoring. Unpublished consulting report prepared for Southern Utah Fuel Company, 7 January 1997.

Mayo and Associates, 1997b, Probable impacts from longwall coal mining at the SUFCO Mine to the hydrologic balance of Box Canyon Creek, Sevier County, Utah. Unpublished consulting report prepared for Canyon Fuel Company, LLC, 1 December 1997.

National Weather Service. 1989. Climatological Data Annual Summary - Utah. volume 91, Number 13. National Oceanic and Atmospheric Administration. Asheville, North Carolina.

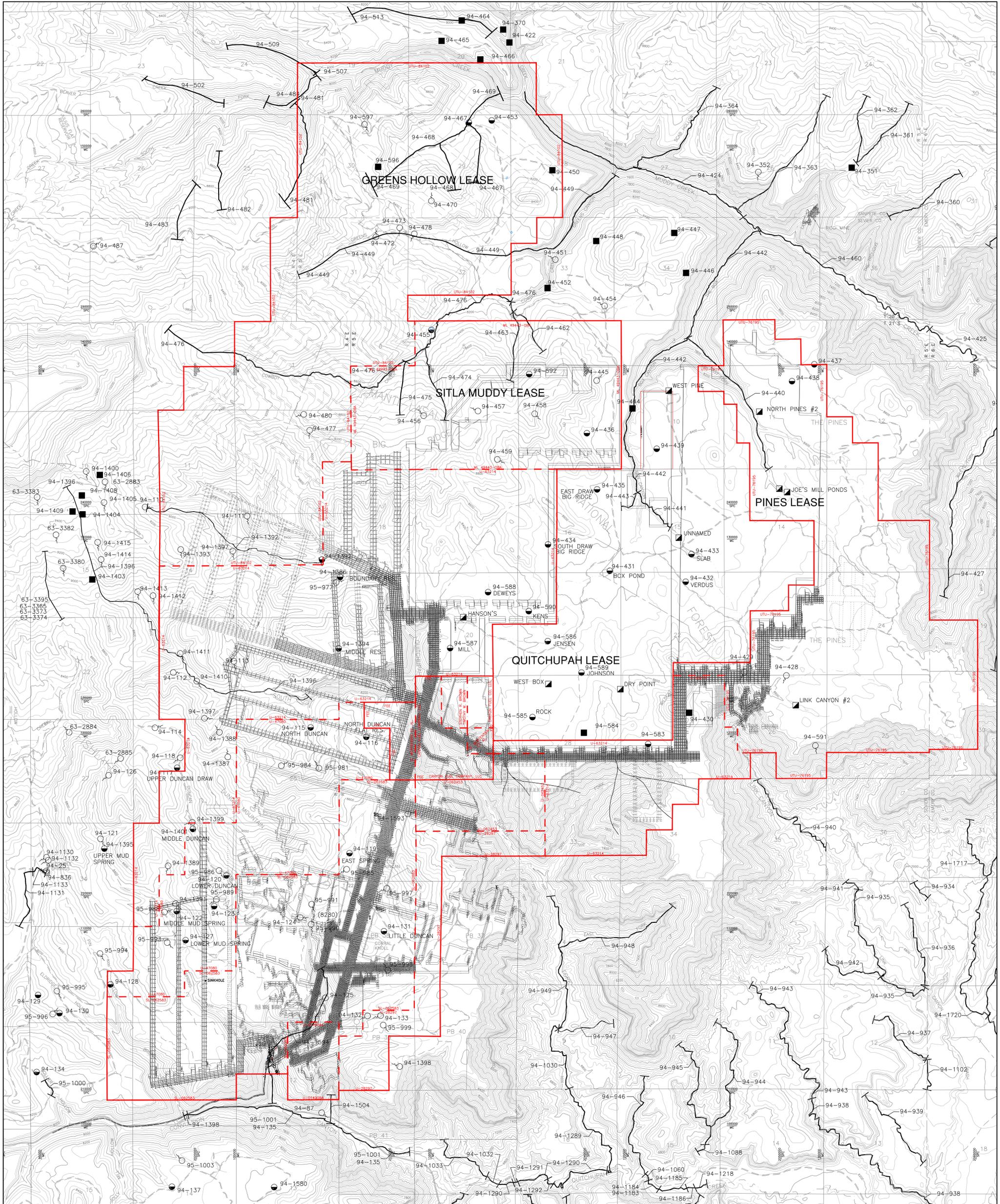
SUFCO. 1992. Chris Kravitz, SUFCO, personal communication with Mindy Rosseland, EarthFax Engineering. Salt Lake City, Utah.

Thiros, S.A. and Cordy, G.E. 1991. Hydrology and Potential Effects of Mining in the Quitchupah and Pines Coal-Lease Tracts, Central Utah. U.S. Geological Survey Water-Resources Investigations Report 90-4084. Salt Lake City, Utah.

Utah Division of Water Resources. 1977. Hydrologic Inventory of the Dirty Devil Study Unit. Utah Department of Natural Resources. Salt Lake City, Utah.

Waddell, K.M., Vickers, H.L., Upton, R.T., and Contratto, P.K., 1979. Selected hydrologic data, Wasatch Plateau-Book Cliffs coal fields area, Utah: Utah Basic-Data Release 31. Utah Water Resources. Salt Lake City, Utah.

Waddell, K.M., P.K. Contratto, C.T. Sumsion, and J.R. Butler. 1981. Hydrologic



EXPLANATION

- SUFCO EXTERIOR LEASE BOUNDARY
- SUFCO INTERIOR LEASE BOUNDARY
- MINE COORDINATES
- STATE PLANE COORDINATES
- WATER RIGHT SPRING
- RUNOFF CATCHMENT POND W/ WATER RIGHT
- SURFACE CATCHMENT POND W/O WATER RIGHT
- SURFACE WATER RIGHT POINT TO POINT
- SURFACE WATER RIGHT NOTES:
- 1. SEE APPENDIX 7-1 FOR DETAILED LISTING OF WATER RIGHTS

CATCHMENT PONDS WITH WATER RIGHTS NUMBER	CURRENT COMMON NAME USED BY UPLTs, CATTLEMEN AND OTHERS	OTHER HISTORICAL NAMES USED FOR CATCHMENT PONDS
94-115	NORTH DUNCAN RES.	
94-116	NORTH DUNCAN FLAT RES.	
94-117	UPPER DUNCAN DRAW RES.	
94-119	EAST SPRING RES.	
94-120	LOWER DUNCAN RES.	
94-122	MIDDLE MUD SPRING RES.	
94-123	SHORT HOLLOW RES.	
94-127	LOWER MUD SPRING RES.	
94-128	PIN HOLLOW RES.	
94-129	ELDRIDGE HOLLOW RES. #1	
94-130	ELDRIDGE HOLLOW RES. #2	
94-131	LITTLE DUNCAN RES.	
94-134	COLLIER RES.	
94-137	JOLLY MILL POINT RES.	
94-430	UNNAMED RES.	LINK CANYON #1
94-431	UNNAMED RES.	BOX POND
94-434	UNNAMED RES.	SOUTH DRAW BIG RIDGE
94-435	UNNAMED RES.	EXIT DRAW BIG RIDGE
94-436	UNNAMED RES.	
94-439	UNNAMED RES.	

CATCHMENT PONDS WITH WATER RIGHTS NUMBER	CURRENT COMMON NAME USED BY UPLTs, CATTLEMEN AND OTHERS	OTHER HISTORICAL NAMES USED FOR CATCHMENT PONDS
94-444	UNNAMED RES.	
94-583	DRY POINT RES.	
94-584	SLEEPS RES.	
94-585	WATER HOLLOW RES.	ROCK POND
94-586	BOX CANYON RES.	
94-587	MILL RES.	MILL POND
94-588	SWERS RES.	DOWNS POND
94-589	SAZE CREEK RES.	JOHNSON POND
94-590	KENS RES.	JENSEN, SAZE GROUSE POND
94-592	BIG RIDGE RES.	
94-732	QUITCHUPAH RES. #1	QUITCHUPAH RES. #1
94-1386	BOUNDARY RES. #1	
94-1394	MIDDLE RES.	
94-1395	UPPER MUD SPRINGS RES.	
94-1401	UNNAMED RES.	
94-1500	JOLLY MILL OUTFLOW RES.	

OTHER CATCHMENT PONDS WITHOUT WATER RIGHTS

94-432	VERDUS
94-433	SLAB
94-434	SOUTH DRAW BIG RIDGE
94-435	EAST DRAW BIG RIDGE
94-436	UNNAMED
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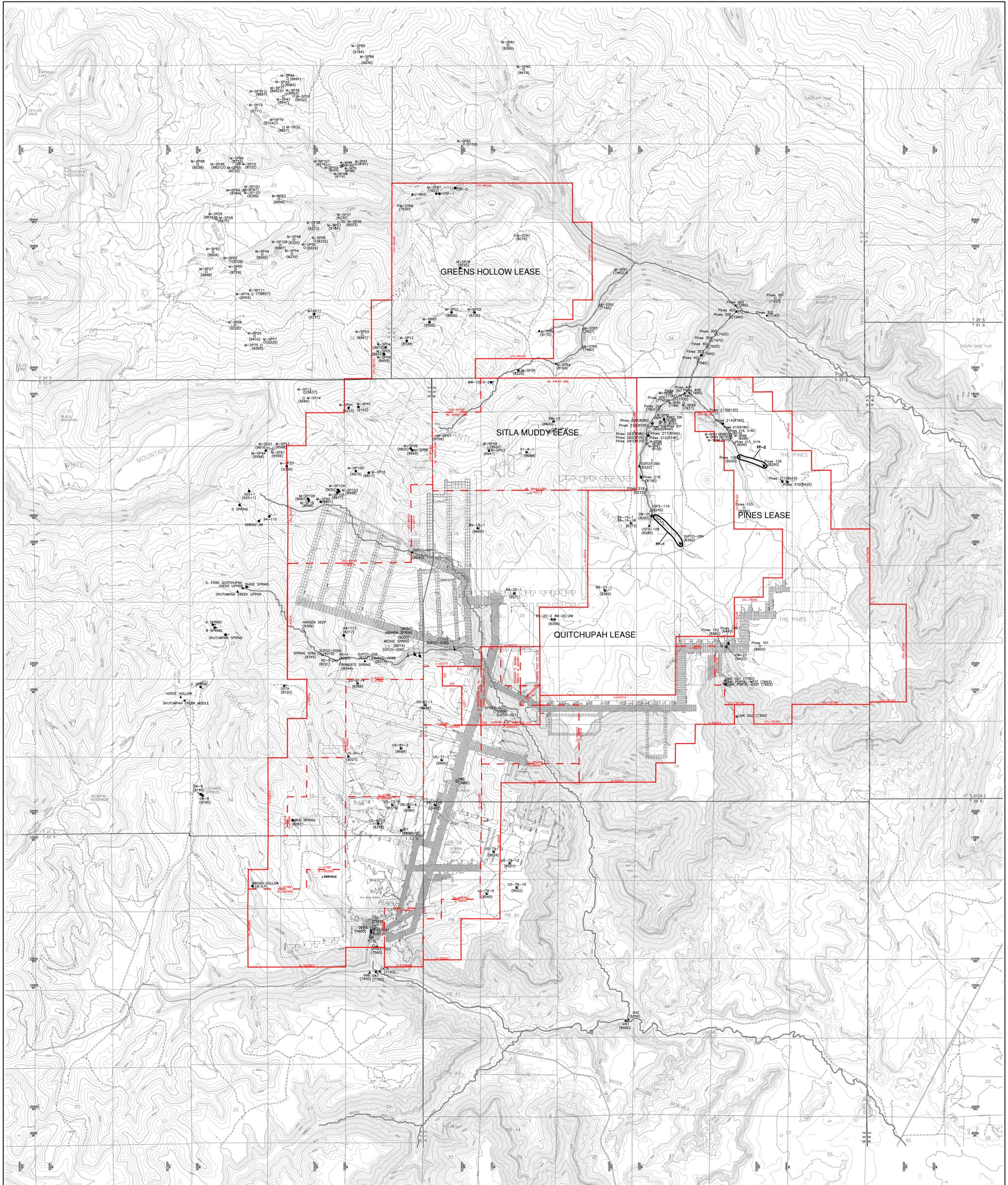
I CERTIFY THE ITEMS SHOWN ON THIS DRAWING ARE ACCURATE TO THE BEST OF MY KNOWLEDGE

NO.	DATE	REQ. BY	DWG. BY	REVISIONS	REMARKS
1	7/23/2016	J.M.	J.C.C.	ADD GREENS HOLLOW & SOUTH FORK LEASES	
2	4/28/2017	J.M.	J.C.C.	BOUNDARIES, CORNER 7-SALIC DRAWINGS	
3	10/14/2017	B.B.	B.R.	ADD HOLE DRAIN	

Canyon Fuel Company, LLC
SUFCO Mine
 597 South 200 West, P.O. Box 117, Blanding, UT 84604
 (435) 286-4880 Phone
 (435) 286-4499 Fax

SURFACE AND GROUNDWATER RIGHTS-QUITCHUPAH TRACT

SCALE: 1" = 1,500'
 DATE: 07/13/2016
 DRAWN BY: J.C.C.
 INSPECTED BY: V.M.
 CHECKED BY: V.M.
 SHEET NO.: PLATE 7-2



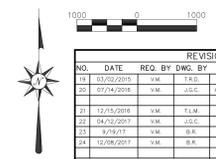
NOTES:
 1. HISTORIC STREAM, SPRING AND WELL MONITORING SITES ARE OLD BASELINE MONITORING SITES OR SITES THAT HAVE BEEN DISCONTINUED OR MINED THROUGH THAT ARE NOT CURRENTLY BEING MONITORED.

EXPLANATION

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



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

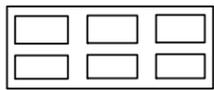
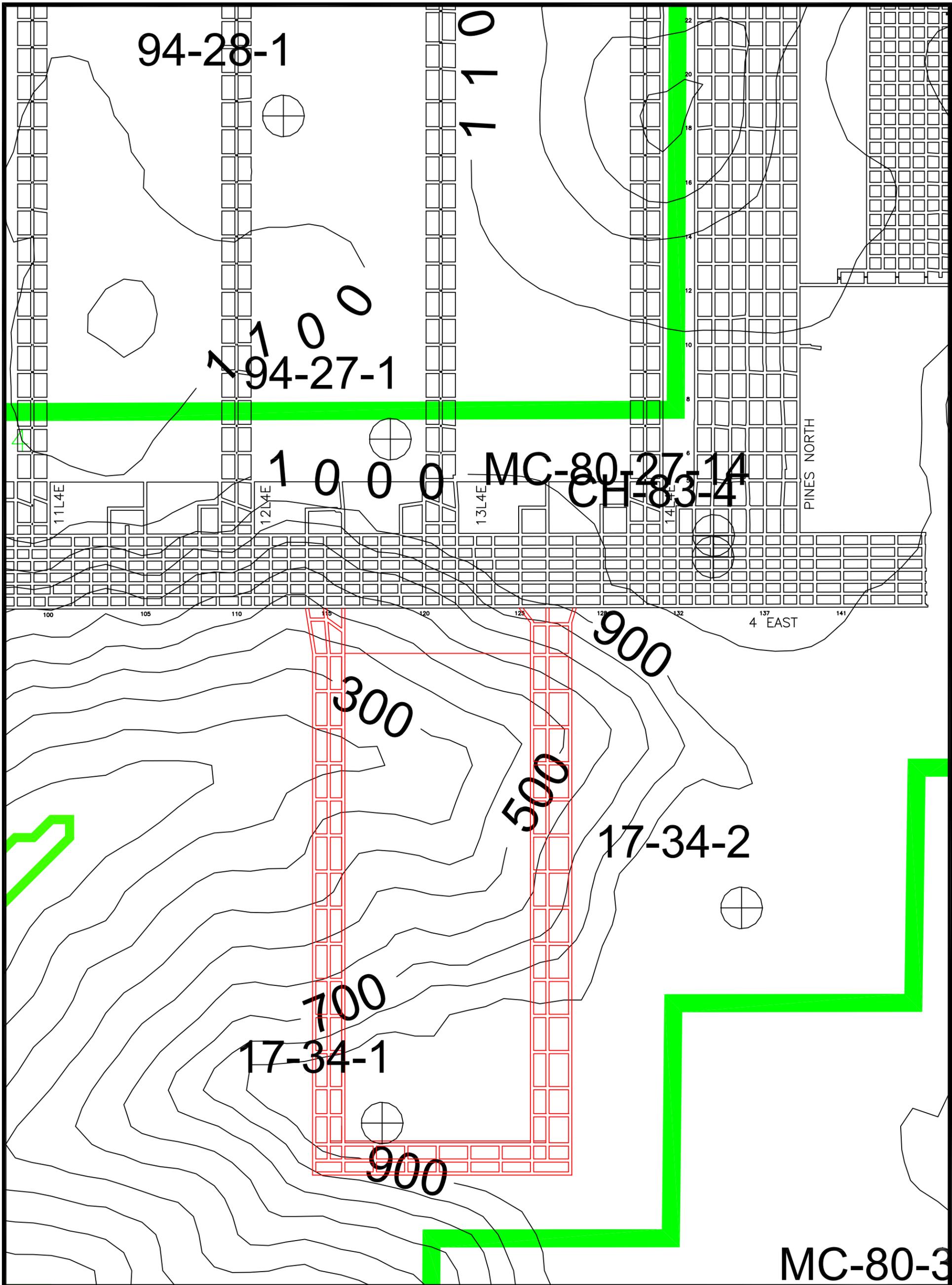


NO.	DATE	REQ. BY	DWG. BY	REVISIONS	REMARKS
11	03/02/2015	VM	J.D.B.	ADD TO ADD SOW AREA FOR S WEST	
22	07/14/2016	VM	J.D.B.	ADD SPURNS HOLLOW & SOUTH FORK LEASE BOUNDARIES	
21	12/15/2016	VM	J.L.W.	REMOVED SOUTH FORK LEASE BOUNDARY	
23	04/12/2017	VM	J.D.B.	GREENS HOLLOW ADD MINE PINE MONITORING	
24	12/08/2017	VM	J.D.B.	ADD MINE PINE	

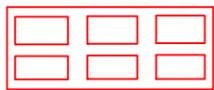
Canyon Fuel Company, LLC
SUFCO Mine
 597 South 900 E., Panguitch, UT 84654
 (435) 286-4880 Phone
 (435) 286-4499 Fax

HYDROLOGIC MONITORING STATIONS

SCALE: 1" = 1,000'	DATE: 10/26/2006	DRAWN BY: JMB/TRB	ENGINEER: J.D.B.	CHECKED BY: V.M.	SHEET NO.:
FILE NAME:	PROJECT NUMBER:				PLATE 7-3
DWG. SET:	PROJECT NUMBER:				



UH Seam Mine Works



UH Seam Projected Works 4R4E Panel



Overburden (ft) CI 100'



Lease Boundary

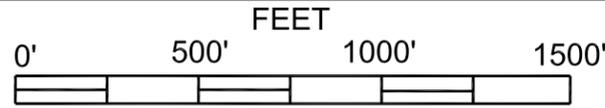


UH Seam Outcrop



Drill Hole Location

76-28-K



SCALE



Canyon Fuel Company, LLC
 SUFCO Mine
 597 South SR 24 - Salina, UT 84654
 (435) 286-4880 Phone
 (435) 286-4499 Fax

Panel 4R4E
 Overburden and Drill Holes

SCALE: 1"=500'	DATE: 12/11/17	DRAWN BY: MB	ENGINEER: MB	SHEET NO.
CHECKED BY:	FILE NAME:			

PLATE 7-11