

March 27, 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: Clean Copies of 4 Right 4 East Panel Amendment, Task ID#5615, Canyon Fuel Company, LLC, Sufco Mine, Permit Number C/041/0002

Dear Sirs:

Please find enclosed with this letter two clean copies of an amendment to the Sufco Mine Permit 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.

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



Bryant Bunnell
Environmental Engineer

Encl.

cc: DOGM Correspondence File

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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: Clean Copies, Amendment to MRP to Address the Mining of 4R4E 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.

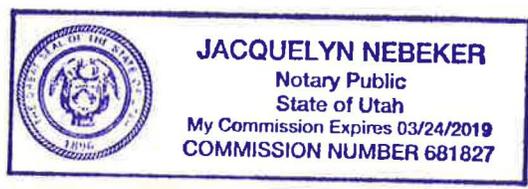
I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Jacob D. Smith
Print Name

J. Smith, Engr. Mgr., 3/27/18
Sign Name, Position, Date

Subscribed and sworn to before me this 27 day of March, 2018

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



For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining <div style="font-size: 2em; color: blue; font-weight: bold;">RECEIVED</div> <div style="color: red; font-weight: bold;">APR 05 2018</div> <div style="color: blue; font-weight: bold;">DIV. OF OIL, GAS & MINING</div>
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APPLICATION FOR COAL PERMIT PROCESSING

Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: Canyon Fuel Company, LLC

Mine: Sufco Mine, 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-ii, 2-iv, 2-9, 2-10
<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, 3-31, 3-32, 3-33
<input checked="" type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 3, Pages 3-14B, 3-14C
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 4, Pages 4-ii, 4-12B
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 4, Pages 4-12C
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 5, Pages 5-vii, 5-23, 5-26, 5-27, 5-30
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 5, Pages 5-23A
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 5, Appendix 5-14
<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
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 6, Pages 6-2A
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Pages 7-v, 7-vi, 7-vii
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Pages 7-16A
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Plates 7-2, 7-3
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Plate 7-11
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	_____
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<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	CONFIDENTIAL
<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
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	_____
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	_____

Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.

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CHAPTER 2

SOILS

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LIST OF APPENDICES

(Appendices appear in Volume 4)

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- 2-1 Prime Farmland Determination Documents
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- 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
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- 2-8 Pines Tract Soils Types
- 2-9 Link Canyon Portal Vegetation, Aquatic Fauna, and Soil Investigations
- 2-10 Muddy Tract Soils Types

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Pines Tract

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

SITLA Muddy Tract

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

3 Right 4 East - Quitchupah Tract

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

4 Right 4 East - Quitchupah Tract

The general description of the soils within in the Quitchupah Tract is provided in the Supplemental Environmental Assessment prepared by UDOGM October 27, 1989, included in Appendix 2-7. The soils above the 4 Right panel support sagebrush, grassland, mountain brush and Pinyon/Juniper, with islands of quaking aspen and scattered pines. No surface disturbance as in the construction of facilities, etc. is associated with the mining of the 4 Right 4 East panel.

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.

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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.

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APPENDIX 2-7

Quitcupah Tract Supplemental Environmental Assessment 1989

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State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Norman H. 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 84180-1203
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

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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

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PURPOSE AND NEED

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

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

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

ALTERNATIVES

Alternative 1. Approval Without Special Federal Conditions

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

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Alternative 2, Disapproval

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

Alternative 3, Approval With Special Federal Conditions

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

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

AFFECTED ENVIRONMENT

Topography and Geology

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

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

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.

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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. **INCORPORATED**

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Soils

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

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

Vegetation

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

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

Fish and Wildlife

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

No fisheries exist within the proposed permit area.

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

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

Land Use

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

Cultural Resources

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

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.

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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.

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Soils

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

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

Vegetation

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

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

Fish and Wildlife

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

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

Cultural Resources

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

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

Socioeconomics

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

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

Long-Term Impacts

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

IMPACTS OF ALTERNATIVE 2, DISAPPROVAL

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

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

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PREVIOUS ENVIRONMENTAL IMPACT STATEMENTS AND ENVIRONMENTAL ASSESSMENTS

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

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

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

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

CONSULTATION

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

PREPARER

Richard V. Smith, Permit Supervisor, Utah Division of Oil, Gas and Mining

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CHAPTER 3

BIOLOGY

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- 3-6 Vegetation Information Guidelines, Appendix A
- 3-7 Power Line Correspondence
- 3-8 Bat Survey for the SUFCO Mine
- 3-9 Vegetation and Wildlife of the Pines Tract Project.
- 3-10 Monitoring and Mitigation Plan for Mining Under the East Fork of Box Canyon
- 3-11 Muddy Creek Technical Report-Wildlife
- 3-12 Mexican Spotted Owl Survey Muddy Tract
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4 Right 4 East Panel - Vegetation Information

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 were documented within the potential subsidence impact area above the 4R4E panel and adjacent areas (See the 4R4E Projected Subsidence Map in Appendix 6-4). The vegetation types found during the survey include the pinyon-juniper, sagebrush/grass, and mountain sagebrush types of the desert shrub biome. These findings 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 coincide with data shown on Plate 3-1.

4 Right 4 East Panel - Raptor Information

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.

4 Right 4 East Panel - Elk & Mule Deer

The 4R4E panel is located in the southern portion of the Quitchupah 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 Quitchupah 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.

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4 Right 4 East Panel - 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.

4 Right 4 East Panel(s) - Seed Mix Information

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.

Table 3-3

USDA-FS Region 4 Sensitive Species - Fishlake and Manti-LaSal
 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
Maquire 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

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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 aprice</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 townsendii 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

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Amphibians

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

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

CHAPTER 4

LAND USE AND AIR QUALITY

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provided in Appendix 4-2 demonstrate that the two shelters 42SV3550 and 42SV3551 should not be affected by the mining.

The additional information was provided to Manti-La Sal Forest Service Archeologist Charmaine Thompson. During a second review of the information pertaining to mining activities in relation to the two shelters (Forest Service Project - ML-13-1452, Appendix 4-2) and a visit to the study area, Ms. Thompson revised her earlier determination to be "no adverse effect" to the shelters listed in the report. Ms. Thompson's evaluation letter and determination were forwarded to the Utah State Historical Society, with a request for concurrence with the decision of "no adverse effect", concurrence was given by Chris Merritt, Senior Preservation Specialist. The documentation of the decision and concurrence is located in Confidential Appendix 4-2.

In accordance with previous commitments the mine has made in previous sections of this M&RP, protection of eligible cultural resources will be in accordance with regulatory authority and Utah SHPO requirements. The Applicant will also instruct its employees that it is a violation of federal and state laws to collect individual artifacts or to otherwise disturb cultural resources.

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

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.

4.1.1.2 Previous Mining Activity

Portions of the mine plan area were mined prior to the filing of this permit application. SUFCA Mine began a small operation mining the Upper Hiawatha Coal seam in 1941. There was no previous mining activity prior to the 1941 SUFCA operation.

From 1941 through 1974, the coal was removed by conventional mining techniques. From 1974 through 1978, both conventional and continuous mining methods were used. From 1978 until October 1985, all mining used continuous mining methods. Since October 1985 both continuous mining and longwall mining methods have been used. The portion of the seam mined by conventional methods was only partially extracted leaving all pillars for support. The majority of the mining done has been full extraction. All longwall mining is full extraction.

The quantity of coal mined prior to this permit application was approximately 37,058,100 tons. The earlier workings are shown on Plate 5-1 as an integral part of the mining operation.

Use of the land preceding mining was primarily grazing. The area also supported limited timbering in the Ponderosa stands and hunting.

CHAPTER 5
ENGINEERING

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- 5-4 USFS Report Regarding Subsidence Tension Cracks
- 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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- 5-10 West Lease Portals Construction and Bonding Details
- 5-11 Upper Mine Yard Details
- 5-12 Office Parking
- 5-13 2RWL Sinkhole
- 5-14 4R4E Panel Location

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

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

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

3 Right 4 East Panel(s)

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

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 & 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 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 & 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 Quitchupah Canyon. The East

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 SUFACO 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 & 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.

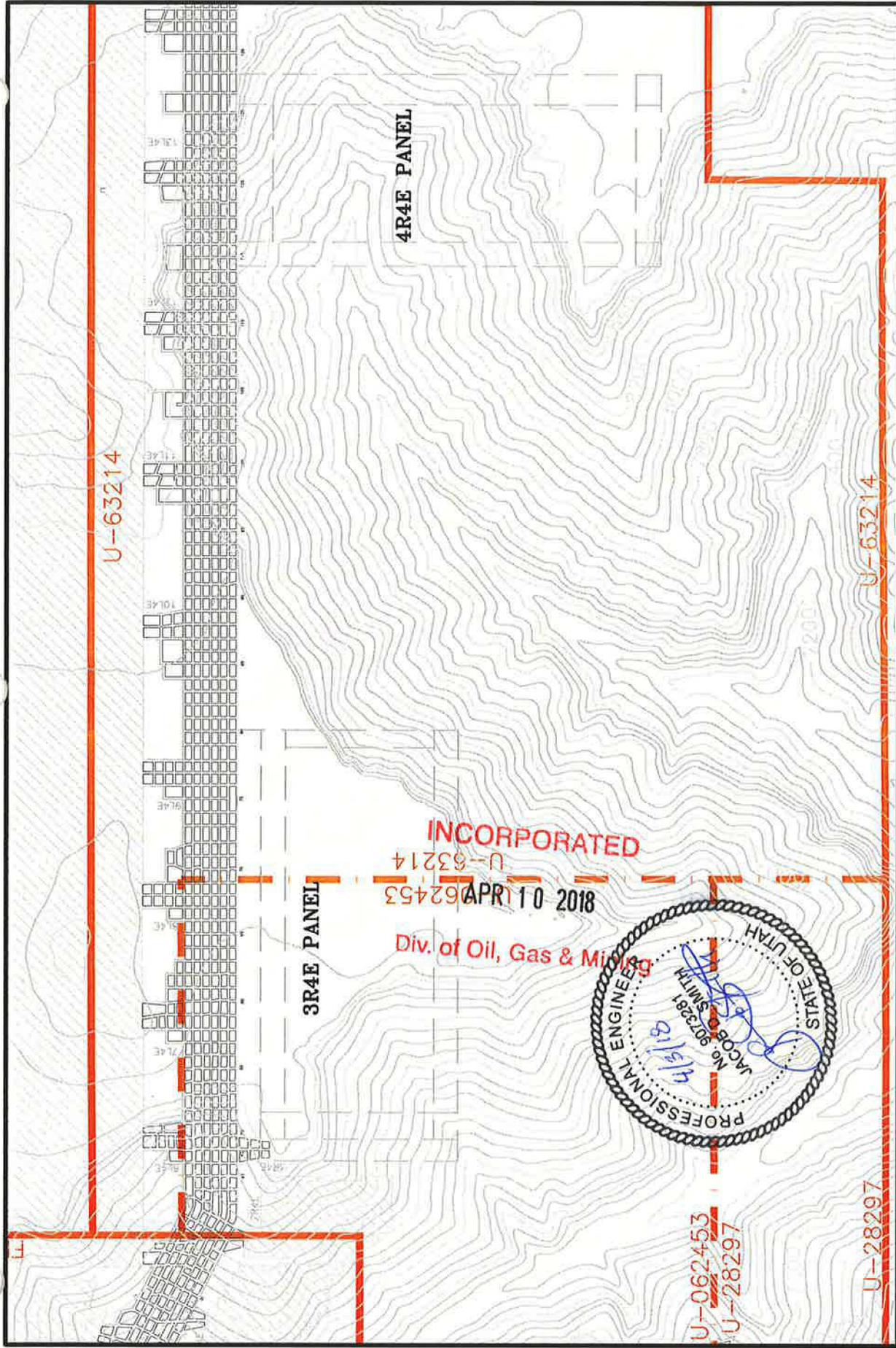
A annual monitoring program was developed to analyze the subsidence cracks related to undermining of the West Fork of Box Canyon. Mining in the area in 1999 did produce visible fracturing at the surface on both the northwest and southeast walls of the canyon in this area. The monitoring program includes 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 SUFACO has performed, will be used to predict the effects of subsidence within other areas of the Pines Tract and other areas of the

Appendix 5-14
4R4E Panel Location

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SUFCO MINE		SHEET NO.
4R4E PANEL LAYOUT		1
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		

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



CHAPTER 6
GEOLOGY

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4 Right 4 East Panel(s) - Geology Information

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.

CHAPTER 7

HYDROLOGY

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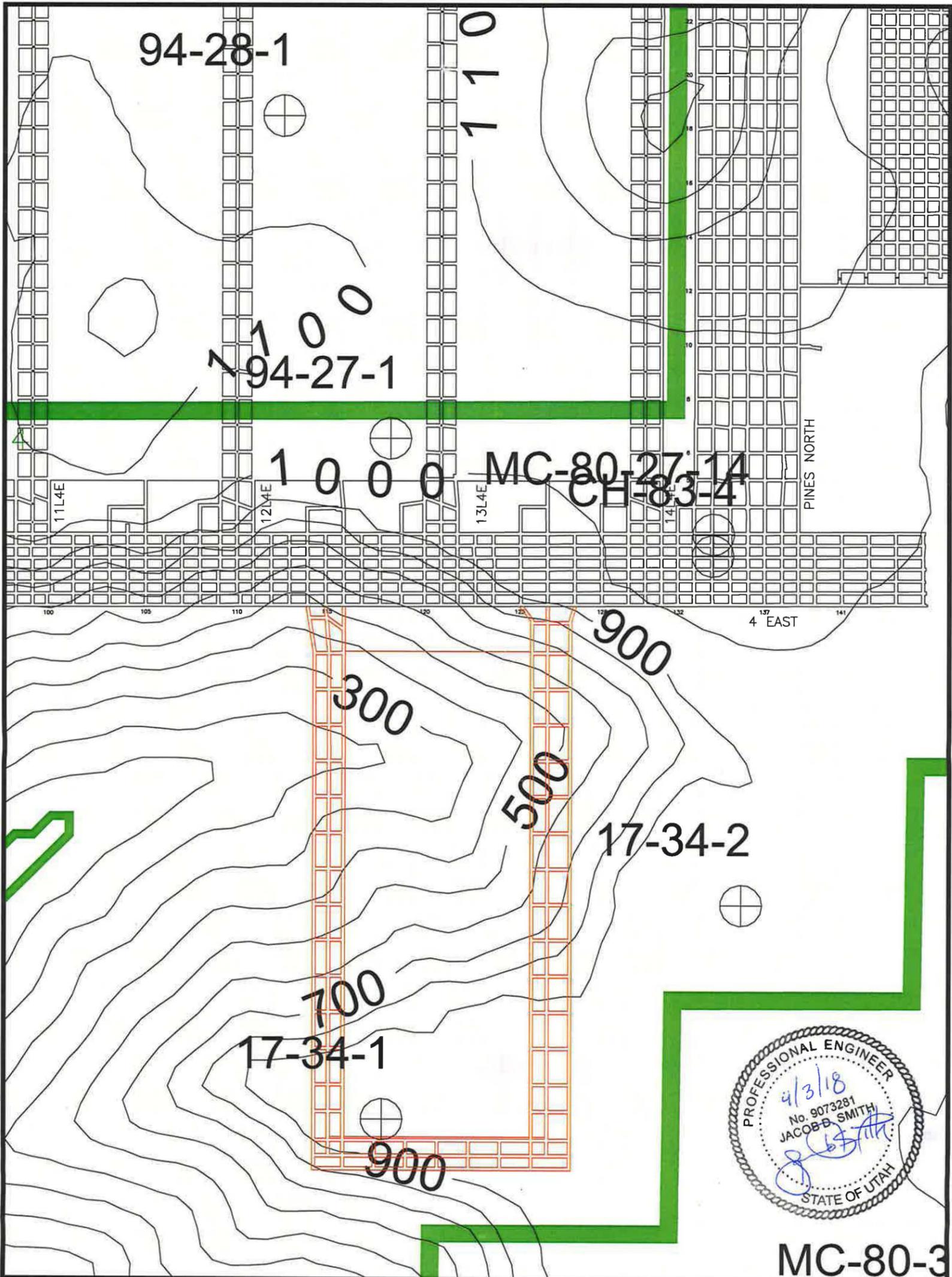
4 Right 4 East Panel - Water Quality

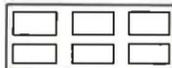
The area of the panel was initially surveyed for surface and ground water resources in the late 1980's and early 1990's to provide information for the USFS and BLM Environmental Assessment of the Quitcupah Lease (U-63214) and the US Geological Survey Water Resources Investigation Report 90-4084. At approximately 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. 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

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-  UH Seam Mine Works
-  UH Seam Projected Works 4R4E Panel
-  600 Overburden (ft) CI 100'
-  Lease Boundary
-  UH Seam Outcrop
-  76-28-K Drill Hole Location



Canyon Fuel Company, LLC
SUFCA Mine
 507 South St 24 - Solms, UT 84654
 (435) 286-4850 Phone
 (435) 286-4489 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

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