

**Table 3-1**

***Federal Listed and Proposed Endangered Species in Utah***  
***February 1999–September 2003 (Revised)***

<b><u>Plants</u></b>		<b>Status</b>
Autumn Buttercup	<u>Ranunculus acriformis var. aestivalis</u>	E
Barneby Reed-Mustard	<u>Schoenocrambe barnebyi</u>	E
Barneby Ridge-Cress	<u>Lepidium barnebyanum</u>	E
Clay Phacelia	<u>Phacelia argillacea</u>	E
Clay Reed-Mustard	<u>Schoenocrambe argillacea</u>	E
Dwarf Bear-Poppy	<u>Arctomecon bumilis</u>	E
Heliotrope Milk-Vetch	<u>Astragalus montii</u>	T
Jones Cycladenia	<u>Cycladenis humilis var. jonesii</u>	T
Kodachrome Bladderpod	<u>Lesquerella tumulosa</u>	E
Last Chance Townsendia	<u>Townsendia aprica</u>	T
Maguire Daisy	<u>Erigeron maguirei</u>	T
Maguire Primrose	<u>Primula maguirei</u>	ET

Novajo Sedge <sup>5</sup>	<u>Carex specuicola</u>	ET
San Rafael Cactus	<u>Pediocactus despainii</u>	E
Shrubby Reed-Mustard	<u>Schoenrambe suffrutescens</u>	E
Siler Pincushion Cactus	<u>Pediocactus sileri</u>	ET
Uinta Basin Hookless Cactus	<u>Sclerocactus glaucus</u>	ET
Ute Ladies'-Tresses	<u>Spiranthes diluvialis var. maguirei</u>	ET
Welsh's Milkweed	<u>Asclepias welshii</u>	T
Wright Fishhook Cactus	<u>Sclerocactus wrightiae</u>	E
Winkler Cactus	<u>Pediocactus winkleri</u>	T
Shivwitz Milk-vetch	<u>Astragalus ampullarioides</u>	E
Deseret Milk-vetch	<u>Astragalus desereticus</u>	T
Holmgren Milk-vetch	<u>Astragalus holmgreniorum</u>	E

**Mammals**

Black-Footed Ferret <sup>1</sup>	<u>Mustela nigripes</u>	E
Utah Prairie Dog	<u>Cynomys parvidens</u>	T

Gray Wolf

Canis lupus

T

**Birds**

American Peregrine Falcon<sup>2</sup> ~~Falco peregrinus anatum~~ E

California Condor Gymnogyps californianus XN

Bald Eagle<sup>4</sup> Haliaeetus leucocephalus T

Mexican Spotted Owl Strix occidentalis lucida T

Southwest Willow Flycatcher Empidonax traillii extimus E

Whooping Crane<sup>3</sup> Grus americanus E

Mountain Plover ~~Charadrius montanus~~ PE

**Fish**

Bonytail Chub Gila elegans E

Colorado Squawfish Ptychocheilus lucius E

Humpback Chub Gila cypha E

June Sucker<sup>5</sup> Chasmistes liorus E

Lahontan Cutthroat Trout	<u>Oncorhynchus Clarki henshawi</u>	E
Razorback Sucker	<u>Xyrauchen texanus</u>	E
Virgin River Chub <sup>6</sup>	<u>Gila robusta seminuda</u>	E
Woundfin	<u>Plagopterus argentissimus</u>	E

**Reptiles**

Desert Tortoise <sup>5</sup> (Mojave population)	<u>Gopherus agassizii</u>	E
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**Snails**

Kanab Ambersnail <sup>7</sup>	<u>Oxyloma haydeni kanabensis</u>	E
Utah Valvatasnail	<u>Valvata utahensis</u>	E

<sup>1</sup>Two confirmed sightings were made in Utah in 1982.

<sup>2</sup>Nests in Utah.

<sup>3</sup>Migrates through Utah, no resident population.

<sup>4</sup>Wintering populations (only two known nesting pairs in southeastern Utah).

<sup>5</sup>Critical habitat designated.

<sup>6</sup>Critical habitat proposed.

<sup>7</sup>Emergency listing.

tamarack for nesting. The vegetative cover of the area is sagebrush with few trees.

- Flammulated Owl - The owl has been seen in the general area but no populations have been found within the 150 acre IBC area. The owl prefers mature ponderosa pine or Douglas fir forests with open canopies. Nests are made in large diameter dead trees with cavities. Vegetative cover of the 150 acre IBC area is sagebrush with few ponderosa pines and Douglas fir.
- Spotted Bat - The bat has been seen in both Muddy and Box Canyons. These canyons are in close proximity to the 150 acre IBC but no populations have been found within the 150 acre IBC area. The spotted bat usually roosts in rock crevices high on steep cliff faces but will inhabit Ponderosa pine, desert shrub, and pinyon-juniper stands. Few steep cliff faces are located within the 150 acres but are adjacent to the area. The 150 acres is part of a plateau and the vegetation is mainly Ponderosa pine, desert shrub, and pinyon-juniper stands.

***Link Canyon Mine Portals.*** A few of the Sensitive species listed in Table 3-3 may be found within the portal area. The disturbed area associated with the re-opened portal is less than one acre and is included in an area previously disturbed by mining activities. No sensitive plants species were found in the area by Zobell (2000) or Mt. Nebo Scientific (2002) nor have mammals included in Table 3-3 been found in the portal area. Previous bat surveys indicated Spotted Bats are not present in the portal area. No access to the mines appear to be available to bats as the portals were completely closed by rubble in the 1980's. No Bald Eagle nests are known to occur in the area. A Peregrine Falcon eyrie was reported two miles to the east of the site in 1998 and 2001 but the eyrie was inactive in 1999, 2000 and 2002. Because the flow of water from the portals is minimal (one gallon per minute or less), fish are not found at this location. A survey specifically conducted for endangered mollusks was conducted in the portal area in June 2002. It is unlikely any endangered snails are present in the general area because of its isolated location and since the source of water only became available after the mine

closed in the 1950's. Amphibians have not been reported in the area, possibly for the same reasons as those listed previously for the mollusks.

***East Fork Of Box Canyon.*** Sufco intends to undermine portions of the East Fork of Box Canyon beginning in the Fall of 2003 as they extract coal from the 3LPE and 4LPE longwall panels. Prior to the initiation of undermining and subsidence, a pre-subsidence qualitative evaluation of vegetation and channel conditions will be conducted in the East Fork of Box Canyon from the Joe's Mill Ponds downstream to a location above the west gate roads associated with the 3LPE panel. The survey will consist of video taping the condition of the stream channel paying particular note to surface flows and ground water discharge, vegetation types and conditions, animal species in the area including documenting the absence or presence of macroinvertebrates in the stream channel by filming the turning over of rocks or debris, general soil conditions, and the general geomorphology of the area. A qualified botanist will be used to identify and report in the video tape the major representative plant species along the stream channel. This will include riparian and spring locations found along the stream channel. Major hanging gardens will be identified and discussed. The general stream morphology will be discussed in the video including the width and depth of pools, height of natural drops, existing joints, cracks, and fractures, locations where flows naturally diminish or increase, etc.

A video tape will be made of the same portion of the East Fork at the same time of the year on the third year following undermining. A comparison will be made of the two tapes using the parameters described above and any changes due to mining activities will be noted. The tapes will be submitted to the Division as part of the Annual Report; the Fall 2003 video tape will be submitted with the 2003 Annual Report and the comparison tape will presumably be submitted with the 2006 Annual Report.

Approximately 10 sites will be identified and established during the qualitative pre-subsidence survey for use in a quantitative evaluation of site-specific vegetative and hydrologic conditions (See Chapter 7 Section 7.3.1.2) The site locations will be mapped and identified in the field with stakes and flagging. The 10 or more sites will include each of the springs found within

the portion of the East Fork to be subsided and the Joe's Mill pond area. The total percent cover of understory and overstory will be measured at each site. The cover will be identified and measured by species and the frequency of each species. The condition of the riparian vegetation flanking the channel at each of the sites will be described and monitored. The hillsides above the channels will also be monitored for changes in morphology. Erosion of the hillsides will be monitored using a numerical ranking system to identify the degree of erosion. The ranking system will be as follows:

4-Extreme erosion	deeply incised rills and gullies with unstable, actively slumping walls and loose material moving rapidly to the rill or gully floor, freshly exposed plant roots, no remaining topsoil, no vegetative litter, little to no vegetative cover.
3-High erosion	incised rills and gullies slightly unstable slopes, only occasional slumps of the rill or gully wall, some plant roots exposed, little to no topsoil remaining, little to no vegetative litter, poor vegetative cover.
2-Moderate erosion	small rills, no gullies, moderately stable slopes, very little to no exposed roots, most of the topsoil remains, moderate vegetative cover.
1-Slight erosion	occasional small rills, no significant channeling in the soils, no exposed roots, topsoil remains, most vegetative litter in place, good vegetative cover.
0-No erosion	Appears relatively undisturbed, essentially no rills, vegetative litter in-place, healthy vegetative cover.

Photographic evidence of the state of erosion will be obtained each year at the East Fork monitoring sites for annual comparative and evaluation purposes. The climatic and overall vegetative conditions of the area will be noted. Particular attention will be paid to the effects of grazing on the vegetation and soils with respect to changes in the rank of erosion.

As part of the quantitative evaluation of the East Fork of Box Canyon, the locations of populations of the Link Canyon Columbine will be identified, mapped, and locations staked. The number of individuals in the populations will be counted or accurately estimated. All other populations of Threatened and Endangered and Sensitive Species found in the area of concern will be identified. The population location will be mapped, if appropriate, and the number of individuals will be recorded.

The vegetative surveys that occur at the 10 monitoring sites as well as the Link Canyon Columbine, Threatened and Endangered Species, and Sensitive Species surveys will be performed as part of the pre-subsidence survey and then again at the same time of the year on the third year following undermining and subsidence. The results of the surveys will be submitted to the Division in Annual Report for the year in which they are completed. A report detailing the changes, and apparent causes, in vegetation observed as a result of comparing the surveys will be provided. The erosion survey will also be submitted with the final vegetative survey as part of the Annual Report.

If substantiated mining-induced changes occur in the vegetation within the affected areas of the East Fork of Box Canyon, a revegetation/enhancement mitigation plan will be created and submitted to the Division. The permittee understands that the mitigation plan will be approved only after the Division consults with the USFS on the proposed plan.

In addition to the East Fork of Box Canyon vegetative monitoring and mitigation plan, Sufco will implement a hydrologic monitoring plan as well as a stream channel subsidence crack mitigation plan. These plans are discussed in greater detail in Section 7.3.1.2 and Section 5.2.5.1 of this M&RP. Mitigation of cracks, if they occur, in the bottom of the stream channel requires the

placement of bentonite grout to stop the diversion of surface flows. If mitigation is required during the critical elk and deer time periods of November 1st through April 1st and May 1<sup>st</sup> through July 1<sup>st</sup>, the Division will be contacted and the mitigation plans reviewed with the appropriate regulatory personnel. Mitigation work will be performed in such a manner as to minimize disturbance to wildlife.

### ***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 SUFACO 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 3-2**

***Native Utah Wildlife Species of Special Interest***  
***February 1999-September 2003(Revised)***

<b><u>Mammals</u></b>		<b>Status</b>
Grizzly Bear	<u>Ursus arctos</u>	EX
Fisher	<u>Martes pennanti</u>	EX
Gray Wolf	<u>Canis lupus</u>	EX
Black-footed Ferret	<u>Mustela nigripes</u> <sup>1</sup>	EN
Utah Prairie Dog	<u>Cynomys parvidens</u> <sup>2</sup>	T
Wolverine	<u>Gulo gulo</u>	T
Spotted Bat	<u>Euderma maculatum</u>	SP
Allen's Big-eared Bat	<u>Idionycteris phyllotis</u>	SD
Fringer Myotis	<u>Myotis thysanodes</u>	SD
Dwarf Shrew	<u>Sorex nanus</u>	SD
Desert Shrew	<u>Notiosorex crawfordi</u>	SD
Abert's Squirrel	<u>Sciurus aberti navajo</u>	SD

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

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Western Red Bat	<u>Lasiurus blossevillii</u>	SP/SD
Big Free-tailed Bat	<u>Nyctinomops macrotis</u>	SP/SD
Brazilian Free-tailed Bat	<u>Tadarida brasiliensis mexicana</u>	SP/SD
Townsend's Big-eared Bat	<u>Plecotus townsendii</u>	SP/SD
Desert Kangaroo Rat	<u>Dipodomys deserti</u>	SP/SD
Northern Rock Mouse	<u>Peromyscus nasutus</u>	SP/SD
Stephen's Woodrat	<u>Neotoma stephensi</u>	SP/SD
Virgin River Montane Vole	<u>Microtus montanus rivularis</u>	SP/SD
Mexican Vole	<u>Microtus mexicanus</u>	SP/SD
Northern River Otter	<u>Lutra canadensis</u>	SP/SD
North American Lynx	<u>Felis lynx canadensis</u>	SP/SD

**Birds**

Passenger Pigeon	<u>Ectopistes migratorius</u>	E
<del>American Peregrine Falcon</del>	<del><u>Falco peregrinus anatum</u><sup>†</sup></del>	<del>EN</del>
Southern Willow Flycatcher	<u>Empidonax traillii extimus</u> <sup>1</sup>	EN

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The Applicant agrees, however, to notify the regulatory authority and the Utah State Historical Society of previously unidentified cultural resources discovered in the course of mining operations. The Applicant also agrees to have any such cultural resources evaluated in terms of National Register of Historic Places eligibility criteria. Protection of eligible cultural resources will be in accordance with regulatory authority and Utah SHPO requirements. The Applicant will also instruct its employees that it is a violation of federal and state laws to collect individual artifacts or to otherwise disturb cultural resources.

**Pines Tract Area**

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

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

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

Sufco intends to undermine portions of the East Fork of Box Canyon beginning in the Fall of 2003 as they extract coal from the 3LPE and 4LPE longwall panels. This change in the mining plan will change the required monitoring schedule in accordance with the Memorandum of Agreement for site 42SV2430/ML-3446 - Elusive Peacock which will be undermined under the 3LPE longwall panel. In accordance with pages 11-12 of the MOA the required monitoring schedule of this site will change from Monitor Schedule A (Sites in areas that will be mined

using full-support methods) to Monitor Schedule B (Sites in areas which will be mined under and subsided) requiring the implementation of additional monitoring of the site. Monitoring results will be provided in DOGM Annual Reports. (2003, 2004, 2005, 2006, and indefinitely until movement ceases)

A proposed mine breakout located on the south wall of Muddy Canyon was inventoried and evaluated by Dr. Hauck and staff in June of 1999(AERC). No artifacts or paleoentological loci were observed or identified during the Muddy Canyon Breakout evaluation. The study concluded that no currently recorded significant or National Register eligible cultural resources will be affected by the development of the breakout (Appendix 4-2, AERC 1999).

mine where similar geomorphologic and geologic conditions occur. This program will be developed and implemented by September 2000.

***Anticipated Effects of Subsidence.*** Future subsidence in the permit 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 permit 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 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 the expected location of the cracks are given in Appendix 7-19. If cracks do develop in the channel floor and appear to be taking surface water from the creek, sealing of these cracks will be done with bentonite grout. Use of bentonite grout for the sealing of the cracks in the channel floor is discussed in Section 3 of the Pines Tract FEIS (1999) and in more detail in the following section.

#### East Fork of Box Canyon Subsidence Monitoring and Mitigation

Portions of the East Fork of Box Canyon will be undermined and subsided as longwall panels 3LPE and 4LPE are extracted in 2003 through 2005. A monitoring plan that is more intensive than the general permit area has been proposed for monitoring vegetation, surface and ground

water flows, and subsidence cracks and repair of the cracks in the portions of the East Fork to be undermined. The subsidence portion of the monitoring program is discussed in detail in the following text.

Prior to the initiation of undermining and subsidence, a presubsidence survey will be conducted in the East Fork of Box Canyon from the Joe's Mill Ponds downstream to a location above the west gate roads associated with the 3LPE panel. The survey will consist of video taping the condition of the stream channel paying particular note to surface flows and ground water discharge, vegetation types and conditions, animal life in the area including macroinvertebrates in the stream channel, soil conditions, and the general geomorphology of the area. A follow-up video survey will be made at the same time of year on the third year following undermining. A general comparison between the two tapes will be made to determine what, if any, effects to the parameters described above have occurred. The biological aspects of the video tape are discussed in greater detail in Section 3.2.2.2 while the monitoring of surface and ground water flows are discussed in Section 7.3.1.2.

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

As the longwall face advances and the 15-degree angle-of-draw area follows, the portions of the channel that now lie outside the 15-degree angle-of-draw will be monitored for subsidence features on a once a week basis for eight weeks. These same areas will then be monitored for subsidence features on a twice a week basis for another eight weeks. Table 7-6 in Chapter 7 lists the schedule for water and subsidence monitoring frequency.

Mitigation of cracks that would appear to interrupt or divert flows from the stream channel will be sealed immediately with bentonite. Sufco will use hand placement methods when sealing cracks with bentonite. The individual(s) conducting the survey will be equipped with an adequate volume of bentonite, in powder, granular, and/or chip form, to seal small cracks. The

bentonite may be placed by pouring it directly into the crack and hydrating with stream water or, if in an actively flowing portion of the stream, temporarily diverting the flow around successive portions of the crack using native soils and placing the bentonite in the exposed section of the crack until the crack is sealed. Sealing of the lower portions of the channel walls may also be required if the crack occurs where the channel is defined by bedrock. If cracks are present in channel walls defined by soil, the soil cracks will be hand filled using a native soil/bentonite mix. The sealing of the channel floor and walls will be accomplished with hand tools such as shovel, picks, trowels, etc. In the unlikely event that cracks too large to be sealed through the efforts of one or two persons in one day do occur and it appears there is a danger of water being diverted from the channel for an extended period of time, arrangements will be made to get additional help to the site as soon as possible.

Sufco will conduct longwall mining operations in such a manner as to minimize surface disturbance while mining within the 15-degree angle-of-draw area that includes the East Fork stream channel. This will be accomplished by advancing the longwall on a schedule where mining will not be suspended for a period to exceed 48 hours. This mining schedule has been discussed with the BLM. A similar mining schedule was successfully implemented at the Canyon Fuel Company Skyline Mine while the lower sections of Burnout Canyon were undermined. No damage to the stream channel or reduction in stream flows were noted as a result of undermining that portion of Burnout Canyon using the approved mining schedule.

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

to be taken as mitigation. Thereafter, the Division will be advised of continuing mitigation efforts, if needed, in the weekly report.

Mining within the area of the East Fork of the Box Canyon will be conducted in accordance with State and Federal rules and regulations and the requirements and stipulations presented in the BLM's Conditions of Approval of the Resource Recovery and Protection Plan (July 31, 2003) located in Appendix 1-2.

#### 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 Plate 5-10 as not planned for subsidence. Based on experience and data collected from the permit 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 (ft<sup>2</sup>)

$A_t$  = area supported by pillar (ft<sup>2</sup>)

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

d = overburden depth (ft)

$D_o$  = overburden density (lb/ft<sup>3</sup>)  
= 160 lb/ft<sup>3</sup> for the permit area

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

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

**Correction of Material Damage.** No material damage of surface resources is anticipated as a result of subsidence in the permit 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

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Prior to disturbing the portals, additional samples have been obtained from both the east and west portals in October and November 2002. One sample from each portal was obtained for four consecutive weeks. No surface flow was present in the summer of 2002 at either of the portals. However, a small pool of standing water was present at the mouth of the west portal through most of the year. The samples were obtained by first excavating a depression near the mouth of the east portal and allowing water to gradually fill the depression and by sampling the standing water at the mouth of the western portal. These samples were obtained as baseline samples in compliance with a request from the Forest. The samples have been analyzed according to the Division's guidelines for baseline water monitoring samples. Copies of the sample analyses results for samples obtained on October 26, October 30, November 6, and November 15, 2002 are included in Appendix 7-4. Included in Appendix 7-4 is a brief report by Erik Petersen of Petersen Hydrologic, Inc. that discusses the various sampling events, the results of the sample analyses, and an interpretation of the data as it relates to the origin of the water in the Link Canyon Mine.

Mr. Petersen discusses in his report that water issuing from the Link Canyon portals is likely not sourced from the springs at the head of the canyon but probably from surface water that enters the mine through the weathered bedrock near the surface. It appears that during periods of normal or greater than normal precipitation, the water discharged from the mine has a TDS level of near 500 mg/l. However, in drought years, as has occurred in the area beginning in 1999 and continuing through 2002, the TDS levels in the water naturally rises due to a lack of fresh water flushing of the abandoned mine workings water. Hence, the samples obtained in the fall of 2002 had TDS concentrations greater than 1400 mg/l.

A hydrograph of the discharges from the Link Canyon Mine is provided in the USGS report by Thiros and Cordy (1991). This hydrograph, along with the additional data collected by Mayo and Associates and Erik Petersen suggest the discharge from the mine is influenced by seasonal changes in precipitation. Significantly, the flow from the mine has nearly ceased as a result of the area drought which began in 1999 and has continued through at least 2002.

Water discharged from the mine will continue to be monitored at sites Link Portal West and Link Portal East, as part of the quarterly water monitoring program. Significant changes in water chemistry and the apparent causes will be reported to the Division.

The only actual loss of groundwater from the hydrologic balance is that water which is the difference between the average as-shipped moisture minus the inherent moisture or in-situ moisture of the coal and leaves the basin upon mining. Based on an average coal moisture loss of groundwater content of 1.8 percent and a long-term coal production rate of 6 million tons per year, approximately 80 AF/yr of groundwater is removed from the basin. This represents about 2 percent of the average annual flow of Quitchupah Creek above Link Canyon.

Several springs and stream locations in the permit area are monitored for quantity and quality as prescribed by the M&RP water monitoring program. Analysis of the monitored flows indicated that very little impact has occurred to springs and streams. Erik Petersen of Petersen Hydrologic, Inc evaluated the flow data collected from several springs and surface flows in the Box Canyon drainage. His evaluation was forwarded to Sufco in the form of a letter report dated August 14, 2003 and is included in Appendix 7-19. Mr. Petersen determined that since mining began in the Pines Tract, a few the area springs have exhibited an increase in flow during a period of prolonged drought. He also concluded that perhaps one spring, Pines 303, in the lower portion of the Box Canyon, may have experienced reduced flows as a result of mining activities. However, because of the prolonged drought in the area that began in 1998, it is not possible to determine with certainty whether mining activities, drought conditions, or both have resulted in the loss of spring flow. A loss in flow from this spring was a predicted possibility described in the Pines Tract EIS. The loss of flow from this spring(less than 4 gpm) has apparently not adversely affected area vegetation or wildlife. Because of the increased discharge of springs farther up canyon, the loss of the less than the 4 gpm contribution of ground water from Pines 303 to Box Canyon Creek is insignificant to the total flow of the creek. No water rights were found to have been filed on this spring discharge.

Mr. Petersen has noted an increase in the flow of springs Pines 209 and 212 and in the flow of the Main Fork of Box Canyon Creek that appears to coincide with mining in the western portion of the Pines Tract. He reasons that the increase in spring flow is related to subsidence enhanced recharge or hydraulic conductivity of the aquifers sourcing the springs. The increase in spring flow has resulted in the increase in flow in the Main Fork of Box Canyon Creek. This has been noted as a positive impact to the creek during a time of drought. Analysis of the flow data presented by Petersen suggests the increase in flow from these springs may be short

lived. He has also indicated that flow from these springs will not cease but should return to near pre-mining rates. In fact, the data presented in his August 14, 2003 letter report suggests the flow rates may already be beginning to return to pre-mining rates.

**Potential Hydrocarbon Contamination.** Diesel fuel, oils, greases, and other hydrocarbon products are stored and used at the site for a variety of purposes. Diesel and oil stored in above-ground tanks at the mine surface facilities may spill onto the ground during filling of the storage tank, leakage of the storage tank, or filling of the vehicle tank. Similarly, greases and other oils may be spilled during use in surface and underground operations.

The probable future extent of the contamination caused by diesel and oil spillage is expected to be small for three reasons. First, because the tanks are located above ground, leakage from the tanks can be readily detected and repaired. Second, spillage during filling of the storage or vehicle tanks is minimized to avoid loss of an economically valuable product. Finally, the Spill Prevention Control and Countermeasure Plan presented in Appendix 7-6 provides inspection, training, and operation measures to minimize the extent of contamination resulting from the use of hydrocarbons at the site.

The potential for hydrocarbon contamination of the environment at the Link Canyon Substation or the reopened Link Canyon Mine Portal is minimal since no fuels or lubricants will be stored at this site. If a catastrophic failure of the transformers at the substation occurred, the minimal volume of oil would be contained behind the berm to be built around the equipment.

Periodically due to difficult recovery conditions or roof collapse, mining equipment is abandoned underground. Abandoned mining equipment locations are shown on Figure 7-7. Prior to leaving equipment underground, lubricating and hydraulic fluids are removed to the extent possible. Since the equipment is steel and not too different compositionally from the roof support throughout the mine, contamination to ground water from abandoned equipment will cause minimal, if any, disturbance to the hydrologic balance within the permit and adjacent areas and is not expected to cause material damage outside the permit area. Assuming the mine were to flood and the abandoned equipment were to be covered with water, several probable results and impacts can be evaluated:

1. Flooding of the abandoned mine might be relatively rapid, but once flooded, flow of ground water into, through, and out-of the void spaces of the mine should be slow.
2. If steel or other metals in the equipment were to oxidize, it would be at a very slow rate and the amount of iron and other metals added to the ground water at any one time would be very small.
3. Oxides of most metals are insoluble or slightly soluble in water. At temperatures expected in the mine, metal oxides would tend to precipitate as solids within the mine rather than flow in solution in the ground water. If any metal were to go into solution, concentrations would be highest near the abandoned equipment, but the volume of water in the flooded mine would dilute concentrations outside the immediate vicinity of the equipment.
4. Because of dilution and dispersion, natural seasonal fluctuations, changes in water quality would not be expected to be large enough to be detected at the surface at springs, ground-water baseflows to streams, or in discharges from the mine.

**Road Salting.** No salting of the mine road occurs within the permit area. This impact is not a significant concern.

**Coal Haulage.** Coal is hauled over the paved county road from the mine portal area to Interstate Highway 70. Past experience has indicated that approximately one truck load of coal (43 tons) is spilled annually. Residual coal following cleanup of the spill may wash into local streams during a runoff event. Possible impacts to the surface water are increased total suspended solids and turbidity from the fine coal particulates. The probability of a spill occurring in an area sufficiently close to a stream channel to introduce coal to the stream bed is considered small.

In order to minimize fugitive coal dust haulage trucks are either covered or modified to reduce the amount of coal dust blown off the trucks. The impact from fugitive coal dust is therefore considered to be insignificant due to the small amounts lost during haulage in the permit and adjacent areas.

#### **7.2.9 Cumulative Hydrologic Impact Assessment (CHIA)**

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

### **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 7-56 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 prefix "GW - ". During the baseline surveys, several springs identified in the publication could not be found as illustrated on the document maps or by using the printed location descriptions. It is assumed the springs that could not be found have a) stopped flowing; b) were miss mapped; or c) were in close proximity to springs found during the baseline surveys but could not be positively identified as USGS located springs and were therefore given new number designations.

Sampling for the SUFCO Mine and adjacent areas is accomplished in accordance with the schedule outlined on Tables 7-2 through 7-56. Sampling for the waste rock disposal site is

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 will include conducting a pre-mining subsidence survey of the East Fork of Box Canyon over the 3LPE and 4LPE panels that incorporates 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. Ten or more sites will be identified within the portion of the East Fork video taped where the monitoring of surface and/or ground water flows, channel width, vegetation, soils, and general geomorphology will occur. The general area in which these sites will be located are illustrated on Figure 7-8. This Figure will be updated once the sites are located in the field in late September 2003. The vegetation and soil monitoring program is discussed in greater detail in Section 3.2.2.2 of this M&RP. The surface and/or ground water flows and channel width at these stations will be monitored on a weekly basis while mining is occurring within the 15

degree angle-of-draw of the stream channel. Once mining has been completed within the angle-of draw, the sites will be monitored once every two weeks for a period of eight weeks after mining has progressed past the 15 degree angle-of-draw. Table 7-6 presents the monitoring site numbers, monitoring parameters, and the frequency of monitoring. The fourth quarter 2003 water monitoring will be conducted prior to mining within the area of concern in the East Fork of Box Canyon. If new springs are created as a result of subsiding the East Fork, the spring flows will be monitored two times per week until the 15 degree angle-of-draw area above the longwall face has advanced beyond the new spring. Thereafter, the spring flows will be monitored once every week for a period of eight weeks followed by monitoring the springs once every two weeks for eight weeks. A report on the impacts, if any, to the stream or ground water flows, vegetation, soils, general geomorphology, location of the longwall, etc., will be provided via e-mail to the Division on a weekly basis.

Monitoring for subsidence cracks within the stream channel of the East Fork of Box Canyon Creek will also be part of this intensive monitoring and mitigation plan. The details of the mitigation plan are discussed in greater detail in Section 5.2.5.1 of this M&RP. However, in an effort to compile as much of the monitoring requirements for the East Fork of Box Canyon in a single location within the M&RP, the parameters and frequency of monitoring for subsidence have been included in Table 7-6. The subsidence monitoring program will consist of inspecting the stream channel floor within the active angle-of-draw on a twice-a-week basis. Mining induced subsidence effects, such as cracks, slumps, offsets, etc., will be identified, mapped, and a brief narrative of the effects will be recorded and forwarded to the Division on a weekly basis. The portions of the channel where the longwall shear has moved beyond the 15 degree angle-of-draw will then be monitored for subsidence effects on a weekly basis for a period of eight weeks. Following the once-a-week eight week period, monitoring will be conducted on a once every two week basis. This monitoring program will result in a moving zone of "high intensity" or twice a week channel monitoring occurring within an area defined by the 15 degree angle-of-draw above the active longwall face. As the longwall face advances, the "high intensity" zone advances and is followed by the "moderate intensity" once-a-week monitoring zone for eight weeks that is then followed by the "less intense" once every two week monitoring zone. A weekly report will be provided via e-mail to the Division on the results of the subsidence monitoring and mitigation activities.

**TABLE 7-6**  
**East Fork of Box Canyon Monitoring and Mitigation**

<u>Monitoring Sites</u>	<u>Protocol</u>	<u>Comments</u>
EFBC -1	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -2	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -3	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -4	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -5	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -6	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -7	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -8	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -9	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -10	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC-***	B	Subsidence Feature - Monitor location, type, frequency, repairs, etc.

\*\*\* Site numbers and quantity of sites will be dependant upon the number of features created due to subsidence. The weekly report to the Division will include all identified sites once mining begins in the area.

Protocol

- A Monitor sites for flow and channel width weekly while site is within the 15 degree angle of draw of the longwall face. Once area is outside angle of draw, monitor on a once every two week basis for eight weeks. Note any changes due to mine-induced subsidence to flows, soils, vegetation, geomorphology, etc. and provide a weekly report via e-mail to the Division of Oil, Gas and Mining.
- B Monitor subsidence features, such as cracks, and repairs (if needed) on twice a week basis while features are within the 15 degree angle-of-draw of the active longwall face. After the features are outside the angle-of-draw, monitor features on a weekly basis for eight weeks followed by monitoring of the features once every two weeks for an eight week period. Provide a weekly report via e-mail to the Division of Oil, Gas and Mining.

(Figure 7-8)

East Fork Box Monitoring Locations

A rain and temperature monitoring station will be established in the area of the East Fork of Box Canyon as soon as permitting allows. The data collected from the station will be used in combination with data collected from local water monitoring stations to aid in determining what, if any, impacts have occurred to surface runoff, stream flows, and local springs as a result of mining activities.

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

Every reasonable attempt will be made by Sufco to implement and follow the monitoring program schedule. However, mining of 3LP panel under the East Fork of Box Canyon will begin in the late fall of 2003 and continue through early winter of 2003 and 2004. If access is limited due to snow or inclement weather, the mine's effort to access the area will be documented in the weekly report to the Division. The time of the access attempt, weather conditions, and reason(s) for failing to monitor the East Fork sites will be provided in the report.

#### ***7.3.1.3 Acid- and Toxic-Forming Materials***

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

#### ***7.3.1.4 Transfer of Wells***

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

Canyon Fuel Company, LLC  
SUFCO Mine

Mining and Reclamation Plan  
December 20, 1991 (R 09/03)

responsible for the management of the well until bond release in accordance with R645-301-529, R645-301-551, R645-301-631, R645-301-738, and R645-301-765.

***7.3.1.5 Discharges***

Three UPDES discharges are associated with the SUFCO mine. These include two mine water discharges and the sedimentation pond discharge. A description of these discharges is provided in Section 7.2.4.2.

The primary mine-water discharge consists of water from the underground mine workings that is diverted into mined-out areas now used as sumps. These sumps are used to settle out fines before discharge to the surface. This diversion is done in accordance with the requirements of R645-301-731.100 through R645-301-731.522 and R645-301-731.800. The clarified water flows through a box weir and pipeline to a point on an outcrop of Star Point Sandstone about 20 feet above the North Fork of Quitchupah Creek (see Plate 7-3). From there, the water flows directly into the creek. This discharge water is monitored for compliance with the UPDES permit standards prior to release from the mine.

An emergency mine-water discharge is also maintained. A description of this discharge point is provided in Section 7.2.4.2.

Water from the disturbed surface area in East Spring Canyon is collected and conveyed to the sedimentation pond. After the collected water is allowed time to settle-out the sediment, the water is discharged to the creek. The discharge water is monitored for compliance with the UPDES permit standards prior to release from the sedimentation pond.

No discharges of surface water are being made to underground mines and none are planned in the future.

The natural discharge of water from the old Link Canyon Portals will be maintained during use of the west portal and after reclamation of the site. Upon abandonment of the mining area, the connection between the Sufco Mine and old Link Canyon Mine works will be sealed and made as water tight as possible. The Link Canyon Mine works utilized by Sufco will be allowed to fill and will discharge naturally at the west portal. None of the structures used to seal the old works from the rehabilitated works will be removed as the mine is abandoned thus maintaining the discharge at the east portal during reclamation. It is possible the discharge to the west portal will result from gravity discharge of water from the undisturbed portion of the old mine

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 main sedimentation pond are located on Plates 7-4 and 7-5. 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**

~~This section applies to surface mining only. Therefore, this section does not apply to the SUFCA Mine where surface mining does not occur.~~ Ground and surface water rights do exist within the Sufco Mine permit 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 replace the water supply of any land owner 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.

The structures to be used for the runoff-control plan for the permit area include disturbed and undisturbed area diversion channels, sedimentation ponds, containment berms, silt fences, and road diversions and culverts.

#### **7.3.2.1 Siltation Structures**

The siltation structures within the permit area consist of the sedimentation ponds described in Section 7.3.2.2.

# M&RP TEXT PAGES

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THESE NEW TEXT PAGES  
IN M&RP**

**Table 3-1**

***Federal Listed and Proposed Endangered Species in Utah  
September 2003 (Revised)***

<b><u>Plants</u></b>		<b><u>Status</u></b>
Autumn Buttercup	<u>Ranunculus acriformis var. aestivalis</u>	E
Barneby Reed-Mustard	<u>Schoenocrambe barnebyi</u>	E
Barneby Ridge-Cress	<u>Lepidium barnebyanum</u>	E
Clay Phacelia	<u>Phacelia argillacea</u>	E
Clay Reed-Mustard	<u>Schoenocrambe argillacea</u>	E
Dwarf Bear-Poppy	<u>Arctomecon bumilis</u>	E
Heliotrope Milk-Vetch	<u>Astragalus montii</u>	T
Jones Cycladenia	<u>Cycladenis humilis var. jonesii</u>	T
Kodachrome Bladderpod	<u>Lesquerella tumulosa</u>	E
Last Chance Townsendia	<u>Townsendia aprica</u>	T
Maguire Daisy	<u>Erigeron maguirei</u>	T
Maguire Primrose	<u>Primula maguirei</u>	T

Novajo Sedge <sup>5</sup>	<u>Carex specuicola</u>	T
San Rafael Cactus	<u>Pediocactus despainii</u>	E
Shrubby Reed-Mustard	<u>Schoenrambe suffrutescens</u>	E
Siler Pincushion Cactus	<u>Pediocactus sileri</u>	T
Uinta Basin Hookless Cactus	<u>Sclerocactus glaucus</u>	T
Ute Ladies'-Tresses	<u>Spiranthes diluvialis var. maguirei</u>	T
Welsh's Milkweed	<u>Asclepias welshii</u>	T
Wright Fishhook Cactus	<u>Sclerocactus wrightiae</u>	E
Winkler Cactus	<u>Pediocactus winkleri</u>	T
Shivwitz Milk-vetch	<u>Astragalus ampullarioides</u>	E
Deseret Milk-vetch	<u>Astragalus desereticus</u>	T
Holmgren Milk-vetch	<u>Astragalus holmgreniorum</u>	E
<b><u>Mammals</u></b>		
Black-Footed Ferret <sup>1</sup>	<u>Mustela nigripes</u>	E
Utah Prairie Dog	<u>Cynomys parvidens</u>	T



Virgin River Chub<sup>6</sup>                      Gila robusta seminuda                      E

Woundfin                                      Plagopterus argentissimus                      E

**Reptiles**

Desert Tortoise<sup>5</sup>                      Gopherus agassizii                      E  
(Mojave population)

**Snails**

Kanab Ambersnail<sup>7</sup>                      Oxyloma haydeni kanabensis                      E

Utah Valvatasnail                      Valvata utahensis                      E

<sup>1</sup>Two confirmed sightings were made in Utah in 1982.

<sup>2</sup>Nests in Utah.

<sup>3</sup>Migrates through Utah, no resident population.

<sup>4</sup>Wintering populations (only two known nesting pairs in southeastern Utah).

<sup>5</sup>Critical habitat designated.

<sup>6</sup>Critical habitat proposed.

<sup>7</sup>Emergency listing.

E - Endangered    PE - Proposed Endangered    T - Threatened    PT - Proposed Threatened

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

Telephone: Commercial (801) 524-5001

closed in the 1950's. Amphibians have not been reported in the area, possibly for the same reasons as those listed previously for the mollusks.

***East Fork Of Box Canyon.*** Sufco intends to undermine portions of the East Fork of Box Canyon beginning in the Fall of 2003 as they extract coal from the 3LPE and 4LPE longwall panels. Prior to the initiation of undermining and subsidence, a pre-subsidence qualitative evaluation of vegetation and channel conditions will be conducted in the East Fork of Box Canyon from the Joe's Mill Ponds downstream to a location above the west gate roads associated with the 3LPE panel. The survey will consist of video taping the condition of the stream channel paying particular note to surface flows and ground water discharge, vegetation types and conditions, animal species in the area including documenting the absence or presence of macroinvertebrates in the stream channel by filming the turning over of rocks or debris, general soil conditions, and the general geomorphology of the area. A qualified botanist will be used to identify and report in the video tape the major representative plant species along the stream channel. This will include riparian and spring locations found along the stream channel. Major hanging gardens will be identified and discussed. The general stream morphology will be discussed in the video including the width and depth of pools, height of natural drops, existing joints, cracks, and fractures, locations where flows naturally diminish or increase, etc.

A video tape will be made of the same portion of the East Fork at the same time of the year on the third year following undermining. A comparison will be made of the two tapes using the parameters described above and any changes due to mining activities will be noted. The tapes will be submitted to the Division as part of the Annual Report; the Fall 2003 video tape will be submitted with the 2003 Annual Report and the comparison tape will presumably be submitted with the 2006 Annual Report.

Approximately 10 sites will be identified and established during the qualitative pre-subsidence survey for use in a quantitative evaluation of site-specific vegetative and hydrologic conditions (See Chapter 7 Section 7.3.1.2) The site locations will be mapped and identified in the field with stakes and flagging. The 10 or more sites will include each of the springs found within

the portion of the East Fork to be subsided and the Joe's Mill pond area. The total percent cover of understory and overstory will be measured at each site. The cover will be identified and measured by species and the frequency of each species. The condition of the riparian vegetation flanking the channel at each of the sites will be described and monitored. The hillsides above the channels will also be monitored for changes in morphology. Erosion of the hillsides will be monitored using a numerical ranking system to identify the degree of erosion. The ranking system will be as follows:

- |                    |   |
|--------------------|---|
| 4-Extreme erosion  | deeply incised rills and gullies with unstable, actively slumping walls and loose material moving rapidly to the rill or gully floor, freshly exposed plant roots, no remaining topsoil, no vegetative litter, little to no vegetative cover. |
| 3-High erosion     | incised rills and gullies slightly unstable slopes, only occasional slumps of the rill or gully wall, some plant roots exposed, little to no topsoil remaining, little to no vegetative litter, poor vegetative cover.                        |
| 2-Moderate erosion | small rills, no gullies, moderately stable slopes, very little to no exposed roots, most of the topsoil remains, moderate vegetative cover.   |
| 1-Slight erosion   | occasional small rills, no significant channeling in the soils, no exposed roots, topsoil remains, most vegetative litter in place, good vegetative cover.  |
| 0-No erosion       | Appears relatively undisturbed, essentially no rills, vegetative litter in-place, healthy vegetative cover.   |

Photographic evidence of the state of erosion will be obtained each year at the East Fork monitoring sites for annual comparative and evaluation purposes. The climatic and overall vegetative conditions of the area will be noted. Particular attention will be paid to the effects of grazing on the vegetation and soils with respect to changes in the rank of erosion.

As part of the quantitative evaluation of the East Fork of Box Canyon, the locations of populations of the Link Canyon Columbine will be identified, mapped, and locations staked. The number of individuals in the populations will be counted or accurately estimated. All other populations of Threatened and Endangered and Sensitive Species found in the area of concern will be identified. The population location will be mapped, if appropriate, and the number of individuals will be recorded.

The vegetative surveys that occur at the 10 monitoring sites as well as the Link Canyon Columbine, Threatened and Endangered Species, and Sensitive Species surveys will be performed as part of the pre-subsidence survey and then again at the same time of the year on the third year following undermining and subsidence. The results of the surveys will be submitted to the Division in Annual Report for the year in which they are completed. A report detailing the changes, and apparent causes, in vegetation observed as a result of comparing the surveys will be provided. The erosion survey will also be submitted with the final vegetative survey as part of the Annual Report.

If substantiated mining-induced changes occur in the vegetation within the affected areas of the East Fork of Box Canyon, a revegetation/enhancement mitigation plan will be created and submitted to the Division. The permittee understands that the mitigation plan will be approved only after the Division consults with the USFS on the proposed plan.

In addition to the East Fork of Box Canyon vegetative monitoring and mitigation plan, Sufco will implement a hydrologic monitoring plan as well as a stream channel subsidence crack mitigation plan. These plans are discussed in greater detail in Section 7.3.1.2 and Section 5.2.5.1 of this M&RP. Mitigation of cracks, if they occur, in the bottom of the stream channel requires the

placement of bentonite grout to stop the diversion of surface flows. If mitigation is required during the critical elk and deer time periods of November 1st through April 1st and May 1<sup>st</sup> through July 1<sup>st</sup>, the Division will be contacted and the mitigation plans reviewed with the appropriate regulatory personnel. Mitigation work will be performed in such a manner as to minimize disturbance to wildlife.

### ***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 3-2**

***Native Utah Wildlife Species of Special Interest  
September 2003 (Revised)***

<b><i><u>Mammals</u></i></b>		<b><i>Status</i></b>
Grizzly Bear	<u>Ursus arctos</u>	EX
Fisher	<u>Martes pennanti</u>	EX
Gray Wolf	<u>Canis lupus</u>	EX
Black-footed Ferret	<u>Mustela nigripes</u> <sup>1</sup>	EN
Utah Prairie Dog	<u>Cynomys parvidens</u> <sup>2</sup>	T
Wolverine	<u>Gulo gulo</u>	T
Spotted Bat	<u>Euderma maculatum</u>	SP
Allen's Big-eared Bat	<u>Idionycteris phyllotis</u>	SD
Fringer Myotis	<u>Myotis thysanodes</u>	SD
Dwarf Shrew	<u>Sorex nanus</u>	SD
Desert Shrew	<u>Notiosorex crawfordi</u>	SD
Abert's Squirrel	<u>Sciurus aberti navajo</u>	SD

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

Western Red Bat	<u>Lasiurus blossevillii</u>	SP/SD
Big Free-tailed Bat	<u>Nyctinomops macrotis</u>	SP/SD
Brazilian Free-tailed Bat	<u>Tadarida brasiliensis mexicana</u>	SP/SD
Townsend's Big-eared Bat	<u>Plecotus townsendii</u>	SP/SD
Desert Kangaroo Rat	<u>Dipodomys deserti</u>	SP/SD
Northern Rock Mouse	<u>Peromyscus nasutus</u>	SP/SD
Stephen's Woodrat	<u>Neotoma stephensi</u>	SP/SD
Virgin River Montane Vole	<u>Microtus montanus rivularis</u>	SP/SD
Mexican Vole	<u>Microtus mexicanus</u>	SP/SD
Northern River Otter	<u>Lutra canadensis</u>	SP/SD
North American Lynx	<u>Felis lynx canadensis</u>	SP/SD

**Birds**

Passenger Pigeon	<u>Ectopistes migratorius</u>	E
Southern Willow Flycatcher	<u>Empidonax traillii extimus</u> <sup>1</sup>	EN

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4-3 Assessment of Particulate Emissions Report
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The Applicant agrees, however, to notify the regulatory authority and the Utah State Historical Society of previously unidentified cultural resources discovered in the course of mining operations. The Applicant also agrees to have any such cultural resources evaluated in terms of National Register of Historic Places eligibility criteria. Protection of eligible cultural resources will be in accordance with regulatory authority and Utah SHPO requirements. The Applicant will also instruct its employees that it is a violation of federal and state laws to collect individual artifacts or to otherwise disturb cultural resources.

**Pines Tract Area**

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

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

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

Sufco intends to undermine portions of the East Fork of Box Canyon beginning in the Fall of 2003 as they extract coal from the 3LPE and 4LPE longwall panels. This change in the mining plan will change the required monitoring schedule in accordance with the Memorandum of Agreement for site 42SV2430/ML-3446 - Elusive Peacock which will be undermined under the 3LPE longwall panel. In accordance with pages 11-12 of the MOA the required monitoring schedule of this site will change from Monitor Schedule A (Sites in areas that will be mined

using full-support methods) to Monitor Schedule B (Sites in areas which will be mined under and subsided) requiring the implementation of additional monitoring of the site. Monitoring results will be provided in DOGM Annual Reports. (2003, 2004, 2005, 2006, and indefinitely until movement ceases)

A proposed mine breakout located on the south wall of Muddy Canyon was inventoried and evaluated by Dr. Hauck and staff in June of 1999(AERC). No artifacts or paleontological loci were observed or identified during the Muddy Canyon Breakout evaluation. The study concluded that no currently recorded significant or National Register eligible cultural resources will be affected by the development of the breakout (Appendix 4-2, AERC 1999).

mine where similar geomorphologic and geologic conditions occur. This program will be developed and implemented by September 2000.

***Anticipated Effects of Subsidence.*** Future subsidence in the permit 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 permit 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 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 the expected location of the cracks are given in Appendix 7-19. If cracks do develop in the channel floor and appear to be taking surface water from the creek, sealing of these cracks will be done with bentonite grout. Use of bentonite grout for the sealing of the cracks in the channel floor is discussed in Section 3 of the Pines Tract FEIS (1999) and in more detail in the following section.

#### East Fork of Box Canyon Subsidence Monitoring and Mitigation

Portions of the East Fork of Box Canyon will be undermined and subsided as longwall panels 3LPE and 4LPE are extracted in 2003 through 2005. A monitoring plan that is more intensive than the general permit area has been proposed for monitoring vegetation, surface and ground

water flows, and subsidence cracks and repair of the cracks in the portions of the East Fork to be undermined. The subsidence portion of the monitoring program is discussed in detail in the following text.

Prior to the initiation of undermining and subsidence, a presubsidence survey will be conducted in the East Fork of Box Canyon from the Joe's Mill Ponds downstream to a location above the west gate roads associated with the 3LPE panel. The survey will consist of video taping the condition of the stream channel paying particular note to surface flows and ground water discharge, vegetation types and conditions, animal life in the area including macroinvertebrates in the stream channel, soil conditions, and the general geomorphology of the area. A follow-up video survey will be made at the same time of year on the third year following undermining. A general comparison between the two tapes will be made to determine what, if any, effects to the parameters described above have occurred. The biological aspects of the video tape are discussed in greater detail in Section 3.2.2.2 while the monitoring of surface and ground water flows are discussed in Section 7.3.1.2.

The subsidence monitoring plan for the East Fork of Box Canyon will include frequent inspection of the stream channel during and after active subsidence. While mining is occurring under the stream channel and within the 15-degree angle-of-draw above the active longwall face, that area of the channel will be inspected twice a week for subsidence cracks or other related features. As the longwall face advances and the 15-degree angle-of-draw area follows, the portions of the channel that now lie outside the 15-degree angle-of-draw will be monitored for subsidence features on a once a week basis for eight weeks. These same areas will then be monitored for subsidence features on a twice a week basis for another eight weeks. Table 7-6 in Chapter 7 lists the schedule for water and subsidence monitoring frequency.

Mitigation of cracks that would appear to interrupt or divert flows from the stream channel will be sealed immediately with bentonite. Sufco will use hand placement methods when sealing cracks with bentonite. The individual(s) conducting the survey will be equipped with an adequate volume of bentonite, in powder, granular, and/or chip form, to seal small cracks. The

bentonite may be placed by pouring it directly into the crack and hydrating with stream water or, if in an actively flowing portion of the stream, temporarily diverting the flow around successive portions of the crack using native soils and placing the bentonite in the exposed section of the crack until the crack is sealed. Sealing of the lower portions of the channel walls may also be required if the crack occurs where the channel is defined by bedrock. If cracks are present in channel walls defined by soil, the soil cracks will be hand filled using a native soil/bentonite mix. The sealing of the channel floor and walls will be accomplished with hand tools such as shovel, picks, trowels, etc. In the unlikely event that cracks too large to be sealed through the efforts of one or two persons in one day do occur and it appears there is a danger of water being diverted from the channel for an extended period of time, arrangements will be made to get additional help to the site as soon as possible.

Sufco will conduct longwall mining operations in such a manner as to minimize surface disturbance while mining within the 15-degree angle-of-draw area that includes the East Fork stream channel. This will be accomplished by advancing the longwall on a schedule where mining will not be suspended for a period to exceed 48 hours. This mining schedule has been discussed with the BLM. A similar mining schedule was successfully implemented at the Canyon Fuel Company Skyline Mine while the lower sections of Burnout Canyon were undermined. No damage to the stream channel or reduction in stream flows were noted as a result of undermining that portion of Burnout Canyon using the approved mining schedule.

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

to be taken as mitigation. Thereafter, the Division will be advised of continuing mitigation efforts, if needed, in the weekly report.

Mining within the area of the East Fork of the Box Canyon will be conducted in accordance with State and Federal rules and regulations and the requirements and stipulations presented in the BLM's Conditions of Approval of the Resource Recovery and Protection Plan (July 31, 2003) located in Appendix 1-2.

#### 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 Plate 5-10 as not planned for subsidence. Based on experience and data collected from the permit 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 (ft<sup>2</sup>)

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Prior to disturbing the portals, additional samples have been obtained from both the east and west portals in October and November 2002. One sample from each portal was obtained for four consecutive weeks. No surface flow was present in the summer of 2002 at either of the portals. However, a small pool of standing water was present at the mouth of the west portal through most of the year. The samples were obtained by first excavating a depression near the mouth of the east portal and allowing water to gradually fill the depression and by sampling the standing water at the mouth of the western portal. These samples were obtained as baseline samples in compliance with a request from the Forest. The samples have been analyzed according to the Division's guidelines for baseline water monitoring samples. Copies of the sample analyses results for samples obtained on October 26, October 30, November 6, and November 15, 2002 are included in Appendix 7-4. Included in Appendix 7-4 is a brief report by Erik Petersen of Petersen Hydrologic, Inc. that discusses the various sampling events, the results of the sample analyses, and an interpretation of the data as it relates to the origin of the water in the Link Canyon Mine.

Mr. Petersen discusses in his report that water issuing from the Link Canyon portals is likely not sourced from the springs at the head of the canyon but probably from surface water that enters the mine through the weathered bedrock near the surface. It appears that during periods of normal or greater than normal precipitation, the water discharged from the mine has a TDS level of near 500 mg/l. However, in drought years, as has occurred in the area beginning in 1999 and continuing through 2002, the TDS levels in the water naturally rises due to a lack of fresh water flushing of the abandoned mine workings water. Hence, the samples obtained in the fall of 2002 had TDS concentrations greater than 1400 mg/l.

A hydrograph of the discharges from the Link Canyon Mine is provided in the USGS report by Thiros and Cordy (1991). This hydrograph, along with the additional data collected by Mayo and Associates and Erik Petersen suggest the discharge from the mine is influenced by seasonal changes in precipitation. Significantly, the flow from the mine has nearly ceased as a result of the area drought which began in 1999 and has continued through at least 2002.

Water discharged from the mine will continue to be monitored at sites Link Portal West and Link Portal East, as part of the quarterly water monitoring program. Significant changes in water chemistry and the apparent causes will be reported to the Division.

The only actual loss of groundwater from the hydrologic balance is that water which is the difference between the average as-shipped moisture minus the inherent moisture or in-situ moisture of the coal and leaves the basin upon mining. Based on an average coal moisture loss of groundwater content of 1.8 percent and a long-term coal production rate of 6 million tons per year, approximately 80 AF/yr of groundwater is removed from the basin. This represents about 2 percent of the average annual flow of Quitchupah Creek above Link Canyon.

Several springs and stream locations in the permit area are monitored for quantity and quality as prescribed by the M&RP water monitoring program. Analysis of the monitored flows indicated that very little impact has occurred to springs and streams. Erik Petersen of Petersen Hydrologic, Inc evaluated the flow data collected from several springs and surface flows in the Box Canyon drainage. His evaluation was forwarded to Sufco in the form of a letter report dated August 14, 2003 and is included in Appendix 7-19. Mr. Petersen determined that since mining began in the Pines Tract, a few the area springs have exhibited an increase in flow during a period of prolonged drought. He also concluded that perhaps one spring, Pines 303, in the lower portion of the Box Canyon, may have experienced reduced flows as a result of mining activities. However, because of the prolonged drought in the area that began in 1998, it is not possible to determine with certainty whether mining activities, drought conditions, or both have resulted in the loss of spring flow. A loss in flow from this spring was a predicted possibility described in the Pines Tract EIS. The loss of flow from this spring (less than 4 gpm) has apparently not adversely affected area vegetation or wildlife. Because of the increased discharge of springs farther up canyon, the loss of the less than the 4 gpm contribution of ground water from Pines 303 to Box Canyon Creek is insignificant to the total flow of the creek. No water rights were found to have been filed on this spring discharge.

Mr. Petersen has noted an increase in the flow of springs Pines 209 and 212 and in the flow of the Main Fork of Box Canyon Creek that appears to coincide with mining in the western portion of the Pines Tract. He reasons that the increase in spring flow is related to subsidence enhanced recharge or hydraulic conductivity of the aquifers sourcing the springs. The increase in spring flow has resulted in the increase in flow in the Main Fork of Box Canyon Creek. This has been noted as a positive impact to the creek during a time of drought. Analysis of the flow data presented by Petersen suggests the increase in flow from these springs may be short

lived. He has also indicated that flow from these springs will not cease but should return to near pre-mining rates. In fact, the data presented in his August 14, 2003 letter report suggests the flow rates may already be beginning to return to pre-mining rates.

**Potential Hydrocarbon Contamination.** Diesel fuel, oils, greases, and other hydrocarbon products are stored and used at the site for a variety of purposes. Diesel and oil stored in above-ground tanks at the mine surface facilities may spill onto the ground during filling of the storage tank, leakage of the storage tank, or filling of the vehicle tank. Similarly, greases and other oils may be spilled during use in surface and underground operations.

The probable future extent of the contamination caused by diesel and oil spillage is expected to be small for three reasons. First, because the tanks are located above ground, leakage from the tanks can be readily detected and repaired. Second, spillage during filling of the storage or vehicle tanks is minimized to avoid loss of an economically valuable product. Finally, the Spill Prevention Control and Countermeasure Plan presented in Appendix 7-6 provides inspection, training, and operation measures to minimize the extent of contamination resulting from the use of hydrocarbons at the site.

The potential for hydrocarbon contamination of the environment at the Link Canyon Substation or the reopened Link Canyon Mine Portal is minimal since no fuels or lubricants will be stored at this site. If a catastrophic failure of the transformers at the substation occurred, the minimal volume of oil would be contained behind the berm to be built around the equipment.

Periodically due to difficult recovery conditions or roof collapse, mining equipment is abandoned underground. Abandoned mining equipment locations are shown on Figure 7-7. Prior to leaving equipment underground, lubricating and hydraulic fluids are removed to the extent possible. Since the equipment is steel and not too different compositionally from the roof support throughout the mine, contamination to ground water from abandoned equipment will cause minimal, if any, disturbance to the hydrologic balance within the permit and adjacent areas and is not expected to cause material damage outside the permit area. Assuming the mine were to flood and the abandoned equipment were to be covered with water, several probable results and impacts can be evaluated:

1. Flooding of the abandoned mine might be relatively rapid, but once flooded, flow of ground water into, through, and out-of the void spaces of the mine should be slow.
2. If steel or other metals in the equipment were to oxidize, it would be at a very slow rate and the amount of iron and other metals added to the ground water at any one time would be very small.
3. Oxides of most metals are insoluble or slightly soluble in water. At temperatures expected in the mine, metal oxides would tend to precipitate as solids within the mine rather than flow in solution in the ground water. If any metal were to go into solution, concentrations would be highest near the abandoned equipment, but the volume of water in the flooded mine would dilute concentrations outside the immediate vicinity of the equipment.
4. Because of dilution and dispersion, natural seasonal fluctuations, changes in water quality would not be expected to be large enough to be detected at the surface at springs, ground-water baseflows to streams, or in discharges from the mine.

**Road Salting.** No salting of the mine road occurs within the permit area. This impact is not a significant concern.

**Coal Haulage.** Coal is hauled over the paved county road from the mine portal area to Interstate Highway 70. Past experience has indicated that approximately one truck load of coal (43 tons) is spilled annually. Residual coal following cleanup of the spill may wash into local streams during a runoff event. Possible impacts to the surface water are increased total suspended solids and turbidity from the fine coal particulates. The probability of a spill occurring in an area sufficiently close to a stream channel to introduce coal to the stream bed is considered small.

In order to minimize fugitive coal dust haulage trucks are either covered or modified to reduce the amount of coal dust blown off the trucks. The impact from fugitive coal dust is therefore considered to be insignificant due to the small amounts lost during haulage in the permit and adjacent areas.

#### **7.2.9 Cumulative Hydrologic Impact Assessment (CHIA)**

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

### **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 7-6 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 prefix "GW - ". During the baseline surveys, several springs identified in the publication could not be found as illustrated on the document maps or by using the printed location descriptions. It is assumed the springs that could not be found have a) stopped flowing; b) were miss mapped; or c) were in close proximity to springs found during the baseline surveys but could not be positively identified as USGS located springs and were therefore given new number designations.

Sampling for the SUFCO Mine and adjacent areas is accomplished in accordance with the schedule outlined on Tables 7-2 through 7-6. Sampling for the waste rock disposal site is

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 will include conducting a pre-mining subsidence survey of the East Fork of Box Canyon over the 3LPE and 4LPE panels that incorporates 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. Ten or more sites will be identified within the portion of the East Fork video taped where the monitoring of surface and/or ground water flows, channel width, vegetation, soils, and general geomorphology will occur. The general area in which these sites will be located are illustrated on Figure 7-8. This Figure will be updated once the sites are located in the field in late September 2003. The vegetation and soil monitoring program is discussed in greater detail in Section 3.2.2.2 of this M&RP. The surface and/or ground water flows and channel width at these stations will be monitored on a weekly basis while mining is occurring within the 15

degree angle-of-draw of the stream channel. Once mining has been completed within the angle-of draw, the sites will be monitored once every two weeks for a period of eight weeks after mining has progressed past the 15 degree angle-of-draw. Table 7-6 presents the monitoring site numbers, monitoring parameters, and the frequency of monitoring. The fourth quarter 2003 water monitoring will be conducted prior to mining within the area of concern in the East Fork of Box Canyon. If new springs are created as a result of subsidizing the East Fork, the spring flows will be monitored two times per week until the 15 degree angle-of-draw area above the longwall face has advanced beyond the new spring. Thereafter, the spring flows will be monitored once every week for a period of eight weeks followed by monitoring the springs once every two weeks for eight weeks. A report on the impacts, if any, to the stream or ground water flows, vegetation, soils, general geomorphology, location of the longwall, etc., will be provided via e-mail to the Division on a weekly basis.

Monitoring for subsidence cracks within the stream channel of the East Fork of Box Canyon Creek will also be part of this intensive monitoring and mitigation plan. The details of the mitigation plan are discussed in greater detail in Section 5.2.5.1 of this M&RP. However, in an effort to compile as much of the monitoring requirements for the East Fork of Box Canyon in a single location within the M&RP, the parameters and frequency of monitoring for subsidence have been included in Table 7-6. The subsidence monitoring program will consist of inspecting the stream channel floor within the active angle-of-draw on a twice-a-week basis. Mining induced subsidence effects, such as cracks, slumps, offsets, etc., will be identified, mapped, and a brief narrative of the effects will be recorded and forwarded to the Division on a weekly basis. The portions of the channel where the longwall shear has moved beyond the 15 degree angle-of-draw will then be monitored for subsidence effects on a weekly basis for a period of eight weeks. Following the once-a-week eight week period, monitoring will be conducted on a once every two week basis. This monitoring program will result in a moving zone of "high intensity" or twice a week channel monitoring occurring within an area defined by the 15 degree angle-of-draw above the active longwall face. As the longwall face advances, the "high intensity" zone advances and is followed by the "moderate intensity" once-a-week monitoring zone for eight weeks that is then followed by the "less intense" once every two week monitoring zone. A weekly report will be provided via e-mail to the Division on the results of the subsidence monitoring and mitigation activities.

**TABLE 7-6**  
***East Fork of Box Canyon Monitoring and Mitigation***

<u>Monitoring Sites</u>	<u>Protocol</u>	<u>Comments</u>
EFBC -1	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -2	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -3	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -4	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -5	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -6	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -7	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -8	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -9	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC -10	A	Monitor flows, vegetation, soils, geomorphology, etc.
EFBC-***	B	Subsidence Feature - Monitor location, type, frequency, repairs, etc.

\*\*\* Site numbers and quantity of sites will be dependant upon the number of features created due to subsidence. The weekly report to the Division will include all identified sites once mining begins in the area.

Protocol

- A Monitor sites for flow and channel width weekly while site is within the 15 degree angle of draw of the longwall face. Once area is outside angle of draw, monitor on a once every two week basis for eight weeks. Note any changes due to mine-induced subsidence to flows, soils, vegetation, geomorphology, etc. and provide a weekly report via e-mail to the Division of Oil, Gas and Mining.
- B Monitor subsidence features, such as cracks, and repairs (if needed) on twice a week basis while features are within the 15 degree angle-of-draw of the active longwall face. After the features are outside the angle-of-draw, monitor features on a weekly basis for eight weeks followed by monitoring of the features once every two weeks for an eight week period. Provide a weekly report via e-mail to the Division of Oil, Gas and Mining.

(Figure 7-8)

East Fork Box Monitoring Locations

A rain and temperature monitoring station will be established in the area of the East Fork of Box Canyon as soon as permitting allows. The data collected from the station will be used in combination with data collected from local water monitoring stations to aid in determining what, if any, impacts have occurred to surface runoff, stream flows, and local springs as a result of mining activities.

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

Every reasonable attempt will be made by Sufco to implement and follow the monitoring program schedule. However, mining of 3LP panel under the East Fork of Box Canyon will begin in the late fall of 2003 and continue through early winter of 2003 and 2004. If access is limited due to snow or inclement weather, the mine's effort to access the area will be documented in the weekly report to the Division. The time of the access attempt, weather conditions, and reason(s) for failing to monitor the East Fork sites will be provided in the report.

#### ***7.3.1.3 Acid- and Toxic-Forming Materials***

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

#### ***7.3.1.4 Transfer of Wells***

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

Canyon Fuel Company, LLC  
SUFCO Mine

Mining and Reclamation Plan  
December 20, 1991 (R 09/03)

responsible for the management of the well until bond release in accordance with R645-301-529, R645-301-551, R645-301-631, R645-301-738, and R645-301-765.

***7.3.1.5 Discharges***

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 main sedimentation pond are located on Plates 7-4 and 7-5. 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 permit 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 replace the water supply of any land owner 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.

The structures to be used for the runoff-control plan for the permit area include disturbed and undisturbed area diversion channels, sedimentation ponds, containment berms, silt fences, and road diversions and culverts.

#### ***7.3.2.1 Siltation Structures***

The siltation structures within the permit area consist of the sedimentation ponds described in Section 7.3.2.2.

APPENDIX 1-2

Lease Documents



## United States Department of the Interior

### BUREAU OF LAND MANAGEMENT

Utah State Office  
P.O. Box 45155  
Salt Lake City, UT 84145-0155  
www.ut.blm.gov

IN REPLY PLEASE REFER TO:

3482

UTU-76195

(UT-070)

JUL 31 2003

Certified Mail--Return Receipt Requested  
Certificate No.

Ken May  
General Manager  
Canyon Fuel Company, LLC  
SUFCO Mine  
397 South 800 West  
Salina, Utah 84654

Re: Approval of Mining Underneath Box Canyon in the 3<sup>rd</sup> and 4<sup>th</sup> Left Panels, Minor Modification to the Resource Recovery and Protection Plan (R2P2), Federal Coal Lease UTU-76195

Dear Mr. May:

On February 20, 2003, the Bureau of Land Management (BLM) received a written request from Canyon Fuel Company (CFC) to modify the approved R2P2 for the SUFCO Mine. The modification requested approval to shorten the Left Pines East longwall panels due to encountering a sandstone channel and mine the complete shortened panels including subsiding the stream channel in the East Fork of Box Canyon. The affected reserves are located in the Upper Hiawatha seam in Federal coal lease UTU-76195. The minor modification request lies within the lease boundary (UTU-76195) and inside the currently approved permit area.

#### Background:

SUFCO discovered a major sand channel in the 3LPE located at cross cut 92 in entry 1. Based on longhole drilling, the sand channel severely scoured zone is approximately 320 feet in width. The channel extents were verified by BLM inspector George Tetrault on April 14, 2003 as follows:

Headgate Entries

- in entry 1 of the head gate, full face of rock,
- in entry 2, between cross cut 93 and 94 there was 1 foot of coal and the remaining (7+ feet) was rock, and
- in entry 3 there were 7.7 feet of coal and the remainder was rock at outby cross cut 94.

Tailgate Entries

- in entry 1 there was full face of rock, and
- in entry 2 and 3 there was about 4 feet for rock.

BLM requested that the company submit economic data for mining through the rock and recovering the block of coal north of (or inby) the sand channel. The information submitted by the company (see attached map and summary financial table) indicates that the coal cannot be economically recovered as part of 3LPE or 4LPE as the channel clearly crosses into that longwall panel as well. BLM considered whether a royalty rate reduction could make the block of coal economic to recover. However, there is insufficient information to enable consideration of the risk factors including the unknown width and location of the sand channel(s) and whether this block of coal could be accessed from another location such as 5LPE.

Based on the information submitted by the company and the confirmed geologic conditions, we conclude that the coal north of (or inby) the sand channel is uneconomic from 3LPE panel or 4LPE (due in large part to timing requirements for 4LPE). Approval of the proposed R2P2 modification for 5LPE is withheld pending further exploration and mine planning for the coal north of or inby the sand channel.

It could be economically possible to recover the coal inby the sand channel either with longwall mining or continuous miners. This is yet to be determined.

Approval:

As provided in 43 CFR 3482.2(c)(2), BLM approves the requested R2P2 modification dated February 20, 2003, with respect to the 3LPE and 4LPE panels. BLM approves the shortening of the 3LPE panel with a setup room outby the sand channel, setup rooms at cross-cuts 89-91 of 3LPE (approved verbally on April 14, 2003) and full extraction mining under the East Fork of Box Canyon. Before approval can be given for the proposed 5LPE panel and future longwall panels, your R2P2 submittal must be expanded to address potential recovery of the coal north or inby of the sand channel. This approval is in accordance with Stipulation 9 of coal lease UTU-76195 that allows for approval of mining under perennial streams. No changes in the length of the 5LPE, 6LPE, and 7LPE longwall panels are authorized until further justification is provided that the coal inby the

panels is not recoverable. The environmental effects of the modification were analyzed in a Determination of NEPA Adequacy (DNA) document dated July 31, 2003.

Reserves:

There is a change in reserves of approximately 180,600 tons due to geologic factors offset by mining underneath the East Fork of Box Canyon for this modification:

R2P2 effect on coal reserves with changes to 3LPE and 4LPE panels

	3 LPE	South Block	3 LPE Stream Block	4 LPE	4 LPE Stream Block	Muddy Creek Break out	Total
Original Plan	8,629,800	0	-876,400	6,163,000	0	70,400	13,986,800
New Plan	5,960,900	665,399	939,900	6,163,000	438,000	0	14,167,199
Difference							180,600

Conditions of Approval:

1. Full extraction under the perennial stream in the East Fork of Box Canyon is not authorized until a permit revision is approved by the Utah Division of Oil, Gas, and Mining as provided in 30 CFR 944.3 Article VI D. In order to be consistent with the terms and conditions of federal coal lease UTU-76195, this approval must incorporate appropriate monitoring requirements and implementation of a mitigation plan to minimize impacts to the perennial stream in the East Fork of Box Canyon in accordance with the provisions of SMCRA.
2. Before initiating longwall mining under the perennial stream in the East Fork of Box Canyon, the company must submit to BLM and receive approval for a plan outlining the steps to be taken and timing to ensure that the longwall mines the area under the stream with minimal interruptions in longwall face advance.
3. Following completion of mining under the East Fork of Box Canyon, the company must provide BLM copies of monitoring and mitigation reports required under the provisions of SMCRA.
4. Within 90 days after approval of the modification, the company must submit a modification request to address mining the block(s) of coal north of or inby the sand channel or provide justification why it cannot be economically mined.

MER and Mineral Lease Act Analysis:

Based on our analysis of the North (or inby) Block being uneconomic to mine from 3LPE or 4LPE longwall panels, and with the conditions of approval as stated, we determine that this modification achieves Maximum Economic Recovery and meets the regulations at 43 CFR 3480 and the Mineral Leasing Act of 1920 as amended, and is consistent with the terms of federal coal lease UTU-76195.

For further information, please contact George Tetrault (435) 636-3604 or Stan Perkes at (801) 539-4036.

Sincerely,



James F. Kohler  
Chief, Solids Minerals Branch

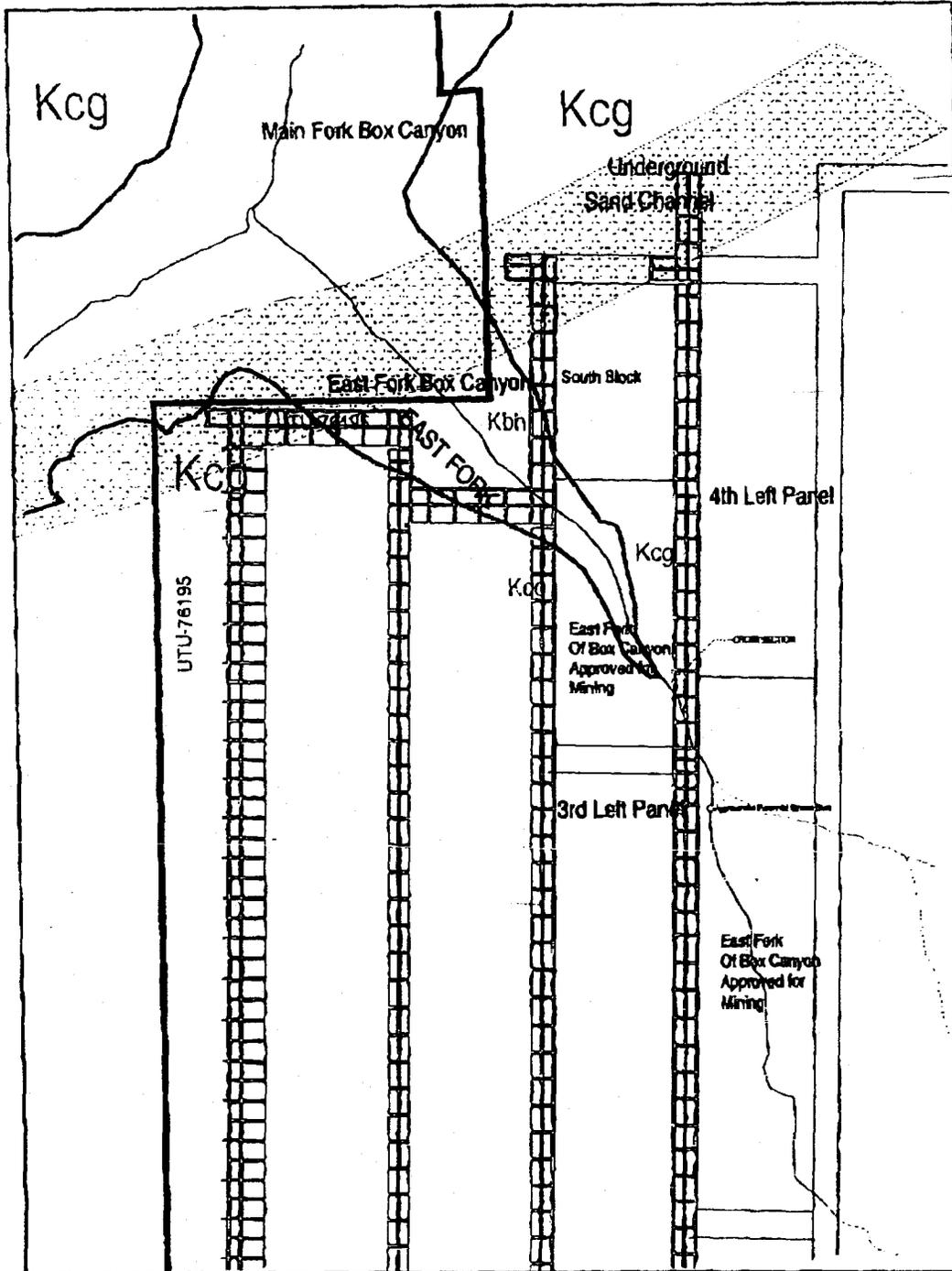
Enclosures  
1-Map 1 (1pg)

bcc: UT-070,  
Gtetrault:sa: 05/13/03  
SUFCO/Pinestrect\LinkCanyon

# SUFCO MINE

Approval

Under mining of  
East Fork of Box Canyon  
3rd and 4th Left  
Longwall Panels



## KEY

Sand Channel

Lease Boundary

Bottom of Castle Gate

Perennial Stream

## Worksheet

### Documentation of Land Use Plan Conformance and NEPA Adequacy (DNA)

U.S. Department of the Interior  
Bureau of Land Management (BLM)

---

**Note:** This worksheet is to be completed consistent with the policies stated in the Instruction Memorandum entitled "Documentation of Land Use Plan Conformance and National Environmental Policy Act (NEPA) Adequacy" transmitting this worksheet and the "Guidelines for Using the DNA Worksheet" located at the end of the worksheet. (Note: The signed CONCLUSION at the end of this worksheet is part of an interim step in the BLM's internal analysis process and does not constitute an appealable decision.)

- A. **BLM Office:** USO, Solids Minerals Group
- B. **Lease/Serial/Case File No.** Federal Coal Lease UTU-76195

**Proposed Action Title/Type:** Minor Modification to an approved Resource Recovery and Protection Plan to fully extract coal underneath a 143.25 acre portion of the East Fork of Box Canyon Creek Drainage.

**Location of Proposed Action:** East Fork of Box Canyon, Sevier County Utah

**Description of the Proposed Action:** Canyon Fuel LLC, and Southern Utah Fuel Company (SUFCO) have submitted a minor modification to the Resource and Recovery and Protection Plan (R2P2) that includes a proposal to fully extract coal in three mine panels from one seam underneath a 143.25 acre portion of the East Fork of Box Canyon Creek Drainage in Sevier County Utah. The East Fork of Box Canyon contains a stream that is perennial across the first panel and partially into the second panel. The second panel would subside a portion of the East Fork of Box Canyon that does not contain a perennial stream. The Forest Service has identified this area as a "perennially functioning" drainage and have indicated their desire to protect it from potential impacts of full extraction mining. The third panel would subside two stock ponds known as the Joes Mills ponds. Because of changes in the mining plan, the proposal would increase coal recovery by approximately 3-4 Million tons of federal coal.

Such a change is normally considered as a minor modification to an existing mining plan and categorically excluded under BLM's NEPA policy (BLM Categorical Exclusions, 516 DM Chapter 6, Appendix 5.4 F.(8)).

In the original R2P2, the company did not plan on full-extraction mining under the drainage in the East Fork of Box Canyon. However, due to unanticipated geologic conditions, they have requested approval to subside these areas. In the record of decision consenting to leasing the lands in question, the Forest Supervisor of the Manti-La Sal National Forest provided the following:

*I consent to the BLM leasing the Pines Coal Lease Tract. My consent is conditioned on inclusion of stipulations derived in part from the Forest Plan, as detailed in Appendix D of the FEIS, and upon ensuring that subsequent mining will meet the performance standards of the applicable mining regulations. Specific terms and conditions of my consent are given in items 1 and 2 below.*

- 1. For the perennial streams in Box Canyon and The East Fork of Box Canyon, Alternative C is the selected alternative. Stipulation 9 from the Forest Plan will be implemented, thus these streams will be protected from mining that would cause subsidence.*

Lease Stipulation 9, that was forwarded by the Forest Service in their consent to the lease included language that allows the stream to be undermined under certain conditions.

Stipulation 9. Except at specifically approved locations, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to existing surface structures, or (3) damage or alter the flow of perennial streams. The Lessee shall provide specific measures for the protection of escarpments, and determine corrective measures to assure that hazardous conditions are not created.

This stipulation requires specific approval before any subsidence could occur that would damage or alter the flow of perennial streams. However, no further approval would be required if the mining would not damage or alter the flow of the stream. This DNA is being prepared to determine whether any impacts mining may cause due to the full extraction of the coal resource in this small area have been adequately analyzed in the existing NEPA documents.

The proposed action does not present environmental concerns that have not been addressed previously, in the leasing EIS.

**Applicant (if any):** Canyon Fuel Company, Skyline Mine

**B. Conformance with the Land Use Plan (LUP) and Consistency with Related Subordinate Implementation Plans**

LUP Name Land and Resource Management Plan, Manti-La Sal National Forest , (1986) (Forest Plan).

Date Approved November 1986

Other document

\*List applicable LUPs (e.g., Resource Management Plans or applicable amendments).  
Forest Plan, Page III-72 "Avoid and mitigate detrimental disturbance to riparian area by mineral activities. Initiate timely and effective rehabilitation of disturbed sites."

Forest Plan Forest-wide Management Direction for Riparian, Flood Plain & Wetlands  
Management

Page III-31.02 "Give preferential consideration to riparian area dependent resources in cases of

irresolvable resource conflicts”

Page III-22, 08 “Manage waters capable of supporting self-sustaining fish populations to provide for those populations”.

Page III-36,01,d,(5) “Coal leases may be denied or limited by special stipulations where operations would result in unacceptable or immitigable impact on wildlife or fisheries” and “Proposed management activities which may cause unfavorable conditions in existing fisheries will include mitigation measures.”

Forest Plan Forest-wide Management Direction for Minerals Management Leasables

Page III-35,01 “negative recommendations, denials, or consent for leasing, permitting, or licensing will be based on site-specific environmental assessments using appropriate standards and guidelines. Stipulations for these actions should minimize and/or mitigate effects or conflicts with other resource uses and should return disturbed lands to conditions compatible with the emphasis of the management unit or adjacent management unit.

The Forest Plan Maps indicate that the management emphasis for the area in question is range and timber.

\*\*List applicable activity, project, management, water quality restoration, or program plans.

The proposed action is in conformance with the applicable LUPs because it is specifically provided for in the following LUP decisions:

Riparian Area Direction: Minerals – Avoid and mitigate detrimental disturbance to the riparian area by mineral activities. Initiate timely and effective rehabilitation of disturbed sites. Where possible, locate mineral activities outside the riparian unit.

Range Direction: Minerals – Provide appropriate mitigation measures to assure continued livestock access and use.

Timber Direction: Minerals – No specific direction is given.

General Big Game Winter Range: Minerals – Modify, delay, or deny mineral leasing, exploration, and/or surface occupancy, where applicable, if they cause unacceptable stress on big game or unmitigated damage to their habitat.

**C. Identify the applicable NEPA document(s) and other related documents that cover the proposed action.**

List by name and date all applicable NEPA documents that cover the proposed action.

The Pines Tract Project Final Environmental Impact Statement (FEIS), US Forest Service and BLM, January 1999.

Record of Decision, Pines Tract Project, US Forest Service, January 1999

Record of Decision, Pines Tract Project, Bureau of Land Management, February 1999

Fluid Flow Characterization of the Castle Gate Sandstone, Southern Wasatch Plateau, Utah; Interpretation of Reservoir Partitioning Through Permeability and Porosity Analysis, Brian J. Black, Masters Thesis, Brigham Young University, December 2000

Probable Hydrologic Consequences of Longwall Mining of the 3 Left Panel Modification Area at the SUFCO Mine, Petersen Hydrologic, Erik C. Petersen P.G., and Kelly L. Payne P.G., April, 2003

3 Left Pines East Stream Buffer Subsidence Proposal, Canyon Fuel Company L.L.C., April 2003

Site Visit to the East Fork of Box Canyon, Letter, Erik C. Petersen, May 2003

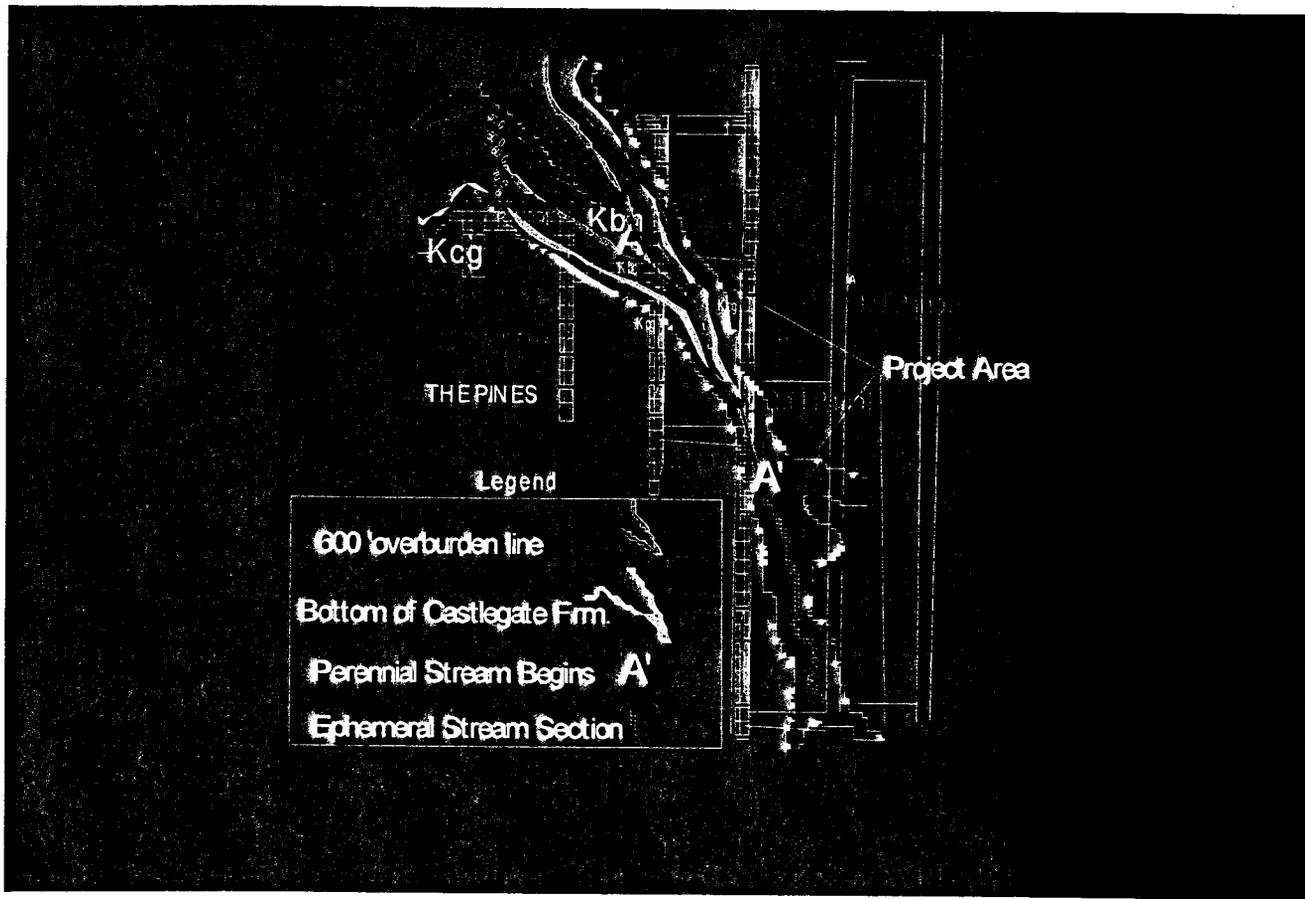
National Register of Historic Places MOU Agreement No. 00-MU-11041000-017, dated May 2000

#### **D. NEPA Adequacy Criteria**

**1. Is the current proposed action substantially the same action (or is a part of that action) as previously analyzed?**

Documentation of answer and explanation: YES

The proposed action of mining under the East Fork of Box Canyon was analyzed in the Final Environmental Impact Statement for the Pines Tract Project. The issue is undermining and subsiding the perennial and "perennially functioning" (ephemeral) portions of the East Fork of Box Canyon. The issue is subsidence of the East Fork of Box Canyon creek. In the first longwall panel (3<sup>rd</sup> Left) the stream is mainly in the Blackhawk formation and is perennial for the entire length of the panel. In the second panel the stream is in the Castle Gate formation and is



**Map 1 Project Area Geology**

only perennial for a small portion of the drainage length. In the third longwall panel only has two small stock ponds in the area. When an area is subsided, two types of surface cracks can occur. Transient cracks that form parallel to the longwall face and cracks that form perpendicular to the longwall face over the gateroads. Both types of cracks are relatively shallow surface features and have been observed in the field to extend to depths of generally less than 30 feet. The limited cracks that occur in the bottom of drainages appear to close relatively quickly and fill up with sediment and other debris. Cracks that occur in the bottom of the streams could temporarily interrupt streamflow, but flow would resume once the cracks have filled with water or organic material. If this natural mitigation does not occur in a timely fashion, then the the stream flow could be restored sooner by placing material in the stream channel. The FEIS discussed this issue at great length and addressed potential impacts and mitigation as follows:

“However, clays in the Blackhawk Formation shales and mudstones swell when wetted and anneal mining-induced fractures. Thus, the downward migration of ground waters is naturally mitigated. This occurrence is suggested by the fact that the discharge from mined-out longwall areas in the SUFCO Mine and other Wasatch Plateau mines consistently decrease with time. (FEIS page 3-45).

Mayo and Associates (1997b) conclude that if tension fractures occur in the Castlegate Sandstone in the bottom of the canyons, streamflow and water from colluvial groundwater systems may be temporarily diverted into the bedrock underlying the canyon. Once fractures fill with sediments and water, movement of water in the fracture will be essentially static and streamflow and colluvial ground water systems would no longer be directly affected. It is not expected that tension cracks will extend downward into the

Blackhawk formation (FEIS, Page 3-48).

Tension cracks are possible in the upper Blackhawk Formation. Because the formation consists of interbedded shale, mudstone, and sandstone layers, tension cracking should be less severe in the Blackhawk Formation than in the Castlegate Sandstone. If tension cracks form, they will most likely form in the sandstone horizons of the formation. Shale layers have the ability to translate stress laterally and should not experience tension cracks, and may help, to some degree, mitigate tension crack formation in the sandstones. The consequence of tension cracks in the Blackhawk Formation is the possible diversion of streamflow into sandstone horizons. Because the East Fork of Box Canyon is a natural ground water discharge location, it is possible that the sandstone horizons that are exposed in East Fork Box Canyon area saturated and would not accommodate significant quantities of surface water. The thickness of sandstone channels in the upper Blackhawk Formation is about 50 feet (Marley et al., 1979) What this means is that the maximum vertical distance that water could travel is 50 feet. Any intercepted water would then likely be translated horizontally down gradient, which in East Box Canyon is also down stream so the discharge would occur where the bottom the of sandstone channel outcrops in the stream channel (FEIS page 3-55). This environmental analysis has shown that direct impacts to groundwater resources resulting from underground coal mining in the Project Area would be negligible. However, Under Alternative B and Alternative D, there is a potential for diversion of some surface water from perennial streams into bedrock. This impact is expected to be of short temporal duration, perhaps less than a year, but could last up to 2 years (FEIS, Page 3-48).

Therefore, depending upon the location, season, duration and extent, both temporary and permanent tension cracking within the upper reaches of East Fork could affect its flows. The exact magnitude and duration of the effects depends upon various factors, at least some of which are not predictable or quantifiable (Mayo and Associates 1997b). However, given the assumptions cited above on crack width and healing rate, these effects would be estimated to generally and typically limited to less than a six-month period for the temporary, transient wave type of cracks. Given the typical tension crack widths and time for initiation projected by Agapito (1997) and a typical average healing rate cited by Dimick (1991), even flow disruptions caused by the more permanent cracking would have the potential to cease within 1 year after undermining, but may take up to 2 years.

Although experience indicates that the cracks are likely to either self-close or be filled over time with sediments/debris, a low potential exists for permanent cracking that either does not infill, or takes much longer to do so than has been observed elsewhere. This potential may be low given; the narrowness of the predicted crack widths (intuitively, the smaller the crack width, the more easily it can be filled with available material and the less likely it is to extend for great depths); the noted availability of sediments and organic matter (which may increase after subsidence as canyon slopes experience instability); and the hydrogeologic characteristics of the channel substrate. If the channel cracks during periods of low flow, there is a higher probability that all flow could be intercepted as the baseflows are less than 20 gpm, and would thus remove the sediment transport source. Additionally, at low or base flow periods, the creek carries minimal sediment that would be available for fracture filling. Cracks may also form in series, where numerous cracks develop over an area. This also presents a higher risk to intercepting stream flow. (FEIS page 3-70).

The loss of hydrologic function of hydric soils (18.6 acres) due to alteration of the surface and shallow groundwater flows by subsidence-induced fractures would be short termed. Most of the fractures would be filled by natural sedimentation and/or swelling for the clays in the rock stratas, thus restoring the natural hydrologic function. The short-term loss would be quickly restored naturally and should not irreversibly affect riparian or wetland vegetation communities (FEIS page 3-89).

The floor of East Fork Box Canyon is built up from colluvium that has accumulated against the face of the escarpment. The groundwater that seeps throughout the sedimentary rocks maintains a moist soil condition in these colluvial deposits well above the level attributed to the creek flow. This zone, often as much as 20 feet above the creek level, supports riparian species. Therefore, the diversion of the surface flow of the perennial waters in East Fork Box Canyon would not impact these "perched" riparian zone that are

recharged from groundwater seeping into the canyon above the creek level (FEIS page 3-101)

Monitoring of the surface flows over the life of mine would provide detection of surface water diversion of ephemeral or perennial drainages and of springs or seeps. Tension cracks that do occur in these areas which result in diversion of surface flow could be sealed with bentonite. Restoring the flow in this manner would maintain the vegetation communities associated with these water sources. Monitoring of ponds to assess mining induced damage and the repair necessary should also be implemented (FEIS page 3-190).

This issue is also addressed in the Probable Hydrologic Consequences (PHC) analysis that is part of the mine permit. The PHC states, "Based on empirical observations and rock mechanic analysis (Goodrich and Agapito, 1997), it is confidently anticipated that fractures that form in the stream substrate would have small apertures (usually less than ½ inch) because of lateral confining pressure present in the interior of the canyon (i.e. although the rock fractures, there is little space created.)

All of these findings support the idea that the stream channels could be undermined with a low probability of affecting the stream. If impacted, the impacts would be short term in nature and would mitigate naturally. If natural mitigation will not produce the desired condition in a timely manner, other mitigation measures are available as stated in many place in the FEIS.

**2. Is the range of alternatives analyzed in the existing NEPA document(s) appropriate with respect to the current proposed action, given current environmental concerns, interests, resource values, and circumstances?**

Documentation of answer and explanation: YES

The range of alternatives analyzed in the NEPA document for the Flat Canyon FEIS include: A) No Action or No mining; B) Lease the proposed areas with Standard BLM Least Terms and Conditions (No special lease stipulations would be attached to the lease); C) Lease the proposed areas with Standard BLM Least Terms and Conditions, and Special Coals Lease Stipulations for Protection of Non-Coal Resources (which would not allow subsidence of escarpments and perennial drainages in the analysis area). D) Lease the proposed area with Standard BLM lease Terms and Conditions and Special Coal Lease Stipulations for Protection of Non-Coal Resources, allowing subsidence of perennial drainages and escarpments in the analysis area. (Pine Tract Project FEIS, USFS and BLM, Jan 1999).

A combination of alternatives C and D were selected by the Forest Service in consenting to the issuance of the coal lease and the lease was issued with the stipulations they identified. The range of alternatives that included an analysis of the effects of subsidizing the streams adequately covered the proposed action.

**3. Is the existing analysis adequate and are the conclusions adequate in light of any new information or circumstances (including, for example, riparian proper functioning condition [PFC] reports; rangeland health standards assessments; Unified Watershed Assessment categorizations; inventory and monitoring data; most recent Fish and Wildlife Service lists of threatened, endangered, proposed, and candidate species; most recent BLM lists of sensitive species)? Can you reasonably conclude that all new information and all new circumstances are insignificant with regard to analysis of the proposed action?**

Documentation of answer and explanation: YES

The publication of the Pines Tract Project FEIS is current, (January 1999). Observations made during subsidence of the Main Fork of Box Canyon which is adjacent to the East Fork of Box Canyon substantiate the analysis in the FEIS with regards to subsidence cracks. The FEIS is further supplemented by Probable Hydrologic Consequences (PHC) report that is part of the mine permit.

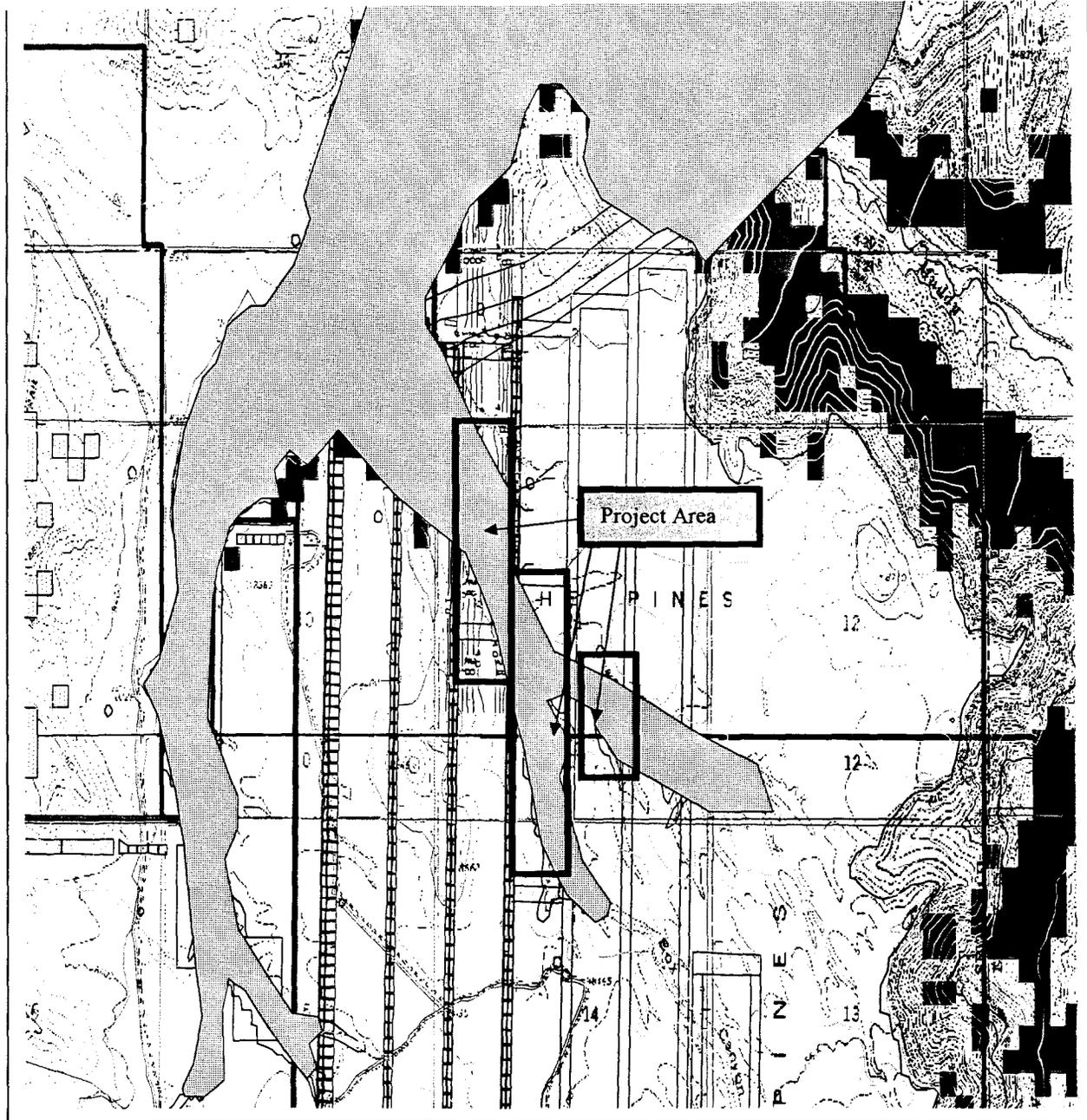
Observations from the subsided areas above the SUFCO mine (Mayo and Associates 1997a, 1997b) suggest that the small-aperture cracks that do form in the channel substrate will be "dead-end" fractures that will likely fill in with sediment rapidly (within a few weeks). Observations also suggest that these tension cracks do not extend below the surface more than a few tens of feet. Field observations in East Fork indicate that the stream in the 3 Left panel modification area visibly transports sandy and silty sediment that would readily fill any tension cracks that would form. Additionally, the presence of swelling clays in the Blackhawk Formation would readily seal tension fracture to heal to prevent water transmittal from the surface to deeper horizons (PHC, p. 17-18).

Subsequent to the FEIS, part of the project area, including portions of the East Fork of Box Canyon, were identified as possible habitat for the Mexican spotted owl

Historically, the Mexican spotted owl (MSO) ranged from southern Mexico to the Colorado Plateau in southern Utah. Very few owls are found in the canyonlands area as compared to forested sites in Arizona and New Mexico. The project area is not in the Critical Habitat area as designated by the United State Fish and Wildlife Service (FWS). DeGraaf, [and others], 1991, indicated that, "In the Southwest, spotted owls are commonly found in forested mountain tablelands and canyons from 5,500 to 9,000 feet(1,676-2,743 m)". The project area ranges from 8000 to 8400 feet and is therefore in the upper elevations of the species range.

Impacts to raptors including Bald Eagle, Northern Goshawk, Peregrine Falcon, and the Flammulated Owl were analyzed in the FEIS for the Pines Tract Project. The FEIS determined that an impact to the surface hydrology which might reduce the riparian area, could, reduce foraging habitat for these species. Escarpment issues were discussed in the FEIS. The Recovery plan for the MSO states that "owls occur primarily in steep-walled, rocky canyons". The FEIS (p 3-17) states, "These combined factors [convex-shaped, shallower canyon and exposure] suggest that cliffs in Box Canyon and the East Fork of Box Canyon [interior cliffs] should be less susceptible to mining-induced instability compared with the observations made during test mining in Quitchupah Canyon [exterior cliffs]". Underground mining has occurred under the ephemeral portion of the Main Fork of Box Canyon. There were approximately 3 escarpment failures in the entire area covering approximately 6000 linear feet of escarpment. This equates to approximately 3% of the linear cliff face that was affected. Therefore the statements in the FEIS are substantiated because of the small amount of cliff failure that would be encountered. Even if owls are present, the probability of an owl nest being affected by subsidence would be minimal.

Surveys are being conducted in the project area and in potential habitat areas that are in a 2 mile radius of the "Muddy" coal tract. To date no owls have been found. MSO generally utilize the same territory year after year. Mining is proposed take place between mid September and the end of December. The nesting season for the MSO is from March through August. The mining period for the first panel to be undermined would be outside of the nesting period and would not interfere with nesting. The surface over the remaining panels will have been fully surveyed by the time mining is initiated. The FEIS relied upon historical records and a 1997



aerial survey for documentation of the types of wildlife in the area. MSO were not reported in the survey.

MSO surveys have been conducted in and around the project area according to the Fish and Wildlife Service protocol, under contract from the Manti LaSal National forest. Four surveys were conducted in 2002 and one survey has been conducted in 2003. So far no owls have been found. Three remaining surveys will be completed by late Aug 2003.

**Figure 1 MSO 2002 and 2003 Survey Area**

Because the impacts have already been analyzed for raptors and disclosed to the public, and the MSO were not found in the 1997 or subsequent surveys, no additional NEPA analysis or public notification is necessary because the impacts listed in the FEIS would be the same for the MSO as other raptors. BLM informally consulted with Fish and Wildlife Service on June 30, 2003. The FWS does not oppose having the project go forward based on the information gathered to-date on the MSO. The FWS requests that the remaining MSO surveys take place. If

MSO are located, then the normal Section 7 consultation would be initiated for protection of the species. (If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required (except when the Services concur, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat). [50 CFR §402.02, 50 CFR §402.13]).

The National Register of Historic Places requirements has been complied with under Memorandum of Agreement between the USDA-Manti-LaSal National Forest, The Utah State Historic Preservation Officer, Canyon Fuel Company L.L.C., and the Utah Division of Oil, Gas and Mining regarding the SUFCO mine (Agreement No. 00-MU-11041000-017 and finally signed May 30, 2000).

**4. Do the methodology and analytical approach used in the existing NEPA document(s) continue to be appropriate for the current proposed action?**

Documentation of answer and explanation: YES

The methodology and analytical approach used in the Pines Tract Project FEIS and the other studies are the current scientific methodologies that are available for predicting impacts due to subsidence. Actual information was gathered from the mine on subsidence. The company has been using longwall techniques for over 10 years. There is no current technical analysis that could be made that would be superior or negate the findings of the FEIS or the technical studies. Both Government and private industry have reviewed the analysis techniques and all involved have accepted them. The bottom line is that the surface impacts from the action are not different than what was analyzed in the Pines Tract Project FEIS NEPA document.

**5. Are the direct and indirect impacts of the current proposed action substantially unchanged from those identified in the existing NEPA document(s)? Does the existing NEPA document sufficiently analyze site-specific impacts related to the current proposed action?**

Documentation of answer and explanation: YES

The FEIS stated that the cracks in the stream should seal within one to two years. By sealing the cracks the creek should return to its original flow. The Probable Hydrologic Consequence (PHC) Report dated April 10, 2003 states "It should be noted that whether the 3 Left panel modification area is mined or not, tension fractures in the vicinity of the 3 Left panel will likely form. As currently permitted, the longwall panel will terminated adjacent to the East Fork Creek, which will create a permanent tension zone. Open fracture will likely form at that location as well as at the location where mining of the panel is later resumed on the other side of the creek. If a continuous progression of the 3 Left panel occurs, subsidence effects are more uniform and many of the anticipated open tension cracks in the vicinity of the 3 Left panel modification area will likely not form".

"Where differential subsidence of the land surface occurs in stream drainages, there is the potential for the temporary increase of sediment yield in these drainages. This potential impact is primarily the result of subsidence induced gradient changes along areas of differential subsidence. However, this effect is generally expected to be short lived. . . ."

**6. Can you conclude without additional analysis or information that the cumulative impacts that would result from implementation of the current proposed action are substantially unchanged from those analyzed in the existing NEPA document(s)?**

Documentation of answer and explanation: YES

All impacts have been addressed in the Pines Tract Project FEIS including cumulative impacts. The estimated impacts if the creek was intercepted by cracks would be short term and it was estimated that it could last up to 2 years (mitigation could dramatically shorten that time period).

If not all cracks healed, this would mean that the vegetation would be stressed as if it were a drought year in the place where water was intercepted. Cracks would heal and fill up with material and water as material become available. The cracks are of limited length and depth. At the mining depth that the company is looking at the cracks will not intercept the mine workings and the water will not drain into the mine. Because the rock where the cracks may form do not accept water very readily, the water will sit in the cracks until flow resumes or it will be available for plant use, or it will reappear down stream.

Ground Water (FEIS p. 3-55- 3-56) Cumulative Impacts, “. . . there is a potential for diversion of some surface water from perennial streams into bedrock. This impact is expected to be of short temporal duration, perhaps less than a year, but could last up to 2 years”. Residual Adverse Impacts, “No residual adverse impacts to groundwater resources overlying the mine workings are anticipated. Although under Alternative B and Alternative D there is a potential for diversion of some surface water resources into bedrock, this impact is expected to be of short term duration, perhaps less than a year, but could last up to 2 years”. “. Irreversible/Irretrievable Commitment of Resources (p-3-56) “. . . No irreversible or irretrievable commitment of groundwater resources that occur near-surface in active groundwater systems that supply base flow to perennial creeks is anticipated. . . “.

Surface Water (FEIS p. 3-80- 3-81) “. . . Cumulative Impacts, Under Alternative B and D, changes to the flow regimes in the Main and East Fork of Box Canyon could occur if subsidence-caused tension cracks intercept flow. . . Residual Impacts, “Under alternatives B and D, the risk of continued effects of flow depletion in localized stretches of perennial streams should the predicted healing of tension cracks not occur, or bentonite repair be impossible or ineffective”. Irreversible/Irretrievable Commitment of Resources (p. 3-81) “No surface water would directly be committed for use in this project

Soils (FEIS p 3-89) Hydrologic function of hydric soil (18.6 acres) due to alteration of the surface and shallow groundwater flows by subsidence-induce fractures would be short-termed. Most of the fracture would be filled by natural sedimentation and/or swelling of the clays in the rock stratus, thus, restoring the natural hydrologic function. The short-term loss would be quickly restored naturally and should not irreversibly affect riparian or wetland vegetation communities”. (P. 3-91) Cumulative Effects “. . . The cumulative effect upon soil resources would be 140.5 acres of short-term disturbance that would be fully reclaimed, . . . Short Term Uses vs. Long Term Productivity “the mining of coal would not significantly reduce the productivity of the soils in the Project Area. . . “

Vegetation (FEIS p. 3-101) “. . . Approximately 18.9 acres of wetlands/riparian areas could be affected. Impacts would be temporary, until cracks area either naturally or artificially sealed. Depending upon the season, potential impacts are expected to be short-term, likely occurring for one growing season, but up to 2 years in some cases”. . . Residual Adverse Impacts (p. 106) “No residual adverse impacts to the vegetation resource are anticipated from any of the alternative analyzed above. . . “. Short Term Uses vs. Long Term Productivity, (p 3-106) “. . . in addition,

a maximum of 24 acres of riparian vegetation could be impacted as a result of mining –induced ground movements. These impacts would be short-term (less than 2 years at a given disturbance site) and temporally distributed over the life of the mine. The sites would be reclaimed, or in the case of ground movement effects, revegetated by natural means. The long-term productivity of the area as vegetation habitat would not be reduced”.

Wildlife (P. 3-120) The impacts to amphibians. . . Therefore, the magnitude of impacts to amphibians has potential to be grater under this alternative”. Residual Adverse Impacts, (P.3-122) “. . . No residual adverse impacts to the wildlife resources are anticipated from any of the selectable alternatives analyzed above. . . . “Short Term Uses vs. Long Term Productivity (p 3-123) “. . . in addition, a maximum of 24 acres of riparian vegetation could be impacted as a result of mining –induced ground movements. These impacts would be short-term (less than 2 years at a given disturbance site) and temporally distributed over the life of the mine. The sites would be reclaimed, or in the case of ground movement effects, revegetated by natural means. The long-term productivity of the area as wildlife habitat would not be reduced”.

Special Species Status (p. 3-150) Based on hydrologic and subsidence studies, [subsidence of perennial streams] is not expected to impact species status species”. Short Term Uses vs. Long Term Productivity, (p. 3-151) “Unless water resources are affected by subsidence, productivity of most habitats should not be affected . . .”

Range Cumulative Effects, (P-3-191) the cumulative effect to the range resources within the Emery C&H Allotment consist of the residual effects from past actions, current effects from present actions, and anticipated effects from reasonably foreseeable future actions. Residual Adverse Impacts, (p 3-192) No residual adverse impacts to the range resource are anticipated from any of the selected alternatives analyzed above”.

## **7. Are the public involvement and interagency review associated with existing NEPA document(s) adequately for the current proposed action?**

Documentation of answer and explanation: YES

The NEPA documents addressed in this analysis had adequate public participation. It was as follows:

January 29, 1998, NOI was published in the *Federal Register* requesting comments.

April 14, 1998, Amended NOI was published in the *Federal Register* requesting comments.

September 25, 1998, Draft EIS was submitted for review and Public comment.

January 25, 1999, Manti-LaSal National Forest Record of Decision

February 22, 1999, Utah State Office, BLM Record of Decision

March 3, 1999, Fair Market Value and Environmental Documentation Public Hearing

The Forest Service was requested to comment on this modification on February 27, 2003. They responded to BLM on May 8, 2003 with the following comments.

The FS decision on the leasing of the tract included a statement by the FS that, “This decision does not approve mining that would cause subsidence or surface disturbance”. However, the Forest Service did consent to the modification of the lease with the stipulations that existed on the lease.

- 1) The Forest Service stated; “The proposed modification does demonstrate that a portion of the west longwall panel would subside a stream channel segment in the Blackhawk Formation where the potential effects could be less than concluded in the ROD.”

Comment: It appears that this may be correct and most of the first panel has the creek located in the Blackhawk formation.

- 2) The Forest Service stated; "However, a substantial portion of the stream in the Castlegate Sandstone would also be subsided in both proposed longwall panels. These segments could experience cracks perpendicular to the stream channel from transient strain related to advancement of the longwall unit through the panel as well as larger longitudinal cracks such as were experienced in the Main Fork of Box Canyon."

### Bedrock Geology and Stream Characteristics in the East Fork of Box Canyon Proposed for Mining

	3RHG	3R Panel	3R TG	4R Panel	4R TG	5R Panel
Black Hawk Formation Length	250	1430	0	0	0	0
Castle Gate Formation Length	0	270	510	3485	278	600
Perennial Stream Length	250	1700	510	435	0	0
Ephemeral Stream Length	0	0	0	3050	278	600

Comment: The information in the above chart shows that 4<sup>th</sup> Right and 5<sup>th</sup> Right Panels contain a "substantial" portion of Castlegate formation on the surface. The 3<sup>rd</sup> Right panel does not contain a "substantial" portion of Castlegate formation but it contains a substantial portion of Blackhawk formation. Most of the Castlegate formation is in the area where the stream is not perennial but ephemeral.

It is documented in the FEIS that the cracks may form in the stream channel perpendicular to the stream channel. All things considered, the impacts are expected to be small.

The Main Fork of Box Canyon experienced longitudinal cracks to the longwall panel on the rim of the canyon. This was due to the interaction of the rim of the canyon. The canyon rim is unconfined and therefore the crack opened up and the rim wants to fall down into the canyon. This is why the cracks are relatively large and take longer to heal.

- 3) The Forest Service stated; "In addition, observation of cracks in the Main Fork indicated that sealing of the cracks has not occurred through the total length of subsided channel within the 1-2 years predicted in the FEIS."

Comment: BLM contacted the Manti-LaSal National Forest in an e-mail on 6/20/2003. They verbally contacted BLM and stated that they saw dead trees and were concerned about that. BLM conducted an on-site investigation on July 9, 2003. We saw cracks in the slick-rock portion but they had healed in the Main Fork of Box Canyon area that had been mined in mid 1999. There were no cracks in canyon where there was any significant amount of sediment. There were no cracks in the canyon where the set-up room started. There were cracks on the rim of the canyon. It also appeared that cracks in the walls of the canyon propagated down until they hit a bedding plane or they just stopped.

- 4) The FS stated that, "we [Manti-LaSal National Forest] have concluded that there would be a substantial risk to water flow and the related riparian and aquatic ecosystems in the canyon for portions of the stream channel. The value of these resources is especially prominent considering the current drought."

Comment: Riparian Habitat: The riparian habitat has two sources of water. First from the water that comes down the canyon along the rocks and flows through the colluvium and second,

the water in the stream. Most of the zone is supported by water running down the rocks through the colluvium. This is evidenced by the fact that riparian zone is as much as 20 feet above the stream and in the case of an ephemeral stream water does not exist year around to support the vegetation. This was discussed in the FEIS as follows: Page 3-101 "The floor of East Fork Box Canyon is built up from colluvium that has accumulated against the face of the escarpment. The groundwater that seeps throughout the sedimentary rocks maintains a moist soil condition in these colluvial deposits well above the level attributed to the creek flow. This zone, often as much as 20 feet above the creek level, supports riparian species. Therefore, the diversion of the surface flow of the perennial waters in East Fork Box Canyon would not impact these "perched" riparian zones that are recharged from groundwater seeping into the canyon above the creek level".

**Aquatic Ecosystems:** The aquatic ecosystems include many things such as macro invertebrates, wildlife, fish, and riparian vegetation. The riparian vegetation has been discussed above. There are no fish in the East Fork of Box Canyon creek. It is stated in the FEIS there would be "No residual adverse impacts to the wildlife resources are anticipated from any of the selectable alternatives analyzed." (FEIS p. 3-122). The largest impact will be to amphibians. The East Fork of Box Canyon surface flow contributes very little the Muddy Creek Water shed (FEIS p 3-73) and that tension fractures that occur will fill with sediments, water, movement of water in the fractures will be static and steamflow and colluvial ground water systems would no longer be directly effected. (FEIS p. 3-48). If the water is diverted, it will stay in the drainage and most likely express it self at some other location until the cracks fill, seal or heal. Petersen acknowledged in April 2003 "We observed that the East Fork of Box Canyon Creek is actively transporting sediment. Both sand and finer-grained sediment was visible moving down the stream channel. I have observed the transport of sediment in the creek on many occasions during previous visits to the site. During the site visit, a layer of sandy sediment was observed on top of the ice of the frozen creek, indicating that significant sediment transport has occurred since the creek froze-over this past fall. The fact that the stream is actively transporting relatively large quantities of sediment suggests that if tension cracks do form as a result of mining, these cracks will rapidly be filled-in." This is in the areas where water was flowing.

Therefore the effects to the aquatic ecosystem are estimated to be temporary and short-term.

In a letter dated July 29, 2003 to the Utah State Office, the Regional Forester acknowledges "... that there are differing professional opinions as to the probable duration and significance of these(stream) impacts", and recognizes that BLM could approve the requested R2P2 modification. Although the Forest Service has expressed their concerns with approval of the proposed modification, they have provided no documented information that would contradict statements in the FEIS nor other information that has not been considered as part of the process in the FEIS.

**E. Interdisciplinary Analysis:** Identify those team members conducting or participating in the preparation of this worksheet.

<u>Name</u>	<u>Title</u>	<u>Resource Represented</u>
Worksheet Preparation		
Stan Perkes	Mining Engineer	Mining
Ron Bolander /Steve Madsen	Biologist	Wildlife
Gregg Hudson	Geologist	Geology
Greg Thayn	NEPA Coordinator	NEPA

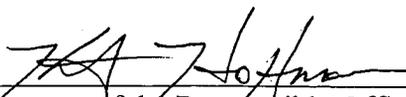
**F. Mitigation Measures:** List any applicable mitigation measures that were identified, analyzed, and approved in relevant LUPs and existing NEPA document(s). List the specific mitigation measures or identify an attachment that includes those specific mitigation measures. Document that these applicable mitigation measures must be incorporated and implemented.

1. Monitor the stream, vegetation and determine effects based on base line information (FIES p. 3-55, FEIS p. 3-105)..
2. The tension cracks should mitigate naturally in perennial drainages (FEIS p.3-55).
3. The repair of visible cracks with bentonite or some other material will heal the cracks faster. Continued attempts may be necessary. (FEIS p. 3-79, p. 3-90, p.3-190, p. 3-105)
4. Monitor and repair ponds. (FEIS p. 3-190) This requires sufficient amount of bentonite material and the drainage needs to be checked in order to determine that the slope is still directed to the pond.
5. Use other repair measures.(FIES p. 3-79)
6. Replace the water (FEIS p.3-10)
7. Formal consultation if necessary on Endangered Species

**CONCLUSION**

- Based on the review documented above, I conclude that this proposal conforms to the applicable land use plan and that the existing NEPA documentation fully covers the proposed action and constitutes BLM's compliance with the requirements of NEPA.

Note: If one or more of the criteria are not met, a conclusion of conformance and/or NEPA adequacy cannot be made and this box cannot be checked

  
\_\_\_\_\_  
Signature of the Responsible Official

7-31-03  
Date

APPENDIX 4-5

Cultural Resource Memorandum of Agreement

**MEMORANDUM OF AGREEMENT  
BETWEEN  
THE USDA- MANTI-LASAL NATIONAL FOREST,  
THE UTAH STATE HISTORIC PRESERVATION OFFICER,  
CANYON FUEL COMPANY, L.L.C.,  
AND  
UTAH DIVISION OF OIL, GAS AND MINING  
REGARDING THE SUFCO MINE**

Agreement No. 00-MU-11041000-017

WHEREAS, the United States Department of Agriculture-Forest Service, Manti-La Sal National Forest (USDA-FS) as the Federal Agency, charged with administering the surface resources on National Forest System lands for Federal coal leases U-76195 and U-63214 as authorized by the Mineral Leasing Act of 1920, as amended by the Coal Leasing Amendments of 1975 and the Office of Surface Mining (OSM) and the Utah Division of Oil, Gas and Mining (UDOGM) are responsible for administration of the SUFCO mine plan under the Surface Mining Control and Reclamation Act of 1977 and the Utah Coal Rules; and

WHEREAS, it is the statutory responsibility of the USDA-FS to ensure consideration of cultural resources as authorized in 36 CFR 800.2(a) and to ensure that the work conducted under this agreement meets professional standards as required by 36 CFR Part 800.2(a)(1); and

WHEREAS, the USDA-FS has determined that its consent to the SUFCO mine plan permit Incidental Boundary Change (Federal coal lease U-63214) and modification (U-76195) (hereinafter referred to as the Project) may have an effect on properties included in or eligible for inclusion in the National Register of Historic Places (NRHP) and has consulted with the Utah State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800.6(b) of the Advisory Council on Historic Preservation (the Council) regulations implementing Section of 106 of the National Historic Preservation Act, as amended, [16 U.S.C. Section 470 (f)] and Section 110(f) of the same Act [16 U.S.C. 470 h-2 (f)]; and

WHEREAS, this Agreement covers permitting and administration of the SUFCO Mine (including underground mining activities such as construction of mine entries, gateroads, mechanical mining of longwall panels and ventilation breakout facilities) and mining-induced subsidence of the ground surface on National Forest System lands; and

WHEREAS, unless otherwise defined differently in this Agreement all terms are used in accordance with 36 CFR Part 800.16; and

WHEREAS, the Canyon Fuel Company, LLC (the Permittee) has been invited to participate in consultation and to concur in this Memorandum of Agreement;

WHEREAS, the USDA-FS has consulted with the appropriate Native American Tribes about the project; and

WHEREAS, the Uintah-Ouray Tribe has expressed an interest in historic properties within the project area and has been invited to comment and participate in this agreement;

NOW THEREFORE, the Permittee agrees that the underground mining operations of the Project shall be administered in accordance with the following stipulations to ensure that historic and prehistoric properties will be treated to avoid or mitigate effects to the extent practicable to satisfy the Forest Service, the Council, UDOGM, OSM and the SHPO and that the proposed project (undertaking) shall be administered in accordance with the following stipulations to satisfy Section 106 responsibilities for all aspects of the undertaking.

**STIPULATIONS**

In accordance with existing Forest Service guidelines for cultural resources (prehistoric and historic) and the Secretary of the Interior's Standards and Guidelines (48 FR 44716-44742) (the Secretary's Standards), the Forest Service will ensure that the following measures will be carried out:

1. The Forest Service will be the lead agency and will be the contact for tribes, UDC, A, OSM, the SHPO, and other interested parties for the project. The Permittee's cultural resource consultant may be called upon to facilitate coordination with the SHPO, company and other agencies or to distribute information and/or reports to reviewers.
2. The Council and the SHPO may monitor activities carried out pursuant to this Agreement, and the Council will review such activities if so requested. The Forest Service will cooperate with the Council and the SHPO in carrying out their monitoring and review responsibilities.
3. The USDA-FS will assure that all evaluation and monitoring of subsidence effects on historic properties and treatments will follow the general process outlined in the Cultural Resource Plan of Work prepared by the Permittee's cultural resource consultant which will meet the specifications as outlined.
4. Monitoring Plan. The USDA-FS will ensure that the Permittee's cultural resource consultant submits a Monitoring Plan to monitor sites described in Appendix B. The Monitoring Plan will describe in detail, the methods, procedures, and criteria (following guidelines in Attachment A) and monitoring frequency (following guidelines in Attachment B) to be employed in evaluating subsidence related effects to each of the sites. This will include, but not necessarily be limited to photography, mapping, field measurements, written descriptions and subsidence data (to be provided by Canyon Fuel Company, L.L.C) The plan will provide the data and information required for the Annual and Final Monitoring Reports as described in Attachments A and B.
5. The USDA-FS will ensure that all work undertaken to satisfy the terms of this Agreement meets the National Historic Preservation Act of 1966 as amended and implemented through 36 CFR 800 as amended 1999, the Secretary's Standards and is consistent with the Council's *Treatment of Archaeological Properties Handbook*, November 1980. The USDA-FS will also ensure that the work is carried out by or under the direct supervision of a person or persons meeting, at a minimum, the applicable professional qualifications standards set forth in the Secretary's Standards.
6. Monitoring Reports. One (1) final cultural resource report, an archaeological monitoring and evaluation of subsidence effects on cultural resources in the Project will be submitted to the Forest Service for initial review. In addition, annual reports of monitoring will also be submitted to the Forest Service for review; this may be included in the Permittee's Annual Subsidence Monitoring. However, any draft recommended determinations of effect, or re-evaluations of National Register eligibility will be submitted to the USDA-FS for review. The USDA-FS will first review these draft reports within 30 calendar days of receipt and request revisions and corrections as necessary. The revised draft report will be subject to USDA-FS review prior to the report being submitted to the SHPO and other agencies for comment. The Forest Service may request the permittee's contractor to submit the revised report to all parties. The SHPO review time will be 30 calendar days from their dated receipt of the document.
7. Assessing Effects. If, after review of the effects findings in the archaeological monitoring reports and/or other relevant data, the USDA-FS determines that underground mining activities has not affected historic properties, and/or if the USDA-FS determines that the effects are not adverse as defined in 36 CFR 800.5(a)(1 and 2), the USDA-FS will forward this determination to the SHPO for review. If, however, after review of these data, the USDA-FS determines and the SHPO concurs that the effects are adverse, the USDA-FS will continue to consult with the SHPO and other consulting parties and tribes to develop and evaluate alternatives, including data recovery measures to mitigate these adverse effects.
8. Treatment Plan. If the USDA-FS and SHPO agree that the underground mining has caused adverse effects, the USDA-FS shall ensure that the Permittee's Cultural Resource Consultant prepares a comprehensive Treatment Plan that will address the effects of the proposed undertaking on all historic properties determined to have been adversely affected. The Permittee will be financially responsible for development of the Treatment Plan and costs associated with data recovery, analysis and reporting to implement the Treatment Plan. The Treatment Plan shall identify the nature of the effects to which each property has been subjected and the treatment strategies proposed to minimize or mitigate the effects of the undertaking. The Treatment Plan shall meet the standards contained in Attachment A, "Standards for the Treatment Plan." The USDA-FS shall submit the Treatment Plan to the SHPO, other parties to this Agreement, and to identified interested parties (pursuant to the 1992 amendments to the Act) for review. The SHPO, and other parties will have 30 calendar days from receipt to comment on the Treatment Plan. If the SHPO, or other parties fail to submit their written comments within 30 calendar days of receipt, the USDA-FS shall implement the Treatment Plan. If the SHPO, or other parties object in writing to the Treatment Plan or any part thereof, within the review period, the USDA-FS will consult with the objecting party to resolve the objection.

If it is determined that more than one site has been adversely affected by underground and mining activities and more than one site will require data recovery measures to mitigate adverse effects, a single, comprehensive research design and Treatment Plan is envisioned for this project through coordination by the Permittee's cultural resource consultant. The research design should reflect the site-specific character of the each site (age, cultural affiliation, site function) and the proposed treatment plan should take into account site-specific effects from underground mining. Though general research questions to be addressed through data recovery will be similar for sites in the area, the research design and treatment plan(s) should reflect the unique character and information potential of each affected historic property. Individual treatment plans may be submitted to the USDA-FS and SHPO for review and consideration. However, these site specific treatments, if required by circumstances, will be incorporated into the comprehensive Treatment Plan to follow. Review times for these specific treatments will be the same as the comprehensive Treatment Plan, above, although the USDA-FS may request expedited review.

9. The Permittee shall be responsible for protecting the cultural property during data recovery operations should data recovery actions be implemented. The Permittee shall also set forth written assurances that funding for fieldwork, analyses, and publication of results shall be made available for sites where data recovery and monitoring is enacted.

10. Curation of Specimens and records. The USDA-FS shall ensure that all records and materials resulting from identification and data recovery efforts are maintained and curated in accordance with 36 CFR 79. All costs of curation will be borne by the Permittee. With the exception of materials that may be repatriated in accordance with the provisions of the Native American Graves Protection Act of 1990 (NAGPRA), collections to be curated will be housed at the College of Eastern Utah Prehistoric Museum. The Permittee's cultural resource consultant will be required to acquire a valid curation agreement with the Museum prior to commencing data recovery operations.

11. Discovery Situations. The Permittee or cultural resource consultant employed by the Permittee shall bring to the attention of the Manti-La Sal National Forest Supervisor's Office any and all antiquities, or other objects of historic, paleontological, or scientific interest including, but not limited to, historic or prehistoric ruins or artifacts discovered as a result of this undertaking.

The Permittee's cultural resource consultant shall document the site on appropriate Intermountain Antiquities System Site (IMACS) records, photographs and detailed site maps showing site features, diagnostic artifacts, tools and natural features to facilitate relocating the site. Maps will show these features to within 90% accuracy. A permanent rebar datum (½" diameter, 3' length is the desired standard) will be established on the site and indicated on the site map to permit easy relocation of the discovery/feature. This datum point will be left in place.

The Permittee's cultural resource specialist will evaluate the site for its National Register eligibility and assess potential effects from underground mining. These findings shall be submitted to the USDA-FS. The USDA-FS will review these findings and forward its determination of eligibility and effect to the SHPO for review and comment. If the site is evaluated as significant and will be adversely affected by underground mining, a treatment plan will be developed in consultation with the USDA-FS and previously identified interested parties and tribes and the SHPO.

12. Human Remains. If human remains are discovered during monitoring, treatment or any other activities associated with the project, they will be secured and protected until such time as appropriate disposition has been determined, in accordance with applicable Federal statutes. Archaeological excavation in the immediate vicinity of the discovery will cease, but may continue on the remainder of the site.

The Manti-La Sal Forest archaeologist will be notified immediately by phone or in person, followed by written notification, of any discoveries of human remains, funerary objects, sacred objects, or objects of cultural patrimony. These items are subject to the requirements of Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). General policy and direction for treatment of human remains will be addressed further in all Treatment Plans (and/or Data Recovery Plans) prepared for the project. In the absence of a specific plan, developed in consultation with a Tribe or Tribes, the USDA-FS will meet the requirements of NAGPRA for all discoveries of NAGPRA items including human remains, associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony on a case by case basis in accordance with the implementing regulations set forth at 43CFR10.

13. Stipulations 10, 11, and 12 dealing with discoveries of historic properties, discovery and/or treatment of human remains and curation of specimens will be referenced in The Mine Plan of Operations and any approved Treatment Plans.

14. Should any party to this Agreement object, in writing, within 30 days to any actions pursuant to this Agreement, the USDA-FS shall consult with the objecting party to resolve the objection. If the USDA-FS determines that the objections cannot be resolved, the USDA-FS shall forward all documentation relevant to the dispute to the Council pursuant to (36CFR800.6(c)(ii)). Within 30 days after receipt of all pertinent documentation, the Council will either:

- a. Provide the USDA-FS with recommendations, which the USDA-FS will take into account in reaching a final decision regarding the dispute; or
- b. Notify the USDA-FS that it will comment pursuant to 36 CFR Part 800.7(c) and proceed to comment. Any Council comment provided in response to such a request will be taken into account by the USDA-FS with reference to the subject of dispute.

Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; the USDA-FS responsibility to carry out all actions under this Agreement that are not the subject of the dispute will remain unchanged.

15. If it is determined that a historic property is being adversely affected or is likely to be adversely affected by subsidence, the Forest Service should consult with the other parties (as provided in Stipulation 7) and resolve any disputes among the parties following procedures in Stipulation 13.

16. Any party to this Agreement may request that it be amended, whereupon the parties will consult in accordance with 36 CFR Part 800.6(c)(7) to consider such amendment.

17. In the event that the ownership of the Permittee(s) changes, such change will be reflected by adding the new owner/mine operator's name signatory page without modification to this Agreement and without concurrence by other signatories to this Agreement.

18. Any one of the parties to this Agreement may terminate it by providing 30 calendar days notice, in writing, to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of a termination, the USDA-FS will comply with 36 CFR Part 800.3 through 800.6 with regard to individual actions covered by this Agreement.

19. In the event the Forest Service does not carry out the terms of this Agreement, the USDA-FS will comply with 36 CFR 800.3 through 800.6 with regard to individual actions covered by this Agreement.

20. This instrument in no way restricts the Forest Service or the Cooperators from participating in similar activities with other public or private agencies, organizations, and individuals.

21. Pursuant to Section 22, Title 41, United States Code, no member of, or Delegate to, Congress shall be admitted to any share or part of this instrument, or any benefits that may arise therefrom.

22. This instrument is executed as of the date of last signature and, unless sooner terminated, is effective through April 30, 2005 at which time it will expire unless renewed.

23. The principal contacts for this instrument are:

Paul Baker  
Utah Division of Oil, Gas and Mining  
1594 West North Temple  
Salt Lake City, UT 84114  
(801) 538-5261

Mike Davis  
Canyon Fuel Company, L.L.C.  
397 South 800 West  
Salina, UT 84654  
(435) 286-4421

Stan McDonald  
Manti-La Sal National Forest  
599 West Price River Drive  
Price, UT 84501  
(435) 637-2817

James Dykman  
Utah State Historic Preservation Office  
300 Rio Grande  
Salt Lake City, UT 84101-1182  
(801) 533-3555

23. Principal Contacts (continued)

Carol Gleichman  
Advisory Council on Historic Preservation  
12136 West Bayaud Avenue  
Suite 330  
Lakewood, CO 80228  
(303) 969-5110

24. This instrument is neither a fiscal nor a funds obligation document. Any endeavor or transfer of anything of value involving reimbursement or contribution of funds between the parties to this instrument will be handled in accordance with applicable laws, regulations, and procedures including those for Government procurement and printing. Such endeavors will be outlined in separate agreements that shall be made in writing by representatives of the parties and shall be independently authorized by appropriate statutory authority. This instrument does not provide such authority. Specifically, this instrument does not establish authority for noncompetitive award to the cooperator of any contract or other agreement. Any contract or agreement for training or other services must fully comply with all applicable requirements for competition.

25. Modifications within the scope of this instrument shall be made by the issuance of an executed modification agreed to by all signatories prior to any changes being performed.

26. Any information furnished to the Forest Service under this instrument is subject to the Freedom of Information Act (5 U.S.C. 552).

Execution and implementation of this Agreement evidences that the USDA-FS has satisfied its Section 106 responsibilities as implemented by 36CFR800 (as amended 1999), for all individual activities on the undertaking and that UDOGM has met their responsibilities to consult with the Utah State Historic Preservation Office regarding the protection of historic properties.

SIGNATORIES

Joseph G. Gallagher 19 May 2000  
FOREST SERVICE, MANTICLASAL NATIONAL FOREST  
By: Crockett Dumas Date:  
Title: Acting Forest Supervisor

Lowell P. Braxton 5/25/00  
UTAH DIVISION OF OIL, GAS AND MINING  
By: Lowell P. Braxton Date:  
Title: Director

Wilson Martin 5/30/2000  
UTAH STATE HISTORIC PRESERVATION OFFICER  
By: Wilson Martin Date:  
Title: Deputy SHPO

CONCURRENCE:

Richard D. Pick 5/24/2000  
CANYON FUEL COMPANY, L.L.C.  
By: Richard D. Pick Date:  
Title: President and CEO

THE AUTHORITY AND FORMAT OF THIS INSTRUMENT  
HAS BEEN REVIEWED AND APPROVED FOR SIGNATURE  
Lisa M. Maynes 5/17/00  
AGREEMENTS COORDINATOR DATE

**ATTACHMENT A**  
**STANDARDS AND GUIDELINES FOR MONITORING,**  
**MONITORING REPORTS, TREATMENT AND PERMITS**

I. Standards for Monitoring and Monitoring Reports:

Standards for Monitoring

The Permittee's consultant shall submit a plan to monitor sites at the required monitoring frequencies for sites outlined in Attachment B. Monitoring will be implemented at the agreed upon intervals (see Attachment B) and continue through the conclusion of the liability period for the mine plan and/or subsidence is determined by the USDA-FS to be complete. The monitoring plan shall be developed in accordance with the procedures outlined in Item #4 of this agreement, stipulations listed below and the Standard for Monitoring Reports.

Standards for Annual Monitoring Reports.

A. Annual Monitoring Report: The Annual Monitoring Report is to be a brief report displaying:

- 1) Brief Description of the Project and Rationale for Monitoring.
- 2) Brief Description of Sites Monitored.
- 3) Monitoring Methods.
- 4) Monitoring frequency.
- 5) Monitoring observations for each site displaying monitoring criteria and results, photographs of each site.
- 6) Monitoring records will be attached as an Appendix.
- 7) Summary of Monitoring results including observed effects or unchanged situations.
- 8) Conclusions and recommendations, changes to the monitoring plan or for remedial actions.

B. Standards for Final Monitoring Report

At the conclusion of all monitoring (estimated to occur approximately three years subsequent to the completion of all subsidence at all sites, see Attachment B for further discussion on monitoring schedules) the Permittee's consultant shall submit a Final Cultural Resource Monitoring Report. The Cultural Resource Monitoring Report should include the following information:

1) Introduction

- a. Description of the Project Area
- b. Description of the proposed undertaking, background information on previous environmental analysis, Section 106-NHPA compliance required for the coal leasing project and administration of the Mine Plan, a brief discussion of anticipated effects to cultural resources from underground mining, and the rationale for implementation of the monitoring program.
- c. Locational information on 7.5 minute USGS Topographical Quadrangle including name, Section and Township/Range, land status (BLM, Forest Service, etc.), and county.
- d. USGS map (1:24000 scale) showing location and boundaries of project area. Map should be clearly labeled and of reproducible quality.
- e. Discussion of all sites monitored including site description, location, size, age, function, identified features and artifacts, and middens. A USGS map (1:24000 scale) showing the location of all monitored sites shall be included displaying Forest and Smithsonian Site numbers. Photographs of all monitored sites should be included in this section.
- f. Discussion of anticipated site-specific impacts (for each monitored site) posed by underground mining including predicted subsidence effects as displayed in the Pines Environmental Impact Statement, the Mining and Reclamation Plan, pertinent technical reports and other relevant data sources.

## 2) Environment

- a. Brief description of the environmental setting including topography, vegetation, elevation, water sources, ground visibility, and human alteration or disturbance, as appropriate.

## 3) Methodology

- a. Monitoring Information (general overview, purpose and scope of monitoring).
- b. Names and designations of field personnel.
- c. Dates of fieldwork.
- d. Monitoring techniques; types of monitoring employed including measurement of subsidence, standardized photography, field mapping, frequency of field monitoring and measurable criteria for assessing effects to the monitored sites. This will also include discussion of methodology and criteria employed during field monitoring to assess changes to the character of sites caused by impacts other than underground mining.
- e. The means relied upon for identifying the location of any monitoring reference points (e.g. photo reference points, elevational mapping points to measure vertical/horizontal displacement of ground surfaces).
- f. Photographs of fieldwork and monitoring techniques should be included in this section along with any graphic illustrations that will aid in explaining monitoring techniques to readers.
- g. Background data on monitoring techniques elsewhere which are applicable to the employed monitoring plan.

## 4) Monitoring Results

- a. A brief summary of the total number of sites monitored, the period and frequency of monitoring, and an overall assessment of the amount of subsidence that has occurred at each site and the observed impacts.
- b. Site-by-site descriptions of the monitoring results including the types of impacts observed, severity or degree and impacts and a discussion of observed impacts versus predicted impacts.
- c. Site-by-site evaluations of impacts to the qualities of sites that make them eligible for listing in the National Register of Historic Places.

## 5) Conclusions

- a. A brief summary of overall impacts to the monitored sites in the Project.
- b. Discussion and assessment of the effectiveness of monitoring techniques and recommendations for any changes to those techniques.
- c. Conclusions regarding direct, indirect and cumulative impacts to sites observed during monitoring including a summary of effects to the qualities of sites that make them eligible to the National Register.
- d. Recommendations for management including data recovery, further monitoring or other work necessary to mitigate any adverse impacts caused by underground mining activities.

## 6) Appendices

- a. Monitoring records. Copies of monitoring records and data recording sheets, photographs and maps.
- b. Updated site records to document changes to site character observed during monitoring.

C. The time frames for submitting reports are as follows:

1. Annual Report:

Draft Annual report of monitoring results: January 15

Forest Service review comments (and addressing comments of UDOGM): February 15

Revision and Final Annual Report: March 15

2. Final Monitoring Report

Draft of Final Monitoring Report: 6 months following the conclusion of the permit.

Forest Service Review comments: 30 days after receipt of the draft final report.

Revision and submission of final report: 30 days after USDA-FS comments.

D. Number of report copies and submission. Two copies of the annual reports and final report will be submitted to the USDA-Forest Service. Distribution will be coordinated through the USDA-Forest Service and the Permittee's Cultural Resource Consultant. Except as noted below, each party to this agreement will be provided with copies of the draft and final annual report and drafts and final copies of the final comprehensive report. Draft report copies will be submitted to the parties in this agreement by Canyon Fuel Company. Draft copies of reports will not be submitted to SHPO. Final copies will be submitted to SHPO and such submission will be coordinated through the USDA-Forest Service and the Permittee's Cultural Resource Consultant. The report shall meet the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44728-44738), (Secretary's Standards), and following the aforementioned outline for the Monitoring Reports. The Permittee's consultant will also provide the USDA-Forest Service with one unbound, camera ready, single spaced text with original archivally processed photographic plates of this report.

## II. Guidelines for Treatment

### A. General

1) The Treatment Plan will conform to the Secretary's Standards. Treatment recommendations should be commensurate with the nature and significance of the involved cultural resources. Recommendations should consider a range of alternative treatments including protection measures and data recovery.

### B. Standards for the Treatment Plan.

1) The Data Recovery Plan shall conform to the Secretary's Standards and should provide the context and justification for, and a detailed description of, the proposed data recovery work.

#### 2) Protection Measures

a. Recommendations for physical or administrative protection measures must consider the nature and source of deterioration of the properties.

b. If long term physical or administrative protection measures are recommended, proposals must include justification and undertaking specifications.

#### 3) The Treatment Plan shall include at a minimum:

a. The properties or portions of properties where data recovery is to be carried out;

b. Any property, properties, or portions of properties that will be destroyed, altered, or transferred without data recovery;

c. The research questions to be addressed through the data recovery, with an explanation of their relevance and importance;

d. The methods to be used, with an explanation of their relevance to the research questions;

e. The methods to be used in analysis, data management, and dissemination of data;

f. The proposed disposition of recovered materials and records including the disposition of Native American sacred items, human remains, and grave goods;

- g. Proposed methods for involving the interested public in data recovery;
- h. Proposed methods for disseminating results of the work to the interested public;
- i. Proposed methods by which relevant Native American Tribes and local governments will be kept informed of the work and afforded an opportunity to participate;
- j. A proposed schedule for the submission of progress reports to the USDA-Forest Service and cooperating agencies.
- k. Proposed methods for site rehabilitation/stabilization following excavation activities, and tied to the Permittee's Plan of Development.
- l. Address security measure(s) for site protection during excavation.
- m. Address how cultural artifacts and samples (carbon 14, pollen, etc.) collected will be secured and protected from the time of removal through excavation or sampling to the final curation facility.

### C. Draft Report

- 1) Preliminary Summary Report of the data recovery will be issued within 60 (sixty) days from completion of the project data recovery.
- 2) The Permittee will submit a data recovery draft report to the USDA-Forest Service following completion of all planned treatment within 18 months after completion of project construction. This report will meet the Secretary's Standards.
- 3) Distribution of the data recovery draft report for review and comment will be coordinated through the USDA-Forest Service and the Permittee's Cultural Resource Consultant. The data recovery draft report will be reviewed by the Forest Service. Copies will also be distributed to each SHPO and agency, with comments made back to the Permittee's Cultural Resource Consultant within 30 calendar days. The Forest Service will then review the corrected draft for completeness and for appropriate incorporation of review comments prior to acceptance of the revised draft. The Forest Service will submit the revised data recovery draft report to all the signatories to the Agreement for their review. There will be a 30 calendar day period for review of the revised draft.

### D. Final Report

- 1) The Permittee's Cultural Resource Consultant shall submit a data recovery final report based on the review and comments to the Forest Service. The Forest Service will follow the same process and time frames established in Stipulation 5 of this document in review and preparation of the final report.
- 2) Distribution of copies of the data recovery final report will be coordinated through the Forest Service and the Permittee's Cultural Resource Consultant. The number of copies to be produced will be determined by Forest Service in coordination with the Cultural Resource Consultant. At a minimum, copies of the report will be made available to the Council, the SHPO, the Forest Service, the Permittee, reviewing agencies, and all interested parties.
- 3) The Permittee's Cultural Resource Consultant will provide the Forest Service with one unbound, camera ready, single spaced text with archivally processed photographic plates of the final data recovery report.

## III. Standards for Permits

### A. General Standards

1) Each cultural resource contractor performing work on National Forest System lands must have cultural resources permits issued by the appropriate authority. These include, but may not be limited to, inventory and excavation permits issued by the Forest Service, state and local permits as required.

**ATTACHMENT B:  
LIST OF SITES TO BE MONITORED**

State/Forest Site Numbers	Site Name	Site Type	Anticipated Impacts	Monitoring Frequency *
42SV2492/ML-3582		Prehistoric Rockshelter	Low Risk for roof failure	Monitoring Schedule B
42SV2423/ML-3439	Refugia Shelter	Prehistoric Rockshelter	None. Mine area below will be fully supported	Monitoring Schedule A
42SV2425/ML-3441		Prehistoric Lithic Scatter	Potential surface cracking	Monitoring Schedule A
42SV2430/ML-3446	Elusive Peacock Shelter	Prehistoric Rockshelter	None. Mine area below will not be mined.	Monitoring Schedule A
42SV2432/ML-3448		Prehistoric Rockshelter	Will be fully supported/low risk of structural failure	Monitoring Schedule A
42SV2433/ML-3449	Big Mac Shelter	Prehistoric Rockshelter	Moderate risk of roof failure	Monitoring Schedule B
42SV2434/ML-3450	Little Mac Shelter	Prehistoric Rockshelter	Moderate risk of roof failure	Monitoring Schedule B
42SV896	Crazy Bird Shelter	Prehistoric Rockshelter	Data recovery implemented under previous 106 consultation; only minor spalling outside of shelter has occurred.	Monitoring Schedule C
42SV2386		Prehistoric Lithic/Ceramic Scatter	Potential surface cracking	Monitoring Schedule C
42SV2387		Prehistoric Lithic Scatter/Rock Art	Some potential for surface cracking	Testing, Monitoring Schedule C
42SV2388		Prehistoric Lithic and Groundstone Artifact Scatter	Limited potential for surface cracking	Monitoring Schedule C
42SV2389		Prehistoric Rockshelter	Potential for failure of portion of shelter roof	Testing, Monitoring Schedule C
42SV2341/ML-3335		Prehistoric Rockshelter	Within area of active mining/potential for roof failure	Monitoring Schedule B

**FOOTNOTES:**

**Monitor Schedule A:** Sites listed in this schedule are located in areas that will be mined using full-support methods (e.g. gateroad entry area where pillars are left in place) or are close to areas to be mined. Monitoring schedule for these sites is as follows: (a) 6 months prior to the mining, the site will be monitored once to provide baseline conditions; (b) After the onset of mining, the site will be monitored once within the following six months (1 to 6 months after the initiation of active subsidence) and once in the following six months (6-12 months after the

ATTACHMENT B, List of Sites to be Monitored, Footnotes-Monitor Schedule A (continued):

initiation of active subsidence); and (c) thereafter, the site will be monitored once per year for two (2) more years at the rate of once per year (when the effects of subsidence are estimated to be complete). If subsidence monitoring data indicates further movement of the ground surface, monitoring will continue at the rate of once per year until such time that subsidence monitoring data indicates no further movement of the ground surface.\*\*

**Monitoring Schedule B:** Sites listed in this schedule are located in areas which will be mined under and subsided. The monitoring schedule for these sites is as follows: (a) 6 months prior to the period of mining (initiated when the site is located within the angle of draw), the site will be monitored once to provide baseline conditions; (b) after the onset of active subsidence, the site will be monitored once per month within the following six months (1 to 6 months after the initiation of active subsidence) and quarterly (once per 3 months) in the following six months (6-12 months after the initiation of active subsidence); (c) thereafter, the site will be monitored once per year for two (2) more years at the rate of once per year (when the effects of subsidence are estimated to be complete). If subsidence monitoring data indicates further movement of the ground surface, monitoring will continue at the rate of once per year until such time that subsidence monitoring data indicates no further movement of the ground surface.\*\*

**Monitoring Schedule C:** Sites listed in this schedule are located in areas currently being undermined and are under approved mine plans. Sites in this schedule will be monitored once per year for at least two (2) years until such time that subsidence monitoring data indicates no further movement of the ground surface and that subsidence is complete.\*\*

Note: Some sites may be located in areas that will be (1) mined first using full support methods and (2) later subjected to subsidence from adjacent mining by full-extraction methods (long-wall panels). Thus, both Monitoring Schedules A and B may apply.

\*Final assignment of sites to either Monitor Schedule A or Monitor Schedule B or both is contingent upon approval of the final mine plan.

\*\*Final Monitoring Report Schedule will commence at the end of the final two year period of monitoring.

Map(s) is kept with this application located in the Public Information Center of our Salt Lake City office.