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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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September 30, 2003

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

Re: Conditional Approval of Undermining East Fork of Box Canyon Amendment, Canyon Fuel Company, LLC, SUFCO Mine, C/041/0002, Task ID #1640 and #1713 Outgoing File

Dear Mr. May:

A Technical Analysis has been conducted on the above-referenced amendment to Canyon Fuel Company's, SUFCO mine permit. As part of the review the Division has consulted with various state and federal agencies and has formulated the attached monitoring and mitigation plan in order to allow mining of this area.

The amendment to undermine the East Fork of Box Canyon is hereby approved conditioned upon Canyon Fuel Company adhering to the Monitoring and Mitigation Plan and ensuring that it is incorporated into the SUFCO Mining and Reclamation Plan (MRP) by no later than October 17, 2003. Approval is also conditioned upon receipt of seven updated clean copies of the amendment. A copy of our Technical Analysis is enclosed for your information.

Thank you for your help in completing this permitting action. If you have any questions, please call me at (801) 538-5325 or Dave Darby at (801) 538-5341.

Sincerely,

Daron R. Haddock
Permit Supervisor

an
Enclosure
cc: Price Field Office
Jim Kohler, BLM
Alice Carlton, USFS
Denise Boggs, UT Governmental Congress
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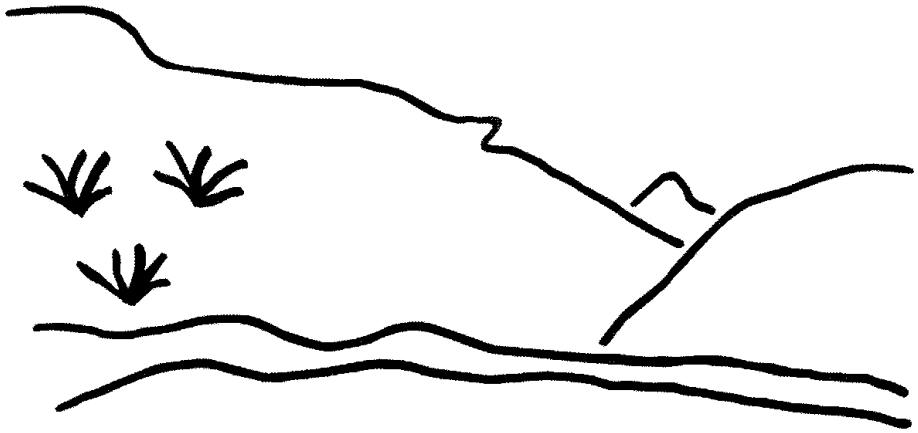
State of Utah



Utah Oil Gas and Mining

Coal Regulatory Program

Sufco Mine
Mining Under the East Fork of Box Canyon
Permit # C041/0002, Task ID #1713
Technical Analysis
September 30, 2003

TECHNICAL ANALYSIS

The Division ensures compliance with the Surface Mining Control and Reclamation Act of 1977(SMCRA). When mines submit a Permit Application Package or an amendment to their Mining and Reclamation Plan, the Division reviews the proposal for conformance to the R645-Coal Mining Rules. This Technical Analysis is such a review. Regardless of these analyses, the permittee must comply with the minimum regulatory requirements as established by SMCRA.

Readers of this document must be aware that the regulatory requirements are included by reference. A complete and current copy of these regulations and a copy of the Technical Analysis and Findings Review Guide can be found at http://ogm.utah.gov/coal

This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings, which comprise the necessary components of an application. Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.

Often the first technical review of an application finds that the application contains some deficiencies. The deficiencies are discussed in the body of the TA and are identified by a regulatory reference, which describes the minimum requirements. In this Technical Analysis we have summarized the deficiencies at the beginning of the document to aid in responding to them. Once all of the deficiencies have been adequately addressed, the TA will be considered final for the permitting action.

It may be that not every topic or regulatory requirement is discussed in this version of the TA. Generally only those sections are analyzed that pertain to a particular permitting action. TA's may have been completed previously and the revised information has not altered the original findings. Those sections that are not discussed in this document are generally considered to be in compliance.

INTRODUCTION

The Division of Oil, Gas and Mining (DOGM, Division) received an amendment from CFC Company, LLC (CFC) to their Sufco Mine Mining and Reclamation Plan (MRP) on August 1, 2003. CFC proposes to shorten the northern panels 3LPE, 4LPE and 5LPE on the northern ends, because development along the gate roads revealed a sand channel cutting through the coal seam, reducing the thickness of coal and the amount of coal reserves in the panels. Plate 5-7 shows the new mine area, which includes the reduced coal reserves on the north, caused by a sand channel and proposed mine operations under the East Fork of Box Canyon. The area is located in the Pines Tract Lease of the Sufco Mine permit, in Sevier County, Utah.

A Technical Review was completed on September 18, 2003. A list of deficiencies were given to CFC including some pre-mining mitigation requirements that would have to be conducted prior to mining the newly proposed panel sections. The application was resubmitted on September 23, 2003. A review of the application concluded the applicant has submitted the required information to show they have right of access, which long-term impacts to resources will not occur.

The Bureau Land Management (BLM) is the mineral leasor and the U.S. Forest Service (USFS) is the surface land manager of the Pines Tract Lease area. CFC received an approval of a minor modification from the BLM dated July 3, 2003 for a change to the Resource Recovery and Protection Plan (R2P2).

Panels 3LPE and 4LPE, were not planned for full extraction mining the previous Pines Tract Lease significant revision. The two panel sections were omitted from the Pines Tract Lease by CFC. CFC accepted the restrictions placed in the permit by the Forest Service's stipulation as identified in the Record of Decision, January 28, 1999.

This lease addition has been under review by the U.S. Forest Service and the Bureau of Land Management (BLM) through the NEPA process resulting in development of the Pines Tract Project, Final Environmental Impact Statement (FEIS). Stipulation 9 in the FEIS allows mining under perennial streams if no impacts or requires special permission to mine areas in Box Canyon if impacts damage or alter the flow of perennial streams, create hazardous conditions, cause damage to existing structures.

A Technical Review was completed on September 18, 2003. A list of deficiencies were given to CFC including some pre-mining mitigation requirements that would have to be conducted prior to mining the newly proposed panel sections. The application was resubmitted on September 23, 2003.

Several reports have been produced from studies conducted in the area. This Technical Analysis (TA) has drawn from all those known to have conducted studies and tests in the area. This Technical Memo is a hydrologic analysis of the proposed amendment incorporating information from the following reports.

- Pines Tract Project, Final Environmental Impact Statement, U.S. Forest Service and U.S Bureau of Land Management (FEIS)

- Evaluation and Prediction of Potential Surface Subsidence Impacts from Longwall Mining under the Box Canyon Area, Sufco Mine, Agapito Associates, Inc.(AGAPITO)

- Hydrology and Effects of Mining in the Quitchupah and Pines Coal-Lease Tracts, Central Utah, U.S.G.S. Report 90-4084, by Thiros & Cordy (USGS)

- Probable Impact From Longwall Coal Mining at the Sufco Mine to the Hydrologic Balance of Box Canyon Creek, Sevier County, Utah (MAYO)

- Resource Recovery and Protection Plan for Federal Coal Lease UTU-7619, August 12, 2003, U.S. Bureau of Land Management.

GENERAL CONTENTS

IDENTIFICATION OF INTERESTS

Regulatory Reference: 30 CFR 773.22; 30 CFR 778.13; R645-301-112

Analysis:

This information is in the current Mining and Reclamation Plan.

Findings:

The information provided in the application meets the minimum Identification of Interests requirement of the regulations.

VIOLATION INFORMATION

Regulatory Reference: 30 CFR 773.15(b); 30 CFR 773.23; 30 CFR 778.14; R645-300-132; R645-301-113

Analysis:

Update is not required by this submittal.

Findings:

The information provided in the application meets the minimum Violation Information requirement of the regulations.

RIGHT OF ENTRY

Regulatory Reference: 30 CFR 778.15; R645-301-114

Analysis:

The application amends Coal Lease UTU-76195, which was issued by the Bureau of Land Management to CFC on September 1, 1999. The application text also includes a new legal description and acreages for the lease. This satisfies the requirements of this section of the regulations. This minor lease modification was approved by the BLM on July 31, 2003.

The Division requested OSM determination on the mine plan modification on August 1, 2003. OSM responded on August 4, finding that the proposal does not meet the requirements of 30 CFR746.11 and 746.18(d)(6) and does not constitute a mine plan action. The BLM approved an updated R2P2 on August 12, 2003.

Findings:

The information provided in the application meets the minimum Right of Entry Information requirement of the regulations.

PERMIT TERM

Regulatory References: 30 CFR 778.17; R645-301-116.

Analysis:

The proposed revision will not affect the permit term. The insurance policy currently on file with the Division meets regulatory requirements. On February 7, 2000, the Division approved an amendment where the Pines Tract public notice was included in the existing mining and reclamation plan. There are no changes to the section dealing with facilities or structures used in common.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

Findings:

The information provided in the application meets the minimum Permit Term Information requirement of the regulations.

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The Permittee has committed in Sec. 3.2.2.2 to contact the lead agency, DOGM, if access is needed for mitigation work during this critical time periods (R645-301-333)for elk and deer.

The applicant has supplied an updated Threatened and Endangered Species and Sensitive Species list in Chapter 3.

Findings:

Information provided in the application is adequate to meet the minimum Permit Application Format and Contents section of the General Contents regulations.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

Dr. FR Hauck et. al., of Archeological-Environmental Research Corporation (AERC) conducted the 1980, 1981, 1996, 1997 (a and b), 1999 Cultural Evaluations for the Southern Utah Fuel Company Coal Mine in Sevier County, Utah. The 1997 evaluation Cultural Resource Evaluation Of A Potential Mining Subsidence Zone In The Pines Locality Sevier And Emery Counties, Utah evaluates the Elusive Peacock. Scott Billat of Earth Touch (Layton, Utah) has conducted more recent monitoring of the Elusive Peacock (Mike Davis, personal contact, 9/9/03).

Dr. Patrick Collins of Mt. Nebo Scientific, Inc. conducted the July 1999 Vegetation & Wildlife of the Pines Tract Project evaluation (Appendix 3-9).

DWR conducted the raptor surveys.

Mark Perkins and Joshua Peterson (SLC, Utah) conducted the 1997 *Bat Survey for the* Sufco Mine.

Arizona Biological Surveys (Lynn and Phil Jensen) conducted the 2003 Mexican Spotted Owl survey of the Muddy Creek and East Fork areas.

Findings:

Information provided in the application is considered adequate to meet the minimum Reporting of Technical Data section of the General Contents regulations.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

GENERAL

Regulatory Reference: 30 CFR 783.12; R645-301-411, -301-521, -301-721.

Analysis:

The Pines Tract Lease is located on the Wasatch Plateau of the Manti-La Sal National Forest in Sanpete County. The Castlegate Sandstone forms a resistant outcrop that rims Box Canyon and Muddy Creek Canyon. At the 8000 to 9000 feet elevation the area usually receive several feet of snow. The sandstone cap rock reduces erosion so that the high mountain streams flow clear and product a high quality runoff in Box Canyon. The sediment load and clarity of the flow changes as it cuts over the softer clays, mudstones and shales of the Blackhawk Formation, which form the canyon slopes and bottoms in lower Box Canyon and Mud Creek Canyon.

The coal bearing units are found in the lower Blackhawk Formation, which underlies the Castlegate Sandstone. The Price River Formation overlies the area to the east of the canyon and some knolls of the proposed lease.

Findings:

Information provided in the application is considered adequate to meet the minimum General section of the Environmental Resource Information regulations.

PERMIT AREA

Regulatory Requirements: 30 CFR 783.12; R645-301-521.

Analysis:

The area pertaining to this amendment application includes the areas in longwall Panels 3LPE and 4LPE that were previously omitted from the Pines Tract Lease. Other areas on the north end of Panels 3LPE, 4 LPE and 5 LPE will be deleted from the mine plan, because an ancient stream channel eroded the coal in that area leaving a sandstone replacement (sand channel). The panels will be shortened on the north to avoid mining the sand channel. The applicant has submitted a copy of the Approval letter from the BLM, dated July 31, 2003, for the

Minor Modification to the R2P2. The letter describes the changes in coal reserves as a result of deleting the "sand channel area" in Panels 3LPE and 4LPE and adding the East Fork of Box Canyon coal blocks. CFC also included the Documentation of Land use Plan Conformance and NEPA Adequacy (DNA) prepared by the BLM, which includes a map showing the location of the sand channel and its relationship to the longwall panels, stream and lease boundary.

Findings:

Information provided in the application is considered adequate to meet the minimum Permit Area section of the Environmental Resource Information regulations.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.12; R645-301-411.

Analysis:

The current mining and reclamation plan contains confidential reports on cultural resources. Dr. FR Hauck et. al., of Archeological-Environmental Research Corporation (AERC) conducted the 1980, 1981, 1996, 1997 (a and b), 1999 Cultural Evaluations for the Southern Utah Fuel Company Coal Mine in Sevier County, Utah. The 1997 evaluation *Cultural Resource Evaluation Of A Potential Mining Subsidence Zone In The Pines Locality Sevier And Emery Counties, Utah* evaluates the Elusive Peacock. Scott Billat of Earth Touch (Layton, Utah) has conducted more recent monitoring of the Elusive Peacock (Mike Davis, personal contact, 9/9/03). Mr. Billat submits reports to the Permittee and USFS. DOGM does not have Mr. Billat's reported results at this time

Dr. Hauck (AERC) conducted the November 1997 Cultural Resource Evaluation of a Potential Mining Subsidence Zone in the Pines Locality Sevier and Emery Counties, Utah. This survey addressed the possible disruption to sites because of subsidence near Box canyon in the Pines, Wildcat Knolls, and Link Canyon. The surveyor identified twelve new cultural resource sites. Six are non-significant, two are undetermined, and four are significant resources having potential for nomination to the National Register of Historic Places. One of the four is the Elusive Peacock Shelter (site 42SV 2430; AERC 158200).

The Elusive Peacock Shelter consists of a rock shelter that measures 15 meters deep by 30 meters wide. This shelter rest partially on top of a large, wet rock cavern that is not eligible through NRHP. The large cavern contains springs seeping from the cave's walls. The majority of the shelter is intact and may contain a depth of 50 to 150cm. The floor of the shelter also partially serves as the roof of the large cavern. The shelter contains lithics, fire-cracked rock, bone, and possible hearth remains.

This site may contain buried features and occupational surfaces that have retained their integrity. It is a significant resource and is determined as eligible for inclusion on the National Register relative to criterion as defined in 36 CFR 60.6 (FEIS, Pines Tract Project, pg 3-153). This site is located in the potential subsidence zone and is susceptible to adverse affects due to subsidence and other disruptive effects associated with underground mining activities in the area. AERC (1997) considers that the shelter would collapse to the large cavern below, which would destroy any possible deposits or artifacts.

Agapito Associates, Inc. evaluated the possible degree of impact of subsidence on the Elusive Peacock (1998; FEIS, pg 3-160). Agapito assigned the Elusive Peacock as a Level III for possible effects. Level III addresses cultural resource sites that are located on cliff edges, overhangs, or canyon edges. At Level III, subsidence and compression are present with compressional strains possibly causing some buckling and/or movement of the rock. At Level III, it is possible that cracking could cause block failure at sites located near cliff faces or escarpments resulting in potential adverse effect to cultural resources.

The MRP (pg. 4-9) references the MOA (00-MU-11041000-017) for information concerning the specifics of cultural resources in relation to subsidence monitoring, possible subsidence impacts, and mitigation. The MOA is between the USDA-Manti-La Sal National Forest, USHPO, DOGM, and CFC. In brief, the MOA covers the monitoring and mitigation plans of the cultural resource sites. The Permittee has every intention to follow all requirements set by the MOA.

The Division developed a monitoring/mitigation plan that covers hydrology, biology, and cultural resources (September 2003). The plan for cultural resources follows the MOA. The Permittee incorporated the MOA as part of the MRP (Appendix 4-5). The text below provides the details of the DOGM cultural monitoring and mitigation plan.

Cultural Resource Monitoring Plan for Mining Under Panels 3Left, 4Left in the East Fork of Box Canyon (September 30, 2003)
Monitoring Plan: (MOA 00-MU-11041000-017; MRP pgs 4-9 to 4-10)
Amend MRP to reflect the implementation of Monitoring Plan in respect to the NRHP eligible - Elusive Peacock. Provide two copies of an Executive Summary of monitoring results. Include one copy in DOGM Annual Reports (2003, 2004, 2005, 2006, and indefinitely until movement ceases). The Division will provide the second copy to the Manti-La Sal National Forest.

Monitoring Plan: (paraphrased from MOA 00-MU-11041000-017 pg 12; refer to MOA for the explicit schedule)

- One time event: The Permittee will provide baseline conditions six months prior to the period of mining.

- One time per month: The Permittee will monitor one time per month within six months following the onset of active subsidence. (1-6 mos)
- Quarterly: The Permittee will monitor one time every three months for six months following the completion of the one time per month schedule. (6-12 mos)
- Yearly1: The Permittee will monitor yearly for two years following the completion of the quarterly schedule. (12 - 36 mos)
- Yearly2: The Permittee will monitor yearly for additional years following the completion of the yearly1 schedule if monitoring indicates further movement of the ground surface. (36 mos – indefinite amount of time)

Note, sites listed under the Monitoring Schedule B are the following:

- 42SV2492/ML-3582 No name Prehistoric Rockshelter
- 42SV2433/ML-3449 Big Mac Prehistoric Rockshelter
- 42SV2434/ML-3450 Little Mac Prehistoric Rockshelter
- 42SV2341/ML-3335 No name Prehistoric Rockshelter.

Brief information on the other confidential reports in the current mining and reclamation plan includes the following:

- 1980: Dr. FR Hauck (AERC) conducted the Intensive Archeological Surface Evaluation and Sample Survey of the Southern Utah Fuel Company Coal Mine in Sevier County, Utah. This survey addressed the possible disruption to nine sites and one monument because of subsidence. AERC states, "should subsidence occur in the future, only marginal or no disruption of these sites is anticipated. Dr. Hauck (1980), states that none of the ten surveyed are eligible for nomination to the National Register of Historic Places.
- 1981: AERC conducted a supplementary survey and observed three new sites. None of these sites is eligible for nomination to the National Register of Historic Places.
- 1997: AERC conducted the Cultural Resource Evaluation of a Potential Breakout Substation and Powerlines in the Link Canyon Locality of Sevier Utah. This survey resulted in no historic or cultural loci in the area.
- 1999: AERC conducted the Cultural Resource Evaluation of a Proposed Mine Breakout Location and a Lease Modification Tract in the Box Canyon Locality of Sevier County, Utah. The surveyor observed four new sites. Two sites are significant rock shelters, one is a significant ceramic scatter, and one site is a non-significant kill-butchering locus. Of the three significant sites, one (42SV 2492) is susceptible to disruption through subsidence. AERC recommends project clearance. The surveyor provides recommendations.
- 1996: AERC conducted the Cultural Resource Evaluation of a Potential Mining Subsidence Zone in the Box Canyon Locality of Sevier County, Utah. The surveyor observed four new sites. The surveyor evaluated the Crazy Bird Shelter and two other previously recorded

significant resource sites. AERC identified ten new sites. Some of these sites are potentially significant and susceptible to subsidence. The surveyor provides recommendations.

The current mining and reclamation plan indicates the permit area contains no cemeteries, public parks, or units of the National System of Trails or the Wild and Scenic Rivers System, and none are identified in the application. Therefore, it can be assumed none are in the proposed addition to the permit area.

Findings:

Information provided in the application is considered adequate to meet the minimum Historic and Archeological Resource Information section of the Environmental Resource Information regulations.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

Climatological information is provided in Chapter 7, page 7-23. Data has been collected at the mine surface facilities since July 1996. Normal annual precipitation at the mine is about 18 inches per year. There is not a precipitation or temperature monitoring station in the Pines Tract area. The applicant makes a commitment in Chapter 7 to install a rain and temperature monitoring station in the East Fork of Box Canyon, as soon as a use permit can be permitted by the U.S. Forest Service. Data from the weather station will be used in combination with water monitoring station data to aid in determining what , if any, impacts have occurred to surface runoff, stream flows and local spring flow as a result of mining activities.

Findings:

Information provided in the application is considered adequate to meet the minimum Climatological Resource Information section of the Environmental Resource Information regulations.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.19; R645-301-320.

Analysis:

The Pines Tract portion of Plate 3-1 has vegetation-mapping information directly from the Environmental Impact Statement. The vegetation community classification scheme is different in the Pines Tract compared to the rest of the permit area, and boundary lines do not match between the Pines Tract and Quitchupah areas. The map shows the sources for the two different sets of information.

Appendix 3-9 (Dr. Patrick Collins) provides qualitative surveys and research of the Pines Tract Project. Similarly, the 2000 Annual Report (Keith Zobell) provides an additional qualitative survey that focuses on riparian areas of Link Canyon, Box Canyon, and East Fork of Box Canyon. The current MRP, however, does not contain quantitative vegetation information for the East Fork of Box Canyon. The Permittee agrees to conduct a quantitative vegetation survey of the East Fork (pg. 3-22B-C). The survey will also include monitoring for erosion on the banks and hillsides of the stream channel and spring area. The consultant (Dr. Collins) agrees to follow the USFS and D.L. Rosgen stream channel survey protocol (personal contact; September 22, 2003).

The Permittee must follow DOGM's biology-monitoring plan submitted to the Permittee in September 2003. The Permittee agrees to incorporate all points of the DOGM monitoring plan into the MRP (Mike Davis; September 30, 2003). DOGM's plan includes obtaining baseline data of vegetation and macroinvertibrate from Joe's Mill Pond to 3LPE prior to undermining the area. The text below provides the details of the DOGM monitoring plan. *The mine operator will implement, if necessary, a revegetation/mitigation plan as determined by DOGM in consultation with the USFS.*

Biology Monitoring Plan for Mining Under Panels 3Left, 4Left in the East Fork of Box Canyon (September 30, 2003)

Qualitative Evaluation: Video tape starting from Joe's Mill Pond to 3LPE prior to undermining the area. (Four points to address). Qualified botanist must participate in the taping of the channel video.

- Identify major representative plant species along the stream channel and riparian and spring areas (5 springs: 2 have two separate discharge sites that merge into a single channel leading towards the stream).
- Identify hanging gardens.
- Video tape or mention all animal species present:
  - Capture, on video, macroinvertibrate presence by turning over rocks at water monitoring stations along the stream channel and riparian and spring areas.

- Capture, on video, other animal species along the stream channel and riparian and spring areas.

- Video tape same areas at same time of year on the third year following undermining (~Fall 2006).

Quantitative Evaluation: Follow basics of the Division's Guidelines. A qualified botanist must survey the stream channel and associated spring areas starting from Joe's Mill Pond to 3LPE. A qualified biologist must survey the baseline for macroinvertibrate along the stream channel.

Stream channel and spring geomorphology and vegetation:

- Stream channel geomorphology – at a minimum define:
  - Geologic/surface substrate of stream bottom.
  - Width of stream channel at water-monitoring locations.
- Spring and surrounding area geomorphology – at a minimum define:
  - Geologic/surface substrate of spring area where the water discharges.
  - Geologic/surface substrate of the spring *tributary* where water converges from the discharge site(s) and forms a *tributary* of the East Fork stream.
  - Width of the spring *tributary* at the location where the consultant surveys vegetation.
- Stream channel and spring vegetation communities – at a minimum:
  - Survey all stream and spring monitoring locations.
  - Define vegetation communities at all monitoring locations.
  - Inventory map of vegetation communities at all monitoring locations.
- Stream channel and spring area threatened, endangered, candidate, and sensitive species. Survey all TEC and Sensitive species including the Link Canyon Columbine. Provide population location and individual numbers for each population.
- Stream channel and spring area vegetation community condition – at a minimum:
  - Describe condition at the meadow near Joe's Mill Pond.
  - Describe condition along steam bank. Concentrate observations at all monitoring locations.
  - Describe condition at all spring locations. Concentrate observations at all monitoring locations as well as discharge sites if different from monitoring locations.
  - Provide photographs of communities along stream channel, on hillsides flanking the steam channel, and at spring locations. Take photographs at established photo points.
  - Describe effects of erosion along stream channel, on hillsides flanking the steam channel, and at spring locations. Numerically rate erosion effects. For example, 1=extreme erosion, 2=high erosion, 3=moderate erosion, 4=slight erosion, 5=no erosion.

- Repeat vegetation community condition observations two times a year (beginning and end of growing seasons) for the first three years and the fifth year following undermining. Refer to schedule below.

- Submit survey reports to DOGM in Annual Reports and to Manti-La Sal National Forest Service.
  - Baseline data prior to undermining: 2003 report in the 2004 Annual Report.
  - 1st year data following undermining: 2004 report in the 2005 Annual Report.
  - 2nd year data following undermining: 2005 report in the 2006 Annual Report. Conduct survey and submit report adhering to the *stream channel and spring area vegetation community condition* requirements, **only**.
  - 3rd year data following undermining: 2006 report in the 2007 Annual Report.
  - 5th year data following undermining: 2008 report in the 2009 Annual Report.

Stream channel and spring infrared vegetation maps:

- Stream channel and spring area low level, colored infrared maps for the baseline year (2003) and fifth year (2008) following undermining.
- Submit survey report and maps to DOGM in Annual Reports (2004 and 2009) and to Manti-La Sal National Forest Service.

Stream channel macroinvertibrate:

- Stream channel macroinvertibrate. The survey must include – at a minimum:
  - EFB4 and EFB11 monitoring sites.
  - Organism species and number (#/m^2).
  - Contractor must consult with DOGM for approved survey protocol.
- Submit survey reports to DOGM in Annual Reports and to Manti-La Sal National Forest Service.
  - Baseline data prior to undermining: 2003 report in the 2004 Annual Report.
  - 1st year data following undermining: 2004 report in the 2005 Annual Report.
  - 2nd year data following undermining: 2005 report in the 2006 Annual Report.

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

The areas of concern for the biology section of this amendment are primarily in the riparian area of East Fork of Box Canyon, mixed and sagebrush communities on the slopes, and rock outcrops. Plate 3-1 shows the riparian and associated communities along the East Fork of Box Canyon Creek. The upper part of the streambed is in the more ridged Castle Gate formation while the lower portion is in the more elastic Black Hawk formation. The "headwaters" of the East Fork is Joe's Mill Pond. From Joe's Mill Pond through the end of the Castle Gate formation, the stream channel in the Castle Gate formation is approximately 4500 feet long. From the end of the Castle Gate formation through the end of the Black Hawk formation at the permit boundary, the stream channel in the Black Hawk formation is approximately 2000 feet long. The Permittee plans to undermine the stream channel, which 69% is in the more rigid Castle Gate formation.

The total area of the Pines Tract project is approximately 7,200 acres. The acreage of the riparian areas for Box Canyon, Muddy Creek, and Link Canyon in the Pines Tract is 1% of the total acreage. Subsidence will occur because of mining operations near and under the stream channel of the East Fork of Box Canyon. The Division predicts that most of the subsidence will occur in the more ridged Castle Gate formation. The Division predicts no overall loss of riparian habitat because of the following points:

- The Permittee will immediately seal cracks that develop in the stream channel with bentonite.
- In the unlikely event that a crack may cause a springs to dry up, the water from that spring will likely emerge as a new spring in a different spot along the stream channel.

The Division cautions that subsidence could cause a loss of riparian habitat in the unlikely event that a crack causes a spring to dry up and water emerges in an already existing spring. If this unlikely loss or any other unforeseen loss to the overall riparian habitat within the East Fork channel occurs, the Permittee will implement, if necessary, a revegetation/enhancement plan as determined by DOGM in consultation with the USFS. The Permittee agrees to this requirement in the MRP (pg. 3-22C). The Division wants to make it clear that the Division will consult with different agencies, including USFS, to design a mitigation plan. The Permittee will implement the mitigation plan.

The Forest Service commented that the applicant should monitor hanging garden communities in Box Canyon. The applicant is monitoring Link Trail columbines and other vegetation in the main fork of Box Canyon using photo points. Annual Reports include the results of these surveys.

During field visits in the summer of 2003, the Division made the following observations:

- Main Fork of Box Canyon: (August 21, 2003)
    - There are significant amounts of subsidence cracks on the bluff portion of the Pines Tract.

  - There are subsidence cracks in the rock outcrops flanking the stream channel where the Permittee was allowed to undermine.
  - Some holes in the stream channel bedrock of the stream channel were full, while neighboring holes were empty.

- East Fork of Box Canyon: (September 4, 2003 and September 22, 2003)
  - September 4: Flowing water was present along the entire reach of the stream channel starting from the confluence of the Joe's Mill Pond and the right fork to the saw mill.
  - September 22: Flowing water was present at Joe's Pond, EFB4 monitoring site, and then continuing at EFB6 monitoring site for remaining of the stream channel.
  - There were areas along the stream channel where the steep banks were seeping water from the colluvium. The Division noted seeping for EFB4, EFB5, EFB9, and EFB10. However, other sites along the stream channel were seeping.
  - Riparian species were present in many areas along the upper reach of East Fork, which indicates water is available throughout the summer. (See Appendix Pics. Upper Reach). These species include: carex, red top, horsetail, rush, willow, potentilla, moss, algae, false Solomon seal, violet, geranium, lichen, fern, penstemon, river birch.
  - Moderate sized pools were present especially in the lower portion of the stream channel (See Appendix Pic. Pools). The largest pool was at EFB11.
  - Upper stream channel has sandy-silt and bedrock areas lining the bottom (See Appendix Pic. Sandy-silt).
  - Lower stream channel has many areas of exposed bedrock lining the bottom (See Appendix Pic. Bedrock). There are also areas of sandy-silt composition that is apparently transient in nature.
  - EFB8 and spring 217 is in the Castle Gate formation supports a diverse community including many of the riparian species.
  - EFB11 and spring 214 supports many of the riparian species, but also present are orchid and columbine.
  - Spring 214 discharges at the Elusive Peacock and enters the stream channel in the Black Hawk formation. This area of the channel was flowing at three gallons/minute (last monitoring event; Mike Davis, personal contact 9/4/03; See Appendix Pic. Spring 214).
  - There are fewer hanging gardens along the stream channel than along the Main Fork.
  - Trees and shrubs lined the slopes except where erosion was present.
  - Tree species include spruce, aspen, white fir, and ponderosa.
  - Shrubs species include dogbane, manzanita, cinquefoil, rose, juniper, serviceberry, redosier dogwood, snakeweed, sagebrush, potentilla, snowberry.
  - Macroinvertibrate species were present on overturned rocks, especially at EFB4. Video taken by the Permittee on 9/22-03 clearly shows this feature. Chris Hansen stated that macroinvertibrates are usually not present in areas that have sandy-silt

bottoms. He reasoned that these organisms drown in sandy-silt. Craig Walker (DWR; September 29, 2003) stated that many of the macroinvertibrates are not in the adult stage at this time of year.

- Riparian area supported bird species including: scrub jay, Clark's nutcracker, black-capped chickadee, Townsend's solitaire, nuthatch and other unidentified songbirds.
- Sightings of bear (scat and tree scratchings) and bobcat were present.
- Some areas of the eastern slope are eroding. Source is unknown.
- Soils of areas of the eastern slope were loose and unconsolidated.
- Single sage grouse hen was sited on the Plateau area above Box Canyon.

By lease stipulation, the applicant is required to monitor the effects of underground mining on vegetation. The MRP provides a plan to conduct this monitoring with color infrared photography every five years. Color infrared photography can detect water stress, so it is appropriate for monitoring potential effects of mining on riparian vegetation. Photographs last taken were in 1999. Results of this and previous CIR photographs are at the mine offices in the survey department (John Black, chief surveyor). The next CIR photograph event will take place during the growing season of 2003 (Mike Davis; September 29, 2003). This photography event will include the East Fork of Box Canyon. The Permittee will flyover in another five years (2008) to take the next low-elevation infrared photographs. The Permittee will include the 2003 and 2008 CIR photos in DOGM's Annual Report as stated in the monitoring plan (September 2003).

Link Canyon also contains some segments of riparian and/or wetland vegetation, particularly below the Link Canyon Mine portals. This and other riparian areas are shown on Plate 3-1.

Findings:

Information provided in the application is considered adequate to meet the minimum Vegetation Resource Information section of the Environmental Resource Information regulations.

The Permittee must follow DOGM's biology-monitoring plan submitted to the Permittee in September 2003. The Permittee agrees to incorporate all points of the DOGM monitoring plan into the MRP (Mike Davis; September 30, 2003). DOGM's plan includes obtaining baseline data of vegetation and macroinvertibrate from Joe's Mill Pond to 3LPE prior to undermining the area.

If the unlikely loss to the overall riparian habitat within the East Fork channel occurs, the Permittee will implement, if necessary, a revegetation/enhancement plan as determined by DOGM in consultation with the USFS. The Permittee agrees to this requirement in the MRP

(pg. 3-22C). The Division wants to make it clear that the Division will consult with different agencies, including USFS, to design a mitigation plan. The Permittee will implement the mitigation plan.

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.21; R645-301-322.

Analysis:

Wildlife Information

The riparian areas of the Pines Tract lease area support about 80 species of mammals, 130 species of birds, 8 amphibians, and 17 reptiles (Appendix 3-9). The amphibians used the area for breeding and developing stages. The reptiles use the area to maintain egg moisture during incubation. The Permittee has not conducted an official macroinvertibrate survey. The Permittee agrees to conduct a macroinvertibrate survey for the East Fork of Box Canyon. The survey will include organisms identified to the species level and organism count. The survey sites must at least include monitoring stations EFB4 and EFB11. The qualified wildlife contractor must consult with the Division before conducting the survey.

Plate 3-2 shows elk ranges, and Plate 3-3 shows deer ranges and raptor nests. All of the proposed area contains critical elk winter range and high priority deer winter range. LeRoy Mead of DWR stated (email 9/10/03) that the Pines Tract area is actually critical for elk during late fall, winter, early spring months on mild years when snow pack is light. Furthermore, that any disturbance during these months may cause the elk to drop down into the valley where they wreak depredation havoc on private property. The winter range exclusion dates are November 1 - May 15. The MRP provides similar exclusion dates for the Link Canyon Substation area (pg. 3-43). The Permittee agrees to obtain entry clearance from DOGM if mitigation for East Fork is necessary during this critical time (pg. 3-22D). Prior to clearance, DOGM will consult with DWR for entry approval for elk and deer.

Elk and deer calving areas are usually at higher elevations than the Pines Tract, therefore, mining operations should not effect the fawning season.

The East Fork does not have long expanses of high rock outcroppings as does the Main Fork of Box Canyon. However, there may be animal species that inhabit the rock outcroppings in the East Fork. These species may include raptors, spotted bats, cougars, bobcats, bears, and snowshoe hare.

Threatened and Endangered Species

Appendix 3-9 is a report on the vegetation and wildlife of the Pines Tract area, and it discusses threatened, endangered, and sensitive species that might be in the area. Table 1 lists eight TE plant species. All but one of the listed plants grow at elevations lower than the mine. These species are desert plants, adapted to soils from geologic formations not found within the Pines Tract area. The only high elevation species is Heliotrope milkvetch (*Astragalus montii*), which is known only from Flagstaff limestone at elevations of 10,990 to 11,320 feet on the Wasatch Plateau. Flagstaff limestone does not outcrop in the current permit area or in the proposed addition, and the highest elevation in the mine area is about 9,160 feet on Duncan Mountain, well below the reported lower elevation limit for this species.

Table 2 of the report in Appendix 3-9 lists seven sensitive plant species investigated for the EIS. Of these, only one, the Link Trail columbine (*Aquilegia flavescens* Var. *rubicunda*), occurs in the area. Two other species, the Arizona willow (*Salix arizonica*) and canyon sweetvetch (*Hedysarum occidentale* Var. *canone*) have potential habitat in the permit area.

Surveyors observed the Link Trail columbine in both the Main and East forks of Box Canyon. This species typically grows in relatively wet areas, but also grows in areas with no obvious subsurface water source. Loss of water is the most likely adverse impact to the Link Trail columbine. The Permittee is monitoring some of the populations in the Main fork of Box Canyon for possible effects caused by mining, but not the East Fork. The Permittee must survey for the Link Canyon columbine in the East Fork of Box Canyon. The Permittee agrees to survey for this and all other TES and C species with possible habitat in the area (pg. 3-22C).

Table 3 in Appendix 3-9 lists ten threatened, endangered, and candidate wildlife species with a likelihood to occur in the Pines Tract area. The EIS for the Pines Tract area lists these same ten species. The peregrine falcon is likely to inhabit the East Fork area.

Muddy Creek and the lower portion of Box Canyon Creek support fish populations. Through water depletions, the mine could potentially adversely affect the four endangered Colorado River fish species, but the undermining of the 3 and 4 Left panels are not expected to increase water consumption.

Surveyors have observed nesting Peregrine falcons within about one-half mile of the Pines Tract Lease area. Peregrine falcons are no longer listed as threatened or endangered, however they are still protected

Bald eagles could occasionally pass through or roost in the area, but the mine is unlikely to have negative effects.

According to the EIS, the willow flycatcher has recently been found on the Wasatch Plateau north of the mine area, but it is not know if this was the southwestern willow flycatcher subspecies. The Forest Service reviewed habitats in the project area for the EIS and determined that "...while some habitat does exist in the area, this habitat is not suitable as willow flycatcher nesting habitat."

The lower portion of East Fork is within the 0.5 mi. buffer zone for Golden Eagle nests: 812, 323, 813, and 1235. The 2002 Annual Report presents the data for the 2002 raptor flyover survey. The results for the nearby nests are: 812 not found, 323 inactive, 813 inactive, and 1235 inactive. The applicant commits in the MRP to monitor any area with suitable habitat where known or new raptor nests could be adversely affected by mining. The Permittee will fulfill this commitment with annual helicopter over flight surveys at the end of May. It is unlikely that the mining in the northern reaches of the 3 and 4 Left panels will impact these nests located across the confluence of Box canyon.

Arizona Biological Surveys (Lynn and Phil Jensen) conducted the 2003 Mexican Spotted Owl survey of the Muddy Creek area that included the East Fork of Box Canyon. The results were negative on owl responses even though potential habitat exits in the Pines Tract Lease area. Their survey showed positive responses from great horned owl and northern saw-whet owl. The Permittee has conducted the required two years of surveys. The Permittee does not have to address or implement special conditions relating to the MSO at this time.

Table 4 of Appendix 3-9 lists the following six USFS Region 4 sensitive species: Townsend's big-eared bat, spotted bat, northern goshawk, northern three-toed woodpecker, flammulated owl, and spotted frog in the area. Three-toed woodpeckers, goshawks, and flammulated owls use Ponderosa pines and other tree species for roosting and nesting in and near the area. It is unlikely, however, that underground mining will effect these trees. The EIS concluded that individuals of these roosting species could possibly be affected, but no significant effects to the populations or to the species.

The Pines Tract contains potential habitat for flammulated owls.

The MRP states that the Western Bluebird is classified as a Utah sensitive species. The Division observed this bird during the two field visits in 2003. There were at least five separate sightings within the sagebrush plateau of the Pines Tract area. The DWR lists the sage grouse as a State and BLM sensitive species (personal contact 9/11/03, UNHP). Appendix 3-9 describes the local history of the sage grouse. The MRP lists this species as a sensitive species (pg. 3-27).

Findings:

Information provided in the application is considered adequate to meet the minimum Fish and Wildlife Resource Information section of the Environmental Resource Information regulations.

LAND-USE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.22; R645-301-411.

Analysis:

Plate 4-1 shows land uses in the area. The land surface is managed by the Forest Service for multiple uses, including, timber, grazing, wildlife, and mining. The Pines grazing unit supports 1387 head of cattle during the early grazing season. The area contains eight livestock and wildlife water stock ponds. The Link Canyon trough and Joe's Mill ponds are the most reliable sources of developed water within the tract area.

The stream in the East Fork of Box Canyon does not support a fishery. Muddy Creek and the lower portion of Box Canyon supports fish populations.

Findings:

Information provided in the application is considered adequate to meet the minimum Land-use Resource Information section of the Environmental Resource Information regulations.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

The Blackhawk Formation contains interbedded layers of sandstones, siltstones, shales, mudstones and coal, Figure 3 and 4. Figure 4 shows there is about 600 feet of overlying Blackhawk strata where the stream channel crosses the western edge of 3Left Panel where the gate road is located. The overburden thickness of the Blackhawk Formation increases to the southwest and reaches a thickness of approximately 800 feet near the eastern edge of the 3 Left longwall panel, where the stream channel crosses the gateroads. It is believed that tensel cracking will take place over the gateroads. It is expected that the ridged Castlegate Sandstone will show more of the cracking than the Blackhawk Formation. That is because the Blackhawk

Formation contains layers of siltstones, ckays and mudstones that make it more elastic and more likely to bend in response to subsidence.

The Castlegate Sandstone is considered a perched aquifer in the vicinity of the East Fork of Box Canyon, because it supplies a source of water for an intended use. The flows produce by the Castlegate Sandstone is relatively low when compared to other aquifers. The reason is because there are several units of very fine sands making up the formation. The sand sizes and cementing of the sand grains prevent high conductivity of flow. The Castlegate Sandstone is highly fractured at the surface by a compound joint system. The fracturing probably helps transmit surface flows into the formation.

The Castlegate Sandstone weathers and produces a sandy soil that builds up on the surface in many areas. It is easily eroded and washes into the channels during rainstorms.

There will be a change in coal resource production as a result of changes by deleting areas where the sand channel cuts through coal reserves and by adding reserves under Panels 3LPE and 4LPE. Information was supplied from the R2P2 in the BLM's approval letter of August 12, 2003. CFC submitted coal information to describe the net balance of coal that will be mined with implementation of the amendment. The sand channel reduced the coal reserves that Sufco Mine planned to mine by approximately 1, 354,500 tons in Panels 3LPE and 4LPE. The coal reserves under Panels 3LPE and 4LPE are about 1,314,400 tons. The mine plan maximizes the amount of coal reserves to be mined. With the discovery of the sand channel a portion of Panel 3LPE would not be mined if the East Fork of Box Canyon blocks can not be mined, because the short panel section lies before the East Fork of Box Canyon area. Mining the block of coal will be uneconomical to mine if a longwall move is required around the East Fork of Box Canyon, resulting in a loss of mined coal of approximately 665,400 tons. Through controlled mining and mitigation an additional 2, 668,900 tons can be mined.

Findings:

Information provided in the application is considered adequate to meet the minimum Geological Resource Information section of the Environmental Resource Information regulations.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

The permittee has conducted surface and groundwater monitoring surveys via Mayo Associates and Peterson Hydrologic. Baseline hydrologic information is presented in Sections 7.2.4.1 and 7.2.4.2, and in the Probable Hydrologic Consequences Appendix 7-18.Water monitoring has been conducted on streams, springs, ponds and wells. The operator has submitted this data in the PHC and DOGM's Water Quality Database.

Baseline Information

Based on available scientific information and data collected by the permittee's consultants, the permittee has described the geologic and hydrologic setting on the Pines Tract Lease. Baseline information has been collected the identifies the premining conditions and characteristics of the site. Maps and cross-sections depict the geologic, hydrologic, mining and archeological resources. Literature and maps describe and identify the stratigraphy, formation thickness, structural geologic features, mined areas, proposed mined areas, archeological sites, and surface structures.

Baseline Cumulative Impact Area Information

The significant revision references the PHC included in the original MRP for a discussion of groundwater occurrence and recharge. There is general agreement among the studies and reports, that recharge to the Castlegate sandstone, which supplies the major portion or groundwater to the East Fork of Box Canyon, is principally by snowmelt and rainfall seepage into the outcropping soils and rock surfaces then into the to formation via surface percolation.

The Castlegate Sandstone is highly fractured by a set of joint systems. The fractures likely provide greater recharge to the formation by acting as conduits for percolating surface waters. Groundwater movement is controlled mainly by fractures, dip of the beds (dip is approximately 2 degrees to the northeast) and hydraulic conductivity of the Castlegate Sandstone. The Castlegate Sandstone overlies the Blackhawk Formation. Lithologic sections, extracted from drilling cores show the Blackhawk Formation consists of interbedded layers of sandstones, silts, shales and mudstones. The fine textures of the layers play an important role in preventing vertical migration of groundwater through the Blackhawk Formation.

A difference in transmissivities of the Castlegate Sandstone and the Blackhawk Formation form a perched aquifer at the contact zone. Small springs and seeps appear along the stream channel and on the slope of the canyon where the contact zone appears. The springs and seeps mostly appear on the east side of the canyon consistent with perched flows following the

dip of the beds. The movement of groundwater is regarded as relatively rapid as it seems to respond some to precipitation events

A journey down the East Fork of Box Canyon from Joe's Mill ponds reveals that the channel above the 4LPE panel contain sediments, consisting mostly of fine sand eroded from the Castlegate Sandstone and decayed vegetation matter. There are no clays to bind the sands and the only adhesion is attributed to vegetative matter. The soils are deeper in the upper reaches where the channel is wider. The upper reaches appear to be intermittent. The soils receive and retain runoff from precipitation events. The soils appear moist most of the time and support grasses, sedges and some shrubs, consistent with a meadow environment. When Division personnel visited the site in August 2003 the upper channel was not flowing, however one of the stock ponds contained some water from recent storm. Moving down the channel, soils become thinner and the canyon becomes narrower. In the lower levels of the Castlegate Sandstone a couple springs appear in the channel and riparian vegetation is observed, the channel receives flow near Spring 217. Flow from the spring was only about 1 to 2 gallons per minute and disappeared where soils filled the channel. The flows returned downstream where bedrock formed the base of the channel. The channel is perennial where it overlies the 3LPE panel. At this point the base of the channel is in the Blackhawk Formation. The Blackhawk Fm./Castlegate SS. contact lies just west of the east gateroad of panel 3LPE. There are no spring in the Blackhawk Formation in this section, Spring 214 flows down the slope (Blackhawk Fm.) from the contact.

Mayo and Associates have proposed a hydraulic disconnect between in-mine waters and near-surface groundwater. Mayo is considered a leading authority on isotopic dating of groundwater resources by some agencies and mining operators. Studies conducted by his firm have identified the groundwater regimes for several mining operations. Mayo and Associates contend the analysis of the groundwater for the Pines Tract Lease is substantiated by tritium analysis and carbon dating, which shows the mine waters to be very old (greater that 7,000 to 20,000 years) as compared to meteoric waters that replenish the near surface waters (MAYO and FEIS). "The cause of this disconnect is attributed to shales and mudstones in the Blackhawk Formation that hinder the downward migration of water" (FEIS). Mayo has concluded , "groundwater should not be diverted from the Castlegate Sandstone into the Blackhawk Formation" (FEIS).

Surface-water information.

Most areas in Utah have been subjected to drought conditions over the past 5 years. The area of the East Fork of Box Canyon has also received less precipitation than normal. In a normal year deeper snow pack stays on the ground longer into the spring and summer, providing a longer period or recharge to the streams and higher levels of storage to the Castlegate Sandstone formation. The required baseline flow conditions and trends have been established for the site.

Monitoring of the surface waters and springs in the Pines Tract area started to be collected in 1999, about the time the drought started.

Surface water sources are identified in the MRP. The sites shown on Figure 3-4 have been monitored since 1997. The permittee has mapped streams and springs on and adjacent to the proposed mining area. Sites 408 is located a the mouth East Fork of Quitchupah Creek and Site 106 is located about a third of the way down the channel above the eastern fork of the East Fork of Box Canyon. The two springs 214 in the channel of the East Fork of Box Canyon and 105 in the eastern fork of the East Fork of Box Canyon.

Most of the stream flow is attributed runoff from snowmelt or rain. Spring flow contributes the most to the baseflow of the streams in later summer and fall months. Streams appear to be unquestionably perennial below the confluence of the tributaries. There is good reason for the perennial flow at this point, groundwater flows from small springs just above the Blackhawk Formation. It appears that the lithologic layers of the Blackhawk Formation prevent downward movement of groundwater, thus creating perched zones where groundwater from the Castlegate Sandstone come to the surface and flow to the channel. The low flows that emanate from spring runoff in the upper reaches of the East Fork of Box Canyon indicate that those sections are intermittent. These areas have not been observed during normal (or average precipitation years, however it is believed that a greater snow depths would provide longer sustained yield of runoff to the channel, which in turn raise the water table level in the stream. The term perennial functioning has been used by the U.S. Forest Service to describe the upper reaches of the East Fork of Box Canyon.

Flow data for these springs is supplied in Appendix 7-19 of the PHC. The flows in the lower channel of the East Fork of Box Canyon at site 408 have been recorded as high as 40 gpm, it includes stream flow and spring baseflow. Site 106 showed greater flows in 1997 (20gpm), however the flows have not exceeded 5 gpm since June of 1998. Spring 241 seems to flow at 3gpm or less. Stream flows observed in this area are indicative of the weather. Rainfall and evaporation are reflected in the inconsistent flow values. Often the forth quarter flows are reported higher than the third quarter. This is because the temperatures are usually lower during the 4th quarter and less evaporation is taking place. Other spring that have been monitored for baseline include Sites 213, 215, 216, 217 and 103, these springs flow at low rates. All trends in flows have decreased since 1997 as a result of the drought.

The permittee has committed to mapping the perennial flows of the Box Canyon Creek in Main Fork, the East Fork of the Main Fork, East Fork and East Fork of the East Fork of Box Canyon. Plate 7-3 identifies the location of monitoring points. The flow data will be compared to local precipitation data to determine if mining impacts the flow in the stream channel.

Table 7-2 identifies the water monitoring program and frequency at which monitoring will take place.

Modeling

Using groundwater chemistry analysis, the recharge to the springs is believed to result primarily from flows in the Castlegate Sandstone as compared to the overlying Price River Formation. This appears to indicate that recharge to the springs in the Box Canyon tributaries is derived primarily from the area's 1,000 feet of the canyon rim (FEIS) and (MAYO). Theoretically, decreased stresses along the canyons allows movement of the blocks in the fractured Castlegate Sandstone to widen creating more storage and conductivity of groundwater. Using Plate 5-2c, the escarpment boundary was used to draw a line 1000 feet in from the canyon rim. This revealed the area of potential recharge. A second chemical analysis suggests that the recharge locations for groundwater in the Castlegate Sandstone are different from the groundwater in the Blackhawk Formation, or that the groundwater recharged under different climatic conditions.

Alternative water source information.

The permittee describes water resources and identifies the water rights in Appendix 7-1 and their locations on Plate 7-2.

Probable Hydrologic Consequences Determination

The probable hydrologic consequences are described in Appendix 7-18. There are two mechanisms where by ground and surface water can be adversely impacted, the direct interception of groundwater by opening mine workings and interception or rerouting of surface and groundwater by strata deformation.

Mayo addressed these issues on Pages 47 and 48, Appendix 7-18 he states that groundwater in the Blackhawk Formation is discontinuous and horizons of shales and mudstones and shales. Groundwater from three Blackhawk Formation springs (Pines 204, 206 and 303) were radiocarbon dated between 500 years to 4000 years. The ages of these waters are younger than the water encountered in the mine workings, which yield dates between 7500 years to 20,000 years.

As mining progresses toward this area more information pertaining to impacts can be obtained. By extrapolating new information to similar areas on the Pines Tract Lease operational and reclamation predictions can be made. Mining of the upper reach of the West Fork of Box Canyon has revealed how subsidence fractures have developed when mining panels parallel and directly under a canyon. Mapping, measuring and analyzing these fractures over time can provide information on fracture healing, shallow groundwater interception and the effects of subsidence on local vegetation.

Findings:

Information provided in the application is considered adequate to meet the minimum Hydrologic section requirements of the Operation Plan regulations. The Permittee, is required to fulfill obligations for mitigation monitoring as outlined in following sections.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Affected Area Boundary Maps

Several maps have been submitted, such as Plate 7-2, which show the topography, mine plan area, the proposed mine layout, structural features, hydrologic, archeological sites and wildlife habitat. Plate 5-10 identifies the extent of expected subsidence.

Coal Resource and Geologic Information Maps

The permittee provided maps and text (Chapter 6) identifying the geological resources, stratagraphic and structural features of the Pines Tract Lease area. The applicant has supplied sufficient information for coal resource changes by submitting the DNA drafted by the BLM along with the cover letter approving the R2P2, Mining Under 3rd and 4th Left Panels, In Federal Coal Lease UTU-76195, dated July 31, 2003 (fax).

Cultural Resource Maps

The Permittee has been asked to make changes to subsidence maps, removing cultural resources sites and submit a separate map of cultural resource map to be held in the Division's "Confidential" file. The applicant has submitted another Plate 5-10B to be placed in the MRP, while the confidential copy, Plate 5-10A, will be placed in the Division's confidential file.

Existing Structures and Facilities Maps

Several maps, including Plates 7-3 Hydrologic Monitoring, Plates 5-10A and B Potential Subsidence Limits depict the surface configuration of the Pines Tract Lease.

Existing Surface Configuration Maps

Several maps, including Plate 7-3, Hydrologic Monitoring, depict the surface configuration of the Pines Tract Lease

Mine Workings Maps

Plate 5-7, Upper Hiawatha Mine Plan, 5 Year Projection, has been revised to show the mining sequence in the Pines Tract Lease. Plate 5-7 shows that operations are already advancing according to previous approved plans incorporated into the MRP.

Monitoring and Sampling Location Maps

The permittee has supplied surface and groundwater monitoring location maps. Plate 7-3 identifies spring, stream and well monitoring locations. All monitoring sites are accompanied with an elevation. The applicant has also committed, in Chapter 7, to supply a Mitigation Monitoring Map identifying the location of sites established along the East Fork of Box Canyon during a pre-mining survey conducted on September 22 and 23, 2003. Twelve monitoring sites were selected along the length of the stream channel. The sites were established along the creek from Joe's Mill Ponds just up from the mouth of the canyon and 5 other site were established near springs emanating at the Blackhawk Formation/Castlegate Sandstone contact zone. A map will be submitted showing the locations of the stations, designated Figure 7-8 of the MRP. The sites are currently being surveyed for elevation, location, width, convergence, subsidence, flora species and flora, and fauna.

Permit Area Boundary Maps

Several maps have been submitted, such as Plate 7-2, that show the topography, mine plan area, the proposed mine layout, structural features, hydrologic, archeological sites and wildlife habitat. Plate 5-10 identifies the limits of subsidence on the Pines Tract Lease.

Surface Water Resource Maps

Surface and groundwater rights are identified on Plate 7-2. Water rights in the East Fork of Box Canyon have been have been allocated for stock watering during a 2 ½ month period, every other year and for culinary sources in Muddy Creek, which serve the town of Emery during the winter months.

The permittee provided a water monitoring stations map, Plate 7-3 in the MRP. All spring found during the baseline studies are presented on Plate 7-3. Additionally, all spring

identified in the USGS publication by Thiros and Cordy (1991) were included on the map and labeled with the prefix "GW-.

Vegetation Reference Area Maps

The reference areas are not shown on the vegetation map (Plate 3-1). The Permittee agrees to provide a vegetation map with the location and boundary of all reference areas (personal contact, 9/11). The Permittee will submit the revised vegetation map with the Link Canyon "as built". (R645-301-323.100).

The Permittee will provide a map in the MRP (Figure 7-8; pg. 7-51C) with the locations and elevations of the additional water monitoring stations in the East Fork of Box Canyon. The Permittee will submit the map once all monitoring stations have been established (September 2003). The Permittee will use these additional monitoring sites for water monitoring, biology survey sample points, and photo points. Refer to the DOGM mitigation plan submitted to the Permittee (September 2003) for details.

Findings:

Information provided in the application is considered adequate to meet the minimum Maps, Plans, and Cross Section Resource Information section of the Environmental Resource Information regulations.

However, the Permittee agrees to submit a revised vegetation map with the Link Canyon "as built" (fall 2003) showing locations and boundaries of all reference areas.

The Permittee also agrees to submit a map showing locations and elevations of the established monitoring stations (October 2003).

The Division agrees to move Plate 5-10A with archeological site to DOGM's confidential file in the PIC room.

OPERATION PLAN

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

Regulatory Reference: 30 CFR784.17; R645-301-411.

Analysis:

The Permittee clearly acknowledges the potential impacts to underground aquifers because of subsidence (MRP pg. 3-38). The MRP states that the mine company will "restore stream water resources in addition to previously identified spring which are contaminated, diminished, or interrupted as a result of the applicant's underground coal mining activities…" (pg. 3-40). To assist the mine with this commitment while mining the 3 and 4 Left panels, the Permittee will implement the Division's hydrology, biology, and cultural monitoring plans.

AERC (1997) identified twelve new cultural resource sites for the Pines Tract area. Six are non-significant, two are undetermined, and four are significant resources having potential for nomination to the National Register of Historic Places. One of the four is the Elusive Peacock Shelter (site 42SV 2430; AERC 158200). The Environmental Resource section of this TA discusses this shelter.

The MRP (pg. 4-9) references the MOA (00-MU-11041000-017) for information concerning the specifics of cultural resources in relation to subsidence monitoring, possible subsidence impacts, and mitigation. The Permittee has every intention to follow all requirements set by the MOA.

Findings:

Information provided in the application is considered adequate to meet the minimum Protection of Public Parks and Historic Places section of the Operation Plan regulations. The Permittee agrees to implement DOGM cultural monitoring plan (MOA Plan B; refer to Environmental Resources for details).

COAL RECOVERY

Regulatory Reference: 30 CFR 817.59; R645-301-522.

Analysis:

The Applicant proposes changes to the mine plan resulting in a change in the volume of coal mined. The volumes have been calculated by the BLM in incorporated into the revised R2P2. The applicant has submitted the new volume information for mining Panels 3LPE and 4LPE in Appendix 1-2.

Findings:

Information provided in the application is considered adequate to meet the minimum Coal Recovery section of the Operation Plan regulations.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey

The submittal proposes no changes to the currently approved renewable resources survey section of the mining and reclamation plan.

Subsidence Control Plan

The permittee plans to develop and extract the federal coal reserves associated with the Pines Tract lease, UTU-76195 including the approximate 1.3 million tons in the blocks under the East Fork of Box Canyon. The long wall panels that will undermine the East Fork of Box Canyon are designated 3LPE and 4LPE, or the 3-Left and 4-Left panels off of the Pines East main entries. To better correlate the area being mined for a surface reference, the 3LPE and 4LPE panels are directly north of the old Link Canyon Mine, located south and west of the town of Emery, Utah.

The currently approved mining and reclamation plan addresses the subsidence control plan in Chapter 5, section 5.2.5.1, page 5-23. The submittal received August 6, 2003 in the PFO includes revisions to pages 5-26, 5-27, and 5-39 of Chapter 5, Volume 1.

The revisions made on pages 5-26 and 5-27 are relative to the approved methods for Subsidence Control Measures.

The revision to page 5-26 proposes the changes to verbiage stating; "where perennial streams are not undermined they will be protected from subsidence by establishing stream buffer corridors within the mine from which only limited coal recovery will occur. "Entries that cross through the underground stream buffer corridors with less than (the proposal is to change this depth from 600 to 300 feet) 300 feet of cover will be sealed and/or backfilled upon abandonment using the best available technology to prevent disturbance of the overlying streams."

The proposed revision to page 5-27 merely adds the words "and streams" to the text describing the surface structures overlying the area to be subsided. The structures referenced include trails, unimproved dirt roads, fences, and runoff catchment ponds.

A revision to the *Anticipated Effects of Mining,* as required by the minimum regulatory requirements, is being proposed through the addition of a paragraph under that section on page 5-39. The additional text states "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. The MRP predicts that surface cracks will likely develop across the East Fork Box Canyon Creek directly above the long wall panels and along the gate roads. These crack zones will form shortly after undermining of the streambed. 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."

Appendix 7-19 is included as part of the submittal and identifies the probable hydrologic consequences (of the effects) of longwall mining of the 3 Left and 4 Left Panel Modification Area at the Sufco Mine. The document was prepared by Mr. Eric Petersen, P.G. of Petersen Hydrologic.

Chapter **6.0, PROBABLE IMPACTS TO THE HYDROLOGIC BALANCE, Fracturing of the Stream Substrate**, pages 17 through 19 indicate 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)."

Additional information is provided which states that the cracks only develop in the stream substrate to depths of not more than a few tenths of feet ("dead end" fractures).

The closing paragraph of the Fracturing of the Stream Substrate section concludes that the "tension fractures that form in the Creek bottom will not significantly alter the hydrologic balance of East Fork by diverting surface waters into the subsurface. There may be some short-term diminution in flow as fractures fill with water, sediment and clays; however, this is not expected to be a major impact because of the localized areas where tension fractures may occur".

The permittee's currently approved subsidence control plan has established the following control points on the surface overlying the 3rd Left, Pines East longwall extraction panel (See PLATES 5-10A and 5-10B). These are as follows:

1) The control point designated as "Paintbrush" at surface elevation 8420.74;
2) The control point designated as "Meatloaf" at surface elevation 8479.53;
3) The control point designated as "Jasen's Nest" at surface elevation 8554.30;
4) The control point designated as "Prairie View" at surface elevation 8451.01.

Refer to **TABLE 5-2**, Chapter 5, pages 5-31 through 5-38A of the approved mining and reclamation plan for locations and elevations of all permit area subsidence monitoring points.

"Paintbrush" is the closest control point to the East Fork of Box Canyon, being located on the SW side of the Canyon.

Two aerial mapping targets also exist in close proximity to 3LPE, being designated as Numbers 73 and 79. These both exist over the 2LPE gate road entries.

Approximately seven hundred feet of the 3LPE panel will be extracted before mining contacts the block under the East Fork. Based on general history of subsidence at the Sufco Mine, subsidence ranges from four (See Chapter 5, Volume 1, page 5-22, section 5.2.5 Subsidence of the approved MRP) to a maximum of seven feet (See Sufco Mine 2002 Annual Report/Subsidence Report, page 6, Area 10), with the extraction of 8.5 to 13.5 feet of coal seam.

As part of the subsidence monitoring program the Permittee supplied the Division with subsidence maps that show the areas that will be subsided, the projected amount of subsidence and areas of special interest. Some areas of special interest include archaeological sites. Because the MRP is a public document, the public will have access to maps showing the location of archaeological sites. In order to protect the archaeological site, their location must be shown only on confidential maps. The Permittee has submitted two subsidence maps, one without the archaeological sites, Plate 5-10A and one without archaeological sites, Plate 5-10B. Plate5-10A will be placed in the confidential file.

Based on information presented by the applicant, and observations conducted in adjacent mining sections the Division expects subsidence to occur, which will lower the areas between the panels and cause fracturing along the gateroads. It is expected that subsidence fractures will occur parallel to the panels in 3 LPE and 4LPE along the edges of the gateroads. It is expected that tension fracturing will be similar to the fractures in the upper reaches of the Main Fork of Box Canyon. Those fractures range from approximately one eighth of an inch to over 4 inches. A survey of fractures along the main fork of Box Canyon on August 18, 2003 revealed that the

cracks were greater at the surface, as they were traced over the cliffs they appeared to narrow to less an inch in the stream channel (still in the Castlegate Sandstone).

The Division believes that fracturing will take place in the Castlegate Sandstone along the edges of gateroads at 3LPE and 4LPE. Shales, siltstones and mudstones in the Blackhawk should allow plastic movement of the overburden to prevent cracking and interception of groundwater. The applicant states that 60 percent of the Blackhawk Formation is made up of these finer less ridged materials. The Division believes that the layers of silts, clays and mudstones will keep groundwater from being transmitted through the Blackhawk Formation and that the perched aquifer in the lower Castlegate Sandstone will be preserved.

If fracturing of the Castlegate Sandstone occurs along the edges of the panels there are five locations where fracture zones could develop along the East Fork of Box Canyon. The stream crossing the west side of panel 3LPE is in the Blackhawk Formation. While the east side is in Castlegate Sandstone. The stream is perennial over 3LPE panel. It is expected that fracturing could take place in the Castlegate Sandstone on the east side. Mining of the 3LPE block should take place in November and December. Stream flows will be low at this time of year, receiving only baseflow. The channel appears intermittent in the upper reaches of the East Fork of Box Canyon. The channel receives limited base flow from springs along the west edge of Panel 4LPE. The upper channel flows and springs seem to flow in response to snowmelt and rainfall. The soils in the upper channel retain moisture and the ground often appears wet. Observations of the channel after precipitation identify that large volumes of sand move through the channel, supplied from the weathered sandstones.

It is expected that most of the middle section of the channel overlying panel 4LPE of the East Fork of Box Canyon will not e sustain fractures, but will be in compression from subsidence. Three areas along the channel could sustain cracking, the channel along the edge of the west panel, the east fork of the channel where it lies next to the east gateroad and the upper intermittent section near the east gateroad. This area will be mined between May and July of 2004.

As a result of the initial Technical Review the Division found that CFC needed to provide more detail for their mitigation plan to ensure protection of the stream channel and riparian areas in the event fractures should intercept stream or spring flow.

New information was submitted with this application and is to be placed in Chapter 5 of the MRP. It describes how mitigation of measures will be taken to seal cracks in the streambed of the East Fork of Box Canyon and the tools, materials and methods to be used. The applicant also plans to conduct subsidence monitoring along the creek (East Fork of Box Canyon) as specified in the mitigation requirements listed in the Technical Analysis of September 22, 2003.

The DOGM established a list of subsidence monitoring and mitigation requirements that CFC needs to implement to ensure resource posterity. The applicant has committed to implement and follow the Monitoring and Mitigation Plan and has submitted it as part of the MRP. The plan sufficiently describe how mitigation of subsidence fractures will be conducted, what equipment is available, how equipment will be used, what supplies are available or when mitigation will take place.

On September 22, 2003 the applicant conducted a premining survey of the East Fork of Box Canyon. Twelve sites were established along the stream channel from Joe's Ponds to the east gateroad on Panel 3LPE. Another 4 sites were established at springs above the stream channel at the base of the Castlegate Sandstone. The length of the stream channel and each monitoring site was digitally recorded. A geo/hydrologic description was conducted at each site by Eric Peterson, P.H., from Peterson Hydrologic. During the pre-mining Mitigation Survey cross-sectional areas were established. Within the cross-sectional area the applicant surveyed to establish elevations, GPS coordinates, fixed photo points, locations of the thalweg, geologic description, vegetation types, stream bank widths, David Rosgen's stream channel classification, flow and channel convergence.

The concept of recording the pre-mining conditions has great merit, because post mining evaluations can be compared to pre-existing conditions. Another record will be made at the same time of year on the third year following undermining of the channel. A comparison will be made to determine what, if any changes have occurred.

CFC will conduct longwall mining operation to reduce subsidence cracking. Mining will not be suspended for a period to exceed 48 hours.

The applicant has committed to conduct a vigorous monitoring schedule to evaluate subsidence and hydrologic changes while mining in the area of the East Fork of Box Canyon. The schedule is presented in Table 7-6, in Chapter 7. The operator committed to sealing any cracks that appear to interrupt or divert flows from the stream channel will be sealed immediately with bentonite.

During mining of the stream channel blocks, the applicant commits to submitting a weekly report to DOGM detailing the results of the inspections, any subsidence activity and any mitigation measured taken.

The applicant has proposed to mitigate fractures by sealing them with bentonite or allowing them to fill with sediments naturally. The applicant does not specify a time frame for sealing the fractures, what type of equipment will be used, if sealing materials are in stock or readily available, or explain how equipment will be transported to the site and used.

Sealing the fractures in the stream channel will ensure any flows reaching the channel will be maintained. Some concerns have been expressed that fracturing the Castlegate Sandstone will interrupt springs and deplete flows to the channel.

In considering the subsidence pattern from adjacent areas mined, subsidence fractures could interrupt the flow to existing springs, however data from some springs in lower Box Canyon indicate that springflow has increased. Since the fractures will cut across the channel of East Fork of Box Canyon, it is likely that new sources could appear by intercepting groundwater in the Castlegate Sandstone. The Castlegate Sandstone is considered a perched aquifer, but flows from the formation are relatively low. The dip of the formation will ensure that if springs are diminished because of interception, the baseflow will still be maintained from new sources created from fracturing. If flows occur along the fractures cutting across the channel, the sources will be upgradient in relation to the sources existing now.

There is likely that some areas of the channel will be lowered. Ponding along the channel has been predicted, but it would not be considered an impact. The gradient along the channel reach would still be positive and a downward flow to the main fork maintained. Some areas were subsided in the upper reaches of the main fork of Box Canyon and no ponding has occurred.

The applicant has identified state appropriated water rights filed by the U.S Forest Service in the stream channels allocated for cattle. There are also state appropriated water rights filed for Muddy Creek. The town of Emery uses water from Muddy Creek during winter months, after it is treated, for culinary purposes.

Performance Standards For Subsidence Control

The permittee's approved subsidence control plan commits to complying with all provisions of the approved plan relative to subsidence.

The permittee has committed to "mitigating any material damage resulting from the subsiding of perennial streams in the permit area as indicated in Chapter 5 of this mining and reclamation plan" (See Chapter 7, page 7-39, section **7.3.1.1 Hydrologic Balance Protection**), thus addressing the requirements of R645-301-525.510.

There are no public buildings or facilities, churches, schools, hospitals or impoundments or bodies of water storing volumes of 20 acre feet or more.

The undermining of the East Fork of Box Canyon, which has been classified as a perennial stream, will not present an imminent danger to any inhabitants of urbanized areas, cities, towns, or communities. There are no such areas in the Pines Tract coal lease area.

Findings:

Information provided in the application is considered adequate to meet the minimum Subsidence Control section of the Operation Plan regulations

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

Protection and Enhancement Plan

In September 2003, the Division submitted to the Permittee a required monitoring plan with the intention to mitigate if necessary subsidence effects of the East Fork of Box Canyon. The Division's Hydrology and Geology sections of this TA will provide details of the stream channel and the monitoring plan for hydrology. The Division designed this monitoring plan to keep track of immediate and cumulative effects of subsidence on the East Fork stream channel and surrounding area. This hydrology monitoring plan along with the biology monitoring plan should allow the Permittee to quickly respond to subsidence cracks and prevent disturbance to overall stream flow and riparian habitats along the stream channel.

The Division's biology monitoring plan includes a video/audio movie of the stream channel (audio presented by a qualified botanist and hydrologist), baseline and follow-up surveys of vegetation and macroinvertibrates, evaluations of erosion on stream banks and hillsides along the stream channel, and a follow up video/audio movie three years following subsidence. The follow up survey will provide the Division with data to determine if mitigation of the riparian and surrounding area is necessary. The biology plan also includes monitoring TES and C species including the Link Canyon columbine that inhabits the East Fork riparian and surrounding areas. The Permittee will also conduct qualitative evaluations for the baseline and the first five years following undermining. In years 2003 and 2008, the Permittee will conduct low-level flyover photography for color infrared mapping.

The Division's hydrology monitoring plan includes a video/audio movie of the stream channel and a hydrology monitoring schedule. This hydrology schedule is progressive by having biweekly monitoring times while the mine is undermining the stream channel. The schedule changes, but is still progressive, after the mine moves away from the stream channel. The Division will apply the hydrology and biology monitoring schedules for both the 3 and 4 Left panels.

As previously mentioned, the Permittee agrees to contact the Division if mitigation of East Fork is necessary during the critical times for elk and deer.

Endangered and Threatened Species

The MRP states that the mine does not plan to conduct construction activities during the MSO nesting and rearing season (February 1 – August 31; MRP pg. 3-8A). The Permittee must agree to contact the Division if mitigation for East Fork is necessary during this critical time (R645-301-333). At that time, the Division will consult with USFWS.

The applicant commits in the MRP to monitor any area with suitable Golden eagle habitat where known or new raptor nests could be adversely affected by mining. The Permittee will fulfill this commitment with annual helicopter over flight surveys at the end of May. It is unlikely that the mining in the northern reaches of the 3 and 4 Left panels will impact these nests located across the confluence of Box Canyon.

Calculating the amount of water consumed by a mine addresses the possible adverse effects to the four Colorado River endangered fish species (Colorado pikeminnow, the humpback chub, the bonytail chub, and the razorback sucker). The USFWS provides the Windy Gap Process that explains the factors necessary for consumption calculations. In brief, consumption estimates must include evaporation from ventilation; coal preparation; sediment pond evaporation; subsidence effects on springs; alluvial aquifer abstractions into mines; postmining inflow to workings; coal moisture loss; and direct diversions. The Division, in adherence to the USFWS regulation, requires mitigation if estimated consumption is greater than 100 acre-feet per year. (R645-301-322; -333). The Permittee must provide this water consumption estimation if, in the unlikely event, there is measurable reduction in flow at monitoring station 408 located at the confluence of the East and Main fork of Box Canyon. If there is no measurable change in flow at 408, the Division requests the Permittee submit the equations and results of the Windy Gap Process before or for the midterm review (November 19, 2004).

The MRP contains a survey for bats in the Link Canyon and Muddy Creek areas. The consultant suggested that subsidence could affect roosting areas and that some individuals could be lost. The consultant, however, believes new cracks would offset destroyed cracks and that there would be little net effect. The consultant believes there could be some impact on local populations of spotted bats.

Subsidence could occur in these areas as a general lowering of the topography or it could cause sudden failure of some rock features. The report states if subsidence occurs in spring and summer, it might cause reproductive females to carry young to another less favorable roost site. In the winter, torpid bats might not have time to arouse and escape during subsidence.

From the information in the report, the Division draws the following conclusions about bats:

- There are bats, including spotted bats, present in the general area although spotted bats may not be present in the upper part of Box Canyon.
- There are no known hibernacula, maternal roosting sites, or other areas of heavy concentration in East Fork of Box Canyon. Generally, rock crevices and defective trees are used by only a few bats rather than large populations.
- Subsidence in rocks used by bats could fail and kill or trap individual or a few animals, but it is unlikely to seriously reduce local populations.
- It is possible that subsidence could create new habitat.

For these conclusions, there the Division believes there should be no need to mitigate possible effects on bats or to conduct further monitoring.

Findings:

Information provided in the application is considered adequate to meet the minimum Fish and Wildlife Information section of the Operation Plan regulations.

The Permittee, however, must contact the Division if mitigation for East Fork is necessary during critical times for elk and deer as well as for the MSO.

Furthermore, the Permittee must provide the Windy Gap Process (water consumption estimations for the entire mine) if, in the unlikely event, there is measurable reduction in flow at monitoring station 408 located at the confluence of the East and Main fork of Box Canyon. If there is no measurable change in flow at 408, the Division requests the Permittee submit the equations and results of the Windy Gap Process before or for the midterm review (November 19, 2004).

VEGETATION

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis:

Much of the vegetation-related analysis is in the Fish and Wildlife Information section of the Operation Plan regulations.

The MRP states that the riparian area within upper Box Canyon (Main Fork) is currently being monitored for the effects of subsidence on vegetation (pg. 3-44). Monitoring includes infrared photography and qualitative surveys. The Permittee submits the qualitative surveys in

annual reports. The Permittee must reflect the monitoring program for East Canyon in the MRP, as previously stated.

The Link Canyon columbine inhabits the East Fork of Box Canyon. The Permittee agrees to monitor this species in the East Fork.

Findings:

Information provided in the application is considered adequate to meet the minimum Vegetation section of the Operation Plan regulations.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Groundwater Monitoring

Longwall mining is planned for the PINES TRACK LEASE. The panel alignment trends north-south. Subsidence of up to four feet is expected along the midline of the panels and subsidence cracks are expected to occur. AGAPITO estimates that fractures of 1 to 4 inches can occur in the canyons and fractures up to 2 feet can take place on the canyon rim where panels are parallel the canyon.

Several springs are located in the canyon and at its confluence with the West Fork of Box Canyon. There are also several springs in the main channel of Box Canyon, which eventually drain into Muddy Creek. The upper reaches of the East Fork of Box Canyon are what the U.S. Forest Service term a perennially functioning stream, Page 3-61, FEIS, Page 7 ROD. Carter Reed, U.S. Forest Service, Geologist defined the upper reaches as flows on the surface and in the alluvial system which contributes to the base flow of the down-stream system and supports riparian vegetation, Personal Communication, January 13, 2000. The canyons exhibit perennial flows near the confluence of the East Fork tributaries, shown on Figures 3, 7, 8 and 9 of the Pines Tract P.C., Appendix 7-18. The permittee proposes a groundwater monitoring program, which includes springs and wells. The groundwater monitoring plan is identified in Table 7-2 of the SR.

An area has been identified during the review that has a potential being impacted during mining. The information presented by the permittee and research reports presents a scenario

where subsidence fractures could develop along canyon rims, and in one canyon, the East Fork of the East Fork of Box Canyon, planned to be undermined. This canyon is also considered perennially functioning. The propagation of cracks may influence the flow pattern within the recharge zone (1000 feet in from the rim of the canyons) identified by Mayo. The seep and spring flow in this canyon is minor in comparison to the watershed, but significant to the riparian resource. It has been proposed that flows will be reestablish in time as the voids fill with groundwater or sediment to reach the original levels.

The permittee plans to monitor point GW-20 the flume in the main fork of Box Canyon The stream becomes perennial at this point.

The permittee has committed and implement a bi-annual fracture monitoring program to analyze the subsidence cracks in the vicinity adjacent to the West Fork of Box Canyon. Similar data will also be collected if subsidence cracks develop in the areas between the West Fork of Box Canyon and the East Fork of Box Canyon where canyon walls do not appear. Information gathered from this monitoring program, along with previous studies that CFC has performed, will be used to predict the effects of subsidence within other areas of the Pines Trace and other areas of the mine where similar geomorphologic and geologic condition occur. The program will be developed and implemented by September 2000.

The information collected during the studies should provide insight to the type of fracturing that may take place in the eastern sections of the Pines Tract Lease and potential rates of fracture closing.

Surface Water Monitoring

The permittee has submitted information to address surface water monitoring sites in the text of the MRP and on Plate 7-3. The permittee recommends monitoring seven stream locations in Table 5 of the P.C. These locations include Pines 106, Pines 108, Pines 403, Pines 405, 406, Pines 407, Pines 408 and USFS-109.

During a previous technical analysis some of the reports and literature indicate that the upper reach of the East Fork of the East Fork of Box Canyon showed a potential for perennial flow. The upper reaches of the tributaries contain low flow perennial springs, but do not supply continuous flow along to the upper reaches of the stream channel in the East Fork of Box Canyon. The upper reaches of the East Fork are shown be lined with riparian habitat in the PHC, Figure 3 and the FEIS, Figure 3-11. This area is identified as perennially functioning according the Page 7, of the Pines Tract Lease Record of Decision.

Although identified as containing riparian habitat, the East Fork of the East Fork of Box Canyon does not have the same designation of protection as the West Fork of the East Fork of Box Canyon in the FEIS. The perennial springs in the upper reaches of the canyon do not

sustain a constant or perennial flow in the channel. The USFS allowed the development and longwall panels under the channel. The USFS has asked the permittee to quantify the riparian and spring resources to determine the extent of any impacts.

In a meeting between the Division and CFC on February 25, 2000, CFC personnel reaffirmed their position that the East Fork of the East Fork of Box Canyon is not a perennial stream that it flows during spring runoff and after periods of substantial rainfall.

Acid- and Toxic-Forming Materials and Underground Development Waste

Information on acid and toxic forming materials is presented in Chapter 6 of the MRP and on page 53 of the P.C. Sulfide mineral pyrite has been identified in Sufco Mine. Although pyrite oxidation does occur acid mine drainage does not. Alkalinity of mine drainage water typically exceeds acidity by a factor of 20. The permittee claims that no acid-forming materials or any toxic forming materials have been identified or are suspected to exist in materials disturbed in the Pines Tract Lease.

Discharges Into An Underground Mine

There are no planned discharges into underground mines for the PINES TRACK LEASE. Only on breakout is planned for the PINES TRACK LEASE, which is down-dip in Muddy Creek Canyon.

Water-Quality Standards And Effluent Limitations

The Permittee plans to maintain water quality standards form disturbed areas and mine water discharges.

Stream Buffer Zones

There will be no surface mining activity within 100 feet of a perennial or intermittent stream except for any mitigation work that needs to be conducted. Any mitigation work will require a Stream Alteration Permit. The permittee will need to obtain the prior to mining within a angle of draw of 15 degrees of the stream channel of any perennial or intermittent stream.

Findings:

As outlined under the subsidence regulations R654-301-525 the Permittee will required to obtain the prior to mining within a angle of draw of 15 degrees of the stream channel of any perennial or intermittent stream.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Affected Area Maps

The submittal contains two revised maps which depict POTENTIAL SUBSIDENCE LIMITS (for the) QUITCHUPAH TRACT, PLATE 5-10A, and POTENTIAL SUBSIDENCE LIMITS (for the) PINES TRACT, PLATE 5-10B.

Both plates are P.E. certified by Mr. Wes Sorensen, Utah registered professional engineer.

The maps correlate with one another and overlap in the East Fork of Box Canyon area. The maps show the maximum limit of the potential subsidence area as determined through angle of draw analysis of the Sufco Mine permit area. In the East Fork of Box Canyon area, the maximum limit of potential subsidence and the permit boundary are co-linear. The extracted 3 Left Pines East panel tailgate entries (2 Left Pines East) will come to within three hundred and fifty feet of the permit boundary. A potential does exist for some subsidence tension cracks to develop parallel with the 2 Left Pines East gate road entries. However, as historically noted, these cracks have a tendency to heal themselves over time, as surface flow laden with sediment reports across them.

Mining Facilities Maps

There have been no revisions made to any of the Sufco Mine mining facilities maps as part of this submittal

Mine Workings Maps

The permittee has provided a revised PLATE 5-7, which is an updated UPPER HIAWATHA MINE PLAN, 5-YEAR PROJECTION. The revised plate shows the 3LPE longwall, and the portion of the extracted panel that will exist beneath the East Fork of Box Canyon.

Monitoring and Sampling Location Maps

PLATES 5-10A and 5-10B show the aerial survey (for subsidence monitoring purposes) control points as well as the aerial targets (used for location correlation). Cultural resource site locations are also depicted.

Certification Requirements

As previously noted, PLATES 5-7, 5-10A and 5-10B are P.E. certified by Mr. Wes Sorensen, Utah registered professional engineer. The requirements of R645-301-512 have been addressed.

Findings:

Information provided in the application is considered adequate to meet the minimum Maps, Plans and Cross Sections of Mining Operations section of the Operation regulations.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

Since there is not any surface development proposed, the mining changes proposed in this amendment will not require reclamation, unless surface mining effects are realized from subsidence. The applicant is required to submit mitigation information as outlined in other sections of this TA.

Findings:

The applicant will follow the mitigation plan identified under R645-301-525.

POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

Analysis:

The post mining land use has not changed from that identified for the Pines Tract Lease.

Findings:

Information provided in the application is considered adequate to meet the minimum Post Mining Land Use section of the Reclamation Plan regulations.

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

Analysis:

In September 2003, the Division submitted to the Permittee a required hydrology, biology, and cultural monitoring plan with the intention to mitigate if necessary subsidence effects of the East Fork of Box Canyon. The hydrology monitoring plan along with the biology monitoring plan should allow the Permittee to quickly respond to subsidence cracks and prevent disturbance to overall stream flow and riparian habitats along the stream channel. The Division's monitoring plans include that if there is an unlikely loss to the overall riparian habitat within the East Fork channel, the Permittee will implement, if necessary, a revegetation/enhancement plan as determined by DOGM in consultation with the USFS and DWR.

Findings:

Information provided in the application is considered adequate to meet the minimum Protection of Fish, Wildlife, and Related Environmental Values section of the Reclamation Plan regulations.

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Revegetation: General Requirements

The Permittee must follow the DOGM biology monitoring plan submitted to the Permittee in September 2003. If the Division determines that subsidence impacts requires a mitigation program, then the Division will address revegetation requirements at that time.

Findings:

Information provided in the application is considered adequate to meet the minimum Revegetation section of the Reclamation Plan regulations.

Monitoring and Mitigation Plan for Mining Under the East Fork of Box Canyon

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

The monitoring and mitigation plan adopted by the permittee should provide sufficient data for all stakeholders associated with these resources and lands to make a determination of the degree of impacts. Information and data collection will be continuous before the area is mined, throughout the mining period, and after mining is past, until impacts are not detectable.

Hydrological and Subsidence Mitigation Plan for Mining Under Panels 3LPE and 4LPE in the East Fork of Box Canyon

Subsidence R645-301-525.454

- Conduct pre- and post-mining video surveys of the East Fork of Box Canyon stream channel over panels 3LPE and 4LPE. The Permittee must conduct a post-mining survey during September of 2006. This post-mining video survey must apply the same procedures as the video survey conducted September 2003.
  - Videotape the stream channel from Joe's Mill Ponds to the west gate road of the 3LPE panel.
  - Establish at least 10 stations to portray stream flow, vegetation, soils, etc. GPS coordinates shall be obtained for each site. Each site must be documented with fixed photo points that can be reproduced during subsequent monitoring intervals (see #4 below). Identify and survey in the Thalweg. Monitor at least two pools and associated falls in the perennial section of the channel. Two sites must include EFB9 and EFB11. Monitoring criteria must include width and depth of the pools, and height of fall structures.
  - Establish location of perennial flow, gaining/losing reaches of the stream channel.
  - Qualified botanist must participate in the taping of the channel video.
    - Identify major representative plant species along the stream channel and riparian and spring areas (5 springs: 2 have two separate discharge sites that merge into a single channel leading towards the stream).
    - Identify hanging gardens.
  - Video tape and mention all animal species present:
    - Macroinvertibrate presence at water monitoring stations along the stream channel and riparian and spring areas.
    - All other animal species along the stream channel and riparian and spring areas.

- Fourth quarter water monitoring shall be conducted prior to mining under the stream channel.
- While mining under the channel, promptly identify subsidence-induced fractures, dewatering, diminution of water quality, and movement of the stream channel.
- Monitor sites for fractures two times per week while mining within the angle-of-draw of the stream channel. Continue weekly for a period of 8 weeks after the shears have passed the 15-degree angle-of-draw opposite the stream channel. Monitor flow and channel convergence weekly while in the angle of draw. Then monitor both fractures, flow and convergence every two weeks for the next 8 weeks. Continue monitoring quarterly for 2-year period after no subsidence, interception, diminution or diversions are identified.
- Immediately seal subsidence cracks and fractures identified within the stream channel wet bank with bentonite or bentonite grout. Access must be limited to methods that would not cause additional effects to the aquatic ecosystem.
- Conduct uninterrupted longwall mining progression, except for normally scheduled maintenance, while under the 15-degree angle-of-draw of the stream channel.
- Provide a weekly report to DOGM via e-mail. Identify any changes in surface expression, dates, any fracturing of surface (location, width, spacing, etc.), any repairs, location of longwall. The Division will provide a copy of the report to the Manti-La Sal National Forest.
- If the applicant cannot gain access to the site, attempts must be documented.
- The applicant will be required to abide by the mitigation outlined in the approved MRP.
- Comply with federal and State rules and regulations.
    - Refer to Conditions of Approval of the Resource Recovery and Protection Plan (R2P2), July 31, 2003.
    - The permittee shall obtain a stream alteration permit, required by Utah Division of Water Rights, prior to conducting construction activities in the stream channel for mitigation.
    -

Water Rights Replacement of State Appropriated Water Supplies (R645-301-731.530)

- Establish a rain and temperature monitoring station.
- Promptly replace or compensate any State appropriated water supply that is contaminated, diminished or interrupted by mining operations for:
    - Cattle
    - Drinking water
- Calculate the amount of diminished flows from monitoring data.

Hydrologic and Subsidence Summary Report

- Submit a summary report to the Division documenting the pre- and post-mining conditions of springs and stream channel. Describe all activities and work conducted by the applicant for site evaluation and mitigation. Identify if impacts have occurred, and if mitigation activities have prevented material damage to resources. The report will be due 90 days after subsidence monitoring is complete for each panel section. The Division will provide a copy of the report to the Manti-La Sal National Forest.

Biology Monitoring Plan for Mining Under Panels 3Left, 4Left in the East Fork of Box Canyon (September 29, 2003)

The Permittee must follow basics of the Division's Guidelines. A qualified botanist must survey the stream channel and associated spring areas starting from Joe's Mill Pond to 3LPE. A qualified biologist must survey the baseline for macroinvertibrate along the stream channel.

Stream channel and spring geomorphology and vegetation:

- Stream channel geomorphology – at a minimum define:
  - Geologic/surface substrate of stream bottom.
  - Width of stream channel at water-monitoring locations.
- Spring and surrounding area geomorphology – at a minimum define:
  - Geologic/surface substrate of spring area where the water discharges.
  - Geologic/surface substrate of the spring *tributary* where water converges from the discharge site(s) and forms a *tributary* of the East Fork stream.
  - Width of the spring *tributary* at the location where the consultant surveys vegetation.
- Stream channel and spring vegetation communities – at a minimum:
  - Survey all stream and spring monitoring locations.
  - Define vegetation communities at all monitoring locations.
  - Inventory map of vegetation communities at all monitoring locations.
- Stream channel and spring area threatened, endangered, candidate, and sensitive species. Survey all TEC and Sensitive species including the Link Canyon Columbine. Provide population location and individual numbers for each population.
- Stream channel and spring area vegetation community condition – at a minimum:
  - Describe condition at the meadow near Joe's Mill Pond.
  - Describe condition along steam bank. Concentrate observations at all monitoring locations.
  - Describe condition at all spring locations. Concentrate observations at all monitoring locations as well as discharge sites if different from monitoring locations.
  - Provide photographs of communities along stream channel, on hillsides flanking the steam channel, and at spring locations. Take photographs at established photo points.

    - Describe effects of erosion along stream channel, on hillsides flanking the steam channel, and at spring locations. Numerically rate erosion effects. For example, 1=extreme erosion, 2=high erosion, 3=moderate erosion, 4=slight erosion, 5=no erosion.
    - Repeat vegetation community condition observations two times a year (beginning and end of growing seasons) for the first three years and the fifth year following undermining. Refer to schedule below.
- Provide two copies of the survey reports to DOGM. Include one copy in DOGM Annual Reports. The Division will provide the second copies to the Manti-La Sal National Forest.
    - Baseline data prior to undermining: 2003 report in the 2004 Annual Report.
    - 1st year data following undermining: 2004 report in the 2005 Annual Report.
    - 2nd year data following undermining: 2005 report in the 2006 Annual Report. Conduct survey and submit report adhering to the *stream channel and spring area vegetation community condition* requirements, **only**.
    - 3rd year data following undermining: 2006 report in the 2007 Annual Report.
    - 5th year data following undermining: 2008 report in the 2009 Annual Report.

Stream channel and spring infrared vegetation maps:

- Stream channel and spring area low level, colored infrared maps for the baseline year (2003) and fifth year (2008) following undermining.
- Provide two copies of the survey reports and maps to DOGM. Include one copy in the 2004 and 2009 DOGM Annual Reports. The Division will provide the second copies to the Manti-La Sal National Forest.

Stream channel macroinvertibrate:

- Stream channel macroinvertibrate. The survey must include – at a minimum:
    - EFB4 and EFB11 monitoring sites.
    - Organism species and number (#/m^2).
    - Contractor must consult with DOGM for approved survey protocol.
- Provide two copies of the survey reports and maps to DOGM. Include one copy in the DOGM Annual Reports. The Division will provide the second copies to the Manti-La Sal National Forest.
    - Baseline data prior to undermining: 2003 report in the 2004 Annual Report.
    - 1st year data following undermining: 2004 report in the 2005 Annual Report.
    - 2nd year data following undermining: 2005 report in the 2006 Annual Report.

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

Cultural Resource Monitoring Plan for Mining Under Panels 3Left, 4Left in the East Fork of Box Canyon (September 8, 2003)

Monitoring Plan: (MOA 00-MU-11041000-017; MRP pgs 4-9 to 4-10)

Amend MRP to reflect the implementation of Monitoring Plan in respect to the NRHP eligible -Elusive Peacock. Provide two copies of an Executive Summary of monitoring results. Include one copy in DOGM Annual Reports (2003, 2004, 2005, 2006, and indefinitely until movement ceases). The Division will provide the second copy to the Manti-La Sal National Forest.

Monitoring Plan: (paraphrased from MOA 00-MU-11041000-017 pg 12; refer to MOA for the explicit schedule)

- One time event: The Permittee will provide baseline conditions six months prior to the period of mining.
- One time per month: The Permittee will monitor one time per month within six months following the onset of active subsidence. (1-6 mos)
- Quarterly: The Permittee will monitor one time every three months for six months following the completion of the one time per month schedule. (6-12 mos)
- Yearly1: The Permittee will monitor yearly for two years following the completion of the quarterly schedule. (12 - 36 mos)
- Yearly2: The Permittee will monitor yearly for additional years following the completion of the yearly1 schedule if monitoring indicates further movement of the ground surface. (36 mos – indefinite amount of time)

Note, sites listed under the Monitoring Schedule B are the following:

42SV2492/ML-3582	No name	Prehistoric Rockshelter
42SV2433/ML-3449	Big Mac	Prehistoric Rockshelter
42SV2434/ML-3450	Little Mac	Prehistoric Rockshelter
42SV2341/ML-3335	No name	Prehistoric Rockshelter.
