GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

October 22, 2013

Foster Kirby, Federal Lands Coordinator
Office of Surface Mining Reclamation and Enforcement
1999 Broadway, Suite 3320
Denver, Colorado 80202

Subject: North Lease Permit Revision, Task ID #4407, Canyon Fuel Company, LLC, Skyline Mine, C/007/0005

Dear Mr. ~~Kirby~~: Foster

The Division has reviewed Canyon Fuel Company's application for the North Lease Permit Revision. The Division has determined that application to be complete and accurate and has authorized Canyon Fuel to conduct mining activities in the Lease Modification Area conditioned upon receiving federal mine plan approval and concurrence from OSM. Canyon Fuel Company is anxious to proceed with their mining plans. Please review and process the enclosed Decision Document and accompanying documentation so that the company can proceed with their plans to mine in the North Lease Modification area.

Thank you for your help with this action. If you have any questions, or need any other information please call me at (801) 538-5325.

Sincerely,

Daron R. Haddock
Coal Program Manager

DRH/ /sqs
Enclosure
O:\007005.SKY\WG4407\kirby.doc

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*

UTAH DNR OIL, GAS & MINING

State Decision Document

Canyon Fuel Company, LLC
North Lease Permit Modification UTU-067939
Granger Ridge Expansion
Skyline Mine
C/007/0005

October 22, 2013

UTAH DIVISION OF OIL, GAS AND MINING
STATE DECISION DOCUMENT AND
TECHNICAL ANALYSIS

Canyon Fuel Company, LLC.
North Lease Granger Ridge Expansion Mining
Skyline Mine
C/007/0005

CONTENTS

* Administrative Overview

* Location Map

* Permitting Chronology

* Findings, dated October 22, 2013

* Permit with conditions, dated October 22, 2013

* Technical Analysis, dated October 16, 2013

* Cumulative Hydrologic Impact Assessment, dated October 7, 2013

* Environmental Assessment on Modification of the Federal Coal Lease, UTU 67939 dated November 2011

* Decision Notice and Finding of No Significant Impact for Modification of Coal Lease UTU 67939, dated December 15, 2011.

* Determination of Completeness by DOGM, date June 15, 2012

* Affidavit of Publication (Sun Advocate)

* AVS Recommendation, dated October 22, 2013

* Letters of Consultation
    - PRWCD – July 20, 2012
    - SUALG – August 15, 2012

ADMINISTRATIVE OVERVIEW

Canyon Fuel Company, LLC
North Lease Granger Ridge Modification Mining
Skyline Mine
C/007/0005

Carbon County, Utah

October 22, 2013

PROPOSAL:

Canyon Fuel Company, LLC proposes to expand mining in the North Lease by modifying the lease to add the Granger Ridge extension consisting of approximately 770 acres to the Skyline Mine. Development mining in the North Lease received mining plan approved in December 2002 in part of the north lease with full extraction being approved in December of 2005. There are no surface facilities or disturbances planned for this proposal. This lease is accessed via the underground works and mining will be conducted using longwall for full extraction. Mining will occur in the Lower O'Conner A seam. It is anticipated that the mine will produce nominally four (4) million tons of coal per year.

BACKGROUND:

The Mining and Reclamation Plan (MRP) for the Skyline Mine was originally approved by the Office of Surface Mining Reclamation and Enforcement (OSMRE) on June 20, 1980. The Permittee was Coastal States Energy Company and the Operator was Utah Fuel Company. On July 20, 1984 a revised permit was issued which authorized the use of a waste rock disposal site near the town of Scofield. On March 28, 1985 the Division of Oil Gas and Mining (DOGM) and OSM determined that the permit would expire on April 30, 1987 five years from the date of initial operations, and notified the Operator accordingly. The Permittee submitted a timely application for permit renewal in 1986.

Due to numerous problems in formatting and technical issues associated with the original MRP, the mine operated under short-term permits from April 30, 1987 to December 1, 1989 when a renewal was issued. That renewed permit was scheduled to expire on April 30, 1992, ten years from the date of initial operations. On December 31, 1991 Coastal States Energy Company submitted another application for permit renewal which included an updated Mining and Reclamation Plan formatted to the new R614 (R645) regulations. The permit was renewed on May 1, 1992. The permit was transferred from Coastal States Energy Company to Canyon Fuel Company, LLC on December 20, 1996.

The renewed permit for an additional five-year period until April 30, 1997 was conditioned upon satisfactorily complying with a Division Order that required additional PHC information. This condition was met on October 3, 1997.

The original application for the Winter Quarters lease was submitted in November 1996 and withdrawn in September 1997. A 28-acre IBC on fee land was approved on August 25, 2000. A fee lease to increase the permit area by 459 acres was approved on April 24, 2001. The permit was renewed on April 30, 2002 with five conditions.

In 2001 Canyon Fuel started to encounter significant amounts of water in the mine. This prompted them to move their mining efforts toward the North Lease. In order to access the North Lease, the company applied for an 84-acre Incidental Boundary Change on a fee lease which was approved on August 16, 2002.

The Skyline mine plan area (including the North Lease) incorporates federal coal leases and one Carbon County coal lease (10,374 acres of permit area with 79.12 acres of surface disturbance). The surface disturbed area includes disturbances (surface facilities) on Forest Service lands and private land (Unit Train Loadout and Waste Rock Disposal sites). The access to the Waste Rock Disposal Pit is a private road and is not scheduled for reclamation.

Canyon Fuel Company, LLC, submitted the permit application package for adding the North Lease (Winter Quarters) Tract to the Skyline Mine on September 4, 2002. Development mining in the North Lease received mining plan approval on December 20, 2002. Full extraction mining in the North Lease was approved on December 2, 2005 with Federal Mine Plan approval being signed on February 24, 2006. The need for additional ventilation soon became apparent and the Company received approval for the Winter Quarter Ventilation Facility on July 29, 2010. Additional acreage was acquired on April 2, 2012 when a lease modification was approved adding approximately 770 acres of lease known as Granger Ridge to the North Lease. The current proposal is to authorize mining in this additional lease area.

ANALYSIS:

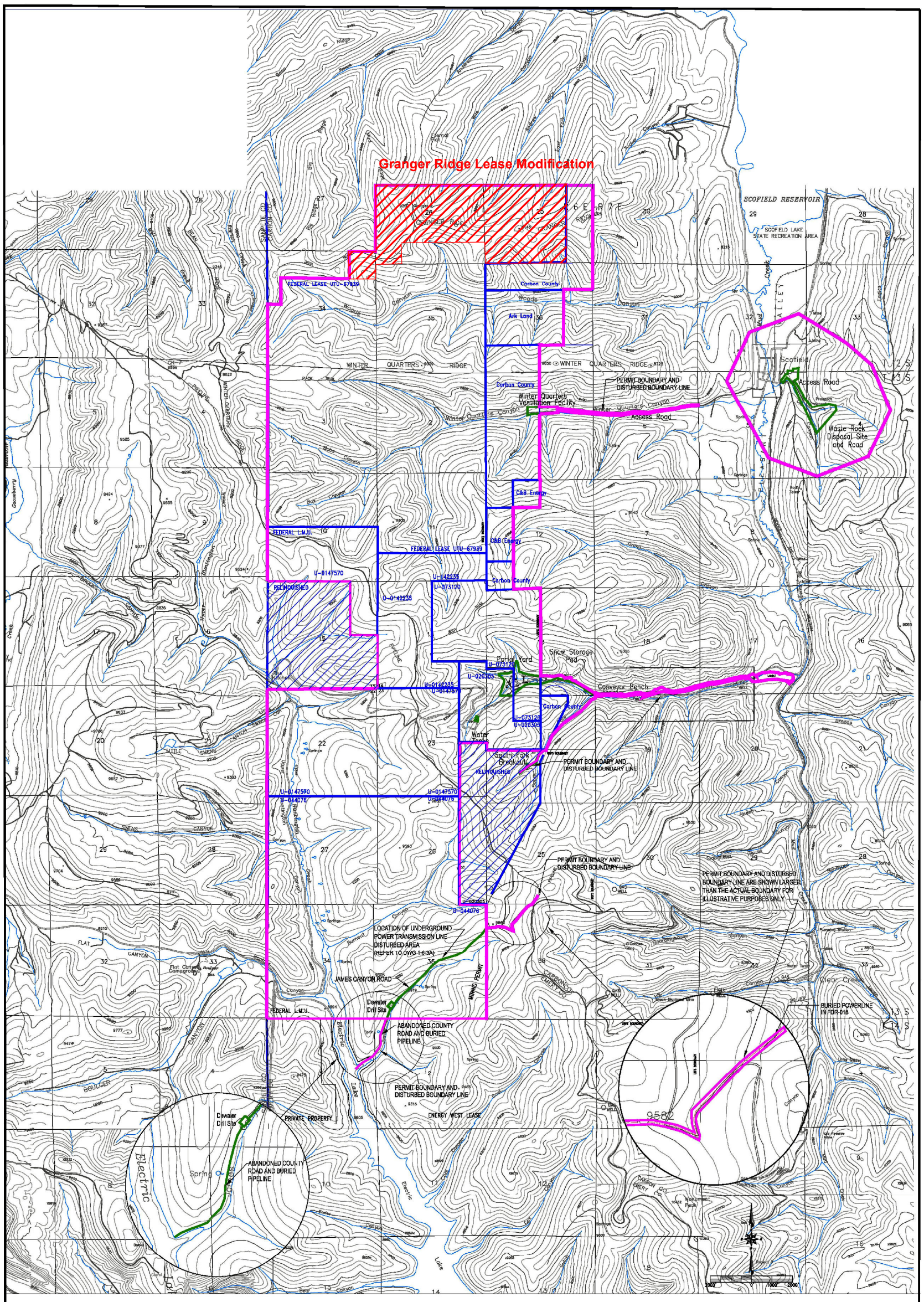
The Division of Oil Gas and Mining has conducted an Administrative and Technical Analysis of the proposed mine Permit Application Package and has produced a written TA. All appropriate State and Federal agencies have been consulted regarding this proposal. It has been determined that the Applicant has the legal right to enter and conduct mining operations in the proposed permit area through acquired lease modification. The probable hydrologic consequences of the action have been analyzed and a Cumulative Hydrologic Impact Assessment (CHIA) has been prepared. All requirements for public participation have been satisfied. The application meets the requirements of the Utah Coal Regulatory Program.

RECOMMENDATION:

This recommendation is based on the complete permit application package (PAP), the Technical Analysis (TA) conducted by the Division, the Cumulative Hydrologic Impact Assessment (CHIA) also prepared by the Division, and the administrative record. Canyon Fuel Company, LLC has demonstrated that mining within the Granger Ridge Expansion Area boundary can be done in conformance with the Surface Mining Control and Reclamation Act, and the corresponding Utah Act and performance standards. The 510(c) report on the Applicant

Violator System was verified for this mine on October 22, 2013 and there are no violations.

It is recommended that approval be given for mining in the Granger Ridge extension to North Lease at the Skyline Mine with the conditions summarized as Attachment A to the Permit.



ADJACENT AREA SITE DESCRIPTION:
Active Lease Areas, Permit Boundary, and 1/2 Mile beyond Waste Rock Disposal Site

13,525 ACRES SITE PERMIT BOUNDARY

PERMIT AREA	SITE DESCRIPTION
13.89	RAIL LOADOUT
42.55	PORTAL YARD
0.28	WATER TANKS & WELL PADS
0.96	SOUTH FORK PORTALS
14.18	CONVEYOR BENCH
32.48	WASTE ROCK DISPOSAL SITE
7.83	WINTER QUARTERS VENTILATION FACILITY
4.92	WINTER QUARTERS ROAD (not reclaimed)
1.90	JAMES CANYON BURIED PIPELINE
0.30	JAMES CANYON BURIED POWER LINE
2.95	JAMES CANYON WATER WELLS AND ROAD
121.97	

LEASE ACREAGE WITHIN ADJACENT AREA

FEDERAL COAL	ACREAGE	NON-FEDERAL COAL	ACREAGE
U-0147570	1532.70	C&B COAL	120.00
U-0142235	520.0	CARBON COUNTY	811.25
U-073120	357.22	ARK LAND COMPANY	240.00
U-044076	2468.32		
U-020305	279.40	TOTAL	1,171.25
UTU-67939	4061.52		
TOTAL	10,440.16		

NOT ALL ACREAGE FOR EACH LEASE IS WITHIN THE PERMIT BOUNDARY, REFER TO PART 1, TABLE 1.114.

LEGEND
- ADJACENT AREA: Areas Authorized for Coal Mining and Reclamation Activities (SEE EHA FOR HYDROLOGIC ADJACENT AREA)
- PERMIT BOUNDARY
- LEASE BOUNDARY

NOTES:
1. COORDINATE BASE ON MINE GRID DATA.
2. MAP DIGITIZED FROM 1:24000 USGS QUADRANGLE MAPS, SCOFIELD, UTAH AND FAIRVIEW LAKES, UTAH.
3. MINE FACILITY, CONVEYOR, AND NEW ECCLES CANYON ROAD LOCATIONS FROM EXISTING RECORD DATA AND INCORPORATED TO MAP IN BEST FIT LOCATIONS.
4. UTM GRID TICK VALUES SHOWN ARE IN METERS.

BASE PREPARED BY INTERMOUNTAIN AERIAL SURVEYS, SALT LAKE CITY, UTAH – M95147

DATE	No.	REVISIONS	DR./DES.
AUG 02	1		/ASM
NOV 02	2		/ASM
JUNE 07	3	MODIFIED PERMIT BOUNDARY (BBC & WASTE ROCK) SKYLINE MINES PERMIT AREA, LEASE AREAS.	BR/GG
MAR 2010	4	ADDED ADJACENT AREA, MODIFIED PERMIT AND LEASE BOUNDARIES	AB/GG
JUL 2010	5	ADDED WINTER QUARTERS ACCESS ROAD	AB/GG
AUG 2010	6	MODIFIED ADJACENT AREA	AB/GG
OCT 2012	7	Modified Adjacent Area with Lease Mod. and Relinquishments	GG/GG

SKYLINE MINE PERMIT AREA

Canyon Fuel Company, LLC
HC35 BOX 380, HELPER, UTAH 84526
435-448-6463
Skyline Mines

SCALE: 1" = 2000'	DATE: 9/24/01	CK.BY: G. Galecki
DWG. NO.: 1.6-3		DR.BY: JLP/CDH
CAD FILE 1.6-3REV7		

REVISION: 7
10/19/12

PERMITTING CHRONOLOGY

Canyon Fuel Company, LLC
Granger Ridge Expansion Mining
Skyline Mine
C/007/0005

Carbon County, Utah

October 22, 2013

May 2, 2012	Canyon Fuel Company, LLC, submits the permit application package for the North Lease Modification to the Skyline Mine.
June 15, 2012	The permit application was determined administratively complete. Canyon Fuel Company, LLC is instructed to publish a Notice of Complete Application in the local newspaper and place a copy of the application in the county courthouse.
June 18, 2012	The Division sent letters to state, federal and local planning agencies notifying them of the complete permit application and soliciting their comments.
January 22, 29 and February 5 and 12, 2013	This permitting action for full extraction in the North Lease Modification at the Skyline Mine, is published in the Sun Advocate for four consecutive weeks.
March 14, 2013	End of public comment period.
October 7, 2013	CHIA completed.
October 16, 2013	TA completed.
October 22, 2013	AVS check completed with issue recommendation.
October 22, 2013	Decision Document completed and Conditional Permit is issued. Permitting Package Sent to OSM for concurrence.

FINDINGS

Canyon Fuel Company, LLC
Granger Ridge Expansion Mining
Skyline Mine
C/007/0005

Carbon County, Utah

October 22, 2013

1. The permit application for the expansion of mining of coal from the Granger Ridge area in the North Lease at the Skyline Mine is accurate and complete and all requirements of the Surface Mining Control and Reclamation Act, and the approved Utah State Program (the "Act") are in compliance. See Technical Analysis dated October 16, 2013 (R645-300-133.100)

2. The applicant proposes acceptable practices for the reclamation of disturbed lands. The Division has determined that reclamation, as required by the Act can be feasibly accomplished following the approved plan with the attached permit conditions. No new surface disturbance will occur with the mining in the Granger Ridge Extension. (R645-300-133.710)

3. An assessment of the probable cumulative impacts of all anticipated coal mining and reclamation activities in the general area on the hydrologic balance has been conducted by the Division and no significant impacts were identified. See CHIA dated October 7, 2013. The Mining and Reclamation Plan (MRP) proposed under the revised application has been designed to prevent damage to the hydrologic balance in the permit area and in associated off-site areas (R645-300-133.400 and UCA 40-10-11 (2)(c)).

4. The proposed lands to be included within the permit area are:

    a. Not included within an area designated unsuitable for underground coal mining operation (R645-300-133.220);

    b. not within an area under study for designated land unsuitable for underground coal mining operations (R645-300-133.210);

    c. not on any lands subject to the prohibitions or limitation of 30 CFR 761.11 {a} (national parks, etc), 761.11 {f} (public buildings, etc.) and 761.11 {g} (cemeteries);

    d. not within 100 feet of a public road except at the location where the public road accesses the property(R645-300-133.220); and

    e. not within 300 feet of any occupied dwelling (R645-300-133.220).

5. The operation would not affect the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats as determined under the Endangered Species Act of 1973. See Technical Analysis dated October 16, 2013. (16 USC 1531 et seq.) (R645-300-133.500).

6. The Division's issuance of a permit is in compliance with the National Historic Preservation Act and implementing regulations (36 CFR 800). See Technical Analysis dated October 16, 2013. There are no surface disturbances associated with underground mining in the Granger Ridge North Lease Modification. (R645-300-133.600)

7. The applicant has the legal right to enter and complete mining activities in the permit area through the federal coal lease issued by the Bureau of Land Management. (Lease Document for Coal Lease UTU-67939, effective September 1, 1996 and Lease Modification dated April 2, 2012) (R645-300-133.300)

8. A 510 (c) report has been run on the Applicant Violator System (AVS), which shows that: prior violations of applicable laws and regulations have been corrected; neither Canyon Fuel Company, LLC nor any affiliated company, are delinquent in payment of fees for the Abandoned Mine Reclamation Fund; and the applicant does not control and has not controlled mining operations with demonstrated pattern of willful violations of the Act of such nature, duration, and with such resulting irreparable damage to the environment as to indicate an intent not to comply with the provisions of the Act (A 510 (c) report was run on October 22, 2013, see memo to file dated October 22, 2013). (R645-300-133.730)

9. Underground mining operations to be performed under the permit will not be inconsistent with other operations anticipated to be performed in areas adjacent to the proposed permit area. (This underground mining operation is consistent with other underground mining operations in the Wasatch Plateau).

10. The applicant has posted a surety bond for the Skyline Mine in the amount of $5,137,000 issued by Lexon Insurance Company (Surety Number 1093362). The bond will not be affected by this permitting action since there is no new disturbance proposed (R645-300-134).

11. No lands designated as prime farmlands or alluvial valley floors occur on the permit area. See Technical Analysis dated October 16, 2013 (R645-302-313.100 and R645-302-321.100).

12. The proposed postmining land-use will not be affected by this action as this is an extension of an underground mining operation with no new disturbance proposed.

13. The Division has made all specific approvals required by the Act, the Cooperative Agreement, and the Federal Lands Program.

14. All procedures for public participation required by the Act, and the approved Utah State Program are in compliance. The public advertisement was published on January 22, 29, February 5 and 12, 2013 in the Sun Advocate (R645-300-120).

15. All existing structures at the mine comply with performance standards. This application is an underground extension of an existing mine with no new surface facilities being proposed (R645-300-133.720).

Permit Supervisor

Associate Director of Mining

Director

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GARY R. HERBERT
Governor
GREG BELL
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Oil, Gas and Mining
JOHN R. BAZA
Division Director

FINDINGS DOCUMENT

Utah Coal Regulatory Program

OCTOBER 16, 2013

PID: C0070005
TaskID: 4407
Mine Name: SKYLINE MINE
Title: NORTH LEASE PERMIT MODIFICATION

General Contents

Right of Entry

Analysis:

The coal lease information is found in Section 114 and Appendix 118A of the application. Lease areas are shown in red on Drawing 1.6-3. Permit (disturbed area) is shown in green on Drawing 1.6-3. The lease area boundary legal description was revised to reflect approximate lease boundaries.

The 2012 application from Canyon Fuel Co., LLC is for a 770.52 acre Significant Revision for the North Lease, BLM Coal Lease UTU-67939, of the Skyline Mine. Table 1.114 records the increase in the total federal lease acreage and reflects the active lease acreage described in the narrative in MRP Section 114. The acreage approved for underground coal mining and reclamation stated on p. 1-39 is 10,733.38 acres. This acreage is equal to the total active lease acreage (10,611.41 acres given on Table 1.114) plus the surface disturbance acreage of 121.97 acres (stated on p. 1-37).

The total subsurface acreage for the No. 3 mine will be 3,810.06 acres (p. 1-36), an increase of 25%. The lease modification will add panels 13 – 15 Left, extending mining beneath Granger Ridge into Sections 25, 26 and in the NE1/4NE1/4 Sec 34 in T 12 S, R 6 E, refer to Dwg. 3.3-2.

Drawing 1.6-1 shows the surface is owned by D. Euray Allred and Madelyn E. Allred Trust and the United States, managed by the U.S. Forest Service. This information has not changed.

With regard to the January 2011 IBC, the warranty deed from Peabody Natural Resources is found in Appendix 118A and provides the rights to mine the coal in T 13 S, R 6 E, Section 36, S/2N/2, N/2S/2. As can be seen on Drawing 1.6-3 only a portion of the fee coal conveyed by the warranty deed will be mined.

The right of entry documentation provided meets the requirements of the Utah Coal Mining Rules.

pburton

Public Notice and Comment

Analysis:

The Affidavit of Publication is included with the application as required by R645-301-121.120. The notice can be found in Appendix 118 of the MRP (or on page 369 of the electronic application). The application meets the requirements of the Coal Mine Rules for public notice.

pburton

Reclamation Plan

PostMining Land Use

Analysis:

A map and supporting narrative of the current uses of the north lease expansion area is included in the application. Map 2.12.1-1 shows the location of the grazing allotments and Table 2.12.1-1 shows the sheep allotments and dates for each grazing area.

The North lease area and the North lease expansion area consist of 7 sheep grazing allotments within the Manti La Sal National Forest. The Granger Ridge grazing allotment located in the North Lease Expansion area is used between July 1 and September 30 each year.

The postmining land use will be the same as the premining land use. No surface disturbance is anticipated.

icampbel

WildLife Protection

Analysis:

No surface disturbance is anticipated from undermining the North Lease Area. Some impacts could occur from subsidence. The Division has requested that the operator survey the area for sensitive species that may be present. These surveys will occur one year prior to undermining as stated on page 2-99 of section 2.9. If sensitive species do occur in the north lease expansion area, the operator, the Division and appropriate wildlife agencies will develop a protection and mitigation plan for the species and its habitat. Non-sensitive species and their habitat will most likely not be impacted from underground mining.

icampbel

Environmental Resource Information

General

Analysis:

The application from Canyon Fuel Co., LLC is for a 770.52 acre Significant Revision for the North Lease, BLM Coal Lease UTU-67939, of the Skyline Mine. The lease modification will add panels 13 – 15 Left, extending mining beneath Granger Ridge into Sections 25, 26 and 34 in T 12 S, R 6 E, refer to Dwg. 3.3-2. Drawing 1.6-1 shows the surface is owned by D. Euray Allred and Madelyn E. Allred Trust and the United States, managed by the U.S. Forest Service. The application was reviewed four times as tasks: #4092 (August 28, 2012), #4208 (January 31, 2013), #4397 (September 23, 2013) and #4407 (completed October 15, 2013).

pburton

Permit Area

Analysis:

The Permittee has requested to add an additional 770.52 acres, known as the North Lease Area to the areas authorized for coal mining and reclamation activities. The Skyline Mine permit area will not change with the North Lease Modification and remains at 121.97 acres. Federal Coal Lease UTU-67939, including this expansion will increase from 3,291 acres to a total of 4,061.52 acres.

The North Lease area is known as Tract 2 of Federal coal lease UTU-67939, managed by the U.S. Bureau of Land Management. Surface area is managed by the Manti La Sal National Forest. The lease area is located in:

Township 12 South, Range 6 East, SLBM

Section 25: lots 3 and 4, SW¼NE¼, W½SE¼, SW¼
Section 26: lots 1-4, N½ S½, SW¼ SW¼

Section 34: NE¼NE¼

The information discussing the North Lease Modification area is sufficient to meet the Utah Coal Rules.

pburton

Historic and Archeological Resource Information

Analysis:

No surface disturbance is anticipated as a result of this application. Subsidence caused by underground mining would have a minimal affect on most historical resources. However, buildings or structures could be impacted. The application does not include historic or cultural resource reports. However, the Skyline M&RP contains several previous studies that include portions of the expansion area.

The AERC Project 1282 (EFX-91-1) located in the confidential volume 2 of the MRP contains a 10 acre sample unit in the southwest quarter of section 26 (T12SR6E). The unit contained no historic or cultural resource activity or isolated artifacts.

AERC Project 1470 (CSEC-95-1) is a cultural resource evaluation of seismic line corridors including a 1.78 mile seismic line along granger ridge in sections 25 and 26 of T12SR6E. The class III intensive inventory of this seismic line included a 20 to 40 meter wide corridor dependent on ground cover visibility and topography. A file search was also conducted. No prehistoric or cultural resources or isolated artifacts were discovered.

icampbel

Vegetation Resource Information

Analysis:

The applicant included a paragraph regarding the vegetation of the North Lease expansion area on page 2-61d of section 2.7. Dr. Patrick Collins of Mt. Nebo Scientific conducted an evaluation of the vegetation in the expansion area and determined that it was not significantly different from the vegetation in the North Lease Area. Map 2.7.1-1a shows the general vegetation types of the north lease expansion area. Subsidence should not directly impact vegetation. No surface disturbance is planned for the expansion area. Habitat for threatened or endangered plant species is not present in the expansion area, according to Dr. Patrick Collins in the 2012 Review of TES species in the expansion area (located in Appendix A-2). Therefore, the Division does not require site specific information on vegetation in accordance with R645-301-321.100.

icampbel

Fish and Wildlife Resource Information

Analysis:

Dr. Patrick Collins of Mt. Nebo Scientific reviewed the list of federally threatened, endangered and sensitive species and their potential habitat within the north lease expansion area. Dr. Collins listed several sensitive species as possible residents in the North Lease expansion area (explained in detail under the protection of sensitive species section of this memo). In accordance with R645-301-322, site specific resource information is required by the Division because the site may include species protected by as a sensitive species in the State of Utah.

For the North lease area, the MRP states the following on page 2-104i of section 2.9: Surveys to determine the presence of the Northern Goshawk and the Northern Three-toed Woodpecker will be conducted in the North Lease area in Spring 2005, prior to any longwall mining being conducted. Details of the timing of the surveys and methods to be used are outlined in Appendix A-2, Biological Studies in the Winter Quarters Canyon Creek and Woods Canyon Creek - A Study Plan. In the event either or both of the birds are located, the Permittee commits to implementing suitable protection method, in consultation with the appropriate regulatory agencies (DOGM, USFS, DWR, etc.).

icampbel

Land Use Resource Information

Analysis:

A map and supporting narrative of the current uses of the north lease expansion area is included in the application. Map 2.12.1-1 shows the location of the grazing allotments and Table 2.12.1-1 shows the sheep allotments and dates for each

grazing area.

The North lease area and the North lease expansion area consist of 7 sheep grazing allotments within the Manti La Sal National Forest. The Granger Ridge grazing allotment located in the North Lease Expansion area is used between July 1 and September 30 each year.

icampbel

Prime Farmland

Analysis:

The application updated the prime farmland discussion in Sec. 2.14 p. 2-161, and provided the referenced correspondence from Joe Dyer in Appendix Volume A-2. The Division concurs with the NRCS evaluation. The application meets the requirements for prime farmland evaluation.

pburton

Geologic Resource Information

Analysis:

Geologic resource information is discussed in Section 2.2, Volume 1 of the Skyline MRP. Drawing no. 2.2.1-1 depicts the General Geologic Map of the Permit Area. Regional geology, along with faults and formation names are all depicted on this map. The North Lease area (Sections 25, 26, 34 of T12S R6E) is already included on this map.

No additional geologic information was presented with the North Lease Modification submittal. The geologic strata found within the North Lease area, is part of the Mesa Verde group of Upper Cretaceous- aged units. This group is found regionally throughout the Skyline permit area. The geologic strata in the North Lease area is the same as the geology throughout the remainder of the permit area. The geologic descriptions discussed in Section 2.2 already encompasses the North Lease area. As such, the lithologic characteristics of each geologic formation that makes up the Mesa Verde have already been summarized in the MRP. (reviewed by April Abate, Division Geologist on 8/20/2012)

Elevations and Locations of Test Borings

According to information discussed in Section 2.3.1 of the Skyline MRP, a test boring 91-35-1 had previously been drilled in Section 35 T12S R6E located between Winter Quarters and Woods Canyons in the North Lease area describing the nature, depth and thickness of the coal seam. This boring was drilled to a depth of approximately 1,500 feet and shown on Drawing 2.3.6-1.

Rule R645-301-622.400 requires any oil and gas will within the permit area be shown on a map. Map 2.2.8-1 circa 1989 lists two former natural gas test wells as abandoned. According to the oil and gas map found on the Utah GIS portal website/Division of Oil, Gas and Mining web interactive map (http://mapserv.utah.gov/oilgasmining/), there have been no additional wells installed within the North Lease significant revision area since 1989.

According to page 2-20 of Volume 1 of the Skyline MRP, the North Lease is a continuation of mining the Lower O'Connor 'A' seam. Drill holes have already been advanced in the floor; roof and coal of the North Lease. Lab analysis of North lease drill holes 06-2-1, 06-24-1, 06-25-1, 06-2-3 and a memo from Gregg Galecki dated 2008 are provided in Appendix A-3-Vol. 2 of the MRP. The results indicate that the potential for generating acidity and toxicity is low. Analysis provided in App. A-3/Vol. 2 dated 2007 for Mine #3 in the North Lease area suggest poor to fair values for pH and SAR. Waste rock brought to the surface will be sampled as it is placed in the waste rock pile.

According to rules R645-301.632 require information referencing subsidence monitoring and a determination of the commencement and degree of subsidence in the context of analyzing measures required to prevent or reduce material damage inside the permit area. The Permittee has provided Map 4.17.3-1A depicting the North Lease pre-subsidence survey information and Map 4.17.5-1 depicting subsidence monitoring points. Drawing 2.3.6-1 includes the North Lease Area showing the locations of monitoring wells, springs and streams and stream subsidence points.

The information provided meets the requirements of the Utah Coal Rules.

pburton

Hydro Baseline Information

Analysis:

In response to baseline water monitoring related deficiencies listed in Task No. 4397, the Applicant has submitted one addition sampling event at all North Lease Expansion Area monitoring locations as requested. The MRP was updated with this information as well as the Peterson Hydrologic report and the Spring and Seep Survey report in Appendix L of the PHC. With these additional samples, the Applicant has collected low and high flow samples for each site at least once.

The MRP was updated to include instruction all sampling locations within the North Lease Expansion Area will be monitored until mining begins in the area, which is at least into 2014. After mining begins in the area the MRP has been updated to indicate that monitoring location S26-1, S25-32, and CS-26 (Lower Wife Creek) will be monitored for operational parameters.

adaniels

Hydro Probable Consequences Determination

Analysis:

The PHC was updated to include the new Fall 2013 baseline sampling events. The data collected from this sampling was consistent with data recorded from past sampling events and provides a clearer view of the nature of the springs and streams in the North Lease Expansion Area. Table 2 of the “Summary of the Spring and Seep Survey and Baseline Monitoring Activities in the Wife and Andrew Dairy Canyon Areas, 2011-2013” was corrected to categorize the spring and stream locations correctly.

adaniels

Operation Plan

Subsidence Control Plan Subsidence

Analysis:

Plate 4.17.3-1A depicts north lease pre-subsidence survey information. The map identifies areas where surface cracking and damage may occur. Also included are potential subsidence contours. The pre-subsidence survey detail overlays the mining projections map.

Plate 4.17.5-1, Subsidence Monitoring Points includes subsidence monitoring station locations including additional points north of Granger Ridge to accommodate the lease modification of mining further north and modified locations of re-established points.

The application states that there is a short jeep trail on the western portion of panel 14-Left where there is an estimated subsidence in the range of approximately 2 feet. The subsidence should not impact the trail, but it will be monitored for any necessary repairs.

jowen

Subsidence Control Plan Performance STD

Analysis:

Rules R645-301-632 et seq require information referencing subsidence monitoring and a determination of the commencement and degree of subsidence in the context of analyzing measures required to prevent or reduce material damage inside the permit area. The Permittee has provided Map 4.17.3-1A depicting the North Lease pre-subsidence survey information and Map 4.17.5-1 depicting subsidence monitoring points. Section 2.2.13, page 2-21(b) of the Geology and Geotechnical section of the Mining and Reclamation Plan (MRP) contains a reference to the Subsidence Monitoring Plan in Section 4.17.

Under the performance standard rule R645-301-642 the Permittee is required to provide a commitment to reclaim any monument or surface marker used as a subsidence monitoring point. On page 4-98 of the Subsidence Control Plan found in Section 4.17, the Permittee references subsidence markings comprised of rebar and biodegradable white sheeting. The Permittee added a commitment to reclaim the markers at the completion of the project as necessary.

This information was reviewed by April Abate, staff geologist and satisfies the compliance requirements of the geology

section of the Utah Coal Mining Rules.

pburton

Subsidence Control Plan Notification

Analysis:

Draft, undated copies of the notification letters required by R645-301-525.700 have been included in Appendix 118 (see page 370 of the electronic application). The application meets the requirements of the subsidence control plan, because the Permittee is aware of the requirement for notification (R645-301-525.700) six months prior to undermining.

pburton

Fish and Wildlife Endangered and Threatened

Analysis:

During the 2011 raptor survey, a newly established goshawk nest was identified within the North lease expansion area. Page 2-111b of section 2.9 states that the nest will be monitored in future annual surveys in advance of mining in the North Lease area.
Dr. Patrick Collins of Mt. Nebo Scientific conducted a review of the Threatened, Endangered and Candidate Species in Sanpete and Carbon Counties of Utah. Habitat for most listed species does not exist in the expansion area. However, Dr. Collins listed several sensitive species as potential residents of the expansion area. These species are listed below:
• Canada Lynx may be present in the area, but it is highly unlikely. Furthermore, subsidence in the area should not negatively impact the Canada Lynx.
• Boreal Toad habitat could potentially exist in isolated springs and wetlands in the expansion area. A survey for Boreal Toads was conducted in the North Lease Winter Quarters area in 2005. No Toads were found. A survey for toads in the expansion area has not been completed.
• Townsends western Big Eared Bat could exist in the expansion area if there are unknown caves or rock crevices in the area. A survey for the bat has not been conducted.
• Spotted Bat could also exist in the expansion area if there are unknown caves or rock crevices in the area. A survey for the bat has not been conducted.
• The Three Toed Woodpecker could nest within the expansion area especially in the abundant beetle killed pine. A survey was conducted in the North Lease area in 2005. A survey for the woodpecker in the expansion area has not been conducted. Dr. Collins suggests that the woodpecker could be impacted in subsidence causes the downing of beetle killed pines.
• Columbia Spotted Frog could exist in the expansion area on isolated wetlands or springs. A survey for the spotted frog was conducted on the North Lease Expansion Area in 2005 and no frogs were identified. A survey for the spotted frog in the expansion area has not occurred.

As a response to the Division's deficiency for surveying the species listed above, CFC contracted Western Land Services, Inc in November 2012 to conduct a habitat assessment for western toad, Columbia spotted frog, townsend's big eared bat, spotted bat, and the three-toed woodpecker. The following conclusions were made:

• Columbia spotted frog and the spotted bat species do not have suitable habitat within the project area. Surveys are, therefore, not recommended for these species.

• Springs S25-32 and S26-1 and upper wife Creek and the East Fork of Andrew Dairy Creek should be surveyed for presence of western toad.

• Three toed woodpecker habitat exists in the upper extents of Wife and Andrew Dairy Canyons, on slopes with northern aspects and coniferous cover. Inventories for three-toed woodpeckers should coincide with the annual raptor surveys in areas of suitable habitat which have potential for subsidence.

• Researchers conducting annual raptor surveys should document the location of any shafts, adits or other openings which could support roosting bats. These openings must be evaluated for roosting potential and utilization by bats.

Page 2-99 of section 2.9 states that the Western Toad and the Three-toed woodpecker will need to be surveyed one year prior to undermining the North lease expansion area. A survey for the Western Toad was conducted in 2013 and is located in Appendix volume A-2. Alpine Ecological conducted a Wildlife Survey Report for the Power line, ventilation Hole, Access Road Analysis area, subsidence area and the spring survey in 2013. One Goshawk response was recorded near burnout

Canyon. Alpine Ecological consultants and FS wildlife biologist, Jeff Jewkes determined that the call was most likely from the pair occupying the burnout canyon nest territory. Western toad surveys were conducted around five springs with suitable habitat. Western Toad was not identified during the survey. Alpine Ecological recommended that the surveys in subsequent years by in coordination with the UNHP, UDOGM and USFS in order to refine survey area requirements and to ensure nesting data is transferred and up to date protocols are followed.

Skyline has committed to conducting surveys for Three-toed woodpeckers in suitable habitat during the annual raptor surveys prior to undermining.

icampbel

Fish and Wildlife Bald and Golden Eagles

Analysis:

Canyon Fuel Company currently employs Mace Crane of Western Land Services to conduct raptor surveys. The Division has met with Mr. Crane several times to discuss the location and timing of raptor surveys. Mr. Crane also communicates with the Forest Service to coordinate surveys and share data. Mr. Crane conducts surveys in areas that will be subsided as well as any areas near planned surface disturbance. Prior to mining in the North lease expansion area, Mr. Crane will conduct a raptor survey of the area. Annual raptor surveys are reviewed in the annual report.

icampbel

Fish and Wildlife Wetlands and Habitats High Value

Analysis:

Limited wetlands, riparian habitat or habitat of unusually high value for fish and wildlife exist within the North Lease Expansion area. No perennial streams will be undermined. Habitats that will be undermined should not be significantly impacted. However, as Dr. Collins indicates in the threatened, endangered and sensitive species report, subsidence caused downing of beetle killed trees could impact three toed wood peckers if they are present in the area.

icampbel

Road System Other Transportation Facilities

Analysis:

Plate 4.17.3-1A, The North Lease Pre-Subsidence Survey Map depicts a jeep trail, and includes a trail designation in the legend. The map identifies areas where surface cracking and damage may occur. Also included are potential subsidence contours. The pre-subsidence survey detail overlays the mining projections map.

The application states that the jeep trail is on the western portion of panel 14-Left where there is an estimated subsidence in the range of approximately 2 feet. The subsidence should not impact the trail, but it will be monitored for any necessary repairs.

jowen

Maps Certification Requirements

Analysis:

Plate 3.3 2 shows Mine No. 3 (Lower O'Connor "A" and Flat Canyon Seams). The timing and sequence of mining of any or all seams is dependent upon mining conditions. North Lease modifications are located on Plate 3.3-2.

The application states that the required certified plates (2) will be supplied upon final approval of the application.

jowen

CHIA

CHIA

Analysis:

The addition of the North Lease Expansion Area to the Skyline Lease area required a change to the current Cumulative Impact Area of the Mud Creek – Upper Huntington Creek Basin boundaries. The CHIA had boundaries that went as far North as Granger Ridge and with the new expansion area, this boundary was moved further North to include the Andrew Dairy and Wife Creek tributaries to Fish Creek. The North Lease Expansion area includes 770 acres, 690 of which are in the Fish Creek Drainage.

In addition to changing the boundary of the Cumulative Impact Area, the CHIA report was also updated. Information regarding the North Lease Expansion was included in the Introduction of the report as well as information in Sections II, III, and IV. The report was updated using information gathered in the Applicant's updated PHC including a report by Peterson Hydrologic in Appendix L of the PHC, the USGS monitoring station on Fish Creek (station 09310500), and baseline water monitoring data gathered by the Applicant.

Using the information gathered in the updated CHIA the Division has found that the proposed mining of the North Lease Expansion Area has been designed to prevent material damage to the hydrologic balance.

adaniels

FEDERAL **October 22, 2013**

PERMIT
C/007/0005

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING
1594 West North Temple
Box 145801
Salt Lake City, Utah 84114-5801
(801) 538-5340

This permit, C/007/0005, is issued for the state of Utah by the Utah Division of Oil, Gas and Mining (DOGM) to:

Canyon Fuel Company, LLC
225 North 5th Street, Suite 900
Grand Junction, Colorado 81501

for the Skyline Mine. Canyon Fuel Company, LLC is the lessee of federal, state and fee-owned property. A performance bond is filed with the DOGM in the amount of $5,137,000, payable to the state of Utah, Division of Oil, Gas and Mining and the Office of Surface Mining Reclamation and Enforcement (OSMRE). DOGM must receive a copy of this permit signed and dated by the permittee.

Sec. 1 STATUTES AND REGULATIONS - This permit is issued pursuant to the Utah Coal Mining and Reclamation Act of 1979, Utah Code Annotated (UCA) 40-10-1 et seq, hereafter referred to as the Act.

Sec. 2 PERMIT AREA - The permittee is authorized to conduct surface disturbing activities only as described in the approved Mining and Reclamation Plan and within areas covered by the Performance Bond which are within the described permit area at the Skyline Mine situated in the state of Utah, Carbon County, and located as follows:

Township 12 South, Range 7 East, SLBM
Section 32: Portion SE1/4SE1/4

Township 13 South, Range 6 East, SLBM
Section 1: Portions of S1/2NW1/4, S1/2NE1/4,
Section 13: Portions of S1/2S1/2,
Section 23: Portions of SE1/4NE1/4,
Section 24: Portions of NE1/4SW1/4,
Section 25: Portions of S1/2S1/2,
Section 35: Portions of NE1/4, S1/2,
Section 36: Portions of N1/2NW1/4

Township 13 South, Range 7 East, SLBM
Section 4: Portions of SW1/4NW1/4, NW1/4SW1/4,
Section 5: Portions of E1/2NE1/4,
Section 6: Portions of S1/2N1/2,
Section 17: Portions of S1/2S1/2,
Section 18: Portions of S1/2S1/2,
Section 19: Portions of N1/2N1/2

Township 14 South, Range 6 East, SLBM
Section 2: Portions of W1/2NW1/4,
Section 3: Portions of SE1/4NE1/4

This legal description is for the permit area of the Skyline Mine included in the mining and reclamation plan on file at the Division as shown on Drawing 1.6-3 Skyline Mines Permit Area.

Sec. 3 **AUTHORIZED MINING AREA** - The permittee is authorized to conduct underground coal mining and reclamation activities only as described in the approved Mining and Reclamation Plan and on lands where the "Right-of-Entry" has been acquired. This area includes the area above underground works and areas subject to subsidence and is described as follows:

Township 12 South, Range 6 East, SLBM
Section 25: SE1/4NE1/4, E1/2SE1/4, lots 3 and 4, SW1/4NE1/4, W1/2SE1/4, SW1/4
Section 26: S1/2SE1/4, SE1/4SW1/4, lots 1-4, N1/2S1/2, SW1/4SW1/4
Section 34: Portions of S1/2N1/2, S1/2, NE1/4NE1/4
Section 35: All
Section 36: W1/2, N1/2NE1/4, S/W1/4NE1/4, NW1/4SE1/4, N1/2NE1/4

Township 12 South, Range 7 East, SLBM
Section 32: Portions of SE1/4SE1/4,

Township 13 South, Range 6 East, SLBM
Section 1: Portions of S1/2NE1/4, W1/2,
Section 2: All,
Section 3: All,
Section 10: All,
Section 11: All,
Section 12: W1/2SW1/4, W1/2NW1/4, NE1/4NW1/4,
Section 13: W1/2, portions of S1/2SE1/4,
Section 14: All,
Section 15: W1/2NE1/4,
Section 22: All,
Section 23: W1/2, NE1/4, W1/2SE1/4,

Section 24: NW1/4, Portions of NE1/4,
Section 25: Portions of SE1/4SW1/4,
Section 26: W1/2, W1/2E1/2,
Section 27: All,
Section 34: All,
Section 35: All
Section 36: Portions of N1/2NW1/4

Township 13 South, Range 7 East, SLBM
Section 4: Portions of W1/2,
Section 5: Portions of NE1/4,
Section 6: Portions of S1/2N1/2
Section 17: Portions of S1/2S1/2
Section 18: Portions of S1/2S1/2
Section 19: Portions of N1/2NW1/4

Township 14 South, Range 6 East, SLBM
Section 2: W1/2NW1/4
Section 3: E1/2NE1/4

This legal description is for the authorized mining area of the Skyline Mine. The permittee is authorized to conduct coal mining and reclamation operations connected with mining on the foregoing described property subject to the conditions of the leases, the approved mining plan, including all conditions and all other applicable conditions, laws and regulations.

Sec. 4 COMPLIANCE - The permittee will comply with the terms and conditions of the permit, all applicable performance standards and requirements of the State Program.

Sec. 5 PERMIT TERM - This permit expires on April 30, 2017.

Sec. 6 ASSIGNMENT OF PERMIT RIGHTS - The permit rights may not be transferred, assigned or sold without the approval of the Director, DOGM. Transfer, assignment or sale of permit rights must be done in accordance with applicable regulations, including but not limited to 30 CFR 740.13(e) and R645-303.

Sec. 7 RIGHT OF ENTRY - The permittee shall allow the authorized representative of the DOGM, including but not limited to inspectors, and representatives of OSMRE, without advance notice or a search warrant, upon presentation of appropriate credentials, and without delay to:

A. have the rights of entry provided for in 30 CFR 840.12, R645-400-110, 30 CFR 842.13 and R645-400-220; and,

B. be accompanied by private persons for the purpose of conducting an inspection in accordance with R645-400-100 and 30 CFR 842, when the inspection is in response to an alleged violation reported by the private person.

Sec. 8 SCOPE OF OPERATIONS - The permittee shall conduct surface disturbing activities only on those lands specifically designated as within the permit area (in section 2 above) on the maps submitted in the mining and reclamation plan and permit application and approved for the term of the permit and which are subject to the performance bond. All coal mining and reclamation operations are to be conducted within the bounds of the authorized mining area.

Sec. 9 ENVIRONMENTAL IMPACTS - The permittee shall minimize any adverse impact to the environment or public health and safety through but not limited to:

A. accelerated monitoring to determine the nature and extent of noncompliance and the results of the noncompliance;

B. immediate implementation of measures necessary to comply; and

C. warning, as soon as possible after learning of such noncompliance, any person whose health and safety is in imminent danger due to the noncompliance.

Sec. 10 DISPOSAL OF POLLUTANTS - The permittee shall dispose of solids, sludge, filter backwash or pollutants in the course of treatment or control of waters or emissions to the air in the manner required by the approved Utah State Program and the Federal Lands Program which prevents violation of any applicable state or federal law.

Sec. 11 CONDUCT OF OPERATIONS - The permittee shall conduct its operations:

A. in accordance with the terms of the permit to prevent significant, imminent environmental harm to the health and safety of the public; and

B. utilizing methods specified as conditions of the permit by DOGM in approving alternative methods of compliance with the performance standards of the Act, the approved Utah State Program and the Federal Lands Program.

Sec. 12 EXISTING STRUCTURES - As applicable, the permittee will comply with R645-301 and R645-302 for compliance, modification, or abandonment of existing structures.

Sec. 13 RECLAMATION FEE PAYMENT - The permittee shall pay all reclamation fees required by 30 CFR part 870 for coal produced under the permit, for sale, transfer or use.

Sec. 14 AUTHORIZED AGENT - The permittee shall provide the names, addresses and telephone numbers of persons responsible for operations under the permit to whom notices and orders are to be delivered.

Sec. 15 COMPLIANCE WITH OTHER LAWS - The permittee shall comply with the provisions of the Water Pollution Control Act (33 USC 1151 et seq,) and the Clean Air Act (42 USC 7401 et seq), UCA 26-11-1 et seq, and UCA 26-13-1 et seq.

Sec. 16 PERMIT RENEWAL - Upon expiration, this permit may be renewed for areas within the boundaries of the existing permit in accordance with the Act, the approved Utah State Program and the Federal Lands Program.

Sec. 17 CULTURAL RESOURCES - If during the course of mining operations, previously unidentified cultural resources are discovered, the permittee shall ensure that the site(s) is not disturbed and shall notify DOGM. DOGM, after coordination with OSMRE, shall inform the permittee of necessary actions required. The permittee shall implement the mitigation measures required by DOGM within the time frame specified by DOGM.

Sec. 18 APPEALS - The permittee shall have the right to appeal as provided for under R645-300.

Sec. 19 SPECIAL CONDITIONS - There are special conditions associated with this permitting action attached as Attachment A.

The above conditions (Secs. 1-19) are also imposed upon the permittee's agents and employees. The failure or refusal of any of these persons to comply with these conditions shall be deemed a failure of the permittee to comply with the terms of this permit and the lease. The permittee shall require his agents, contractors and subcontractors involved in activities concerning this permit to include these conditions in the contracts between and among them. These conditions may be revised or amended, in writing, by the mutual consent of DOGM and the permittee at any time to adjust to changed conditions or to correct an oversight. DOGM may amend these conditions at any time without the consent of the permittee in order to make them consistent with any new federal or state statutes and any new regulations.

THE STATE OF UTAH

By: Joe R. Byra

Date: 10/22/2013

I certify that I have read, understand and accept the requirements of this permit and any special conditions attached.

_____

Authorized Representative of the Permittee

Date: _____

ATTACHMENT A
Special Conditions
C/007/0005
October 22, 2013

1) Canyon Fuel Company, LLC must submit water quality data for the Skyline Mine in an electronic format through the Electronic Data Input web site, http://linux1.ogm.utah.gov/cgi-bin/appx-ogm.cgi

2) Canyon Fuel Company, LLC must submit cumulative monthly flow data for discharges into Electric Lake and Eccles Creek. This monthly data must be submitted in the first week of the following month.

3) Mining within the boundary of the 770 acre North Lease Modification area known as Granger Ridge can only proceed after Federal Mine Plan Approval is granted and concurrence is received from OSM

MUD CREEK BASIN AND UPPER HUNTINGTON CREEK BASIN CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

For

SKYLINE MINE
C/007/0005

WHITE OAK MINE
C/007/0001

BLAZON MINE
FOR/007/0021

KINNEY #2 MINE
C/007/0047

In

CARBON, EMERY, AND SANPETE COUNTIES, UTAH

October 7, 2013

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I. INTRODUCTION

The Skyline, White Oak, Blazon and Kinney #2 mines are located in the northern Wasatch Plateau Coal Field, approximately within a 5-mile radius of the Scofield Reservoir and 25 miles west of the city of Price, Utah. Castle Valley, where the cities of Price and Huntington are located, lies east of the Wasatch Plateau, and farther east is the San Rafael Swell. The Sanpete valley is west of the Wasatch Plateau (Figure 1, Appendix A).

Skyline

The Skyline Mine straddles the drainage divide between the upper Huntington Creek and Mud Creek basins. The Carbon - Emery County line follows this same divide. Though Skyline Mine has workings beneath both basins, the mine's only portals are in Eccles Canyon in the Mud Creek basin. Skyline's boundary stops at the Sanpete County line on the west.

The Skyline Mine has workings in three different seams, the Upper O'Connor Seam (Mine No. 1), the Lower O'Connor B Seam (Mine No. 2), and the Lower O'Connor A Seam (Mine No. 3). Construction of the Skyline Mine Facilities began in 1980, and the No. 3 Mine and No. 1 Mines began production in October 1981, and June 1982, respectively. Development of the #2 mine began in 1992. In addition to the mine offices, surface facilities include: a conveyor down Eccles Canyon, a loadout at the mouth of Eccles Canyon, a waste rock disposal site in UP. Canyon near the town of Scofield, and a ventilation portal opened by breakout from the #3 mine into the South Fork of Eccles Canyon.

The Skyline Mine was idle from May 2004 to January 2005, after completing mining in the southwest portion of the mine. During that time, Canyon Fuel Company continued to pump water from the mine, ventilate it, and perform maintenance duties on the surface and underground. In January 2005 they began development mining in the North Lease area, and began longwall mining in the North Lease in early 2006.

In 2009, with mine operations advancing northward, the Operator submitted plans to build a ventilation shaft, escape shaft, and access slope in Winter Quarters Canyon. The Winter Quarters Ventilation Fan facility will disturb approximately 8 acres near the center of Section 1, T. 13S, R. 6E.

A lease modification to the North Lease in 2013 extended the mining slightly into the Fish Creek drainage, adding approximately 770 acres.

White Oak

The White Oak Mine was located east of, and adjacent to, the Skyline Mine. This mine was previously known as Valley Camp and the Belina Complex. In addition to the mine site, surface facilities included a loadout in Pleasant Valley, just south of Scofield, and an office

building just across the highway from the loadout. Access to the reclaimed White Oak Mine site is through Whisky Canyon, a side canyon to Eccles Canyon. Approximately 22 % (700 acres) of the White Oak permit area lies within the Huntington Creek basin, and the remainder is in the Mud Creek basin.

Construction of the White Oak Mine facilities began in 1975. The White Oak Mine operated underground from 1979 through September 2001. Lodestar Energy, Inc. surface mined much of the White Oak Mine portal area from November 2001 through April 2003. Lodestar went through bankruptcy proceedings during 2003 and 2004 and did not finish mining or reclaiming the portal area. Except for a few Utah Pollutant Discharge Elimination Systems (UPDES) reports in early 2003, water monitoring ended in September – October 2002. The Division of Oil, Gas, and Mining (the Division) completed reclamation of the mine and loadout sites in late 2005 with money from the surety company and a settlement with the owners and controllers of Lodestar.

Poor vegetative growth overall and deep erosion of the lower reach of the restored stream channel required the Division to pursue further reclamation. Plans finalized in July 2010 called for recontouring of the stream channel, construction of terraces on the north side for runoff and erosion control, mulch and biosolids for soil augmentation, and reseeding and planting of live trees and shrubs.

Blazon

The Blazon #1 Mine was located just south of the town of Clear Creek. Construction on the Blazon #1 Mine began in July 1980, and the mine produced coal from March 1981 through January 1982. North American Equities forfeited the reclamation bond on the site, and the Division has subsequently reclaimed it.

Kinney #2

The Kinney #2 Mine is a proposed underground mine located just east of the town of Scofield adjacent to State Road 96. The permit area covers approximately 452 acres with a disturbed area footprint of 38 acres. Mining is planned for the Hiawatha coal seam from the outcrop at the edge of Pleasant Valley. The coal seam is located at elevations between 7,800 and 7,900 feet above sea level. Entry will be achieved via an approximately 600 foot wide corridor between old abandoned mine workings. Coal will be extracted from multiple fault bounded reserve blocks. Maximum productions rates are estimated to be 800,000 tons annually utilizing continuous mining methods. Mining will be restricted to blocks of coal lying between faults. The project life of the mine is estimated to be 3 years with potential future expansion further to the south and east.

Historical mining activities have occurred in the area producing abandoned underground workings in the general vicinity of the Kinney #2 mine. The Utah Division of Oil, Gas and

Mining's Abandoned Mine Reclamation program conducted a project in the 1980s reclaiming the historical workings.

CHIA Objectives

This cumulative hydrologic impact assessment (CHIA) is a findings document involving an assessment of the cumulative impact of all anticipated coal-mining operations on the hydrologic balance within the Cumulative Impact Area (CIA). The CHIA is a determination of whether or not there will be material damage resulting from the cumulative effects of adjoining mines outside of individual mine permit boundaries. This report complies with federal legislation passed under the Surface Mining Control and Reclamation Act (SMCRA, Public Law 95-87) and subsequent Utah and federal regulatory programs under R645-301-729 and 30 Code of Federal Regulations (CFR) 784.14(f), respectively.

The objectives of a CHIA document are to:

1.	Identify the Cumulative Impact Area (CIA).	(Part II)
2.	Describe the hydrologic system – including geology, identify hydrologic resources and uses.	(Part III)
3.	Document the baseline conditions of surface and ground water quality and quantity.	(Part IV)
4.	Identify Hydrologic Concerns (Identify which hydrologic resources are likely to be impacted and determine which parameters are important for predicting future impacts to those hydrologic systems).	(Part V)
5.	Identify relevant standards against which predicted impacts can be compared.	(Part VI)
6.	Estimate probable future impacts of mining activity with respect to the parameters identified above.	(Part VII)
7.	Assess probable material damage.	(Part VIII)
8.	Make a statement of findings.	(Part IX)

The original Belina (White Oak) Mine CHIA prepared by Engineering-Science (1984) and the Huntington Creek Basin CHIA prepared by Simons, Li, and Associates, Inc. (1984), for the U. S. Office of Surface Mining (OSM), provided much of the basic information used in this

CHIA. The White Oak and Skyline Mine Reclamation Plans (MRP) have also been used. The original Technical Analysis (TA) for the Skyline Mine permit includes information similar to that required for a CHIA, but a complete CHIA was apparently not prepared at the time the original permit was approved in 1980.

II. CUMULATIVE IMPACT AREA (CIA)

Figure 2 (Appendix A) shows the boundaries of the Cumulative Impact Area (CIA). The Office of Surface Mining (OSM) defines the CIA as "an area where impacts from the proposed operation, in combination with other existing and anticipated operations may cause material damage." The Division determines the CIA boundaries based on existing mining activities, anticipated mining activities, knowledge of surface and ground water resources, and anticipated impacts of mining on those water resources.

In October 2013, the CIA boundary was revised to include the Skyline Mine modification of the North Lease. This lease extends into the Upper Fish Creek Drainage, which contributes flow to Scofield Reservoir.

The CIA boundary was revised in June 2011 to incorporate the newly proposed Kinney #2 mine. The rationale for defining the CIA boundary is as follows:

On the west, the Gooseberry Fault runs north south, and is believed to form a barrier to groundwater flow. This would include the area between the west edge of the Huntington Creek drainage and Gooseberry Creek in the CIA. To also include springs along the fault escarpment, the boundary was extended west to Gooseberry Creek. Similarly, the Pleasant Valley Fault runs north south along the Mud Creek valley and is believed to form a boundary to groundwater flow. The Blazon, White Oak, and Skyline Mines (including the North Lease added in 2005, and possible future Flat Canyon Lease) lie between these two faults. Granger Ridge and Scofield Reservoir bound the northern end and the southern boundary was extended in 2002 to include Electric Lake. The CIA includes about 56,680 acres with about 29,200 acres in the Mud Creek drainage, about 21,146 acres in the Huntington Creek drainage, about 4,849 acres in the Gooseberry Creek drainage and 54 acres in the North Fork of Gordon Creek.

The CIA encompasses the entire Mud Creek basin; from Scofield Reservoir on the north, to the southern end at the Carbon/Emery County Line. This basin includes the ephemeral drainages on the east side of Pleasant Valley. East of the town of Scofield, these ephemeral channels include (from west to east): Eagle Canyon, Long Canyon, and Miller Canyon. The eastern boundary of the CIA incorporates UP Canyon where Skyline's waste rock disposal site is located and Eagle Canyon, which serves as the eastern permit boundary for the Kinney #2 mine. The CHIA boundary has been drawn to include the outfall of Miller Creek (approximately 2 miles north of the Kinney #2 permit boundary) as it drains into Scofield Reservoir and would be representative of the downstream drainage from the Kinney #2 permit area.

The north end of the Mud Creek drainage includes the Woods Canyon and Winter Quarters Canyon drainages. The White Oak Mine lies mostly in the Mud Creek Basin, and the Blazon Mine is included entirely within the Mud Creek drainage area. The Blazon Mine has been reclaimed, but remains within the Division's jurisdiction.

The mountain ridge on the west side of the Mud Creek drainage is also the east side of the Huntington Creek drainage. That ridge, or divide, forms part of the boundary between Carbon and Emery Counties. The north end of the CIA boundary in the Mud Creek drainage is Granger Ridge. Granger Ridge connects the common ridge between Mud Creek and Huntington Creek, to Scofield Reservoir.

Scofield Reservoir is included in the CIA because Skyline mine-water discharges flow down Eccles Creek into Mud Creek, and then into Scofield Reservoir. In 2013 the Skyline Mine modified their lease, extending into the Upper Fish Creek drainage which contributes flow into the reservoir. Scofield Reservoir is also considered the receiving body of any downstream drainage from the Kinney #2 mine via the perennial reach of Miller Creek. Scofield Reservoir will be the receiving water body from any intermittent flows from Eagle Canyon draining the Kinney #2 permit boundary. Mud Creek is known to contribute 16 % of the water inflow to the reservoir, Fish Creek supplies approximately 75% (Waddell and others, 1983b, p. 43) and Pondtown, Lost/Dry Valley, and Miller Canyon Creeks account for the remaining 9%. Though Mud Creek supplies just 16% of the water to Scofield Reservoir, it contributes 18% of the total nitrogen and 24% of the total phosphorous inflows (Waddell et al., 1983a). The total phosphorous in Scofield Reservoir is of concern to the Utah Division of Water Quality, and they have set the Total Maximum Daily Load (TMDL) Target Load of 4,842 kg/yr (29 lb/day). The historical data suggest that the Mud Creek drainage has nutrient-rich soils, which are fairly easily eroded, and carried down stream. However, the increased flows from the Skyline mine-water discharge have not appreciably increased the amount of total phosphorous in Mud Creek through increased stream bank erosion (measured at MC-3; see Figure 12, Appendix A, EarthFax 2002, 2003, 2004). The Price River, which is used for irrigation in Castle Valley and provides the municipal water supply for the city of Price, flows from the reservoir. The increased flows (March 1999-Present) have increased the water volume in the reservoir and have provided considerably more water to the Price River drainage than natural runoff would have. Other than increased flows, no other hydrologic impacts have been noted downstream of Scofield Reservoir.

The CIA also encompasses all of the Huntington Creek drainage above the mouth of Valentines Gulch. The area immediately below Electric Lake dam, down to North Hughes Canyon, includes the Valentine Fault which runs through Valentines Gulch and continues north into the area of the CIA where mining has occurred. The CIA includes Electric Lake itself, which covers from 100 to 450 acres, depending on water level, and contains 31,500 acre-ft of active annual storage. The lake is a contributor to groundwater in the CIA. Roughly half of the Skyline Mine permit area lies within the Huntington Creek drainage. Drainages on the west side of Huntington Canyon that are part of the CIA include Bear Canyon, Little Eccles Canyon, Boulger Canyon, Flat Canyon, Swens Canyon, Little Swens Canyon, Brooks Canyon, and Upper Huntington Creek.

Electric Lake became a part of the CIA in November 2002 because records provided by PacifiCorp (owner and operator of the Lake) indicated a marked decline in storage volumes beginning in July 2001; the same time Skyline Mine had a significant increase in mine-water inflows. These records, and claims by PacifiCorp that the two events were related, prompted the

Division to closely study all reports related to the mine in-flows and Electric Lake water losses. In September 2001, Skyline Mine developed a well and began pumping water into Electric Lake. Although not considered mine-water discharge because it is not drawing water directly from the mine workings, Well JC-1 pumped an average of approximately 3,000 gallons per minute (gpm) into Electric Lake from September 2001 through September 2004 (~400 acre-ft/month). Starting in July 2003, another well (JC-3) started pumping mine-water discharge water into Electric Lake. JC-3 pumped through July 2004, at an average of 2,550 gpm (~340 acre-ft/mo) of mine-water discharge to Electric Lake, at which time it encountered both mechanical and water quality problems and was shutdown. According to Storage Volume records provided by PacifiCorp (Hansen, Allen, and Luce, Inc. 2005, PacifiCorp 2003, 2004), the water provided to Electric Lake from the JC wells (~740 acre-ft/month at highest) has had little effect on the volume of water stored in the lake. JC-1 continues to consistently pump approximately 4,000 gpm (530 ac-ft/mo) into Electric Lake.

III. HYDROLOGIC SYSTEM

The CIA is located in both the Mud Creek and upper Huntington Creek basins, which are the headwater basins of the Price and San Rafael Rivers, respectively. The Price River flows generally southeast and passes through the city of Price. Huntington Creek flows generally east. It emerges from the Wasatch Plateau near the town of Huntington and joins with Cottonwood and Ferron Creeks on the east side of Castle Valley to form the San Rafael River. The Price and San Rafael Rivers are tributaries to the Green River, which in turn is tributary to the Colorado River.

Precipitation on the Wasatch Plateau varies from 40 inches at higher elevations to less than 10 inches at lower elevations and more than 30 inches per year on the higher ridges and in the upper Huntington Creek basin (Coastal, 1993; Simons, Li, and Associates, 1984). Seventy to eighty-percent of the total precipitation falls as snow between October and April. Skyline Mine has a weather reporting station, which averages between 22 and 26 inches of precipitation per year. SNOTEL meteorological reporting stations are also located in the area and include: Clear Creek #1, Clear Creek #2, Scofield Dam, and Price, Utah. Precipitation data measured from the SNOTEL station located at the Scofield Dam average totals 14.56 inches per year with average total snowfall as 115.8 inches per year. Actual and potential evapotranspiration rates are roughly equal (less than 18 inches per year) in the upper elevations of the Wasatch Plateau (Waddell and others, 1983b). Probably less than 5% of the precipitation recharges the ground water system (Price and Arnow, 1979). The Wasatch Plateau is classified as semiarid to sub-humid.

Vegetation varies from Sagebrush/Grass communities at lower elevations to Spruce/Fir/Aspen and Mountain Meadow communities at higher elevations. Other vegetative communities include Mountain Brush, Sagebrush, Ponderosa, and Riparian (Simons, Li, and Associates, 1984). These communities are generally used for wildlife habitat and livestock grazing. Even though slopes are steep, there is good vegetative cover, and soils with high organic content are well developed, providing an adequate medium for ground water recharge (Coastal, 1993, p. PHC2-5).

SURFACE WATER

Mud Creek Drainage

Mud Creek basin is an asymmetric watershed. Watersheds on the dominant west flank contain perennial and ephemeral streams that flow eastward to Mud Creek through straight, deeply incised canyons. Small, ephemeral watersheds drain to Mud Creek from the east flank of the basin (Fig. 5, Appendix A). Scofield Reservoir, a man-made structure, represents the northern limit of the Mud Creek Watershed.

Scofield Reservoir

Scofield Reservoir is approximately 2,815 acre body of water that was created in 1946 to serve a variety of purposes such as coal mining, agriculture, and recreational use. The reservoirs capability as a fishery has been impaired in recent decades due to the elevated amounts of phosphorus a entering the reservoir principally from Mud Creek and Fish Creek. Elevated concentrations of phosphorus have resulted in blue-green algal blooms leading to the loss of zooplankton, an important food source for trout. External sources of phosphorus entering the reservoir include: sediment, and livestock sewage. Other problems identified for Scofield Reservoir include: oxygen depletion that threatens fish populations and excessive sedimentation into the reservoir.

The reservoir's elevation is measured by a staff gauge located at the Scofield Dam by the Bureau of Reclamation real-time measuring station. The reservoirs elevation is listed on topographic maps as 7,618 feet above sea level.

Mud Creek

Mud Creek flows north through Pleasant Valley to Scofield Reservoir and normally contributes around 16% of the annual flow to that reservoir (Valley Camp, 1993, p. 40). Mud Creek drains an area of approximately 42 square miles. The headwaters of Mud Creek are located 9 miles to the south with a length of approximately 11.2 miles.

Since March 1999, inflows to Skyline Mine were pumped to abandoned underground workings and, after appropriate settling, pumped to Eccles Creek, a tributary to Mud Creek. Skyline measures and reports these discharges to Eccles Creek quarterly as CS-12 (Mine #3 discharge) and CS-14 (Mine #1 discharge). Until March 1999, the combined discharge to Eccles Creek never exceeded 795 gpm, and averaged just 285 gpm. Combined mine-water discharges to Eccles Creek have been recorded continuously and reported monthly since August 16, 2001 (data available at https://fs.ogm.utah.gov/pub/MINES/Coal/007/C0070005/DischargeInfo/07-26-2010Mine-James-%20Discharge.xls). Between August 2001 and December 2003, the average monthly discharge varied from 2,826 gpm (September 2003) to 9,846 gpm (March 2003), with an overall average discharge of 7,7,98 gpm. Since January 2004, Skyline has allowed some abandoned workings in the southwest portion of the mine to flood. The flooding, combined with decreased mine inflows, has reduced the overall monthly average discharge (January 2004 through June 2010) to Eccles Creek to 3,795 gpm, with a low of 860 gpm (July 2004) and a high of 4,914 (July 2006). The discharge rate increased slightly during the development of the North Lease due to discharges of stored water from Mine #3, averaging 4,170 gpm from October 2004 to December 2005. Discharge has been on a downward trend since 2005 (Exhibit 1), and in 2008 and 2009 the discharge averaged 3,400 gpm.

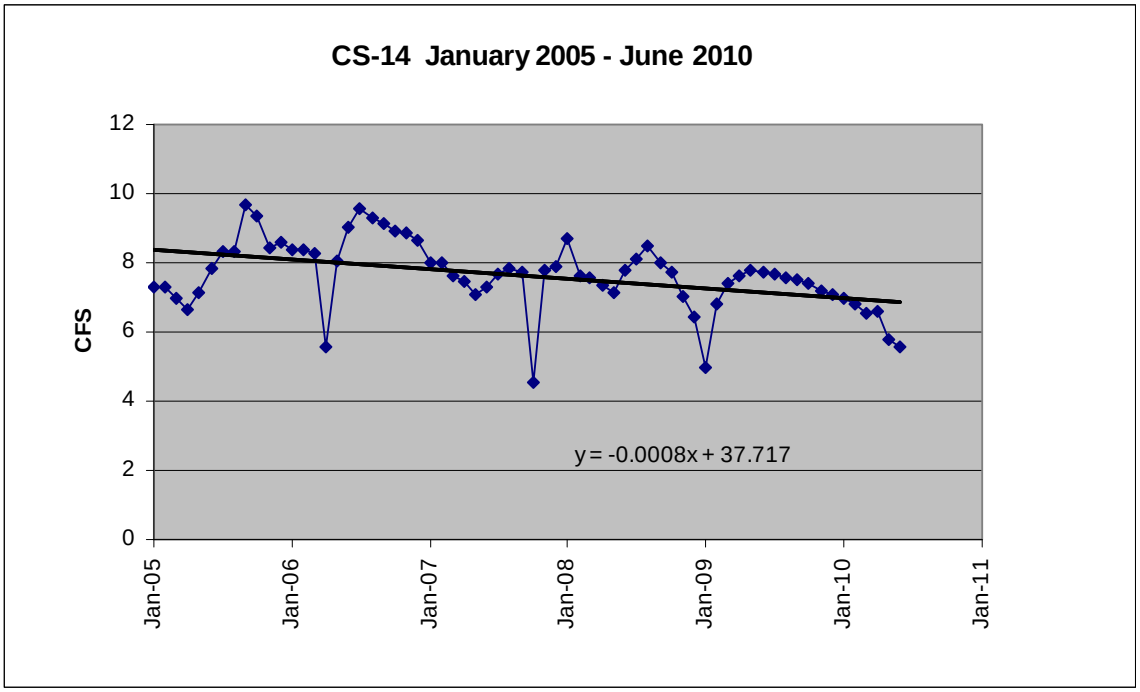

Exhibit 1 – The discharge from the mine, measured at CS-14, has been declining since 2005.

The mine workings in the southwest portion of the mine were completely flooded in September 2004. With the water in the mine workings at a static level, it is possible to measure mine inflows and the effects of increased head (if any) on the inflows with some accuracy.

The increased flow in Eccles Creek peaked at approximately 10 times the average pre-1999 annual amount, and flow in Mud Creek at about 1.2 times the average pre-1999 flow. At the same time, the peak monthly flows were only about 13% of spring runoff rates. A study (EarthFax 2002, 2003, 2004) to analyze the impacts to Eccles and Mud creeks indicated that the streams were well armored and that, so far, the increased flows have affected them very little.

Upper Fish Creek Drainage

Upper Fish Creek is a perennial tributary to Scofield Reservoir located North of Granger Ridge and will not be undermined in the Skyline North Lease. Within the Upper Fish Creek drainage area three surface drainages will be undermined with the North Lease modification, these include Wife Creek and two forks of Andrew Dairy Creek. These three drainages are ephemeral in nature within the Skyline North Lease area. Wife Creek becomes perennial as it meets Upper Fish Creek, while Andrew Dairy Creek has been dry during all baseline monitoring activities. The Skyline October 2013, North Lease modification added 690 acres within the Fish Creek drainage. The overburden within the area to be mined ranges from approximately 900-1300 feet.

Miller Creek

Miller Creek is a small tributary to Scofield Reservoir located in Section 21 T12S R7E and approximately two miles north of the Kinney #2 permit boundary. Miller Creek originates in Miller Canyon where it flows intermittently at the higher elevations. The creek becomes perennial at a lower elevation for approximately one and a half mile reach before it discharges to Scofield Reservoir from a point known as Miller Outlet. Miller Creek contributes approximately 9% of the annual flow to Scofield Reservoir. Surface water flow from Miller Outlet is measured from a culvert that discharges to the Scofield Reservoir. Typically, this location is frozen over during the months of November through March. When the stream is flowing, flow velocity averages around 141 gpm.

Upper Huntington Creek

Ephemeral and perennial streams drain the upper Huntington Creek Basin (approximately 20,000 acres; 18,000 acres in the CIA), and flow into Electric Lake, which is owned and operated by PacifiCorp (formerly Utah Power and Light Company). PacifiCorp also holds a significant portion of the water rights in the Huntington Creek basin, which they use to cool their coal-fired electric generating plant located downstream along Huntington Creek. Electric Lake has regulated the discharge of upper Huntington Creek since its construction in 1973.

Beginning in August 2001, PacifiCorp began noticing that the water level in Electric Lake was dropping faster than they were discharging it at the dam. The change in lake response is clearly seen in Figure 13, based on data that PacifiCorp provided. PacifiCorp has monitored the water levels in the lake and the amount of water being released from the dam on a monthly basis. Lake inflows were not measured, but estimated or 'imputed' by subtracting the amount of water released at the dam from the change in water volume of the lake. Over time these imputed numbers showed a fairly consistent performance of the reservoir. In August 2001, the imputed inflow numbers were consistently negative, implying that the lake was losing water at a significant rate. Traditionally, reservoirs such as Electric Lake have no need to collect accurate inflow numbers; as long as the reservoir holds sufficient water for uses downstream, there is no need to spend time and money investigating the exact nature of all inflows and outflows. Standard water-balance budgets for reservoirs generally assume both a groundwater inflow and groundwater outflow component (i.e. communication with bedrock, flow into faults, saturation of alluvial sediments, etc). However, because of the changed response in lake function, PacifiCorp began measuring the inflow into Electric Lake in July 2002 with a flume located on Huntington Creek above the Lake. The flume was recalibrated in June of 2003 and continues to collect flow data when not inundated. Because the lake level was rising in 2004, PacifiCorp installed a second flume further upstream, but still below Boulger Creek, in May of 2004. With these two flumes, measurement of inflow coming from Upper Huntington Creek has been continuous, with the exception of periods when the flumes were either washed-out or inundated. Side flows that occur during spring runoff and other high-flow periods have also been measured at least twice per year, and estimated as a percentage of total flow during months when not

directly measured. Figure 14 illustrates both the calculated and measured inflows for Electric Lake (Hansen, Allen, & Luce, Inc.).

Intuitively, it may appear as though the increased losses noted at Electric Lake are associated with the increased mine inflows experienced at the Skyline Mine. However, despite the efforts of all parties, studies supplied by the Skyline Mine and PacifiCorp do not *conclusively* prove or disprove a direct connection. These studies will be discussed in more detail in Section VII of this CHIA, Surface Water Usage.

Hansen, Allen, and Luce, Inc. conducted a survey of water rights for Valley Camp of Utah in 1990. The survey covered most of the CIA. One hundred and ninety four surface water rights were found, 106 for stock watering, 25 for irrigation, 55 undeclared, and the remaining 8 for other uses. Skyline Mine conducted an updated survey of the water rights in their permit area in 2002, in conjunction with the addition of the Winter Quarters/North Lease. Most streams in the CIA have water rights filed on them.

Figure 15 graphically illustrates the Operation of Electric Lake compared with the amount of available water based on the Surface Water Supply Index for the San Rafael drainage basin for the 1983 – 2002 period. The graph generally reflects that when sufficient water is available, both Electric Lake Storage and Discharge are high. When water availability is low, storage is correspondingly lower. An interesting comparison is the1978-79 period to the 2001-02 period. In 1978, the average storage was 18,600 acre-ft while total discharge was 9,375 acre-ft. In 2001, the average storage was 16,397 acre-ft while discharge was 14,945 acre-ft. Surface Water Supply Index information is not available for 1979, however with total discharge being only approximately 50 percent of the average storage volume in 1978, the storage volume rose in 1979. The opposite effect was noted in 2001-02 when total discharge was 91 percent of the average storage volume in 2001. This was also compounded by the drought conditions experienced in the area since 1998, as illustrated by the Surface Water Supply index information. However, some of the effects of drought were negated with approximately 25 percent (4,480 acre-ft) of the water being pumped into Electric Lake from the JC-1 well.

Ground Water

Ground water is found principally in two configurations within the CIA: numerous small, localized perched systems related to discontinuous sandstone lenses in the Blackhawk Formation, and a continuous regional system in the coal seams and adjacent rocks of the lower Blackhawk Formation and the underlying Star Point Sandstone. A principal factor influencing the distribution and availability of ground water in these systems is the geology.

Geologic studies conducted for the Kinney #2 permit found that fault-block structure that forms the basin and range topography in the area is the result of faulting. These faults have been found to be a contributing influence on regional groundwater. Faulting in the Eastern Wasatch plateau will typically form a brecciated gouge zone. These fault gouge zones appear to act as both a barrier and a conduit for the movement of groundwater. As rainwater and snowmelt percolate in a downward trajectory toward the lower-lying grabens, water is both impaired by structural discontinuities and varying permeability of the material in the gouge zone. Once water percolates into the gouge zones, it is believed to then flow in a horizontal pathway following the path of least resistance.

Unlike other areas of the CIA, in the area of the Kinney #2 permit boundary, a saturated groundwater zone has not been found within the Hiawatha coal seam. Eleven wells were completed during the initial groundwater investigation for the Kinney #2 permit. Of the three groundwater monitoring wells drilled that intercepted the Hiawatha coal seam, only one well CR-06-09 has intercepted groundwater. This well is located approximately 2,000 feet northeast of the permit boundary and is separated by Eagles Canyon. Out of the remaining wells, only one other is currently producing water CR-06-03-ABV is located at the northeast corner of the permit boundary. This well was drilled in the Eagle Canyon graben, which is believed to be an active zone for the lateral transmission of groundwater migrating through the fault zone.

Geology

Stratigraphy

An offlap (regressive) sequence is exposed in the outcropping Cretaceous rocks within the CIA. Strata exposed in and adjacent to the CIA are shown on the regional geology map on Figure 3. A Mining and Geology map shown on Figure 3A presents the mine workings for the Skyline mine relative to the locations of faults. A regional geology map focused on the bedrock and surficial geology in the area of the Kinney #2 mine is presented as Figure 3b. Generalized cross-sections of the Skyline Mine and the Kinney #2 Mines are presented on Figure 4a and 4b. All figures are located in Appendix A. The geologic age of all the strata represented on the maps, with the exception of the alluvial/colluvial material in Pleasant Valley, range in age from Late Cretaceous to Tertiary (Eocene).

The oldest rocks exposed in or adjacent to the CIA are upper members of the Mancos Shale, which crops out in Huntington Canyon below Electric Lake and forms the surface of Castle Valley. The Mesaverde Group overlies the Mancos Shale and consists of the Star Point Sandstone, Blackhawk Formation, Castlegate Sandstone and Price River Formation. Overlying the Mesaverde Group are the North Horn and Flagstaff Limestone of the Wasatch Group, deposited in the very late Cretaceous and Tertiary periods. Except for well-developed soils in Pleasant Valley, quaternary sediments are generally limited to narrow, thin alluvium and colluvium deposits along valley bottoms.

The Mancos Shale consists of marine shales interbedded with sandstones and minor amounts of limestone. These shales are good aquicludes, with typically low horizontal and

vertical permeability, even near faults. Information discussed later in this CHIA suggests that water may flow through some faults more readily than usually observed. The Mancos is a thick, regional aquiclude that hydrologically isolates deeper strata from the coal mining and reclamation operations considered in this CHIA. The Upper Blue Gate (formerly Masuk) Shale Member at the top of the Mancos grades upward into the Star Point Sandstone, and westward-thinning wedges of marine shale intertongue with and is considered part of the Star Point.

The Star Point Sandstone was deposited in a barrier-beach environment. It consists of three main tongues – from lowest to highest, the Panther, Storrs, and Spring Canyon - that thin eastward and are separated by tongues of marine shale. A report prepared by Kravits Geological Services, LLC for the Skyline Mine identifies a Trail Canyon Tongue, just below the Panther Tongue, in the Skyline Mine area. Bedding in the sandstones is often massive. West of the outcrops, along the Wasatch Plateau escarpment, the sandstone tongues thicken and merge and then grade into the backbarrier, coastal plain and deltaic deposits of the Blackhawk Formation. Because of the regressive depositional sequence, the lowest Blackhawk coal seam – the Hiawatha or O'Connor - usually lies on, or just above, the top of the Star Point Sandstone. Within the Kinney #2 permit boundary east of the Pleasant Valley fault, the McKinnon seam, the Hiawatha seam, and the Columbine seam all outcrop along the Pleasant Valley graben. Additional seams in descending order that are at an elevation below the valley floor are the UP Seam and the Flat Canyon Seam (refer to cross section Figure 4b).

Doelling (1972) described the Star Point as almost devoid of shale in the Scofield area. Spieker (1931, p. 25) described the Star Point as uniformly 400 to 500 feet thick in exposures along the Wasatch Plateau escarpment, between Gordon Creek (west of Helper) and Ferron Canyon, but also noted the Star Point is 600 feet thick in central Huntington Canyon and over 1,000 feet thick along Mud Creek. A petroleum exploration well drilled just west of the Skyline Mine (in NE1/4 SE1/4 Sec 16, T. 13 S., R. 6 E) encountered a 1,200-foot thick sequence of Star Point Sandstone that consisted of sandstone layers, with a combined thickness of over 800 feet, inter-bedded with shale.

The Star Point is generally a poor aquifer, due in part to low permeability shale lenses, but water bearing characteristics are greatly enhanced by localized faulting, fracturing, and jointing. The large discharge and low seasonal variability of baseflow to Mud Creek and of springs along the Pleasant Valley fault zone indicate the Star Point has a large storage coefficient and relatively high transmissivity (Waddell, et al, 1983b, p. 78).

To better understand the geology of the Skyline area and to have better data for a numeric hydrologic groundwater model of the area, Kravits Geological Services, LLC compiled additional geologic information for the area in November 2003. The compilation consisted of drill hole information collected from 16 oil and gas wells and 73 coal exploration holes. The study focused on mapping the Star Point Sandstone, and primarily on the Storrs, Panther, and Trail Canyon Sandstone Tongues, which are likely the transgressive units supplying water to the Skyline Mine. The report states that the Trail Canyon Tongue is a more recently recognized tongue that lies just below the Panther Tongue. The sandstone tongues vary between 2 and 211

ft thick and average 44 ft thick. They are composed of relatively clean, fine to medium grained quartz sand, with sparse matrix, and 8 to 12% cement. The tongues have an average porosity of 16% and average permeability of 90 milli darcies based on work to the southeast.

The groundwater encountered by the Skyline Mine appears to be predominantly supplied by the underlying Star Point Sandstone. Although significant water has been discharged (56,000 acre-ft from January 2000 through October 2004), the Star Point Sandstone has a significant areal extent, reaching beyond the CIA, and does not appear to be affected in areas where the Star Point Sandstone water is being put to beneficial use.

The Blackhawk Formation consists of approximately 1,500 to 1,900 feet of lenticular claystones, siltstones, sandstones, and coal seams deposited in backbarrier, coastal plain, and deltaic environments. The claystones contain high percentages of montmorillonite and other swelling clays (Coastal, 1993, p. PHC2-3). The Blackhawk is the main coal bearing formation in the Wasatch Plateau. The important coal seams occur in the lower 350 feet, which is the section that inter-tongues with the Star Point Sandstone. The lower Blackhawk and upper Star Point are usually considered to be one continuous aquifer.

Fluvial channel sandstones are found in the lower Blackhawk but are more frequent toward the top of the formation. These sandstones are local in extent, generally fine grained, and well cemented. They have localized high clay content. The discontinuous character of these channel sandstones and the abundance of clay throughout the Blackhawk Formation produce perched aquifers and favor formation of local flow systems that discharge through numerous seeps and springs.

The Castlegate Sandstone, the basal part of the Price River Formation, is typically massive, resistant to erosion, and white to gray in color. It consists of fluvial pebble conglomerates and fine- to coarse-grained, argillaceous sandstones with some shale. It is carbonaceous in the Book Cliffs, but the coal is thin and lignitic. The Castlegate Sandstone is good aquifer material, with seeps and springs common at the Castlegate-Blackhawk contact.

The Price River Formation is light-colored, medium-grained and shaley sandstone interbedded with roughly an equal volume of darker, carbonaceous shale or mudstone. There are large point-bar sandstones, and also minor amounts of coal.

The Mesa Verde Group is overlain by the North Horn Formation, which is exposed along the top of the ridge in the western part of the CIA. The North Horn is composed of bentonitic, calcareous, silty, shales interbedded with thin limestones and fine-grained sandstones, and minor amounts of conglomerate. There are lenticular channel-sandstones throughout, enclosed by the fine-grained shales.

The Tertiary Flagstaff Limestone, which lies outside of the CIA to the west, is the youngest consolidated rock in the region. Fracturing and dissolution can produce good

permeability in this lacustrine limestone, and it is an aquifer thick and extensive enough to receive and store adequate recharge.

Structure

Surface elevations vary from 7,600 feet to 10,400 feet within the CIA, with the Star Point Sandstone and Blackhawk Formation outcrops forming most of this relief.

The CIA is located near the north end of the Wasatch Plateau structural province and lies on the Clear Creek anticline, primarily on the west flank. Bedrock generally dips on the west flank range from three to six degrees, to the southwest at the south end of the CIA and to the northwest at the north end.

The Pleasant Valley fault zone, one segment of a regional fault zone that extends north south across the Wasatch Plateau, lies on the axis of the Clear Creek anticline. Total vertical displacement is 800 to 900 feet, down to the east. Intertongued Star Point Sandstone and Mancos Shale crop out west of the fault zone, but the Blackhawk Formation crops out on the east. Mud Creek flows north along the Pleasant Valley fault zone to Scofield Reservoir, where the fault zone broadens to become the Pleasant Valley Graben. UP. Canyon, where Skyline's waste rock disposal site is situated, also follows one of the faults of this zone. Strata east of the fault zone, but within the CIA, are generally flat lying - Figures 4a and 4b, Appendix A show geologic cross sections on either side of the Pleasant Valley fault.

Other major faults in the CIA are high-angle, normal faults that run north south to northeast southwest. Movement is dominantly down to the west. The largest of these faults, with up to 350 feet of displacement, is the O'Connor fault that obliquely transects the White Oak permit area. The Connelville Fault zone, up to 1,000 feet wide and with up to 250 feet cumulative vertical displacement, separates the Skyline and White Oak mines. Upper Huntington Creek and Electric Lake lie along the Upper Joe's Valley fault zone that includes the Diagonal fault, which is paralleled on the east by the Valentine fault. The Joe's Valley, Diagonal, Valentine, and smaller unnamed faults do not have significant vertical displacement within the CIA. All of these faults gradually die out to the north and do not extend beyond the northern CIA boundary. The O'Connor and Upper Joe's Valley faults continue southward outside the CIA. Very small displacement faults, oriented roughly east west, have been encountered in the White Oak Mine and mapped on the surface at the Skyline Mine (Figures 3a and 3b, Appendix A). Four major joint and fracture orientations have been mapped underground and at the surface.

Some of the smaller east-west trending faults have been intruded by magma that solidified to form dikes. A major dike passes through the White Oak Mine, extending from Mud Creek to the Connelville Fault. Coal has been coked adjacent to this dike and has a slightly increased metal content. There is evidence these dikes affect the movement of ground water in the shallow perched systems (Figures 3a, 3b, and 4, Appendix A). Most of the approximately north-south trending faults located west of the Connelville Fault die out, or terminate in the area

of an east-west trending fault in Sections 22, 23, 24, Township 13 South, Range 6 East. North of this fault the majority of the faults and fractures trend east west. These faults appear to be sub-parallel to the Fish Creek Graben located a few miles north of the Winter Quarters/North Lease area. Canyon Fuel measured the in-situ stresses in the rocks of Mine No. 3 (generally to the north); the results indicated that the rocks were in compression in an east-west direction. Similar tests conducted in Skyline Mine No. 2 (generally to the south) indicated the rocks were in extension in an east-west direction.

The geologic history of faulting in this area has resulted in a geomorphology of north-south elongated fault-controlled structural blocks that form basin-range style topography. These uplifted blocks in some instances have enough coal reserve to mine while in other cases are too small and isolated to be economically viable to mine.

Aquifer Characteristics

In the CIA, the Star Point Sandstone, Blackhawk Formation, Castlegate Sandstone, Price River Formation, North Horn Formation, and Quaternary deposits all contain potential reservoirs or conduits for ground water. Reservoir lithologies are predominately sandstone. Sandstone reservoirs occur where there is sufficient intergranular porosity and permeability in lenticular fluvial-channel and tabular overbank deposits. Shale, siltstone, and cemented sandstone beds act as aquitards or aquicludes to impede ground-water movement. The Mancos Shale is a regional aquiclude that limits downward flow. Localized aquitards can occur within any of the more permeable formations. Ground water in the CIA occurs under both confined and unconfined conditions.

Shallow, perched ground water systems provide water to the seeps and springs issuing at the Castlegate Sandstone-Blackhawk Formation contact and from sandstone lenses of the Blackhawk Formation. The Blackhawk sandstone lenses are discontinuous and of local extent. Springs and seeps discharge on the slopes at an elevation considerably above nearby streambeds. The majority of seeps and springs daylight along the canyon sidewalls within the Blackhawk formation, often at a shale-sandstone interface. Flow is influenced by the dip of the strata and varies seasonally in response to precipitation and snowmelt. The perched systems may provide some flow directly to alluvial and colluvial fill in canyon bottoms, but they do not provide sufficient baseflow to sustain perennial streams. A total of 29 springs, 18 ground water wells, 36 stream sites, and 6 in-mine sites are continually monitored as part of the Skyline permit. A total of 4 springs, 11 groundwater monitoring wells, and 3 stream sites have been monitoring for baseline studies at the Kinney #2 mine since 2005. Figure 5 (Appendix A) illustrates all of the monitoring sites within the CIA.

Recharge percolates from the surface downward until shale, or another aquiclude is encountered. The water then moves down dip, and is channeled into discontinuous, but more permeable, sandstones creating isolated aquifers. Water in these isolated aquifers either continues to move down dip until it is discharged at the surface, or until it is able to resume vertical flow. Discharge from most seeps and springs in the CIA closely tracks precipitation

rates, and recharge probably originates in the small surface depressions or basins in the immediate vicinity. The perched system of the Blackhawk Formation and regional Star Point Sandstone are separated by unsaturated rock. Flow along faults and fractures through the Blackhawk Formation appears minimal, due to the sealing ability of the clays (see section 2.3 of the Skyline Mine MRP), but some recharge does move below the perched systems to reach the deeper regional saturated strata or aquifer. Results from the age-dating techniques used at the Skyline Mine suggest that a portion of the water encountered at the mine has a modern component (i.e. in contact with the atmosphere post 1950's). PacifiCorp's tritium study also indicates a modern component.

Figure 5a provides flow data for selected springs around Electric Lake compared to the Surface Water Supply Index (SWSI). Though a few of the springs showed no reduction in flow with the 2000-2004 drought, those that did show reduced flow are consistent with the drought conditions.

Figure 5b provides flow data for selected stream locations in the Upper Huntington Creek basin. There have been no notable reductions in flow, except those attributed to the drought conditions experienced since 2000.

The Skyline Mine has encountered significant inflow along the faults solely from the floor of the mine. Any inflows encountered from the roof have been of limited duration, which is consistent with roof flows from the Blackhawk Formation at other mines.

In the area west of the Pleasant Valley fault, a regional ground water system is located in saturated coal and rock of the lower Blackhawk Formation and Star Point Sandstone. Observation wells show that the water in this deeper regional system resides beneath the headwater drainages in the CIA and has not shown influence on the seeps and springs of the shallower lenticular systems. The Skyline Mine has historically been a relatively dry mine, with occasional roof drips, and occasional channel sandstones that typically dry up immediately or flow for a brief period. The mine did not start producing significant amounts of water until 2001, when they started encountering fracturing and faults in the floor of the mine, which were the source of the large inflows. The theory that a large portion of the water is coming from a deep regional aquifer located in the Star Point Sandstone is supported by the performance of the JC-1 and JC-2 wells, and the drawdown noted in the areas surrounding JC-1. A potentiometric surface map of the regional aquifer provided by Canyon Fuel Company (Skyline MRP drawing 2.3.4-2, last updated October 4, 2007,) indicate that the gradient is generally from southwest to northeast in the Skyline permit area. Until March 1999, a long-term decline of water levels in the wells, typically less than 3 feet per year, was attributed to long-term decreases in precipitation and to dewatering of the aquifer by mining (Coastal, 1993, PHC2-4, Figure 3c). The long-term draw down of the aquifer was observed in wells W79-26-1 and W79-35-1B (Exhibit 2), which saw declines of 48 feet and 15 feet, respectively from 1982 through June 2003 (Figure 3c, Appendix A). Well W79-35-1A showed an 88-foot elevation drop from 1982 through 1998.

In the area east of the Pleasant Valley fault east of Scofield Reservoir, groundwater is characterized in the area underlying the Kinney #2 permit area as being limited to minor, localized perched aquifer systems in the Blackhawk formation. The Hiawatha coal seam to be mined has been found to be dry within the permit boundary. More significant sources of groundwater have been found east of the Kinney #2 permit area in the form of a series of springs, seeps, and spring-fed ponds that form along the axis of Eagle Canyon graben and the subsequent graben to the east Long Canyon. These springs, seeps and ponds are believed to be the result of a surface expression of groundwater from rain and snowmelt percolating through the more porous sandstone lenses in the Blackhawk and are impeded by the more impermeable lenses of siltstone and shales.

Eagle Canyon forms an intermittent channel that ultimately drains to the Scofield Reservoir. Long Canyon is intermittent for most of its length but turns into a perennial reach at a lower elevation where it joins with Miller Canyon and becomes Miller Creek. The source of the surface water for the perennial reach of Miller Creek is likely attributed to the cumulative volume from the numerous springs originating from the higher elevations in Long Canyon, any groundwater from the perched systems migrating in a down dip northwesterly direction of the bedrock, rain and snowmelt, and the fact that this Miller Creek intersects Miller Canyon and is a receiving channel for any intermittent flows from this canyon.

The most significant source of groundwater is from an area known as Sulfur Spring. This spring is located directly on the Pleasant Valley Graben East Boundary Fault. Sulfur spring is a natural sulfur spring that is anomalous in that it flows year round at an approximate rate of 80 gpm. The water quality is considered poor and is believed to either be discharging water from the Colombine coal seam or discharging groundwater that is moving horizontally along the Pleasant Valley fault system, or a combination of both. Baseline data is available for Sulfur Spring in Chapter 7 of the Kinney #2 MRP.

Pleasant Valley represents another aquifer system mostly comprised of alluvial/colluvial deposits that is distinct from the perched systems found in the higher mountainous elevations. The East Boundary fault that created Pleasant Valley has formed a floodplain at the confluence of Mud Creek and the Scofield Reservoir. The floodplain consists of shallow groundwater that is contained in the alluvial deposits associated with the Mud Creek drainage. The groundwater system within the alluvial deposits appears to be closely tied to the surface water system where recharge occurs during periods of high flow. Monitoring well data from two wells drilled in the floodplain on the western boundary of the Kinney #2 permit area have consistently detected groundwater at an approximate elevation of 7,648 ft above sea level (ASL). The average water level of Scofield Reservoir is 7,618. Not surprisingly, groundwater gradient in the south end of Pleasant Valley flows toward the reservoir.

Data were not available to draw a correlation between any hydrologic connection feeding the alluvial aquifer in Pleasant Valley and any form of a continuous regional aquifer system that exists at the base of the Blackhawk formation/Upper Starpoint Sandstone. The existence of a regional aquifer has been reported in the western portions of this CHIA, primarily containing

water in the coal outcrops on the western side of the Pleasant Valley fault but no data presently exist confirming the presence of groundwater at lower elevations below the Hiawatha coal seam in the Kinney #2 permit area. Drilling activities during the initial exploration phase for the Kinney #2 mine found the Hiawatha coal seam to be dry in several borings drilled within the proposed permit boundary. It should be noted that the Hiawatha coal seam to be mined in the Kinney #2 permit area is located approximately 280 feet above the Scofield Reservoir surface level and is essentially truncated by the Eastern Boundary Fault of Pleasant Valley (see cross section 4b). There is no apparent hydrologic connection between the perched aquifer systems that exist in the Blackhawk sandstone above the Hiawatha coal seam and the alluvial aquifer that exists in Pleasant Valley.

The following tables represent the volume of water measured from United States Geological Survey (USGS) gauging station 09310700 Mud Creek Below Winter Quarters Canyon from surface water drainages discharging into the Scofield Reservoir since the year 2005:

YEAR	Table 1. Mud Creek Monthly Discharge Mean in cubic feet per second (cfs)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2005	12.1	13.2	15.5	20.3	138.5	48.8	13.6	12.9	12.3	13.9	14	12.9
2006	12.7	12	11.9	28	114.5	36.3	18.9	14.9	14.2	16.9	16	15
2007	14.9	15.3	17.8	21	34.5	18.8	14.3	13.8	14.9	12.4	13.4	12.7
2008	11.6	13.1	10.1	15.9	64.5	83.5	20	14.5	14.3	13.9	13.2	13.5
2009	12.4	12.3	13.1	18	56.9	23.8	14.3	12	14.4	14.1	12.3	13.3
Mean of monthly Discharge	13	13	14	21	82	42	16	14	14	14	14	13

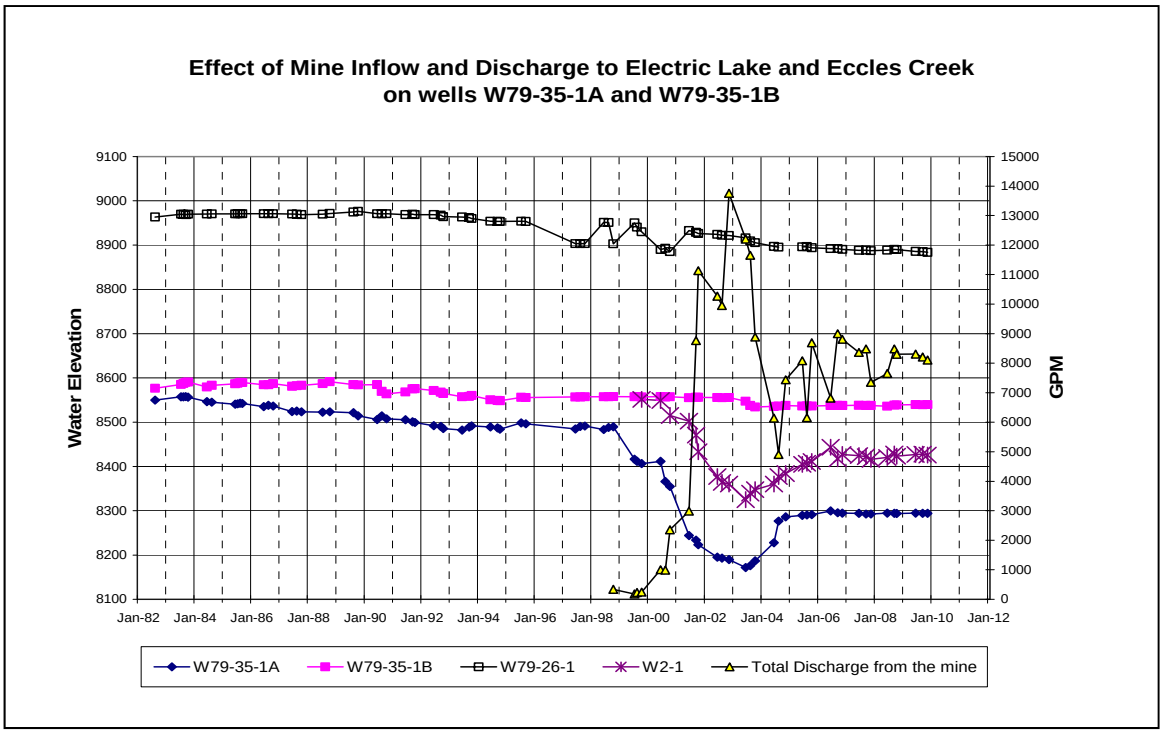

Exhibit 2 – Response of water levels in wells W2-1, W79-26-1, W79-35-1A, and W79-35-1B to mine water discharge (as an indicator of mine inflow).

From March 1999, until Canyon Fuel completed mining of the 12LB panel and allowed the southwestern portion of the mine to start flooding in January 2004, the Mine encountered significant water from fracture/fault zones (primarily from the Diagonal Fault), and systematically drew down the potentiometric head of the Star Point Sandstone. Two wells that illustrate the draw down are W79-35-1A and W2-1, where potentiometric surfaces dropped 318.26 feet and 226.1 feet, respectively, from 1998 through June 2003. Both wells have partially recovered since the southern portion began flooding in January 2004: 122.55 feet and 100.47 feet through November 2009. Although 19 ground water wells exist within the Skyline Mine permit area, well W79-35-1B is the only well completed in the Blackhawk Formation that does not penetrate the coal seam or the Star Point Sandstone. Figure 3c illustrates that the drawdown of the Star Point aquifer is focused primarily along fault and fracture lines.

Natural discharge from the regional groundwater system occurs as baseflow into Mud Creek and the lower reaches of its perennial tributaries, and into Huntington Creek downstream of Electric Lake. Natural discharge also occurs as seeps and springs at faults and along the outcrop of the impermeable Mancos Shale. The Mancos Shale outcrop delimits the lateral extent of this regional aquifer. Water is unable to flow downward through the Mancos at any significant rate, so prefers to flow laterally through more permeable overlying strata until it discharges at the surface. Little is known of the Blackhawk-Star Point aquifer to the west, but it does not crop out and is considered to extend beneath the Sanpete Valley.

As evidenced by Skyline's monitoring well at the waste rock disposal site, the regional aquifer continues to the east of Mud Creek in the Blackhawk-Star Point strata. Water supply wells in alluvium along Pleasant Valley produce from a shallow, unconfined aquifer interconnected with Mud Creek. The connection between this alluvial aquifer and the regional Blackhawk-Star Point aquifer is not uniform, but areas have been identified where ground water flows through the Pleasant Valley Fault from the regional aquifer to the alluvial aquifer and directly to Mud Creek. During periods of low flow, water in Mud Creek comes mainly from seepage from the regional aquifer (Waddell and others, 1983b, p. 34).

Faulting has only local importance in the Blackhawk Formation because clays tend to seal fractures and stop or restrict water movement. On the other hand the clay content of the Star Point Sandstone is low, therefore, fractures are not as readily sealed by clay as in the Blackhawk (see Section 2.3 of the Skyline Mine MRP), and secondary permeability created by fracturing increases the mobility of water through the regional system. Observations within the Skyline Mine suggest that sections of major faults (e.g. Diagonal and Connelville) where vertical displacement is less pronounced (0-200 ft), do not seal off, and do act as conduits for water to flow. Conversely, sections of faults with large vertical displacement result in gouge-filled, low permeability fault zones that do not produce significant amounts of water. This is evident in the performance of wells JC-1 and JC-2 located in James Canyon of the Skyline Mine permit area. Both wells were drilled as production wells to intercept water before it entered the mine. JC-1 is a 14 1/4-inch diameter well with a 60-foot screen-interval that is completed within the Diagonal Fault -fractured Star Point Sandstone approximately 70 feet below the Skyline Mine workings, and currently (July 2010) still pumps approximately 4,000 gpm. JC-2 is a 20-inch diameter well with a 60-foot screen drilled from the same site as JC-1, but at a different angle. Unfortunately, JC-2 was not completed within a fractured portion of the Star Point Sandstone and pump tests showed that it would only yield approximately 350 gpm. Due to the low yield, JC-2 was only pumped for a very short time, and no plans exist to pump it in the future. Because JC-2 had such a low yield, Canyon Fuel was forced to drill a third well, JC-3, to increase dewatering from the 10-Left area of the mine. JC-3 was completed in the mine workings near the 10-Left inflow. Between July 2003 and July 2004, JC-3 was pumped at rates varying from 600 gpm to 6,700 gpm, but because water quality is not satisfactory for discharge into Electric Lake, it has been pumped only once (October 2007) since July 2004.

In the case of the CIA area east of the Town of Scofield, groundwater was not found above or within the Hiawatha coal seam within the permit boundary of the Kinney #2 permit area; however, groundwater was present in a monitoring well advanced in Eagles Canyon graben. In Eagle Canyon graben, the Hiawatha seam has been dropped down approximately 170 feet below its elevation in the Kinney #2 permit boundary (refer to Figure 4B). It is interesting to note that groundwater is detected in the Hiawatha seam in the graben, but not at higher elevations of the Hiawatha seam in the permit area. Groundwater is either present as part of a regional water table located at this lower elevation, or it is present as a result of groundwater transmission via the fault gouge zone.

Core Laboratories, Inc. (Dallas, Texas) measured hydraulic conductivities in eight core-samples from the Star Point Sandstone and Blackhawk Formation (Lines, 1985, Table 3). The cores were collected from a well in NE/4SE/4NE/4 Sec 27, T. 17 S., R 6 W., approximately 30 miles south of the Skyline Mine. Values for both horizontal and vertical hydraulic conductivities in the Star Point Sandstone were on the order of 10^{-2} ft/day. In the Blackhawk Formation, horizontal hydraulic conductivities in the shales ranged from no measurable permeability to 10^{-8} ft/day, and in the siltstones from 10^{-9} to 10^{-7} ft/day; vertical hydraulic conductivities were typically within one order of magnitude of corresponding horizontal hydraulic conductivity values, although vertical hydraulic conductivity was greater than horizontal hydraulic conductivity in some samples and small in others..

A pair of drawdown/recovery tests conducted in a test well near the Skyline portal found the transmissivity of the Blackhawk to be approximately 18 gal/day/ft (2.4 ft^2/day). No significant difference was noted between the coal zone and sandstone tongue (Vaughn Hansen Associates, 1979, p. 85). Transmissivity of the entire Blackhawk-Star Point aquifer, based on pump tests and core analyses from the Trail Mountain area, ranges from 20 to 200 ft^2/day. The storage coefficient averages about 10^{-6} (ft/ft) for confined conditions and about 0.05 (ft/ft) for unconfined conditions (Lines, 1985, p. 15).

As part of the numeric hydrologic modeling conducted for Canyon Fuel Company, the estimated or bulk hydraulic conductivity (*K*) for the Star Point Sandstone, using several analytical techniques, was found to be approximately 2 ft/day, and the specific storage to be approximately 6 x 10^{-6} ft^{-1} in the vicinity of the Skyline Mine. Conversely, the modeling assumes *K* values of about 1 ft/day in the Star Point Sandstone outside of the zone of north-south fracturing, where historic inflows were much lower. Except as described below, the small-displacement faults are assigned K_h values of 0.001 ft/day in the upper portions of faults (within the overburden) and K_h values of 1.0 ft/day within the sandstone units below the Lower O'Connor B coal seam. The Diagonal Fault is assigned a K_h value in the sandstone of 10 ft/day generally, and 20 ft/day beneath the mine.

Seeps and Springs

Skyline

In 1978, 174 seeps and springs were identified on and adjacent to the Skyline permit area, of which 30% were seeps. This is roughly one spring or seep for every 40 acres. The seeps and springs exhibited higher flows in the springtime than at other times of the year. Many seeps and springs dried up completely during the summer, and by fall most of the remaining sources flowed less than 2 gpm; only four springs flowed more than 10 gpm in the fall. (Coastal, 1993, p. 2-24a and -25a). A survey of the White Oak mine area in 1978 and 1979 found 94 flowing, and 15 dry seeps and springs (Valley Camp, 1993, p. 700-7). In early summer, 8 of the sources had flows greater than 10 gpm, but by autumn most springs were flowing less than 1 gpm and many could not be located (Engineering-Science, 1984, p. 33). Another survey of the White Oak area in the summer of 1990 identified 81 flowing and 43 dry seeps and springs (Valley Camp, 1993,

p. 700-7). Anticipating the addition of the Winter Quarters/North Lease tract, Canyon Fuel conducted another spring and seep survey in 1993, from which they selected monitoring sites to characterize the new lease area. The monitored springs have exhibited an overall decrease in flow (Coastal, 1993, p, PHC2-6; Valley Camp, 1993,p 700-6). The Skyline and White Oak surveys probably include duplicate information on some springs because the two permit areas abut.

Due to the significant inflows encountered in the Skyline Mine since August 2001, Canyon Fuel has increased monitoring of the seep and spring flows within the Skyline permit and adjacent area. All of the seeps and springs in the Skyline groundwater monitoring program are located within the Blackhawk Formation; none have indicated a draw down or an obvious decrease in flow that can be correlated to the mine inflows. No seeps or springs have been found at Skyline's waste rock disposal site (Coastal, 1993, p. 2-30a).

White Oak

According to the Seep and Spring survey conducted in the White Oak permit area in the summer of 1990, a total of three seeps/springs would be affected by surface mining that was planned at that mine. Seeps/springs S25-13, S25-14, and 30-1 are all located up gradient of the surface mining. Seep/spring S25-13 is the only site that provided consistent enough flow to be continually monitored. Recorded quarterly flow measurements from site S25-13 range from 0 to 60 gpm, and average <5 gpm. It was anticipated that any flow from the three seeps or springs would still report to Whisky Creek and not be significantly impacted by the surface mining. The Division completed reclamation of the White Oak Mine in late 2005, including a restoration of Whisky Creek and installation of French drains where necessary to conduct seep/spring flow to the creek.

Seeps and springs often issue at shale-sandstone interfaces. Flow along faults and fractures through the Blackhawk Formation appears minimal, due to the sealing ability of the clays abundant therein (see Section 2.3 of the Skyline Mine MRP).

Kinney #2

A spring and seep survey was conducted at and adjacent to the Kinney #2 permit boundary in 2006 by Rock Logic Consulting, LLC. As a result of the investigation, a total of 32 springs and seeps were identified in the permit and adjacent area. The majority of these springs and seeps were identified along the fault-related perched aquifer systems within Eagle Canyon and the subsequent canyons to the east including: Long Canyon, Miller Canyon, and Jump Creek Canyon. Springs and seeps were observed to be either discharging from rock ledges or expressed on the surface as spring-fed ponds. Most of these seeps reported flow rates on the order of less than 1 gallon per minute. Springs located further to the east in Long and Miller Canyons reported flow rates in select springs between 5 - 10 gpm. Sulfur spring, located to the north of the Kinney #2 permit boundary is located along the Pleasant Valley fault and has year-round flow rate of 80 gpm. This spring discharges into the Scofield Reservoir. The water

quality from this spring is considered poor and the water was reported to have a strong sulfur odor to it.

One water right has been identified in the Kinney #2 permit area as WR-4026. This water right is listed as being on an "unnamed spring and used for stockwatering purposes" totaling 10.76 acre feet. Since there are several seeps and ponds in Eagle Canyon, the Permittee is in the process of field checking the precise location of this water right and verifying this information with the Utah Division of Water Rights.

Electric Lake Seepage (not updated in 2013)

Beginning in November 2002, Electric Lake (a man-made reservoir) has been included in the CHIA due to its proximity to the Skyline Mine. Skyline Mine comes within approximately 500 feet horizontally and approximately 850 feet vertically of Electric Lake. Information provided by PacifiCorp (owner/operator of Electric Lake Reservoir) suggests the reservoir has lost appreciable amounts of water coinciding with the major inflows encountered within Skyline Mine beginning in September 2001. Prior to June 2002, performance of the reservoir was based on reservoir elevation and discharge from the dam; inflow data to the reservoir was then back calculated (assuming no water was lost to infiltration). From June 2002 through spring runoff 2003, then June 2003 to present, actual inflow data has been collected for the reservoir, including the water pumped in via the James Canyon Wells. These provide additional hard data to include with the reservoir performance data, and to more readily quantify what volumes of water are being lost to the surrounding geologic formations. The data provided by PacifiCorp (PacifiCorp 2003, 2004; Hansen, Allen, & Luce, Inc. 2005) do show that the performance of the reservoir has changed substantially since 2001. However, none of the 16 springs and streams feeding into Electric Lake that are part of the Skyline Water Monitoring program have demonstrated the type of reduced water availability that has been recorded in the lake.

Seepage studies were done in Eccles Creek, South Fork of Eccles Creek, and Huntington Creeks. There is a significant increase of flow in Eccles Creek where the stream crosses onto the Star Point Sandstone outcrop. There is another significant increase at the O'Connor Fault where the fault conveys water through fractured Star Point Sandstone to the stream. In comparison, the Connelville Fault does not add significantly to flow in either the Main or South Fork of Eccles Creek because potential flow paths through the fractured Blackhawk Formation have apparently been sealed by clays. Observations within the Skyline Mine suggest that sections of major faults (e.g. Diagonal and Connelville) where vertical displacement is less pronounced (0-200 ft), do not seal off, and do act as conduits for water to flow. Conversely, sections of faults with large vertical displacement result in gouge-filled, low permeability fault zones that do not produce significant amounts of water.

Changes of stream flow in Huntington Creek can be largely accounted for by inflow from tributaries and hillside springs. Loss of flow just above Electric Lake is attributed to recharge into the alluvium (Vaughn Hansen Associates, 1979, pp. 68 - 80).

Water in Mines

The coal seams mined within the CIA are located in the lower Blackhawk Formation, within strata included in the Blackhawk-Star Point aquifer. The saturated conditions encountered in the White Oak and Skyline Mines have been along fracture and fault zones, and have persisted as mining has progressed down dip. Similar conditions were found in the Utah #2 Mine, a pre-SMCRA mine, while it operated in Pleasant Valley (near the White Oak Loadout). The Utah #2 Mine was located approximately one mile south of the proposed Kinney #2 mine.

Mining of the Hiawatha coal seam in the Kinney #2 will not occur in Eagle Canyon graben where appreciable amounts of groundwater would likely be encountered from the fault system. The Kinney #2 Permittee has proposed to monitor the groundwater quality within Eagle Canyon graben during the operational mining phase via an in-mine well. This well will have a horizontal completion and pierce the gouge zone of the West Boundary fault that forms the border of Eagle Canyon graben. Because mining will not cross any major faults, groundwater flowing laterally along fault lines is not likely to be encountered as inflows during mining. Groundwater from overlying perched lenses of fluvial sand channels within the Blackhawk formation are anticipated to be encountered. These lenses are recharged primarily by direct precipitation and groundwater reinfiltration and are considered limited in aerial extent.

Slight declines in the water levels of wells complete in the Blackhawk-Star Point aquifer in the vicinity of the Skyline Mine, (typically less than 3 ft per year) can be attributed to both decreases in precipitation (drought periods), and to dewatering of the aquifer by mining (Coastal, 1993, Figures PHC2-4, July 2002 Addendum to the PHC). Ground water flow into the mines can be characterized as:

- Seepage from the coal seams and associated channel sandstones,
- Flow from Blackhawk channel sandstones that have been fractured by faulting and folding, or
- Flow coming up from the Star Point Sandstone through the Blackhawk by way of faults and fractures.

Discharge from coal seams and channel sandstones average approximately 10 gpm per active mine face, but flow of 200 gpm was encountered at the Connelville Fault in the White Oak Mine. Water production in the mines typically declines rapidly over a short time. Most inflows dry up by the time mining has advanced 500 feet beyond them, but an occasional roof bolt dripper will continue to flow up to 2 gpm for an extended time (Coastal, 1993, p. 2-49). A 200 gpm flow from the Connelville Fault observed in the White Oak Mine decreased to 10 to 15 gpm over a four-day period. These observations indicate that permeability is most likely localized, and recharge to the saturated areas is not extensive. Permeable zones in the Blackhawk sandstones are capable of yielding large quantities of water from storage for a short period of time, but are not extensive enough to have sufficient storage or recharge to sustain flows. Seasonal fluctuations of inflow have been observed and are attributed to both seasonal recharge and to subsided areas that intercept surface runoff (Engineering-Science, 1984).

Faulting typically has only local importance in the Blackhawk Formation because the high clay content tends to seal fractures, and movement of water along most faults appears to be effectively blocked or restricted by these clays. Of the 44 individual fault planes encountered up to 1988 in the Skyline Mine, only 5 dripped water from the roof (4 of those where faults intersected sandstone paleochannels). During the same period of time, water discharged up through the floor from the Star Point Sandstone along two other faults (Coastal, 1993,p. 2-24).

Fracturing in the Star Point Sandstone is not as likely to be sealed by clays as in the Blackhawk and as a result, secondary permeability created by fracturing tends to increase the mobility of water through the Star Point. Flows of up to 450 gpm were measured from the Pleasant Valley Fault zone in the Utah #2 Mine. In the area of the Kinney #2 mine, the Hiawatha coal seam is truncated just east of the Pleasant Valley fault. Underground mining activities will advance up to this fault but will not cross the fault. At different times, flow from the Clear Creek Mine portal has been reported to be between 100 and 300 gpm (Waddell and others, 1983b; Engineering-Science, 1984). When Division personnel checked this portal in September 1993, water was still flowing at approximately the same rate, however as of 2003 water was no longer flowing from the portal. Most of the water that flowed into the Clear Creek Mine came from the Pleasant Valley fault. Water from Mud Creek was intercepted upstream of the mine and reached the fault by way of abandoned mine workings and through the Star Point Sandstone (Waddell, et al., 1983b). Because of the Pleasant Valley Fault zone, it is expected that mines east of Mud Creek will typically have larger, more persistent inflows than mines on the west side.

North Joes Valley Fault has little offset and is not a major structural feature within the CIA. Flow of water from the surface into the mine, through the Blackhawk Formation by way of the North Joe's Valley Fault zone, would not be anticipated because of the sealing clays in the Blackhawk Formation (see section 2.3 of the Skyline Mine MRP). In addition, the no mining buffer zone should separate mine workings from main sections of the fault along Huntington Creek and Electric Lake. This will reduce the possibility of reactivation of faults by subsidence and subsequent downward flow along the reactivated faults.

Beginning in March 1999, Skyline Mine encountered a series of major water inflows that are summarized in Table 1. These inflows are cumulatively the largest ever to occur in an underground coal mine in Utah. However, as evidenced in Table 1, the flows have steadily decreased with time, especially once Canyon Fuel allowed the southwestern portion of the mine to flood. Until March 1999, the combined discharge to Eccles Creek never exceeded 795 gpm, and averaged just 285 gpm.

Table 2 - Water Inflows to Skyline Mine

Inflow Location	Date	Estimated Initial Flow, gpm	Estimated March 2003 Flow, gpm	Estimated March 2004 Flow, gpm	Estimated December 2004 Flow, gpm	2008 - 2009 Average Flow, gpm
14-Left HG	03/1999	1,600	300	300	14, 15, 16L	
16-Left HG	12/1999	1,200	300	300	Combined 600	
W. Submains (now referenced as Diagonal Fault)	03/2000	1,000	300	209		
10-Left	08/2001	6,500	3,200	3,200		
E. Submain XC5	10/2001	1,000	370	380		
11-Left HG XC24	02/2002	1,000	900	500	All other flows	
11-Left HG XC40	02/2002	1,000	1,000	700	In SW portion	
11-Left Setup Rm.	03/2002	1,500	1,300	700	Combined 2,500	
CS-14 discharge						**3,400**
	Totals	**14,800**	**9,300**	**6,289**	**3,100**	**3,400**
	% of initial flow		63%	42%	21%	23%

These inflows prompted considerable investigations by the mine and outside consultants in an attempt to find out where they were coming from and how to alleviate them. They also necessitated a revision to this CHIA in November 2002. All of the inflows were in Mine 2, which proceeded further west than Mines 1 or 3. All of these inflows are associated with faults, and enter the mine through the floor. The investigations by HCI and Petersen (Appendices C, G, and H of July 2002 Addendum to the Probable Hydrologic Consequences (PHC), PHC Addendum Appendix J) suggest that the water source is the Star Point Sandstone located beneath the coal seam. The Star Point in the mine area is believed to consist of 14 different sandstone layers totaling 743 feet in thickness. As discussed earlier, this formation has a large storage coefficient and relatively high transmissivity. The large numbers of fracture planes that make up the regional fracture network provide the surface area necessary to drain the water stored in the matrix of the Star Point Sandstone. Based on ^{14}C age dating and tritium analysis, the water in the Star Point Sandstone is believed to be of ancient origin and represents an isolated groundwater storage volume that is not in direct connection with the surface.

Immediately after the 6,500-gpm inflow in 10L began in late 2001, the mine drilled 2 wells into the fault that intercepted the 10-Left inflow. The intent was to remove ground water before it entered the mine and thus reduce inflows. Only one well, JC-1, produced appreciable water and as of July 2010 it was still pumping approximately 4,000 gpm. This pumping was only marginally successful at reducing inflow waters and was estimated to reduce the inflow no more than 800 gpm while the well was pumping 2,200 gpm (HCI).

Though information provided by PacifiCorp (PacifiCorp 2003, 2004) suggests that Electric Lake is losing water at an "alarming" rate; water chemistry, stable and unstable isotope analysis of the water, and dye tracer studies to date do not confirm a direct connection between the mine and lake (see Section VII). Based on observations within the mine, as well as other studies and data, the Star Point seems to be the source of the majority of the inflows. However, there is a component of modern water in the inflows, which may be coming from Electric Lake or other surface water storage by way of the Star Point Sandstone and related fractures

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Ground- and surface-water monitoring of streams, springs, and seeps conducted by the mine has not indicated any impacts due to the increased in-mine flows. The springs and seeps respond rapidly to seasonal and climatic cycles, indicating that the springs are fed by discharge from a shallow groundwater system. Appendix A of the Skyline Mine July 2002 Addendum to the PHC graphically outlines the flow of the springs and their response to the Palmer Hydrologic Drought Index (PHDI). Age dating of numerous springs also supports the recharge being fed from a shallow groundwater system. Based on water-monitoring data, springs, seeps, and streams entering Electric Lake do not appear to be impacted by the volume of water being discharged from the mine.

Most of the monitoring wells available for analysis are either completed in the Star Point Sandstone or through the coal seam in the Blackhawk Formation. The one exception is well W79-35-1B, which is immediately adjacent to W79-35-1A but is completed within the Blackhawk Formation above the coal seam. Exhibit 2 shows the response of these two wells to the total mine discharge, which is an indicator of the total flow into the mine. During the initial dewatering of the mine in September 2001- November 2002, the water level in Well W79-35-1B remained fairly constant, but it dropped approximately 20 feet over the period when discharge from the mine was at its greatest, from November 2002 and December 2003. Since October 2003 up through the end of 2009, the water level in this well has shown little change. The water level in Well W79-35-1A (screened below the coal seam) began to drop concurrent with the increased mine inflow and discharge; the water level dropped from 8489.9 on October 17, 1998; to 8411.6 on June 20, 2000; and to 8171.64 feet on June 11, 2003 (Figure 3c, 4a, and 5, Appendix A, data from the Division's Coal Water Monitoring Database). As mine discharge decreased in 2003, the water level in W79-35-1A recovered over 100 feet and has remained at the higher elevation since. This difference in the timing and magnitude of the responses of these two wells to the mine discharge (as an indicator of mine inflow) is evidence of the effectiveness of the Blackhawk Formation in impeding vertical migration of water through the formation.

Beginning in late July 2003, Well JC-3 began pumping water directly from the Skyline mine-workings into Electric Lake at a rate of approximately 5,100 gpm. The well represented no net increase in the amount of mine-water being discharged, only a change in the point of discharge. Due to equipment failure and high TDS (limit set at 255 mg/L for discharge into Electric Lake), JC-3 ceased operation in July 2004.

The Winter Quarters Ventilation Fan decline slope portal, at an elevation 8,120 feet, will be at a lower elevation than portions of the mine workings; the Trespass Portal, at an elevation of 8,580 feet, is currently the next lowest portal. Because of this lower elevation, gravity discharge from the Winter Quarters Ventilation Fan portal would be a possibility at the time mine dewatering were to cease and reclamation begin. To safeguard against such gravity discharge, the Permittee will seal and backfill both the shafts and slope at the Winter Quarters Ventilation Fan facility to prevent discharge (MRP Sections 4.9 and 4.11.9).

Ground Water Usage

Hansen, Allen, and Luce, Inc. conducted a survey of water rights for the White Oak Mine in 1990. The survey covered most of the area in the CIA. A total of 135 ground water rights were found, 112 on springs and 23 on wells or tunnels. Stock watering was the declared use on 62 of the water rights, 41 were for other uses, and the remaining 32 were undeclared. The information is summarized in Table 724.100a in the White Oak MRP, and the locations are shown on Map 724.100a. Skyline Mine updated the water rights information in their MRP with the addition of the Winter Quarters/North Lease area in 2002. Water Rights information for the Kinney #2 mine can be found on pages 35 and 53 and on Maps 30 and 31 and in Exhibit 13 of the Chapter 7 of the Kinney #2 MRP.

Both the Skyline and White Oak mines utilize water from wells in Eccles Canyon that were drilled into fault zones in the Star Point Sandstone. Wells near the Skyline and White Oak loadouts in Pleasant Valley produce water from both alluvium and the Star Point Sandstone. Water from these wells is for domestic, stock watering, and other uses. Potable and sanitary water supply for the Kinney #2 mine will be provided by the Town of Scofield via a connection from Mud Creek. Any groundwater inflows to the mine works will also be captured to meet water supply needs at the mine. Water will be stored in a storage tank to be constructed within the facilities area at the Kinney #2 mine.

From the startup of well JC-1 in September 2001 through September 2005, approximately 62,700 acre-ft of water were discharged from the Skyline Mine. Of that, approximately 37,400 acre-ft reported to Scofield Reservoir via Eccles and Mud Creeks, and approximately 25,300 acre-ft reported directly to Electric Lake via the JC-1, JC-2, and JC-3 wells. As of June 2010, these numbers were, respectively, 125,300; 69,100; and 56,200. Monthly discharge data provided by Skyline Mine are available at https://fs.ogm.utah.gov/pub/MINES/Coal/007/C0070005/DischargeInfo/07-26-2010Mine-James-%20Discharge.xls). The discharged water is generally of good quality and has been put to

beneficial use in both drainages. As of July 2010, no proven adverse effects to the existing surface or groundwater resource usage have been observed.

The major mine inflows that necessitate discharge are slowly decreasing with time. Canyon Fuel completed the mining of the southern portion of the Skyline Mine in May 2004. At that time they allowed the mine-workings in that area to flood to an elevation of 8,280 feet, which took approximately four months.

JC-1 and JC-3 are both considered as mine-dewatering wells, but only JC-3 has an associated UPDES discharge permit. JC-1 is related to mining because it encounters water that would otherwise enter the mine. It does not have an associated UPDES discharge permit because the water does not enter the mine and comes from the formation in its natural state. When mining ceases permanently, the operation of JC-1 will be terminated. JC-3 has an associated UPDES permit, held by PacifiCorp, because it can pump water directly from the mine-workings. It is the understanding of the Division that the UPDES permit for JC-3 will also be terminated once mining ceases permanently. Neither JC-1 nor JC-3 has an associated water-right.

IV. BASELINE CONDITIONS OF SURFACE AND GROUND WATER QUALITY AND QUANTITY.

Surface Water – Baseline Conditions

Surface water is monitored for quantity and quality at various stations operated by the USGS and the coal mine operators. Locations are shown on Figure 5 (Appendix A) and analysis results are found in the Skyline, White Oak, and Kinney #2 MRPs, the Mud Creek /Huntington Creek CHIA, the Division's Coal Water Quality Database (http://linux1.ogm.utah.gov/cgi-bin/appx-ogm.cgi) and USGS publications. Graphs of selected springs and streams comparing historic flow to the Palmer Hydrologic Drought Index (PHDI) are provided in Appendix A of the July 2002 Addendum to the Skyline PHC, and were last updated with data from the 1st quarter (calendar year) of 2003. These graphs illustrate how the springs in the Blackhawk Formation respond rapidly to seasonal and climatic cycles, indicating that the springs are fed by discharge from a groundwater system that is in good communication with the surface, and with annual recharge events. Also, to assist in quantifying any potential effects to Electric Lake, PacifiCorp provided the Division with graphs and information illustrating the performance of the lake dating back to 1974. Monitoring has been infrequent or irregular at some stations. With the addition of the Winter Quarters-North Lease tract, additional studies were conducted in Winter Quarters Creek and Woods Creek due to their perennial nature and importance of fishery habitat.

Surface Water Quantity

Average annual yield from the 22,000-acre Mud Creek drainage, as determined from continuous USGS measurements from 1978 to 2010 at station 09310700, was 16 cfs (equal to 6.3 inches of rain over the entire drainage per year, or 11,600 acre-ft/yr). Discharge rates are summarized in Table 3 and shown graphically in Exhibit 3. The highest discharges result from spring snowmelt (Price and Plantz, 1987). A comparison of the flows encountered between 1982 through 1986 (a naturally high flow period) and 1998 through 2002 (increased mine discharge with drought conditions) indicate that the increased mine inflows were only higher than natural conditions for approximately a 6-month period (See Figure 10a). With the addition of Well JC-3, Canyon Fuel anticipated that the flow rate would decrease significantly during 2004 and stay there. However, as JC-3 is no longer operating and all excess water must be pumped to Eccles and Mud Creek, the discharge is still averaging around 9 cfs (4,000 gpm) and total flow at the gauging station since 2005 has averaged 22 cfs. From September 2001 through June 2010, an additional 69,100 acre-ft of mine-water discharge (11 cfs) has been added to Scofield Reservoir (https://fs.ogm.utah.gov/pub/MINES/Coal/007/C0070005/DischargeInfo/07-26-2010Mine-James-%20Discharge.xls).

Table 3 - Daily Mean Discharge of Mud Creek measured near the town of Scofield.

Gauging Station	Water Years	Daily Average	Maximum	Minimum
USGS 09310700 (Continuous)	1979 - 2010	17 cfs	300 cfs	1.6 cfs
	2005 – 2009	22 cfs	290 cfs	8.6 cfs

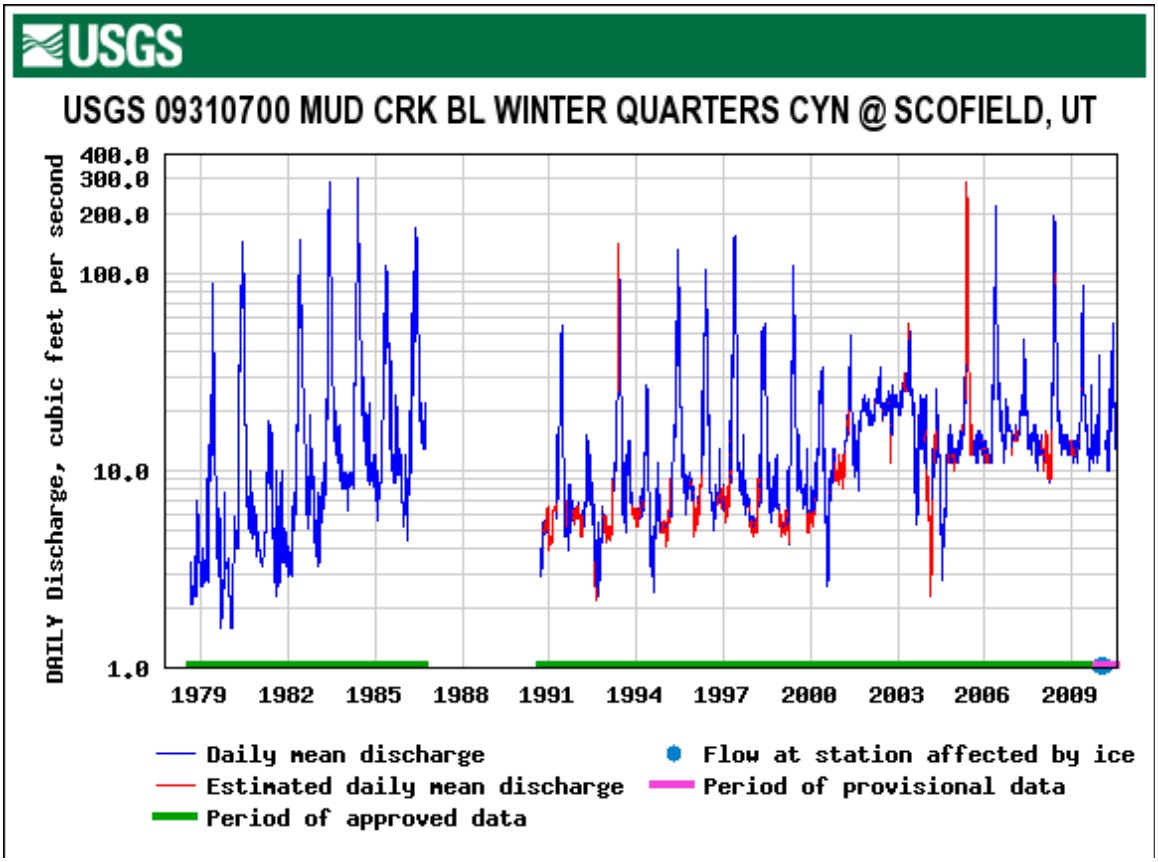


Exhibit 3 – Daily Mean Discharge of Mud Creek measured at USGS flow monitoring station 09310700 at Scofield, Utah.

Eccles, Winter Quarters, Boardinghouse, and Finn Creeks are the principal tributaries to Mud Creek. Based on continuous measurements by the USGS from 1980 to 1984 at station 09310600 (Price and Plantz, 1987), average annual yield from the 3,500 acre watershed in Eccles Canyon is 3,412 acre-feet/yr (equivalent to 11.7 inches rainfall per year over the entire watershed). The maximum-recorded peak flow was 71 cfs in May 1984. Skyline recorded high peak flows in 1983 through 1986. Discharge rates are summarized in Table 4.

Table 4 - Discharge measured near the mouth of Eccles Creek.

Gauging Station	Date	Average	Maximum	Minimum
USGS 09310600	1980 - 1984 (Continuous)	4.70 cfs	66 cfs	0.62 cfs
Skyline CS-6	1981 - 1999	6.09 cfs	71.2 cfs	0.54 cfs
	2000 – March 2010	12.29 cfs	22.75 cfs	1.00 cfs

Skyline's data indicate that water began to be discharged from the #3 Mine (CS-12) in 1983, and from 1984 to 1992 discharge averaged 0.5 cfs. Discharge from Skyline Mine #1 (CS-14) began in 1989 and averaged 0.28 cfs from 1989 to 1992. Minimum measured discharges from #1 and #3 were 0.08 cfs and 0.13 cfs and maximums were 0.69 cfs and 1 cfs. In late summer to early autumn when streamflow is naturally low, discharge from the Skyline Mine has been estimated to have accounted for as much as 60% to 70% of flow in Eccles Creek.

The 12 cfs discharged from August 2001 through March 2010 represents approximately 2 times the average flow encountered in Eccles Creek at water monitoring site CS-6 (Table 4) from 1981 through 1999. To monitor the impacts of this additional water to the physical characteristics of Eccles and Mud Creek, a study was initiated in the summer of 2002 and continued in the summers of 2003 and 2004. Field observations indicate the additional water makes the flow at or just below bankfull capacity of Eccles Creek; however, Eccles Creek appears to be well armored and able to handle the additional flow. Mud Creek is larger than Eccles Creek and flows there are approximately 4-times larger than normally seen; however, the flow is not as close to bankfull capacity. Results from the study indicate no significant impacts to the stream morphology have been observed. The details of the study are outlined in Appendix D of the July 2002 Addendum to the PHC, and copies of the reports are located in the Division's Public Information Center (PIC).

Prior to the breakout of the ventilation portal in South Fork of Eccles Creek in 1989, maximum measured flow at station VC-10 was 14.7 cfs. Periods of no-flow were observed in 1981, 1984, 1995, 2001, and 2002 but never during the third or fourth quarter of the calendar year (July-December). Average measured flow from 1978 to 1990 was 1.39 cfs (Table 5).

Construction of the road to the White Oak Mine in Whisky Canyon began in 1975. Monitoring of Whisky Creek began the same year, so there are no data on conditions prior to disturbance of the drainage. Periods of no-flow have been recorded at least once in each of the four calendar quarters (Table 5). Although not as consistently dry, Whisky Creek was periodically dry from 1982 through 2000.

During average flow conditions, Whisky Creek (at VC-5) accounts for approximately 8.1 percent of the flow in Eccles Creek, and 2.4 percent of the flow in Mud Creek. Upper Whisky

Creek at VC-4 accounts for approximately 15.8 percent of the flow of VC-5. The surface mining at the White Oak Mine and reconstruction of Upper Whisky Creek has impacted the area immediately surrounding site VC-4. However, any flow lost due to infiltration into the reclaimed fill should surface further downstream in Whisky Creek. Although a significant loss in flow at VC-4 would impact flows at VC-5, minimal cumulative impacts would be seen at Eccles Creek and Mud Creek.

The location of sample site VC-4 was moved upstream approximately 280 ft. due to disturbance created by the surface mining. VC-4 represents undisturbed drainage of Whisky Creek. Although moved upstream, only one small ephemeral draw was eliminated from the drainage basin resulting in an insignificant change in flow.

Lodestar Energy, Inc. declared bankruptcy and discontinued mining and water monitoring at the White Oak Mine. Except for a few UPDES reports in early 2003, water monitoring ended in September – October 2002.

Table 5 - Discharges measured at South Fork of Eccles Creek and Whisky Creek

Gauging Station	Date	Average	Maximum	Minimum
South Fork White Oak VC-10	1978 - 2002	1.39 cfs	14.7 cfs	0 cfs (2 of 4 quarters)
Whisky Creek White Oak VC-5	1976 – 2002	0.38cfs	3.70 cfs	0 cfs (4 of 4 quarters)
Whisky Creek White Oak VC-4	1977 – 2002	0.06 cfs	1.0 cfs	0 cfs (4 of 4 quarters)

Boardinghouse and Finn Creeks were not directly affected by surface mining at the White Oak Mine, but were monitored by White Oak and results are summarized in Table 6 (Valley Camp, 1993, p. 700-23). The Permittee reported no-flow for each of the five times that they were able to observe Finn Creek during a first calendar quarter.

Table 6 - Discharges measured at Boardinghouse and Finn Creeks

Gauging Station	Date	Average	Maximum	Minimum
Boardinghouse White Oak VC-11	1980 - 2002	1.6 cfs	12.8 cfs	0.02 cfs
Finn Creek White Oak VC-12	1980 - 2002	0.47 cfs	4.20 cfs	0 cfs (4 of 4 quarters)

Waddell and others monitored Winter Quarters Creek in 1979-1980 and Skyline did so in 1981 and 2002-present (CS-20: CS-24 was added in November 2009). Results are summarized in Table 7.

Table 7 - Discharges measured at Woods (CS-19) and Winter Quarters (CS-20) Creeks

Gauging Station	Date	Average	Maximum	Minimum
35*	1979-1980	0.405 cfs	0.51 cfs	0.30 cfs
CS-19	2002-2009	0.76 cfs	3.92 cfs	0.05 cfs
CS-20	Nov. 1981	0.07 cfs		
	2002-2009	1.37 cfs	6.24 cfs	0.24 cfs

* (Waddell and others, 1982)

Skyline monitors upper Huntington Creek where it discharges into Electric Lake, at station UPL-10. Flow is measured periodically when the site is accessible, mainly from May to October. Skyline's data in the Division's database indicate that from July 1984 to November 2009, average flow has been 6.9 cfs. Utah Power and Light monitored Huntington Creek above Burnout Creek prior to completion of Electric Lake in 1973, and the information is found in the report by Vaughn Hansen Associates (1979). Discharge of upper Huntington Creek is summarized in Table 8.

Average flow of Burnout Creek at station CS-7 from 1981 to 2002 was 1.2 cfs, with minimum and maximum measured flows of 0.1 and 10.7 cfs. Average flow from June 2003 to November 2009 was 0.6 cfs, with minimum 0.002 cfs (1.3 gpm) and maximum of 3.7 cfs. Flows from Swens (CS-16), Little Swens (CS-17), Boulger (CS-18), and James (F-10) Canyons have been monitored since June 2001: respective average flows have been 0.4, 3.8, 0.2, and 0.9 cfs. Flow from Electric Lake is regulated for the benefit of downstream users and does not accurately characterize the hydrologic system.

Table 8 - Discharge of Huntington Creek above Burnout Creek

Gauging Station	Date	Average	Maximum	Minimum
Utah Power & Light	1971 – 1973	-	>170 cfs	□0.5 cfs
Skyline UPL-10	1981 – 2005	6.9 cfs	79 cfs	0.32 cfs
	2006 - 2009	4.8 cfs	22 cfs	0.58 cfs

Predicted average discharge for Eccles Creek, based on flow duration curves for water years 1976 through 1978, is 5.43 cfs, corresponding to a yield of 13.4 inches of rainfall over the watershed. Flow duration curves from Huntington Creek above Burnout Creek for water years 1972 and 1973, before Electric Lake was filled; indicate an average annual discharge of 13 cfs and a yield of 16 inches of rainfall over the entire watershed per year (Vaughn Hansen Associates, 1979). The predictions are based on data from different periods, but the higher predicted yield from the upper Huntington Creek basin in comparison to that from the Eccles watershed may be a consequence of the relative impermeability of the Blackhawk Formation that forms or immediately underlies the surface over most of the upper Huntington Creek basin (Coastal States, 1993, p. 2-42), and the westward dip of the strata.

Burnout and Huntington Creeks drain 8,240 acres (42% of the upper Huntington Creek basin located above the dam), and their combined average discharge has been 6,500 acre feet per year (9 cfs). Estimating from the Burnout and Huntington Creek data, discharge from the entire 19,854 acres of the upper Huntington Creek basin located above the dam would be 16,000 acre feet per year (22 cfs). Comparing the continuous flow recorded at the mouth of Eccles Creek (Table 4) and using the same flow volume per acre of land for the Upper Huntington basin supports this estimated number. Using the same volume per acre number from the Eccles Creek drainage for the 19,854 acres, the average flow for the Upper Huntington basin is 21.2 cfs or 15,350 acre-ft/yr. Subtracting a calculated 800 acre-ft of evaporation per year, based on PacifiCorp data, the Upper Huntington drainage basin receives an average of approximately 14,500 acre-ft/yr.

In 2013, Skyline modified their lease to include several ephemeral washes that drain into Upper Fish Creek. Upper Fish Creek is a perennial creek flowing into Scofield Reservoir. The USGS has been collecting discharge data along Upper Fish Creek at station 09310500. An evaluation of data collected indicates that Upper Fish Creek discharge varies greatly by season and has an average flow rate of 79 cfs. The creek is fed by numerous tributaries, three of which are within the 2013 North Lease expansion area. These are the two forks of Andrew Dairy Creek and Wife Creek. Andrew Dairy Creek has been dry since monitoring started in 2012. Wife Creek's flow varies seasonally but since monitoring began in 2012, just above its confluence with Upper Fish Creek, Wife Creek has had a minimum flow of 0.45 gpm and a maximum flow of 40.4 gpm. Fish Creek is the greatest tributary contributor to Scofield Reservoir (Peterson, 2013, p. 6).

The surface water hydrologic regime in the Kinney #2 permit and adjacent area are strongly influenced by geologic structure, stratigraphy, lithology, topography, and climatic conditions. The mine is located within the Mud Creek Subwatershed. The major perennial streams in the vicinity are Mud Creek and Miller Creek. Both of these water sources drain into Scofield Reservoir, the headwater source of the Price River.

Table 9 - Discharge of Miller Creek to Scofield Reservoir

Gauging Station	Dates	Average	Maximum	Minimum
Miller Outlet	2005 – 2010	133 gpm	545 gpm	18 gpm

No other perennial sources of surface water exist in this area. Several ephemeral washes bisect the Kinney #2 permit area in a west-east direction. None of these small washes have been observed to be flowing during the baseline monitoring period for the Kinney #2 mine, which began in 2006. Eagle Canyon and UP Canyon are adjacent ephemeral channels that have been observed to flow in response to heavy precipitation or snowmelt events. Drainages west of Pleasant Valley are considered to be hydrologically disconnected from potential impacts to mining activities. A few stock watering ponds have been identified along the Eagle Canyon Graben east of the Kinney #2 Permit boundary. These ponds are believed to be spring-fed systems that are influenced by climatic cycles of wet and dry periods.

Electric Lake

Electric Lake, with a storage capacity of 31,500 acre-ft, began filling in 1974. PacifiCorp owns water shares in Electric Lake, and uses approximately 12,000 acre-ft of water annually. Since 1974, PacifiCorp (formerly Utah Power and Light) has monitored the water within the Upper Huntington drainage basin using imputed flow data, discharge records, lake levels, and precipitation and evaporation data. Since June 19, 2002, they have measured actual flow data in the Upper Huntington basin, with the exception of tributaries located below Boulger Creek, which are estimated to contribute approximately 1 cfs on average.

In July 2003, PacifiCorp submitted a report to the Division suggesting Electric Lake has been losing a disproportionate amount of water since August 2001, based primarily on the reaction of the lake (PacifiCorp – Investigation of Technical Issues related to the Electric Lake and Huntington Creek Controversy June 25, 2003). No calculation reflecting the purported volume lost from Electric Lake was provided in the original report. The report provided numerous graphs illustrating how Electric Lake intuitively appeared to be losing water. Regardless, and though much of PacifiCorp's inflow data were 'back-calculated' and hard monitoring numbers were lacking at the time, the data showed a change in the reservoir performance. PacifiCorp has since started to monitor inflow into the lake and they update and provide a detailed spreadsheet with measurable inflows and outflows, as well as lake performance data to the Division monthly. Stage volumes, natural leakage of Electric Lake, and the effects of the drought all contribute to the response being seen in the lake elevations.

Whether the inflows encountered in the Skyline Mine are associated with this apparent loss of water, and to what degree, is still being evaluated (see Section VII).

Discharge of Mine Inflows to Surface Drainages

As discussed earlier, Skyline Mine encountered considerable groundwater inflows beginning in March 1999. In an attempt to reduce inflows, wells were drilled in James Canyon to pump ground water from the fracture system 70 feet below the mine (JC_1 and JC-2), and directly from the mine workings (JC-3) into Electric Lake. From September 2001 until September 2002 water was pumped at about 2,200 gpm from Well JC-1. In October 2002, the pumping rate in JC-1 increased to about 4,200 gpm by installing a higher capacity pump. In late July 2003, Well JC-3 began pumping directly from the mine workings at approximately 5,100 gpm and continued pumping until July 2004. JC-1 currently (Jan. 2006) operates at around 4,000 gpm. Through July 2010, approximately 56,200 acre-ft of water have been pumped from the James Canyon wells into Electric Lake and therefore, the Huntington Creek drainage. None of the 16 springs and streams feeding into Electric Lake that are part of the Skyline Water monitoring program have demonstrated the type of reduced water availability that has been recorded in the lake.

A portion of the mine inflows has also been pumped out of the mine into Eccles Creek. Between August 2001 and September 2005, these flows varied from 0 to 10,500 gpm and averaged about 5,700 gpm. At the peak, this increased the average flow in Eccles Creek by 3 times normal amounts (pre-1999) and increased the average flow in Mud Creek by 1.2 times normal amounts. From October 2005 through July 2010, discharges to Eccles Creek (measured at CS-14) have been between 2,048 and 4, 303 gpm and averaged 3,400 gpm. The trend since 2005 has been downward (Exhibit 1)

The Division anticipates that the addition of the Winter Quarters / North Lease area will have minimal, if any effect on the water quantity being discharged to either drainage. This conclusion is based on past mining in the area, differences in geology from the southern portion of the mine, and an apparent lack of communication between groundwater wells located in the northern and southern portions of the permit area. The Division anticipates that any inflow to the North Lease will be infrequent, and short-term in nature.

Mine inflows into the Kinney #2 workings are anticipated to be minimal primarily originating from any isolated perched aquifer systems that are characteristic in the Blackhawk Sandstone. During exploration activities and during the baseline monitoring period, groundwater was not encountered in the coal seam. Historic mining has occurred in this region from coal seams located stratigraphically below the Hiawatha coal seam. There is a possibility that water may be stored in these underground mine workings. However, due to these coal seams being stratigraphically lower in the geologic section, these old workings will not be encountered during planned mining activities.

Surface Water Quality

Water within the CIA is used for watering livestock and wildlife, mining coal, domestic use, fisheries, and recreation. Downstream, the water is additionally used for irrigation and industrial needs. Land within the CIA is used for wildlife habitat, grazing, recreation, and mining coal. Anticipated post-mining uses are for wildlife habitat, grazing, and recreation.

The Utah Division of Water Quality classifies (latest classification December 7, 2001) Scofield Reservoir as:

1C - protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
2B - protected for secondary contact recreation such as boating, wading, or similar uses.
3A - protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
4 - protected for agricultural uses including irrigation of crops and stock watering.

The total phosphorous in Scofield Reservoir is of concern to the Utah Division of Water Quality, and they have set the TMDL Target Load of 4,842 kg/yr (29 lb/day). Blue/green algal blooms are linked to high phosphorus concentrations in the reservoir.

Scofield Reservoir:

- Is a culinary water source,
- Is one of the top four trout fishing lakes in Utah, and
- Has an annual recreational fishing value of more than 1 million dollars.

(E-mail from Louis Berg, Utah Division of Wildlife Resources, to Division dated February 4, 2002).

The Utah Division of Water Quality classifies (latest classification December 7, 2001) Electric Lake as:

2B - protected for secondary contact recreation such as boating, wading, or similar uses.
3A - protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
4 - protected for agricultural uses including irrigation of crops and stock watering.

Electric Lake:

- Provides cooling water for the Huntington Power Plant, and
- Is a major source of agricultural water for the Huntington Cleveland Irrigation Company.

Streams in both basins are classified as 1C, 3A, and 4.

In addition, surface waters located within the outer boundaries of a USDA National Forest, with specific exceptions, are designated by the Utah Division of Water Quality as High Quality Waters - Category 1 and are subject to the state's antidegradation policy. This antidegradation policy states that waters shall be maintained at existing high quality, and new point source discharges of wastewater (treated or otherwise) are prohibited (Utah Administrative Code, R317-2-3.2 and R317-2-12.1). All of the upper Huntington Creek drainage, and most of the headwater drainages of east flowing tributaries to Mud Creek- including the Skyline Mine disturbed area -are within USDA Forest Service boundaries and are therefore protected by this policy. The White Oak Mine, both loadouts, and the waste rock disposal site are outside forest boundaries. The Kinney #2 mine is located on private land.

The Utah Water Quality Board agreed in their September 24, 2001 meeting to reclassify Electric Lake as High Quality Waters – Category 2. Category 2 is defined as "…designated surface water segments which are treated as High Quality Waters – Category 1; except that a point source discharge may be permitted, provided that the discharge does not degrade existing water quality." Both the effluent from Skyline Mine (JC-3), and the lake were to be sampled for a period of two years for a full suite of metals and nutrients to ensure that the mine water is not of a lower quality of water than exists in Electric Lake. Due to equipment failure and high TDS, the JC-3 well, which discharged directly from the Skyline Mine into Electric Lake, is no longer pumping. Canyon Fuel and PacifiCorp have continued to sample the quality of water from the lake and the JC-1 well.

Total Dissolved Solids (TDS)

Water quality in the CIA is considered good, most being of calcium bicarbonate type. TDS levels normally vary between 100 and 400 mg/L in the headwaters regions. Higher TDS levels correspond to low flows. Calcite and aragonite are at or near saturation in the streams flowing into Scofield Reservoir and precipitation of calcium carbonate in the reservoir is indicated by the water chemistry (Waddell and others, 1983a).

At Well JC-3 (discharging to Electric Lake) TDS is limited to a daily maximum of 255 mg/L with no daily tonnage or flow limitation. Canyon Fuel had a difficult time meeting this standard, even when blending the JC-3 and JC-1 water. For this reason they discontinued pumping from JC-3 after one year.

Skyline's monitoring station CS-6 is at the same location as USGS gauging station 09310600 near the mouth of Eccles Canyon. Skyline and USGS measurements of TDS are summarized in Table 10. Skyline measured higher concentrations of TDS between 1981 and 2002 than were measured by the USGS between 1980 and 1984. The USGS analyzed samples more frequently than Skyline. TDS concentrations had been increasing from year to year at this location and others along Eccles Creek below the Skyline Mine (Figure 6a, Appendix A). Due to the increased mine inflows and necessary discharge of them at high rates, Skyline was exceeding their UPDES daily tonnage limit for TDS (7.1 tons/day). Canyon Fuel worked closely with Utah Division of Water Quality (UDWQ) to remedy the situation, and after much study and effort,

UDWQ modified the Skyline Mine UPDES permit in May of 2003 to remove the 7.1 ton per day limit for TDS, unless the 30-day average were to exceed 500 mg/L.

UDWQ issued the current UPDES discharge permit UT0023540 effective December 1, 2009. It allows for a daily maximum of TDS of 1,200 mg/L and a 30-day average of 500 mg/L. There is no tonnage per day (tpd) daily maximum unless the 30-day average exceeds 500 mg/L; then a 7.1-tpd limit is imposed. The permit also states:

> *Upon determination by the Executive Secretary that the Permittee is not able to meet the 500 mg/L 30-day average or the 7.1 tons per day loading limit, the Permittee is required to participate in and/or fund a salinity offset project to include TDS offset credits, within six (6) months of the effective date of this permit.* [Section I,D,2,c]

In September of 2004, Skyline's mine discharge began averaging 850-950 mg/L TDS, and due to the volume of water pumped (approx 3,500 gpm), they were routinely exceeding the tons per day limit. Because the conditions at the mine will require such pumping for quite some time, Canyon Fuel Company prepared a salinity offset plan and submitted it as required to UDWQ. The Division of Water Quality approved the plan on January 5, 2005, but it is retroactive to September 2004.

USGS gauging station 09310700, on Mud Creek near the mouth of Winter Quarters Canyon and just upstream of the town of Scofield, was operated continuously during water years 1979 through 1984. TDS measurements averaged 315 mg/L with a minimum of 170 mg/L and a maximum of 390 mg/L (Price and Plantz, 1987). Monitoring station VC-1 is approximately one mile upstream of 09310700 and just below the White Oak loadout. At VC-1, the average TDS from 1975 to 2002 was 320 mg/L, with a maximum of 730 and a minimum of 156 mg/L.

The Kinney #2 mine will operate under UPDES permit #UTG040028 effective July 1, 2010 and due to expire on April 30, 2013. One outfall location has been assigned for the single sediment pond that will discharge to Mud Creek. TDS limitations cited on the permit require that the outfall achieve a 30-day average of 500 mg/L or one ton (2000 lbs) per day as a sum from all outfalls. The Permittee for the Kinney #2 mine will also monitor Mud Creek as part of their quarterly water monitoring program. Baseline TDS data from the Kinney #2 mine is also shown on Table 10. Figure 7B (Appendix A) illustrates the TDS levels in Mud Creek as monitored during the Kinney #2 baseline period have actually showed a decreasing trend in the past 5 years.

Table 10 - TDS in Eccles and Mud Creeks

Gauging Station	Date	Average	Maximum	Minimum
Eccles Creek just above confluence with Mud Creek				
USGS 09310600	1980 - 1984	294 mg/L	492 mg/L	161 mg/L
Skyline CS-6	1981 - 2005	471 mg/L	1282 mg/L	198 mg/L
	February 2006 – March 2010	532 mg/L	752 mg/L	419 mg/L
Mud Creek below White Oak Loadout				
USGS 09310700	1979 - 1984	315 mg/L	390 mg/L	170 mg/L
White Oak VC-1	1975 - 2002	320 mg/L	730 mg/L	156 mg/L
Mud Creek (Kinney #2)	2005 – 2010	458 mg/L	720 mg/L	230 mg/L

There is a shift from calcium toward sulfate and magnesium cations as the water flows toward Scofield Reservoir, probably due to the dissolution of evaporites in Mancos Shale tongues exposed in Pleasant Valley (Coastal, 1993, p. 33).

Figures 6 through 8 (Appendix A) show TDS concentrations from 1977 through 2002 from data submitted by Skyline and White Oak to the Division. Linear regressions of TDS concentration as a function of time were calculated, providing a rough representation of ongoing coal mining activities such as production, storage, and hauling of coal and discharge of water from the mines. Representative linear regressions are plotted on the figures. Data from the initial period of road construction during 1975 and 1976 were not used in the regression calculations because they are not representative of ongoing mine operations. Road improvement and additional construction were ongoing from 1980 to 1984, but there was not a noticeable change in TDS concentrations during this period. Other specific data omitted from regression calculations are indicated on the figures.

TDS levels in water discharged from Skyline's sediment pond began exceeding the UPDES maximum of 1,000 mg/L (753 mg/L annual average) on a regular basis in November 1990. Sulfate concentrations also exceeded the 500 mg/L UPDES limit in most of these high TDS samples. Leaching of sulfate from rock dust in flooded, abandoned areas of the Skyline Mine was the source (ERI, 1992). In May 1994, the Utah Division of Water Quality raised the daily limits to 1,600 mg/L TDS and 1,000 mg/L sulfate on an interim basis through September 1994, with TDS and sulfate levels to meet requirements of the regular UPDES permit at the end

of the interim period. The current daily maximum UPDES limit for TDS is 1,200 mg/L, with a limit of 500 mg/L averaged over 30 days. There is no limit for sulfate in the current UPDES permit.

TDS concentrations in lower Eccles Creek are diluted between CS-2 and VC-9 by inflow from South Fork and Whisky Creek and baseflow from the Star Point-Blackhawk aquifer. Further dilution occurs when Eccles Creek flows into Mud Creek, but still TDS concentrations have increased at VC-1 and VC-2 (Figure 7, Appendix A).

TDS concentrations have remained nearly constant at CS-9 above the Skyline Mine, but data from CS-3, CS-4 (discontinued), and CS-11 above the Skyline Mine indicate TDS concentrations have generally increased with time, even though at a lower rate than in the samples taken downstream of the Skyline Mine. TDS concentrations at VC-10 and CS-1 (both discontinued) in the South Fork of Eccles Creek decreased between 1981 and 2005.

In Whisky Creek, TDS concentrations steadily increased at VC-5 below the White Oak Mine from approximately 300 mg/L in 1978 to close to 1,200 mg/L in 2001 (Figure 6d, Appendix A). The rate of increase is similar to that in lowermost Eccles Creek. Because Whisky Creek accounts for approximately 8% of the flow of the Eccles Creek, this is a minor contribution to the overall balance of Eccles. White Oak reported 4,000 mg/L TDS at VC-5 on June 27, 1986, a singular anomaly possibly caused by road salt getting into the stream (Valley Camp of Utah, 1993). At VC-4 (Figure 6d, Appendix A) above the White Oak Mine, TDS concentrations declined over the same period of time..

The surface-mining methods that the White Oak Mine employed had little impact on the TDS reporting into Eccles Creek. Acid and Toxic-forming testing of the geology in the area demonstrated a high neutralizing potential of the sediments, and low toxicity. Geologic units containing elevated levels of selenium and metals were buried with at least 4 feet of cover, and were placed outside of the floodplain of Whisky Creek.

The TDS in Huntington Creek at UPL-10, above Electric Lake, varied from 80 to 442 mg/L, and averaged 185.9 mg/L from 1981 to 2005. Figure 8 (Appendix A) shows TDS concentrations for stations upstream of Electric Lake. TDS concentrations appear to have changed little with time in this drainage.

At UPL-3 just below the outlet from Electric Lake, TDS averaged 156.7 mg/L from 1981 to 1991 and ranged from 130 to 210 mg/L (Coastal, 1993, Volume 4). TDS in Huntington Creek at USGS gauging station 09318000 near the town of Huntington was 165 to 345 mg/L between June 1977 and September 1979. TDS in the Price and San Rafael Rivers where they flow into the Green River is 1,500 to 4,000 mg/L.

TDS measured at CS-20 on Winter Quarters Creek appears to have an upward trend, but the data are limited (2002 to 2009, 23 samples) and R^2 is only 0.03.

As shown on Table 11, TDS baseline values from each of the surface water inlets (Mud Creek, Miller Outlet, and RES-1) entering Scofield Reservoir from streams draining the Kinney #2 mine have been reported between 96 – 720 mg/L. Baseline TDS values from the springs were reported between 120 – 440 mg/L. These levels are consistent with historical TDS concentrations reported from headwater regions in the Scofield area.

Table 11 – Baseline TDS into Scofield Reservoir

Monitoring Station	Date	Average	Maximum	Minimum
Miller Outlet	2005 - 2010	299 mg/L	620 mg/L	200 mg/L
Mud Creek	2005 - 2010	458 mg/L	720 mg/L	230 mg/L
RES-1	2005 - 2010	336 mg/L	620 mg/L	96 mg/L

Iron and Manganese - Dissolved

From 1979 to 1984, measurements of dissolved iron at USGS gauging station 09310700 in Mud Creek above Scofield ranged from 0.003 to 0.21 mg/L.

Water analyses done for the White Oak Mine only sporadically included dissolved iron, and only included dissolved manganese from 1995 to 2003. The highest value for dissolved iron reported by the White Oak Mine is 6.65 mg/L at VC-13, a sampling station in Long Canyon. The highest value measured in Whisky Creek, below the White Oak Mine at VC-5, was 1.45 mg/L (October 1982). The highest dissolved iron found in Eccles Creek by White Oak was 0.76 mg/L at VC-6 in August 1980. With the exception of a one-time dissolved iron value of 7.65 mg/L at VC-4 in 1982, Whisky Creek had very low dissolved Iron and Manganese values.

Maximum dissolved iron (in surface water) reported by Skyline, between 1980 and 2009, was 0.36 mg/L (1992) at CS-2 in Eccles Creek just below the Skyline Mine. Maximum dissolved manganese was 0.2 mg/L, also at CS-2 (1995).

Dissolved iron in Huntington Creek at station UPL-10 above Electric Lake varied from 0.03 to 0.16 mg/L, and averaged 0.08 mg/L from 1981 to 2009. Dissolved manganese varied from 0.006 to 0.02 mg/L and averaged 0.011 mg/L.

At Winter Quarters Creek (CS-20), there is only one recorded value for dissolved iron, 0.02 mg/L. The four dissolved manganese values range from 0.005 to 0.009 mg/L and average 0.007 mg/L.

Maximum dissolved iron concentrations from dissolved iron detection in the Kinney #2 permit area from the springs reported a maximum of 2 mg/L and 1 mg/L for surface water from Miller Outlet. Baseline monitoring of dissolved iron illustrate that dissolved iron detections occur more frequency in the spring samples than in the surface water samples.

Iron and Manganese - Total

Total iron averaged 2.7 mg/L and total manganese averaged 0.15 mg/L at sites monitored for the White Oak Mine from 1975 through 2002. The highest reported concentration of total iron was 88.5 mg/L, and for total manganese it was 7.15 mg/L. Both samples were from VC-5 on Whisky Creek, but were collected at different times. High total iron concentrations have been reported by Skyline at several locations, the highest being 45.10 mg/L at CS-9, above the Skyline Mine in the north fork of Eccles Creek. Total manganese concentrations reported by Skyline have ranged from 0.01 to 1.06 mg/L. Price and Plantz (1987) do not report total iron or total manganese concentrations.

For steam sites monitored by the Skyline Mine, total iron ranged up to 45 mg/l, and total manganese up to 1.05 mg/L.

Data from CS-6, near the mouth of Eccles Creek, show that total iron ranged between <0.05 and 24.5 mg/L from 1981 to 2009, and averaged 1.06 mg/L. Total manganese was up to 0.74 mg/L and averaged 0.10 mg/L

At monitoring station VC-1 on Mud Creek, just below the White Oak Loadout, average total iron from 1977 to 2002 was 1.11 mg/L. The maximum was 7.66 mg/L and the minimum was 0.015 mg/L.

Total iron in Huntington Creek at station UPL-10 above Electric Lake has varied from 0.09 to 12.2 mg/L and averaged 0.49 mg/L from 1981 to 2009. Total manganese varied from 0.009 to 0.12 mg/L and averaged 0.03 mg/L. At UPL-3, just below Electric Lake, total iron averaged 0.2 mg/L from 1981 to 1991 and ranged from 0 to 1 mg/L. Total manganese was below detection limits (Coastal, 1993, Volume 4).

At Winter Quarters Creek (CS-20), maximum total iron values reported is 0.37 mg/L, and the average is 0.11 mg/L. Total manganese values range up to 0.016 mg/L and average 0.01 mg/L.

Total iron and manganese concentrations from baseline data collected at the Kinney #2 mine showed maximum concentrations of 25.8 from Aspen Spring and 6.5 from Miller Outlet (stream) for total iron. The total iron result of 25.8 for Aspen Spring was anomalous as compared to the rest of the data with the concentrations averaging 2.3 mg/L. Total manganese baseline data report from the springs and streams did not exceed 1 mg/L in any of the baseline samples collected.

Nickel

The Skyline Mine PHC states that nickel concentrations have reached as high as 40 µg/L in the water that they discharge to Eccles Creek. This level is greater than the 15-µg/L known to inhibit the reproductive capabilities of Ceriodaphnia dubia, an invertebrate biologic indicator species, but below the chronic and acute criteria, for both aquatic wildlife and human health, in the Standards of Quality for Waters of the State. As the flows increased from 1999 through 2001, there initially were indications of toxicity from high nickel concentrations and high TDS. The significant inflow to the mine from the 10-Left area and changes of how water is handled underground resulted in a decline in TDS and dissolved nickel over time.

The source of this nickel is not identified. Nickel is not typically found in the Wasatch Plateau; neither is it commonly associated with the other atypical metals (copper, lead, and zinc) that are sometimes detected in water and sediment samples from the Eccles and Mud Creek drainages. Monitoring results from ongoing sampling will be checked to see if nickel values rise in the future. The Skyline Mine has been working with the Utah Division of Water Quality and the Division to track nickel values.

Nickel was not monitored as a baseline parameter metal at the Kinney #2 mine site.

Other Metals

Trace metals were below U. S. EPA maximum contaminant levels (MCL) in water samples collected from Mud and Eccles Creeks in 1979 through 1980 (Waddell and others, 1983b). Simons, Li, and Associates (1984) found the water at USGS gauging station 09318000, on Huntington Creek near the town of Huntington, met EPA drinking water standards.

Surface water quality data in the Skyline MRP show metal concentrations have generally met Utah Division of Water Quality criteria for class 1C, 2B, 3A, and 4 waters (The Utah Division of Water Quality revised the standards on February 16, 1994; to be based on dissolved metal concentrations, instead of acid-soluble metal concentrations). Dissolved selenium in water discharged from the Utah #2 Mine and monitored at VC-3 and VC-3a from 1973 to 1978 frequently exceeded the current Class 1C water quality standard of 0.01 mg/L and exceeded the Class 4 standard of 0.05 mg/L several times (Valley Camp, 1993, Appendix 722.100a).

There are no applicable standards for total metals in water, but what appear to be elevated concentrations of total copper (0.03 mg/L up to 24.5 mg/L) were found between 1981 and 1991 in samples from most of Skyline's sampling stations, including CS-7 and CS-10 in upper Huntington Canyon. High total lead (up to 0.74 mg/L) and total zinc (up to 0.062 mg/L) also were found in several samples (Coastal, 1993, Volume 4). Data from the White Oak Mine contain several analyses with similarly high total lead, copper, and zinc concentrations. The igneous dikes crossed during mining may be the source of these metals.

pH

The range of the average pH of surface water in the Mud Creek and Huntington Creek basins is 7.2 to 8.0 based on measurements at numerous locations. Extremes of 6.0 to 9.2 have been reported. Where both acidity and alkalinity have been determined, alkalinity is typically at least 25 times acidity.

Solids

The estimated annual sediment yield of the Skyline permit area is approximately 0.44 acre-ft per square mile, which would indicate total annual yield to the Price River is 1.25 acre-ft and to the San Rafael River it is 3.07 acre-ft. The majority of this is suspended sediment, with only a small percentage carried as bed load (Coastal, 1993, p. PHC3-2). Using the same estimated yield of 0.44 acre-ft per square mile for the White Oak permit area, approximate total annual yield to the San Rafael drainage is 0.5 acre-ft and to the Price River drainage is 1.7 acre-ft.

TSS measured at CS-3 and CS-11 in the headwaters of Eccles Creek averages 14 and 39 mg/L, respectively, when taking into account values under the detection limit by using half the detection limit (otherwise, the values are 19 mg/L and 49 mg/L). Average TSS is 76 (81) mg/L at station CS-6 on Eccles Creek, just above the confluence with Mud Creek. The maximum TSS at this location has been 3,190 mg/L, and the minimum 1.4 mg/L. TSS averages 85 (90) mg/L at VC-9, at the confluence with Mud Creek; the maximum was 4,166 mg/L in 1983. As measured by the White Oak Mine operator, the average TSS at VC-5 on Whisky Creek ws454 mg/L, and the minimum 1.0 mg/L, and the annual average TSS at VC-1 on Mud Creek below the White Oak Loadout was 183 mg/L.

TSS in Huntington Creek at station UPL-10, above Electric Lake, have varied from below detection limits to 41mg/L (May 1983), and averaged 4.4 (7.5) mg/L from 1981 to 2009. Suspended sediment loads reported by the USGS for undisturbed areas of the Huntington Creek drainage are typically less than 100 mg/L at low flow, but during high flows can be between 500 mg/L and 1000 mg/L. In lower Huntington Creek, suspended sediment loads in excess of 10,000 mg/L can be expected from thunderstorms, and major floods could produce even higher levels. Construction, mining, and traffic on unpaved roads have produced increases in suspended sediment load in streams, but these are minor, temporary conditions that have not been quantified (Simons, Li, and Associates, 1984, p. 2.33).

The naturally reproducing population of cutthroat trout in Eccles Creek was virtually eliminated from Eccles Creek between 1975 and 1983 as road and mine construction increased the sediment load in the stream. Up to 18 inches of fine sediment had accumulated over the natural substrate. However, habitat improvement initiated in 1981 resulted in significant recovery of the trout population, totaling 93% of pre-disturbance levels by 1986 (Donaldson and

Dalton, Utah Division of Wildlife Resources (UDWR) in Appendix Volume A-3, Coastal States, 1993).

Landslides occurred at approximately 1,500 locations in the Wasatch Plateau during the 1983-1984 water year due to higher than average precipitation. One of these slides occurred in the North Fork of Eccles Canyon, where the creek is normally diverted beneath Skyline's topsoil stockpile. Debris blocked the entry to the diversion, water overtopped the stockpile, and mud and other debris were flushed into Eccles Creek. TSS was measured at up to 9,800 mg/L in Eccles Creek by Division personnel. During this same period, mud was flowing into Whisky Creek from the unpaved road to the White Oak Mine. TSS levels were not documented in Whisky Creek, but the deterioration of water quality from suspended solids was visibly evident to Division personnel who investigated.

In 1987, a tunnel was advanced through an igneous dike in the Skyline #3 Mine. A dark mica mineral, phlogopite, was carried from this tunnel to the sedimentation pond by the mine discharge water. The phlogopite did not settle-out in the pond and was discharged into Eccles Creek, where algae entrapped it. The phlogopite and algae, along with bacteria and mold, produced a marked discoloration of stream substrate, described as "slime", as far as the White Oak Loadout on Mud Creek. The fine sediment did not seem to be having any direct effect on the fish in July 1987, but macro invertebrates were substantially fewer in number and less diverse in Eccles Creek below the mine in comparison to Eccles Creek above the mine, South Fork, and Mud Creek. Elevated concentrations of nitrite, nitrate, and phosphate were found in water below the mine, and coliform bacteria in the sediment pond were elevated (UDWR, 1987).

Rerouting underground drainage around the dike, and adding a flocculent to the sedimentation pond solved the suspended phlogopite problem, but the slime was still in the streambed in late 1988 when sudsing was observed in Eccles Creek. Further water analyses found a surfactant in addition to continuing high levels of nitrogen and phosphorus. The sudsing and elevated phosphate were found to be caused by detergents used in the shop and offices. Mop water was being disposed of into floor drains, which empty into the 72-inch bypass culvert by way of the sedimentation pond. Skyline solved the problem by replacing detergents with low sudsing, non-phosphate types and revising procedures so that mop water is now discarded into the sanitary sewer (Utah Fuel Company, 1988). The elevated nitrogen was harder to remedy, but the source was determined to be the water-oil emulsion that was being used in the longwall hydraulic system to meet Mine Safety and Health Administration (MSHA) fire protection requirements: in addition to occasional leaks and spills, as much as 4,000 gallons of this emulsion can be released each time the longwall unit is moved. Oil is captured and removed from the mine water discharge system by skimming and flocculation, but nitrites and nitrates from the hydraulic oil were going into solution and being discharged from the mine. Skyline replaced the emulsion oil with one that contained no nitrites or nitrates as soon as the connection was realized. Since 1988 an extensive no-spill program has been part of the longwall operations, and if a spill does occur the water and oil emulsion is to be pumped into abandoned sections of the mine rather than being discharged to the surface (Utah Fuel Company, 1988).

A survey of Eccles Creek in August and October 1989 by the UDWR found coal fines were accumulating behind beaver dams, particularly in the stretch downstream of the Skyline Mine, to the confluence with South Fork. Entrapment of the coal in the ponds was causing a loss of trout habitat in upper Eccles Creek, but it was also having a positive effect by preventing migration of the fines downstream to lower Eccles Creek, Mud Creek, and Scofield Reservoir. Fish were almost absent from Eccles Creek at the South Fork confluence, but downstream numbers of fish increased and young fish were evidence of successful spawning. In addition to coal fines, gravel chips from the highway had completely covered the substrate in places (Report dated June 26, 1990 by UDWR in Appendix Volume A-3, Coastal States, 1993).

Studies of macro invertebrates and sediment in Eccles Creek done for Skyline by Ecosystems Research Institute (ERI, 1992) found that the mean number of individuals, total number of taxa, and aquatic plant biomass decreased immediately below the mine and then increased downstream. Water below the mine was not acutely toxic, but the effects of chronic toxicity and sediment transport were not determined. The streambed immediately below the Skyline Mine was extremely embedded and 0.5 mm to 2 mm diameter particles made up approximately 15% to 25% of the sediment, compared to 5% to 10% in other reaches of the stream.

Benthic invertebrate studies conducted in Eccles Creek after the Skyline mine water discharge increased the streamflow to bankfull (Mt. Nebo Scientific 2005) show that the increased discharges were having a cumulative effect on the macro invertebrate populations. The October 2003 study (Mt. Nebo Scientific 2005) did show that there is an apparent trend toward recovery, though far from where it needs to be. Skyline is required to repeat these benthic invertebrate studies in the spring and fall of 2006. Skyline Mine conducted macroinvertebrate studies in Eccles Creek in September of 2007 and July of 2008 to monitor changes caused by the increased water discharge into the stream. In the Skyline Mine 2009 Annual Report, the Division biologist made the following comment regarding the results of these surveys: "Some measures …indicate a considerable improvement in habitat quality of a few sites between 2001 and 2007. However, all other measures indicated that Eccles Creek has not yet recovered from the increased flow. Due to the gradient of the stream channel and the increased discharge … the stream cannot return to its previous state. The stream would only possibly recover with a reduction of flow or an increased input of loose, coarse material into the stream."

Baseline macroinvertebrates data were gathered in Winter Quarters and Woods Canyons in 2003, 2007, and 2008, and studies will be done every three years. The area adjacent to the Winter Quarters Ventilation Fan pad has too low of a gradient and too much fine sediment for meaningful macroinvertebrate study, so an electo-fishing evaluation will be done on this section of the stream (MRP, Section 2.8.1). In the Skyline Mine 2009 Annual Report, the Division biologist commented on these surveys: "Between 2003 and 2008 … there has been some variation in data. These variations could be due to stream side grazing, increased surface runoff, or other environmental factors. This variation will be important to note when looking at future studies during and after undermining."

Winget (1980) noted that sheep and cattle grazing, recreation, unpaved roads, mines, and fires had all contributed to previous degradation and erosion of these watersheds. The results were increased sedimentation and reduction or loss of fish and invertebrate populations. Improved range management along Huntington Creek in the late 1970's allowed some recovery of riparian habitat and bank stability.

Nitrogen and Phosphorus

Waddell (1983a) concluded that Scofield Reservoir might become highly eutrophic unless measures are taken to limit the inflow of nutrients. Winget (1980) attributed nutrient input to Scofield Reservoir to recreation, cattle and sheep grazing, and domestic sources. Waddell's study during the 1979 and 1980 water years found that Mud Creek was providing 16% of the inflow to the reservoir but 18% of the total nitrogen and 24% of the total phosphorus. Waddell attributed elevated nutrient levels in 1979 and 1980 to the clearing of 27 acres of forested land for fire prevention around the Skyline Mine portals and roads in 1979.

Fish Creek and Mud Creeks account for 52 % and 29 % of the nutrient input to Scofield Reservoir, respectively. Only providing 16% of the inflow, Mud Creek contributes a disproportionately high amount of the nutrients. Total phosphorus in particular has been directly correlated with sediment load, and phosphorous loads in Scofield Reservoir have been directly attributed to the erosion and transport of soils during spring runoff. Peaks in nitrate and phosphate during spring runoff have been measured in Mud Creek (Clyde and others, 1981).

The Mud Creek drainage has nutrient-rich soils that are fairly erodable, but increased flows from the mine have not substantially changed stream morphology (EarthFax, 2002, 2003, and 2004), nor have they increased the total phosphorous in the reservoir (measured at MC-3; see Figure 12, Appendix A).

Inflows to Skyline Mine have been pumped into Eccles Creek since 1983. Since March 1999, inflows to Skyline Mine have been pumped to abandoned underground workings, allowed to settle, and then pumped to Eccles Creek. Discharges have been continuously recorded since August 16, 2001, and from then through September 2005 have varied from 0 to 10,500 gpm, with an average of about 5,666 gpm. Based on the monthly reports provided by Skyline Mine, the volume of water pumped to Eccles Creek (and subsequently Mud Creek, and Scofield Reservoir) from September 2001 through June 2010 is 69,100 acre-ft (11 cfs). This has increased the average flow in Eccles Creek to about 3 times the normal average flow (pre-1999), and increased flow in Mud Creek to about 1.2 times the normal average flow. Flows are still only about 13% of spring runoff rates.

TSS and flow at sample locations CS-6 on Eccles Creek, VC-9 on Mud Creek, and VC-1 on Mud Creek show that the average sediment yield carried by Eccles and Mud Creeks prior to 1999 was 2,710 Tons/yr. The average sediment yield carried by Eccles and Mud Creeks between 1999 and 2002 was 2,908 Tons/yr, which is an increase of 7% annually.

Five new monitoring sites were added to Mud Creek and two on Eccles Creek to determine if the significantly increased mine discharge flows are having a negative impact on Mud Creek or Scofield Reservoir. These sites are monitored for total flow, TDS, TSS, and total phosphorous, and for changes to stream morphology.

There is no water quality standard for nitrite, but concentrations in excess of 0.06 mg/L produce mortality in cutthroat trout (UDWR, 1988). The nitrate numeric standard for groundwater and surface water in Utah should not exceed 10 mg/L in Class 1C water, and levels above 4 mg/L are considered an indicator of pollution, usually from sewage. Levels of phosphate in excess of 0.04 mg/L are not toxic to trout, but are excessive and promote eutrophication (UDWR, 1988). By state standards for Class 2A, and 2B waters, phosphate in excess of 0.05 mg/L is a pollution indicator. The recommended limit for MBAS, a surfactant, is 0.2 mg/L (Steve McNeil, Utah Dept. of Health, personal communication with the Division, 1988).

At the Kinney #2 mine, surface water stations Miller Outlet, RES-1 and Mud Creek reported orthophosphate concentrations ranging from non-detect to 0.13 mg/L. Orthophosphate is one form of phosphate and may not be an accurate representation of the total phosphate present in a sample (Personal Communication with Kyle Gross, Lab Manager America West Analytical Laboratories). Despite the lack of baseline data for total phosphate, the orthophosphate component alone exceeds the Class 2A and 2B standards for phosphate in surface water (0.05 mg/L). As mentioned previously, total phosphorus data in Mud Creek are available from 2001 – 2006. These data have shown that total phosphorus loading has been on the increase on the order of 1.5 to 2 pounds per day over that time period. Since total phosphate is a listed TMDL pollutant for Scofield Reservoir by the UDEQ (http://www.waterquality.utah.gov/TMDL/Scofield_Res_TMDL.pdf), Kinney #2 mine will be required to modify their water monitoring plan to begin monitoring for total phosphate instead of orthophosphate.

Nitrate did not exceed concentrations above 1.5 mg/L in surface water samples from Kinney #2, significantly below the 4 mg/L pollution indicator. Groundwater samples from the monitoring wells CR-10-11 and CR-10-12 did show exceedances in the pollution indicator for nitrate concentrations ranging from 2.4 to 6.7 mg/L but not the groundwater numeric standard of 10 mg/L. The two wells are screened in the shallow alluvial/colluvial groundwater system that is hydrologically connected to the Scofield Reservoir system where nitrate has been identified as a pollutant.

At station UPL-10, on Huntington Creek above Electric Lake, total nitrogen averaged 0.23 mg/L from July 1981 to June 2005, with highs of 1.0 mg/L ammonia and 0.68 mg/L nitrate and lows of <0.01, and <0.02 mg/L, respectively. Total phosphate averaged 0.040 mg/L with a high of 0.06 and a low of <0.01 mg/L. At UPL-3, just below Electric Lake, total nitrogen averaged 0.6 mg/L from 1981 to 1991, with highs of 1 mg/L as ammonia and 2 mg/L as nitrate and lows of 0 mg/L for both. Total phosphate averaged 0.2 mg/L with a high of 2 and a low of 0 mg/L (Coastal, 1993).

Data collected by Winget (1980) from 1976 to 1978 indicated that phosphate in Electric Lake was below the minimum concentration needed by aquatic life, and nitrate was just above the limit. These nutrient concentrations reflected the mesotrophic nature of the streams feeding the reservoir. Eccles Creek had nitrate concentration adequate for algal growth at most times, but low phosphate.

Discharge weighted average concentrations for nitrogen and phosphorus at Station S-29 in Eccles Canyon (same as USGS gauging station 09310600 and Skyline's station CS-6) during water years 1979-1980 were 11 and 2.2 mg/L. Concentrations of suspended and dissolved nitrogen combined reached 21 mg/L in May 1980, and phosphorus reached 4.3 mg/L. These nutrient levels apparently resulted from the clearing of 27 acres of forested land for fire prevention around the Skyline mine portals and roads in 1979 (Waddell et al., 1983a). In Mud Creek, downstream of the confluence with Eccles Creek, at S-36 (near Winter Quarters Canyon and USGS gauging station 09310700), discharge weighted average concentrations were 1.3 mg/L nitrogen and 0.1 mg/L phosphorus. The downstream decrease is attributed to the nutrients from Eccles Creek being mostly in suspended form that settles out in the slower flow of Mud Creek. About 50% of the nitrogen and 25% of the phosphorus in Mud Creek in 1980 came from Eccles Creek, but only 20% of the flow. Concentrations of nutrients in Mud Creek peaked at about the same time as those in Eccles Creek (Waddell and others, 1983a; Waddell and others, 1983b).

At CS-6, on Eccles Creek, total nitrogen averaged 0.6 mg/L and phosphate averaged 0.14 mg/L between 1981 and 2002. Highs and lows for nitrogen were 2.5 and 0.01 mg/L nitrate and 3.5 and 0.01 mg/L ammonia; for phosphate they were 0.76 and 0.01 mg/L. Data from 1976 to 1979 from several stations along Eccles Creek indicate a high for nitrate of 2.70 mg/L and for phosphate of 0.22 mg/L (Vaughn Hansen Associates, 1979).

High, low, and mean nitrate concentrations at VC-1 on Mud Creek were 0.38 mg/L, 0.01 mg/L, and 0.07 mg/L between 1975 and 2002, but analyses for nitrates have been infrequent since 1988. Maximum phosphate was 4.55 mg/L in June 1984 and minimum was 0.01 mg/L in September 1987. No phosphate analyses were done at VC-1 after 1999.

In 1987 a dark mica mineral, phlogopite, was being discharged from Skyline Mine #3 into Eccles Creek by way of the sediment pond (as discussed above). The phlogopite was entrapped in algae, which combined with bacteria and fungi to produce slime on the stream substrate as far as the White Oak Loadout on Mud Creek. The fine sediment did not seem to be

having any direct effect on the fish in July 1987, but macro invertebrates were substantially fewer in number and less diverse in Eccles Creek below the mine in comparison to Eccles Creek above the mine, South Fork, and Mud Creek. Analyses of water samples taken by UDWR (Table 9) found 0.46 mg/L total nitrogen in the stream below the Skyline Mine, 0.11 mg/L nitrite (24% of total nitrogen), and 0.34 mg/L nitrate (76% of total nitrogen). Total nitrogen measured above the mines, was 0.29 mg/L, with no nitrite. Phosphate levels in the Skyline sediment pond and Eccles Creek were 0.045 mg/L, but no phosphate was detected above the mine. UDWR subsequently found elevated total and fecal coliform bacteria in the sediment pond. Because of the bacteria and nitrites, UDWR suspected that the sewage tank was backing up into manhole connections and leaking into the sediment pond. UDWR recommended chlorination of the sediment pond and other procedures to avoid recurrence of the suspected sewage backup (UDWR, 1987).

Table 12

	Nitrite	Nitrate	Ammonia	Phosphorus Total[(a)]	MBAS Detergent
Above Skyline Mine*	not detected	0.29	**	not detected	**
Below Skyline Mine*	0.11	0.34	**	0.045	**
Miller Outlet	0.042	0.92	0.16	0.13	**
RES-1	0.039	0.37	0.02	0.045	**
Mud Creek	0.0	1.5	0.57	0.69	**
Sulfur Spring	0.022	0.10	0.44	0.02	**

*Sampled by UDWR July 1987 (UDWR, 1987)** Analysis not reported, probably not done
(a) RES-1, Mud Creek and Sulfur Spring phosphorus data were analyzed for orthophosphate

The phlogopite was eliminated from the pond discharge by rerouting flow in the mine, and using a flocculent. The UDWR recommendations for reducing pollution from sewage were also implemented, but slime persisted in the streambed through the summer of 1988. Random checks by UDWR indicated that the water quality was acceptable. Fish were abundant, and macro invertebrate populations appeared normal in lower Eccles Creek, however in late September of 1988, foaming was observed in Eccles and Mud Creeks along the same reaches where the slime was found. The slime appeared to be covering more surface area, and extending deeper into the substrate. Division personnel took water samples on Eccles Creek above and below the mines in September and October 1988 at several locations within the 72-inch bypass culvert, including at the discharge of the sedimentation pond (Table 10). Analysis of these samples revealed that high nitrite levels persisted. In September, nitrite concentration was 0.64 mg/L in the outfall of the 72-inch culvert, which carries undisturbed drainage beneath the

disturbed area, and also receives the discharge from the sedimentation pond. Ammonia and organic nitrogen concentrations were also elevated in comparison to undisturbed drainage (The Division, 1988). Samples taken from the pond outfall by UDWR in October 1988 had 14 mg/L nitrate and 0.09 mg/L nitrite (UDWR, 1988). Results of analyses from several different sources during September and October are summarized in Table 10.

Total phosphate was 0.50 mg/L in one sample of the discharge from the Skyline shop (Utah Fuel Company, 1988). Another sample from the shop sump reportedly approached 13 mg/L (Keith Zobell, personal communication, The Division, 1988). Samples taken from the sedimentation pond by UDWR personnel in July and October of 1988 had phosphate levels of 0.045 mg/L and 0.06 mg/L (UDWR, 1988). Water analyses also detected a detergent, MBAS, in the sediment pond, and in the outfall (see Table 13).

In addition to the laboratory analyses, Skyline used a field kit to check nitrate levels at various times and locations. On October 5, 1988, nitrate levels were 8 to 9 mg/L in Eccles Creek below the mine and 13 mg/L in the discharge from the #3 mine (CS-12). Other flows into the sediment pond showed no nitrate, indicating that the sewage holding tanks were not the source of the nitrate. On October 6, water coming off the longwall section of the #3 mine had 5 mg/L nitrate, return water had 3 mg/L, and overflow from the emulsion pump had 2 mg/L. Water from mined out areas had no nitrate (Utah Fuel Company, 1988).

Trout and invertebrates had not been checked in upper Eccles Creek in mid-September 1988 when lower Eccles Creek was monitored, because lower Eccles Creek was supporting healthy populations even with the slime present. However, an intensive sampling of fish and macroinvertebrate populations in early October 1988 revealed that the trout population and biomass in upper Eccles Creek had declined over 90%. Macroinvertebrates were essentially gone in upper Eccles Creek downstream from the sediment pond outfall, but taxa and numbers increased downstream, as did numbers and biomass of fish. High concentrations of nutrients were producing both toxic and eutrophic conditions. Nitrite in the water was a contributing and probable primary cause of mortality of macroinvertebrates in upper Eccles Creek and had forced trout to migrate downstream to where dilution produced a tolerable habitat. Trout spawning had not been successful in 1987 and 1988 in any section of the stream: either the slime precluded successful spawning, the nitrites were fatal to the eggs and fry, or both (UDWR, 1988). Refer to the section Fish and Invertebrates for more information.

Table 13

	Nitrite	Nitrate	Ammonia	Organic Nitrogen	Phosphorus Total	MBAS Detergent
Sampled by UDWR July 1988 (UDWR, 1988)						
Sed. Pond Effluent	**	**	**	**	0.045	**
Sampled by the Division 28 September, 1988						
North Fork	<0.05	1.20	<0.05	<1.00	<0.05	<0.03
Middle Fork	<0.05	0.59	<0.05	<1.00	<0.05	<0.03
South Fork	<0.05	0.21	<0.05	<1.00	<0.05	<0.03
72" Bypass Outfall	0.64	0.38	0.19	1.30	<0.05	0.28
Sampled by the Division 03 October, 1988						
Sed. Pond at 3'	*	0.26	0.14	*	<0.05	0.75
Sed. Pond at 6'	*	0.37	0.14	*	<0.05	0.50
Sed. Pond at 9'	*	0.32	0.14	*	<0.05	0.83
Sed. Pond at 10.5'	*	0.3	0.16	*	<0.05	*
72" Bypass Outfall	*	0.33	0.25	*	<0.05	*
Pond Spillway in Bypass	*	0.41	0.18	*	<0.05	0.80
Middle and South Fork Confluence in Bypass	*	0.25	*	*	<0.05	0.1
28" Pipe in Bypass	*	*	*	*	<0.05	0.09
Sampled by UDWR October 1988 (UDWR, 1988)						
Sed. Pond Effluent	0.09	14.0	**	**	0.06	**
Sampled by Skyline October 1988 (Utah Fuel Company, 1988)						
Eccles Creek	**	**	**	**	0.04	***0.90
Mine #3 Discharge (CS-12)	0.08	2.28	**	**	0.04	***0.87
Sed. Pond Discharge	0.04	3.39	**	**	0.06 and 0.04	***1.33
Shop Discharge	0.03	3.18	**	**	0.50 and 0.36	***1.33

* Analysis not done
** Analysis not reported, probably not done
*** Unspecified surfactant, not identified as MBAS

Elevated nitrites were traced to emulsion oil used in the longwall system in the #3 mine. In the 1:20 dilution that was used at the time, nitrite concentration was 182 mg/L and nitrate was 872 mg/L. As much as 4,000 gallons of this emulsion was released each time the longwall unit

was moved, which had occurred six times from 1986 to 1988. There were also occasional spills and leaks when the longwall operated. The oil was captured and removed from the water by skimming, and flocculation before it left the mine, but the nitrogen compounds went into solution in the water and passed through the sediment pond into Eccles Creek. Skyline replaced the emulsion oil with one that contained no nitrites or nitrates as soon as the connection was realized. Field kit test results submitted to the Division by Skyline in late 1988 indicated that the nitrate and nitrite levels were dropping in discharges from Mine #3 (CS-12) and the sediment pond (Utah Fuel Company, 1988). Samples taken by the Division in December 1988 (Table 14) detected no nitrite or nitrate in discharges from the #3 mine, or the pond; but elevated levels were found in the discharge from the #1 mine. Field kit results from January to May 1989 showed consistent nitrite and nitrate levels, 0.03 mg/L and 1.07 mg/L respectively, in both the sediment pond and the Mine #3 discharge (CS-12). In 1989 the longwall unit was moved from Mine #3 to Mine #1. Nitrate and nitrite were within acceptable limits by August 1989 (Table 14).

Sudsing and elevated phosphate turned out to be unrelated to the nitrogen compounds, and were caused by detergents used in the shop and offices. Mop water was being disposed of into floor drains, which empty into the 72-inch bypass culvert by way of the sedimentation pond. Skyline has solved the problem by replacing detergents with low sudsing, non-phosphate types and revising procedures so that mop water is now discarded into the sanitary sewer (Utah Fuel Company, 1988).

Table 14

	Nitrite				Nitrate			
Sampled by the Division	12/14/88	3/29/89	4/18/89	8/31/89	12/14/88	3/29/89	4/18/89	8/31/89
Mine #1 Discharge (CS-14)	0.83	?	*	0.05	5.2	0.034	*	0.075
Mine #3 Discharge (CS-12)	<0.05	0.013	0.14	*	<0.05	0.039	2.0	*
Pond Discharge	<0.05	0.032	0.24	<0.05	<0.05	0.033	1.76	1.48
72" Bypass Outfall	*	*	<0.05	<0.05	*	*	<0.05	1.11

* Analysis was not done

Oil and Grease

There is no water quality standard for oil and grease, but the UPDES permit limit for the White Oak, Kinney #2, and Skyline Mines is 10 mg/L. However, a 10 mg/L oil and grease limit does not protect fish and benthic organisms from soluble oils, such as those used in longwall hydraulic systems. The UDWR has recommended soluble oils be limited to 1 mg/L (Darrell H. Nish, Acting Director UDWR, letter dated April 17, 1989 to Dianne R. Nielsen, Director of the Division). For water being discharged to Electric Lake from the JC wells, the limit is also 10 mg/L.

Baseline data collected from the surface water and spring samples in and adjacent to the permit area of the Kinney #2 mine have shown oil and grease detections ranging from concentrations of 3-4 mg/L from springs and 2-3 mg/L for the stream samples. The explanation offered for this phenomenon in the text of the MRP was the possibility that oil and grease could be present in the historic abandoned mine workings.

Oil and grease in water discharged from Skyline Mine #1 (CS-14) is typically below detection limits, with a maximum of 23.4 mg/L measured in June of 1993. The maximum at Mine #3 (CS-12) 12.5 mg/L, recorded in 1987. Discharge from the sediment pond has only occasionally (10 of 880 samples as of June 2010) exceeded the 10 mg/L UPDES limit (3 times in the 1980's, 6 times in the early 1990's, and once in 2002).

The principal source of oil discharged from Mine #3 appears to be the longwall unit that was installed in 1986. A water-oil emulsion (5% oil) is used in the longwall hydraulic system to meet MSHA fire protection requirements. As much as 4,000 gallons of this emulsion can be released each time the longwall unit is moved. The unit was moved six times between 1986 and October 1988. There are also occasional spills and leaks when the longwall is operating. Oil is captured and removed from the mine water discharge system by skimming and flocculation before it leaves the mine. Since 1988 an extensive no-spill program has been part of the longwall operations, and if a spill does occur the water and oil emulsion is to be pumped into abandoned sections of the mine rather than being discharged to the surface (Utah Fuel Company, 1988). If there is flocculated oil in the sediment pond sludge, it is a potential source of recontamination that will eventually require proper removal and disposal.

Although Well JC-3 discharged water directly from the mine workings, it was pumped from a portion of the mine that is flooded and not accessible. No evidence of contact with oil and grease, emulsion fluids, or any other contaminants was ever measured.

Prior to 1985, oil and grease in water discharged from the White Oak Mine was generally less than 0.5 mg/L, with a maximum of 2.2 mg/L. Between September 1985 and June 1989, measurements exceeding 0.5 mg/L increased, and the February 21, 1986 sample exceeded 10 mg/L. Longwall mining equipment was never used in the White Oak Mine. Reasons for the increase in oil and grease in the mine discharge have not been identified.

Temperature

Water temperatures in the streams fluctuate greatly, because low flows and turbulence act to quickly equilibrate water temperatures with air temperatures. Winget (1980) found daily fluctuations of 12 to 15° C during warmer months, but fairly constant temperatures (0 to 2° C) from November to March. The Division found that the temperature of Eccles Creek increased, from 43° F to 54° F, as it passed through the 72 inch bypass culvert and joined with the sediment pond discharge (The Division, 1988). Since the streams within the CIA have steep gradients and rocky beds, entrainment of air and transfer of oxygen, and equilibration with air temperature should be sufficient to eliminate temperature as a factor in habitat quality.

The maximum allowable temperature change for Class 3A waters is 2° C (3.6° F). The water temperature of the combined discharges of the JC wells is approximately 14°C. Since the temperature of the receiving waters, Electric Lake, varies from 0.5° - 19.7°C at the surface (winter to summer, respectively) the temperature of the discharge is satisfactory. No mine water discharges from underground workings are planned for the Kinney #2 mine that would have the potential to discharge to Scofield Reservoir.

Fish and Invertebrates

Upper Huntington and Eccles Creeks have naturally reproducing populations of cutthroat trout. Rainbow and brown trout were reported in upper Huntington Creek prior to 1979, but UDWR's work to eliminate these trout species from this fishery has apparently been successful. Rainbow trout have been planted in Scofield Reservoir, and cutthroat trout are recruited from inflowing streams. Speckled dace, mountain suckers, and mottled Sculpin are also found in area streams. Macroinvertebrate communities in both drainages have considerable species diversity (Winget, 1980).

James Creek

The Skyline Mine MRP (page 2-71) commits to conducting macroinvertebrate studies and fish studies in James Creek for 2 years beginning in October 2001 and then every three years thereafter. Sampling should identify any slow degradation of the creek due to sedimentation. Unfortunately, only one year of baseline data was obtained prior to mining activities. Mt. Nebo Scientific, Inc. collected the data for the first two years, and Dr. Dennis Shiozawa conducted the surveys. The October 17, 2000 and 2001 (2001 Annual Report) reports found James Creek to be in excellent condition despite the large decrease in macroinvertebrate and fish numbers, Table 15 summarizes the sampling. James Canyon and Burnout Creek were surveyed in September of 2007 and July 2008: there was evidence of possible reinvasion and successful reproduction of trout.

Table 15 - Summary of Aquatic Resource Sampling on James Creek in 2000 and 2001

Date	**Macroinvertebrate #/m^2**	**Biomass (g/m^2)**	**Total Fish**
Fall 2000	378,510*	272	587
Spring 2001**	335,000		
Fall 2001	127,875	256	93

*Used summary data from Fall 2001 report, because Fall 2000 report indicates 34,757/m^2.
** Spring 2001 report not found; used summary data from Fall 2001 report.

The 2001 report provides several explanations for the decrease in macroinvertebrate and fish numbers, and cannot directly attribute the decrease to mining activities. The large amount of drilling fluids that spilled into the Creek while drilling the James Canyon Wells was not mentioned, or accounted for in this study. However, a subsequent conversation between Susan White of the Division and Dr. Shiozawa indicated that the drilling fluids could have influenced the fish numbers. The James Canyon well drilling was carried out under an exploration permit administered by the Bureau of Land Management (BLM).

Because of the lack of adequate baseline data, and the dramatic decrease in numbers of macros and fish for fall 2001, studies are ongoing in James and Burnout Creeks. The spring 2002 report concluded, "Both streams can be considered to be in good condition. The impact recorded in the fall of 2001 in James Canyon appears to have been temporary." The Skyline Mine MRP includes a commitment to sample macroinvertebrates in the perennial streams in Woods, Eccles, Burnout and James Canyons in the fall and spring every three years, beginning in 2007. Sampling was done in 2007 and 2008, and the next sampling date is fall 2011.

Eccles Creek

UDWR ranks Eccles Creek as a valuable trout stream, mainly as a spawning stream for wild cutthroat trout that are eventually harvested in Scofield Reservoir. Data the UDWR collected in 1971, prior to coal development, identified Eccles Creek as a somewhat pristine fishery. The stream sustained an estimated 1,272 wild cutthroat trout along 2.5 miles of habitable stream. Adult trout comprised only 4% of this population (Donaldson and Dalton). Although not officially documented by UDWR, local sportsmen have reported catching "some of the largest cutthroat out of Eccles Creek" that they have seen out of any stream on the Wasatch Plateau. This is attributed to the increased flows in Eccles Creek due to the increased mine discharge observed beginning in August 2001.

Benthic invertebrate studies were done by the USGS at three sites on Mud Creek and two in Eccles Canyon in July and September 1979, and July and October 1980. There were consistent downstream and seasonal trends. Diversity decreased downstream in Eccles Canyon, probably because Skyline Mine was relocating the stream at the time (Waddell and others, 1983b).

Winget (1980) collected data on invertebrates and sediments in Eccles and Huntington Creeks prior to construction of the Skyline Mine. Skyline studied benthic communities and sediment composition of gravel beds in Eccles Creek from 1979 to 1985. Fishery habitat studies were also done (Coastal, 1993, p. 2-70).

In conjunction with the Skyline study, UDWR conducted fish surveys the first week of August from 1979 to 1986 (Donaldson and Dalton). UDWR found that the fishery began to decline after 1975 in the 1.75 mile stretch of Eccles Creek below the turnoff to the White Oak Mine. The construction of roads and mines caused high sedimentation in the stream, depositing up to 18 inches of fine sediment above the natural substrate. In 1979, the fish population along the entire 2.5 miles of habitable stream was down to 40% of 1971 pre-mining levels, and 18% of the fish were adults compared to 4% in 1971. Construction of the Skyline Mine began in 1980. Mitigation started in 1981, but deterioration of the stream continued. By 1983, most of the road through Eccles Canyon was asphalted, and disturbed areas were revegetating. Still, only 27 fish were found in Eccles Creek, a 98% reduction compared to 1971. There were no young-of-year or 1-year juveniles. A reduction of sedimentation was evident by 1985, and by 1986 the cutthroat population had recovered to 93% of the 1971 levels and 1-year juveniles were present (Donaldson and Dalton).

The UDWR conducted fish surveys and macroinvertebrate inventories in 1988 as part of the investigation of the problems with foam and slime in Eccles Creek (discussed above). Fish population had been estimated in 1986 to be 600 fish per mile. In mid September 1988, fish in lower Eccles Creek were abundant and macroinvertebrate populations appeared normal. However, when Upper Eccles Creek was assessed in October 1988, only 20 fish per mile were found. It was also found that one and two-year old fish were absent from the population. Macroinvertebrate diversity dropped from 6 - 7 families per square foot above the Skyline Mine, to 1 family present below the mines. Diversity in Mud Creek was 8. Toxicity from nitrites and eutrophication from nitrates and phosphates were the causes of these population losses (UDWR, 1988; The Division, 1988).

R. W. Baumann (1985) and Ecosystems Research Institute (ERI, 1992) performed studies of macroinvertebrates and sediment in Eccles Creek for Skyline. Benthic invertebrates in the stream below the mines indicated stress in the 1984 - 1985 surveys, but showed recovery from the conditions that existed in 1981. In 1991, mean number of individuals, total number of taxa, and aquatic plant biomass decreased immediately below the mine; then increased further downstream. The zone of impact appeared to extend to the confluence of Eccles Creek with Mud Creek, but parameters there were similar to those in Mud Creek. It was determined that the water below the mine was not acutely toxic, but the effects of chronic toxicity and sediment transport were not determined. The streambed immediately below the mine was extremely embedded, and the percentage of sediment 0.5 to 2 mm in size was significantly higher than elsewhere in the streams. Electrical conductivity of the water was highest directly below the mine and decreased further downstream. Sulfate leached from gypsum in the limestone rock dust in flooded, abandoned areas of the mine was identified as the reason TDS levels in mine

water discharges were exceeding UPDES standards. TDS in the discharge returned within UPDES limits after application of contaminated rock dust ceased and continuing flow diluted or flushed residual contamination.

Skyline Mine conducted macroinvertebrate studies in Eccles Creek in September of 2007 and July of 2008 to monitor changes caused by the increased water discharge into the stream. In the Skyline Mine 2009 Annual Report, the Division biologist made the following comment regarding the results of these surveys: "Some measures …indicate a considerable improvement in habitat quality of a few sites between 2001 and 2007. However, all other measures indicated that Eccles Creek has not yet recovered from the increased flow. Due to the gradient of the stream channel and the increased discharge … the stream cannot return to its previous state. The stream would only possibly recover with a reduction of flow or an increased input of loose, coarse material into the stream."

Upper Huntington Creek

After the spillway gates of Electric Lake were closed in 1973, and the reservoir began to fill, UDWR measured increasing numbers of cutthroat trout in Huntington Creek above the lake. Numbers increased from 104 fish per 0.1 mile in 1974 to 263 fish per 0.1 mile in 1977. Also, smaller fish made up increasing percentages of this population, indicating increased reproduction, resident fish, and increasing recruitment stock for the reservoir (Winget, 1980).

Benthic invertebrate studies were done by the USGS at seven sites in Huntington Creek from 1977 through 1979. Diversity indices had a large variability that was attributed to variations, possibly natural, in water quality and stream environment. Simons, Li, and Associates (1984) concluded several years' worth of additional data would be required to establish baseline conditions.

Winter Quarters and Woods Creeks

Winter Quarters Creek was surveyed by UDWR in 1968 and 1971. In 1968, 70 cutthroat trout were found along a 0.1 mile reach, with a maximum size of 14 inches. Winget (1980) does not report the numbers for 1971, but maximum size was 9 inches and the presence of young fish indicated successful spawning. Banks were stable along 70% of the stream. Spawning gravels composed 38-42% of the substrate, but low flows limited fish production. Caddisflies, stoneflies, and mayflies were common and water quality was high (Winget, 1980).

Baseline macroinvertebrates data were gathered in Winter Quarters and Woods Canyons in 2003, 2007, and 2008, and studies will be done every three years. The area adjacent to the Winter Quarters Ventilation Fan pad has too low of a gradient and too much fine sediment for meaningful macroinvertebrate study, so an electo-fishing evaluation will be done on this section of the stream (MRP, Section 2.8.1). In the 2009 Skyline Mine Annual Report, the Division's biologist made the following comment on the surveys of Winter Quarters and Woods Creeks: "Between 2003 and 2008 … there has been some variation in data. These variations could be due

to stream side grazing, increased surface runoff, or other environmental factors. This variation will be important to note when looking at future studies during and after undermining".

Kinney #2 Permit Area

The Kinney #2 permit adjacent area provides potential habitat for approximately 7 fish species. This area includes all Pleasant Valley and its tributaries that drain into Scofield Reservoir. The UDWR database included for Scofield Reservoir and its tributaries apply. According to Table 2 – Potential Wildlife Species of the Wasatch Plateau (Dalton, 1990) in the Kinney #2 MRP, fish species listed as common include: cutthroat trout, rainbow trout, carp, Utah chub, red side shiner, mountain sucker and walleye. None of these fish are listed on the Utah Sensitive Species list. Because there are no streams or lakes with the permit boundary, there is no potential for fish species to exist within the permit boundary. The Kinney #2 mine is designed to control runoff in the disturbed area by directing all drainage to a sediment pond. The effect of the sediment pond may show decreases in runoff and flow in the natural drainages to receiving water bodies. Effects to downstream surface water bodies that do provide habitat for fish populations is anticipated to be negligible given the relatively small (38-acre) surface disturbance footprint.

The Colorado River Fish Recovery Act is a multi-agency partnership to recover endangered fish in the upper Colorado River basin while water development proceeds in compliance with state and federal law. Four species of fish native to the Colorado River basin are in danger of becoming extinct: the Colorado pike minnow, the razorback sucker, the bony tail, and the humpback chub. The goal of the program is to stem further reductions in numbers of these species and, eventually, to create self-sustaining populations, while water development proceeds in compliance with state and federal law. Water usage from mining activities has the potential to intercept the amount of water in the Colorado River thereby impacting these endangered fish populations. According to the Act, any mine removing over 100 acre feet/year of water per year is subject to a mitigation fee paid to the Fish and Wildlife Service. Because the Kinney #2 mine is anticipating an estimated water usage of a maximum of 66 acre feet /year, the requirements of the Act and the associated fees do not apply.

Stream Channel Alteration, Alluvial Valley Floor, and Land Use

The Division's March 1984 Technical Analysis written for the Valley Camp - White Oak Mine provides a summation of the history of the alluvial valley floor determination. The Division stated that Whisky Canyon and Pleasant Valley (above the Utah #2 facilities) were observed by the Office of Surface Mining in August of 1983 to be too narrow for flood irrigation or sub irrigation agricultural activities. Also in 1984, it was noted that the pastures are flood irrigated and the grasses on the valley bottom may be subirrigated.

Since August 2001, Skyline Mine has been discharging an average of 4,800 gpm (9 cfs) into Eccles Creek. These waters flow down Eccles Creek and then to Mud Creek. Mud Creek flows through Pleasant Valley, which is an alluvial valley floor below the Utah #2 Mine. This

flow has *increased* water availability in, and has not caused material damage to the quality of, water supplying the alluvial valley floor.

The historical record of flow in Mud Creek is graphed in Exhibit 3, as recorded at USGS station 09310700 just downstream of the confluence with Winter Quarter's Creek. Ordinarily, high flows of approximately 100 – 150 cfs occur for a short duration during the months of May and June. Flows quickly subside after snow melt, back to the baseline flow of approximately 6 – 12 cfs. The highest daily mean flow during the period from 1974 – 2005 was 300 cfs during the month of May 1984. The lowest daily mean flow was 1.6 cfs during January 1980. The mine discharge is constantly contributing additional water to the baseline flow.

Measurements of flows taken on November 26, 2001 (Appendix D, Skyline Mine MRP) recorded 18.4 cfs in Mud Creek after the confluence with Eccles Creek and 24.44 cfs after the confluence with Winter Quarters Creek. The gain in flow downstream is attributed to contributions from springs and side streams (2 – 3 cfs) and re-emerging baseflow from the alluvium of 3 – 4 cfs (Section 2.12 and Appendix D July 2002 Addendum to the Skyline Mine PHC).

The mine waters being discharged to Eccles Creek had an average TDS level of 600 mg/L in July of 2000. As of July 2010, the Eccles Creek mine discharge water reported TDS ranges of 380-550 mg/L. In Eccles Creek above the mine, the average concentration of TDS is 360 mg/L (2008-2009).

As part of the alluvial valley floor determination, cross sections of the Mud Creek channel were measured at six different stations. The potentiometric surface was measured at four of those stations. At Station 7300, in the vicinity of Green Canyon, the groundwater is four feet below the surface. In the area of Station 14480, the groundwater level is eight feet below the surface, reflecting the rolling nature of the land and the incised nature of the stream channel. The ground water rises back up to four feet below the surface at Station 17340. Station 17340 is located at the site of an irrigation diversion; so as a result, the depth to groundwater at a point 400 feet distant from the stream is closer to the surface than that along the stream channel. This is due to irrigation return flow as well as stream channel entrenchment (Section 2.12 of the Skyline Mine MRP).

The land along Mud Creek is owned by four different landowners, and is used for grazing. Ray Jensen, Range Specialist for the BLM describes the area as sub-irrigated, grazed land with an historical yield of 4,000-6,000 pounds/acre. The predominant vegetation type is grass. The number of animals grazed on the pastures by each landowner is variable with time.

Canyon Fuel Company has evaluated the value of the pasture ground in terms of the replacement cost for feed. At a consumption rate of 0.5 tons per month, and a cost of $100 per ton of hay; the replacement cost is $50 per animal per month. The need for replacement of feed is not likely, however, since grazing will not be impeded by high flows along Mud Creek, and

the reduction in available grazing area is limited to stream banks that may be eroded by the high water.

Dr. Patrick Collins of Mt. Nebo Scientific assessed the vegetation along the Mud Creek stream channel in December 2001 (Appendix A of Appendix D, July 2002 Addendum to the Skyline Mine PHC). He conducted a level II investigation using the methods of the USDA Forest Service. Two reaches were located on Mud Creek. Reach #4 is located just below the confluence of Eccles and Mud Creeks. The riparian community was approximately 91 feet wide and consisted of willows, sedge and rush grasses. Approximately 80% of the banks were vegetated and stable. Downstream, at Reach #5, the width of the riparian community broadened to 120 feet and consisted mostly of willows growing in both riparian and wetland communities. Approximately 60% of the bank was vegetated and stable (February 27, 2002, EarthFax report in Appendix D of the July 2002 Addendum to the PHC). Additional fieldwork observations were conducted in the summers of 2002 and 2003. The results of these observations did not provide any definitive alteration of the riparian or wetland communities.

The gradient of Mud Creek is approximately 0.0091 ft/ft with a sinuosity ratio of 1.6. These figures were derived from aerial photographs (personal communication, November 15, 2002, Rich White, Earth Fax Engineering, with Priscilla Burton of the Division). The channel flattens on approach to Scofield Reservoir with an average gradient of 0.02 to 0.1 ft/ft. Channel subsoils are silty sands and clayey silts, classified by the 1988 Carbon County Soil Survey as Silas and Silas Brycan series. The results of laboratory analysis on the physical properties of the soils in the creek are found in Appendix B of Appendix D of the July 2002 Addendum to the Skyline Mine PHC. Cross sections of the channel describe a channel bed that is 96% cobbles and gravels and side slopes that are 100% sand, silt and clay (Appendix E of Appendix D of the July 2002 Addendum to the Skyline Mine PHC). Low flow terraces are limited in extent and the channel is incised. There is no broad flood plain.

The current stream flows do not approach natural bankfull discharge (Table 5 of Appendix D July 2002 Addendum to the Skyline Mine PHC). The erosional stability of the Mud Creek channel beds and banks was evaluated and found to fall within the allowable velocity using the techniques of evaluation described by the Soil Conservation Service (Table 3 of Appendix D July 2002 Addendum to the Skyline Mine PHC).

A stability evaluation of the channel concluded that well vegetated slopes (grasses and willows) are able to handle the increased flow without erosion (Appendix D of the July 2002 Addendum to the Skyline Mine PHC). There are channel banks of Mud Creek that are not well vegetated and the landowners of these lands should avail themselves of programs that would provide assistance to armor the bank and divert flow to allow the eroding banks an opportunity to reclaim. In an effort to stabilize the stream bank in critical areas and prevent erosion before it began, Canyon Fuel Company obtained a stream alteration permit from the Division of Water Rights and planted trees in 22 locations along the stream bank in cooperation with the landowner.

The July 2002 Addendum to the Skyline Mine PHC (page PHC A-21) commits to armoring stream channel banks, planting of stream bank stabilizing vegetation, or redirection of some flows; should monitoring reveal that deterioration of stream chemistry or stream morphology or vegetative community is related to mine water discharge. To help mitigate any potential erosion of the stream banks in Mud Creek, Canyon Fuel Company has provided time and materials to a private landowner owning land on Mud Creek to establish additional armoring along the steeper cut banks located along the creek.

The location of the Kinney #2 mine is directly adjacent east of the Pleasant Valley alluvial valley floor created by Mud Creek draining into Scofield Reservoir. Mining will occur well above the regional water table (as presented in Chapter 7 of the Kinney #2 MRP). The coal seam to be mined is located well above the water table present in Pleasant Valley. As a result, the potential for ground water interception of the water table within Pleasant Valley is considered negligible. In addition, the irrigation water that supplies the alluvial valley floor (AVF) is derived from Mud Creek at a diversion point upstream of the proposed mine site. Based upon a Utah Department of Environmental Quality TMDL analysis of Scofield Reservoir, 87% of the inflow to the Scofield reservoir comes from Fish and Mud Creek. The proposed mining activity poses a minimal potential for interrupting or impacting these drainages due to it's proximity to the drainages and the utilization of first mining practices only (i.e. no planned subsidence). Additional ground water investigations will be conducted as mining progresses eastward. Surface runoff will be controlled via the Kinney #2 mine proposed storm water drainage system. All surface runoff generated during snowmelt and precipitation events will be routed to Sediment Pond No. 1 located within the surface disturbance area of the Kinney #2 permit boundary. A Utah Pollutant Discharge Elimination System has been obtained by the Permittee and establishes water quality/effluent standards for any discharge from the sediment pond that could potentially enter the AVF area.

In conclusion, additional contributions of flow from the Kinney #2 mine are not expected to Mud Creek due to the lack of a hydrologic connection elevation of the coal seam and the general northwest dip direction of the strata influencing any gradient. The potential negative impact to Mud Creek from the increased flows originating from the Skyline Mine is not the interruption of agricultural activity, but the acceleration of instability in the channel banks and increased erosion of the stream channel in reaches of the channel that are not well vegetated. The area impacted would be very small in relation to the acreage being pastured and would be negligible to the total production of the pastures.

Stations along Mud Creek will be monitored four times a year (seasonally) for a period of one year following a reduction in mine discharge to 350 gpm or less. Sediment loading in Mud Creek will be computed from the TSS and flow data collected. Annual evaluations of the stream will be summarized in a report to be submitted to the Division with the Skyline Mine Annual Report. The monitoring plan will also evaluate the changes in stream morphology and vegetation at the stations over the same time period. For the Kinney Mine, operational monitoring stations designed to monitor impacts to Pleasant Valley and the Scofield Reservoir

includes: Mud Creek, RES-1, Miller Outlet, Sulfur Spring and monitoring wells CR-10-11 and CR-10-12.

Ground Water - Baseline Conditions

Ground Water Quality - General

With few exceptions, ground water in the CIA is a calcium bicarbonate type. Spring water is generally of better quality than well or mine discharge water. Quality is usually highest in the second quarter of the year when flows are greatest. At Skyline, samples are rarely taken during the first quarter because of snow cover. Locations of seeps and springs sampled for the Skyline, Kinney #2 and White Oak Mines are shown on Figure 5 (Appendix A). The Division feels these sampling locations adequately characterize the hydrologic regime. Except for a few UPDES reports in early 2003, water monitoring at the White Oak Mine ceased in September – October 2002.

The USGS analyzed water from 140 springs in the Huntington and Cottonwood Creek basins between July 1977 and September 1980. None of the analyses found concentrations over U. S. EPA drinking water standards (Engineering-Science, 1984, p. 2.39). TDS content of the ground water from springs and seeps ranges from less than 125 mg/L in the Skyline permit area to 4,000 mg/L at the confluence of the Price and San Rafael Rivers with the Green River.

Ground Water Quality - Castlegate Sandstone

Spring S10-1, which is the only monitored spring that discharges from the Castlegate, or near the Castlegate-Blackhawk contact, has had an average TDS concentration of 99 mg/L, and a maximum of only 165 mg/L. This low TDS is attributed to the lack of shale in the Castlegate. The water is low in nutrients and metals. The pH averages 7.3 and alkalinity is typically 25 times acidity. Total and dissolved iron average 0.28 and 0.08 mg/L and total and dissolved manganese average 0.04 and 0.06 mg/L. Springs issuing from the Castlegate Sandstone typically have less than 180 mg/L TDS (Engineering-Science, 1984, p. 27).

Ground Water Quality - Blackhawk and Star Point Formations

Total Dissolved Solids

Springs and seeps monitored for the White Oak Mine typically have TDS values in the range of 200 to 300 mg/L. Quarterly average values go from a low of 96 mg/L in the second quarter at S25-13 to a high of 363 mg/L during the fourth quarter at S24-12. The highest TDS reported is 9,187 mg/L at S36-19.

Skyline's data show that spring waters from perched aquifers in the Blackhawk Formation typically have TDS levels of 240 mg/L (Coastal, 1993, p. PHC2-6). The highest TDS measured by the Skyline Mine operator is 668 at S17-2, next to Eccles Creek just above the

Skyline Loadout. Average TDS at this spring is 365 mg/L. High TDS is also found S13-2, in the north fork of Eccles Creek near the mine and at S24-12 at the head of South Fork.

Kinney #2 data from the springs and groundwater monitoring wells indicate a range of TDS values from 120 mg/l to 620 mg/l with an average of 339 mg/l. There was no significant variance of TDS values from groundwater monitoring well CR-03-ABV screened in the Blackhawk formation above the coal seam as compared to CR-10-10 and CR-10-12 which are screened in the alluvial/colluvial material in Pleasant Valley. All springs within the Kinney #2 permit area originate in the Blackhawk sandstone. There does not appear to be significant variance in the TDS values for these springs. Eagle Spring appeared to have the best water quality with an average TDS of 152 mg/L; however, this was also the spring location with the least amount of data points collected during baseline monitoring.

As part of the permitting process, the Division has requested that additional baseline data be collected on the Eagle springs and seeps clustered within the Eagle Canyon graben located along the eastern margin of the permit area. These springs originate from the perched fault-controlled aquifer system that is present in Eagle Canyon. As a result, there are also a few spring-fed ponds in this same area. Because these springs likely have a water right associated with them, they will need to gauged for a period of 12 months in order to estimate volume of any potential water loss that could occur from mining to these springs and seeps, then monitored for an additional 2 years. Furthermore, the Permittee has committed to measuring water levels in the ponds with a staff gauge to record any potential water loss that is attributed to mining activities.

Water discharged from the White Oak Mine and well water from the Blackhawk-Star Point aquifer had TDS levels of 180 to 480 mg/L in 1979 (Engineering-Science, 1984, Table 1). Average TDS in water discharged from the White Oak Mine from 1981 to 2000 was 674 mg/L, but TDS values as high as 1,340 mg/L were measured (Valley Camp, 1993, p. 700-22).

Water discharged from the Skyline Mine contained an average of 467 mg/L TDS in 1984, but this had increased to an average of 1,273 mg/L in 1991. The average had reduced to 520 mg/L in 2001, and then rose to 850 to 950 mg/L in late 2004. In 2008-2009, the Eccles Creek mine discharge water (CS-14) has a TDS of 380-550 mg/L. Average sulfate levels went from 150 mg/L in 1984, to 673 mg/L in 1991, and down to 126 in 2008-2009. TDS in the waste-rock-disposal-site monitoring-well averaged 552 mg/L in 1992-1993, and 325 mg/L in 2008-2009.

Iron and Manganese

Waddell (1982) measured dissolved iron concentrations of 0.720 mg/L at the Clear Creek Mine. At the spring near the mouth of Eccles Canyon, which is the same as Skyline's S17-2, Waddell measured 0.860 mg/L. Skyline's 26 measurements of dissolved iron at S17-2 between 1981 and 2009 (November 19) averaged 0.42 mg/L. Both of these groundwater sources issue from faults or fractures in the Star Point Sandstone.

For spring waters from perched aquifers in the Blackhawk Formation, total and dissolved iron average 0.71 and 0.10 mg/L, respectively, and total and dissolved manganese both average 0.02 mg/L. Concentrations of total iron were a little higher in the springs originating from the Blackhawk near the area of the Kinney #2 mine. Total iron averaged between 0 – 2 mg/L and dissolved iron averaging between 0 – 1 mg/L. Total and dissolved manganese from the Kinney #2 area springs averaged at non-detectable concentrations.

Groundwater concentrations from the Kinney #2 mine from the three monitoring wells that are capable of furnishing data indicated that total iron was elevated in one of the two wells screened in the alluvial material of Pleasant Valley. CR-10-12 has showed spikes in iron concentrations since December of 2010. This well, along with CR-10-11 were recently installed in July 2010 in order to better characterize groundwater in Pleasant Valley to the west of the Kinney #2 permit area. The reason for the elevated total iron detections in CR-10-12 is unknown at this time. Dissolved iron for all wells averaged between non-detectable to 0.02 mg/L. Total and dissolved manganese for the wells averaged between 0.01 and 0.8 mg/L for total and non-detect to 0.04 mg/L for dissolved.

In water discharged from the Skyline Mine, total and dissolved iron averaged 1.4 and 0.09 mg/L, respectively. Total and dissolved manganese levels averaged 0.1 and 0.07 mg/L at the Mine # 1 and 0.07 and 0.08 mg/L at Mine # 3. Water from wells is generally similar to mine discharge water (Engineering-Science, 1984, p. 27). For samples collected at waste rock disposal site monitoring well 92-91-03 between September 1993 and December 2009, total iron averaged 1.7 mg/L, but this average is heavily skewed by four samples from 2003-2004 with values of 4, 5, 10, and 16 mg/L (taking into account values under the detection limit by using half the detection limit, the average value is 1.3 mg/L). Total manganese was 0.17 mg/L (0.11 mg/L accounting for values below the detection limit), and there were no high manganese values corresponding to the high iron values..

Water discharged from the White Oak Mine between 1981 and 1989 contained an average total iron concentration of 0.56 mg/L. Total iron exceeded 1.0 mg/L 25 times from 1981 to 1985, with a maximum of 4.60 mg/L, but from 1985 to 1989 levels exceeded 1.0 mg/L only 3 times and the maximum for that period was 2.2 mg/L. From 1989 through 2000, Total iron exceeded 1.0 mg/L/day 6 times with the last exceedance in April 1998 being the highest reported value of 7.27 mg/L. From 1985 through 2000 the 30-day maximum of 70 mg/L Total Iron was exceeded 6 times, with the maximum being 155 mg/L in April 1985 and the last being 108 mg/L in May 1997.

Other Metals

Dissolved copper exceeded the 1 hour average criterion for Class 3A waters in the four samples from monitoring well 92-91-03 at Skyline's waste rock disposal site (1993 Annual Report), although the few analysis results for dissolved copper that are in the Division's database are below the detection limit. There are no applicable standards for total metals in water, but concentrations of total copper up to 0.42 mg/L (S22-5, 8/28/1985) were found in the springs

sampled by Skyline. Total lead up to 0.05 mg/L and total zinc up to 0.185 mg/L were also reported by the Skyline Mine operator (Coastal, 1993, Volume 4), but the highest values in the Division's database are 0.017 mg/L total lead (SS14-4, 8/22/1984) and 0.76 mg/L total manganese (S12-1, 8/22/1983). Data from the White Oak Mine show concentrations of total lead up to 0.17 mg/L and of total zinc up to 0.135 mg/L, however, total copper values are all 0.02 mg/L or lower. Analyses were not done for dissolved copper, lead, and zinc (Valley Camp, 1993, Appendix 722.100a). The igneous dikes in the area may be the source of these metals.

To monitor the addition of mine-water discharge from JC-3 into Electric Lake, trivalent arsenic, cadmium, trivalent chromium, copper, iron, lead, mercury, nickel, selenium, silver, and zinc were to be monitored in both the effluent discharge into the lake and Electric Lake itself for a period of two years; there are no values for these parameters for JC-3 in the Division's database. This will continue if the pumping resumes, to provide adequate baseline information and ensure no degradation of Electric Lake is occurring.

In the area of the Kinney #2 mine, dissolved arsenic concentrations were detected in monitoring well CR-06-03ABV but did not exceed the Utah groundwater quality standard of 0.05 mg/L. Trace amounts of aluminum were detected in Eagle Spring at concentrations ranging from 0.94 to 3.9 mg/L. These concentrations have the potential to exceed the aluminum standard for aquatic wildlife of a Class 3A water body, which Scofield Reservoir is classified as. However, this spring during the baseline monitoring period for the Kinney #2 mine has only demonstrated flow three times at and therefore these concentrations of aluminum are unlikely to affect the downstream conditions at the reservoir.

pH

The average pH range of ground water from monitored seeps and springs in the Mud Creek and Huntington Creek basins is 7.1 to 8.0, based on measurements at numerous locations. Extremes of 6.0 to 9.5 have been reported. Where both acidity and alkalinity have been determined, alkalinity is typically at least 25 times acidity (Coastal, 1993, p. PHC2-6).

The average pH of water discharged from the Skyline Mine (1983-2005) is 7.5 with a high of 9.0 in May of 1987 and a low of 6.5 in September 1989 (Division's Coal Water Quality Database). Water discharged from the White Oak Mine had an average pH of 7.7, with measured high and low of 9.7 and 6.7 (Valley Camp, 1993). The average pH measured at the Skyline Mine waste rock disposal site was 6.6 in 1992-1993, ranging from 6.51 to 6.84 (1993 Annual Report). The UPDES permit for Well JC-3 does not allow for it to change the average pH of water being discharged to Electric Lake. During its short operation time the average pH at JC-3 was 7.6. The average pH at the JC-1 well has been 7.8 (Division's Coal Water Quality Database). Baseline pH ranges for all groundwater samples from wells and springs at the Kinney #2 mine were within neutral ranges.

Temperature

Temperature variances become a potentially significant parameter when comparing potential sources of water. As outlined in Appendix G of the October 2002 Addendum to the PHC, water encountered in in-mine roof sources have been 8.9 °C, while the temperature of water extracted from Well JC-1 and originating below the mine in the Star Point Sandstone has a temperature range of 13.2 to 15.6 °C. The temperature from JC-1 suggests a source at-depth (geothermal gradient) necessary to produce the temperatures. Baseline data collected for temperature from springs and groundwater wells for the Kinney #2 mine are presented on Table 16. It is interesting to note the temperature differences in the monitoring wells illustrating the 24 C water temperature originating from CR-06-03ABV screened in the Blackhawk sandstone above the coal seam versus the lower water temperatures from the wells in the alluvial/colluvial material in Pleasant Valley. The data were collected over a one year time span and the differences in temperature were not the result of a seasonal effect.

Dissolved Oxygen

Although not typically analyzed in groundwater samples, dissolved oxygen has been useful in characterizing differences between water encountered within the mine and Electric Lake water. The dissolved oxygen content of Electric Lake water is over 10 times greater than that of mine inflow waters. While dissolved oxygen can be readily removed from groundwater, it seems unlikely that would occur while moving large volumes of water rapidly through fractures, as some have hypothesized.

Table 16. Kinney #2 Groundwater Baseline Field Parameter Data Summary

SPRINGS	Estimated Flow (gpm)	pH	Dissolved Oxygen (ppm)	Specific Conductivity (Us)	Temp (C)
Eagle Spring (Miller Spring)	2-10	7.51	5.40	67.13	24.47
Angle Spring	0.62	6.66	4.71	436.08	18.34
Aspen Spring	9.01	7.58	7.58	388.20	21.50
Sulfur Spring	83.12	7.21	3.52	535.63	20.46
WELLS	**Water Elev. (ft above sea level)**				
CR-06-03-ABV	7798.29	7.06	-	504.83	24.38
CR-10-11	7647.89	6.92	-	579.83	8.65
CR-10-12	7651.05	7.12	-	570.33	8.59

Ground Water Quantity – Baseline Conditions

Flow of springs and seeps issuing from the perched aquifers varies seasonally, indicating local systems. Recharge for most of these springs and seeps probably originates in the small

surface depressions or basins in the immediate vicinity. Higher flows occur during spring snowmelt, and flows in the autumn are often lower by an order of magnitude. Some seeps dry completely during the summer. Sustained flows from springs are low; only 4 springs on the Skyline permit area were flowing at 10 gpm or more during the 1978 autumn inventory, and most flowed at 2 gpm or less. Flows are also sensitive to the amount of precipitation during the winter. OSM contract staff surveyed springs on the Skyline property in 1983 following a very wet winter. One unidentified spring was flowing at 300 gpm in late June, but by early August it was flowing only 4 gpm. A nearby spring flowed 100 gpm in June and could not be located, apparently because it was dry, in August (Engineering Science, 1984, p. 34). An additional Seep and Spring survey was conducted by the Skyline Mine in the Winter Quarters / North Lease area in 1992 and 1993, which was used in determining the current water monitoring locations. Graphs of selected groundwater wells, springs and streams comparing historic flow to the Palmer Hydrologic Drought Index (PHDI) are provided in Appendix A of the July 2002 Addendum to the PHC in the Skyline MRP, and were last updated with data from the1st quarter of 2003. These graphs illustrate how the springs in the Blackhawk Formation respond rapidly to seasonal and to climatic cycles. This indicates that the springs are fed by discharge from a groundwater system that is in good communication with the surface and annual recharge events. Similar to the Skyline mine, the springs that originate from the Blackhawk sandstone seem to exhibit the same flow behavior. Through the 3rd quarter of 2005, no obvious changes in flow in the springs, seeps, or elevations in the groundwater wells located in the Blackhawk Formation have been noted; despite the significant mine inflows encountered in the Skyline Mine since 2001. This determination is based on the groundwater monitoring sites outlined in the Skyline MRP, for which data is available in the Division's Coal Water Quality Database.

According to the Seep and Spring survey conducted in the White Oak area in the summer of 1990, a total of three seeps/springs are affected by the 2001 Surface mining in the area. Seeps/springs S25-13, S25-14, and 30-1 are all located up gradient of the surface mining. Seep/Spring S25-13 is the only site that provided consistent enough flow to be continually monitored. Recorded quarterly flow measurements from site S25-13 ranged from 0 to 60 gpm, and averaged <5 gpm. Any flow from the three seeps or springs still reported to Whisky Creek and were not impacted by the surface mining.

The Blackhawk-Star Point aquifer provides baseflow to Mud Creek and the lower reaches of Eccles Creek, but the volume of ground water discharged from the regional Blackhawk-Star Point aquifer has not been quantified. Vaughn Hansen Associates (1979) estimated that 64% of the flow of Eccles Creek was from ground water discharge, with the major portion of this flow entering the stream from the Star Point Sandstone. The Star Point can be presumed to provide baseflow to lower reaches of other Mud Creek tributaries where it is exposed. Low flows of Mud Creek are sustained principally by ground water flowing up from the regional Blackhawk-Star Point aquifer (Waddell, 1983b). Discharge through fractures such as the O'Connor fault and the Pleasant Valley fault zone has been documented. Some baseflow also probably occurs directly through un-fractured but permeable zones in the Star Point Sandstone. The Star Point Sandstone does not crop out in the headwater drainages of Mud and Huntington Creeks and the

regional Blackhawk-Star Point aquifer does not discharge from springs, or otherwise contribute to surface flow in these areas.

V. IDENTIFICATION OF HYDROLOGIC CONCERNS

(IDENTIFY HYDROLOGIC RESOURCES THAT ARE LIKELY TO BE AFFECTED AND DETERMINE WHICH PARAMETERS ARE OF IMPORTANCE FOR PREDICTING FUTURE IMPACTS TO THOSE HYDROLOGIC SYSTEMS.)

The Class 3A streams in the CHIA are protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain. The drainages of upper Huntington Creek and Mud Creek have both been identified as habitat for naturally reproducing populations of cutthroat trout. Scofield Reservoir is stocked with rainbow trout, but contains cutthroat trout that have reproduced in tributary streams, including Mud, Eccles, Winter Quarters, and possibly Boardinghouse Creeks.

Burnout Creek has been identified as a spawning habitat for the native Yellowstone cutthroat trout population in Electric Lake. Cutthroat trout have been observed in large numbers in James Creek, just south of Burnout Creek, during spawning season. Boulger Creek has been studied as a stream that could be developed for spawning, and Skyline has provided funds to the USDA Forest Service for construction of a fish ladder to bypass Boulger Reservoir. Utah UDWR is concerned about the potential loss or alteration of these and other important fish habitats in and around Electric Lake as a result of coal mining activities.

There are 194 surface water rights in the CIA; 106 for stock watering, 25 for irrigation, 55 undeclared, and the remaining 8 for other uses. Most streams in the CIA have water rights filed on them. Water rights have been filed on 112 springs and 23 wells or tunnels. Stock watering was the declared use on 62 of the water rights, 41 were for other uses, and the remaining 32 were undeclared. Springs and seeps are important to wildlife, though there are no filed rights that declare this as a use. Specific water rights information for the North Lease was updated in October 2002 (second binder volume 4- Water Rights).

Electric Lake is a reservoir owned and operated by PacifiCorp. PacifiCorp also owns roughly one-third of the water shares in the reservoir, and uses approximately 12,000 acre-ft annually, to cool their coal-fired electric generating plant in Huntington Canyon. The Utah Division of Wildlife Resources typically requires minimum flows of 12 cfs in winter and 15 cfs in summer below the lake to maintain a quality aquatic habitat. In 2002, the minimum flow requirement was reduced to 6 cfs because of low storage levels in Electric Lake. PacifiCorp also purchased the majority of remaining water shares in the irrigation company to maintain plant operations. For those reasons, the agricultural needs of the Huntington Cleveland area were at a minimum, or were not met during the 2003 growing season, since little water was delivered downstream of the Huntington Power Plant. Hydrologic impacts to Electric Lake affect everything from wildlife, to agriculture, to power generation along the Wasatch Front. Whether the possible connection of water entering the Skyline Mine is impacting Electric Lake continues to be studied by all parties.

Both the Skyline and White Oak Mines utilize water from wells in Eccles Canyon that were drilled into fault zones in the Star Point Sandstone. Wells near the Skyline and White Oak Loadouts in Pleasant Valley produce water from both alluvium and the Star Point Sandstone. Water from these wells is for domestic, stock watering, and other uses.

During the 1979-1980 water year, Mud Creek contributed approximately 16% of the inflow to the Scofield Reservoir. Scofield Reservoir discharges into the Price River, which is used for irrigation in Castle Valley and provides the municipal water supply for the city of Price. The Upper Huntington Creek drainage contributes an unknown amount to the total discharge of Huntington Creek, but estimates indicate it could be 25% or more.

Table 17 lists potential impacts to the hydrologic resources, indicates where there is a possibility for cumulative impact outside the permit areas, and identifies analytical parameters or other indicators that need to be monitored to track potential impacts of the permitted mines.

Seasonal periods of high suspended-solid loads in the streams, and periods of high runoff are typical. Therefore, fine sediments alternately settle in, and later are flushed from, the streambed. The high flows leave clean gravel beds for trout spawning. Sediment cleared from the streambed simply moves downstream, eventually accumulating in Electric Lake or Scofield Reservoir. When runoff is low, fine sediments may remain, and spawning gravels become unavailable. Fine sediments increase trout egg and fry mortality through suffocation. Invertebrates are also impacted by sedimentation through loss of habitat or mortality. Invertebrate diversity may decrease, since resistant or adaptive species will remain. Impacts on invertebrates may reduce the supply of food for the trout. Construction, mining, and other activities produce the same negative impacts that nature does by decreasing flow, or increasing sedimentation beyond the capacity of the stream to flush itself.

Fine sediments, including coal fines, have covered portions of the streambed below the Skyline Mine and have been trapped behind beaver dams in Eccles Creek. Some beaver dams have been removed in an attempt to increase access from Scofield Reservoir to Eccles Creek for spawning cutthroat trout, and to facilitate the flushing of fine sediments from the streambed. Sediment traps along Mud Creek have been suggested by UDWR as a solution that would maintain access to the stream for spawning trout while reducing sedimentation in Scofield Reservoir. The increased flow in Eccles and Mud Creeks, resulting from the pumping from the Skyline Mine, has had a beneficial impact by flushing more fine sediment from these streams.

Temperature increases can reduce dissolved oxygen in a stream. Changes in temperature may also directly influence algae growth rates. Winget (1980) found that water temperatures in upper Huntington and Eccles Creeks equilibrated quickly with air temperatures because of the turbulence from rough channels and low flows. However, the Division found that the temperature of Eccles Creek increased, from 43° F to 54° F, as it passed through the 72-inch bypass culvert and joined with the sediment pond discharge (The Division, 1988). However, since the streams within the CIA have steep gradients and rocky beds, the entrainment of air and

transfer of oxygen, and equilibration with air temperature should be sufficient to eliminate temperature as a factor in habitat quality.

Toxic materials in the water will reduce trout and invertebrate populations through mortality or avoidance. Nitrite concentrations in excess of 0.06 mg/L result in trout mortality. The long term LC_{50} exposure level for trout to nitrate is 1060 mg/L. Phosphorus in excess of 0.04 mg/L is not toxic to trout, but does lead to eutrophication of the stream. The UDWR identified toxic levels of nitrite, and eutrophication from excessive nitrogen and phosphorus as causes of fish and invertebrate declines in Eccles Creek in 1987 - 1988. None of the baseline results for surface water nitrite from the Kinney #2 mine were in exceedance of the 0.06 mg/L standard.

Increased TDS has not been identified as a problem in any of the fisheries. There is no water quality standard for TDS for aquatic wildlife, but 1200 mg/L is the limit for agricultural use. There is a possibility of cumulative effect outside of individual permit boundaries in the Mud Creek drainage, but none has been noted. TDS and sulfate exceeded UPDES limits at the Skyline Mine in the past, because of gypsum contamination in the limestone used for dust control. The discharge returned within UPDES limits after application of contaminated rock dust ceased, and continuing flow diluted or flushed residual contamination. At the Kinney #2 mine, the surface facilities disturbance square footage area is estimated to be approximately 38.1 acres. The Kinney #2 surface area disturbed footprint will be constructed with the proper drainage controls and graded roads and equipped with a sediment pond at the downgradient end of the disturbed area. Thereby limiting the amount of TDS from the disturbed area that could potentially make its way into surface water bodies' downgradient of the permit boundary.

Sediment, total nitrate, phosphorous, and dissolved oxygen have been identified as water quality concerns for Scofield Reservoir. High nitrogen and phosphorus levels lead to increases in algae and aquatic vegetation (eutrophication), which in turn leads to a deterioration of water quality. The reservoir may become eutrophic, unless measures are taken to limit nutrient inflow (Waddell and others, 1983a). The increased flow in Eccles and Mud Creeks, resulting from the pumping from the Skyline Mine, may have had a beneficial impact by increasing the inflow of low TDS water into the reservoir; however, the volume of all nutrients being added by this flow has not been determined yet. The increased flows have not appreciably increased the amount of total phosphorous in Mud Creek (measured at MC-3; see Figure 12, Appendix A).

During the 1979-1980 water years, Mud Creek contributed approximately 16% of the inflow to the reservoir, 18% of the TDS, 28% of the TSS, 18% of the total nitrogen, and 24% of the total phosphorous. During snowmelt, concentrations of nitrogen and phosphorus reached 21 and 4.3 mg/L at the Eccles Canyon gauging station. Most of this was in suspended form, and these unusually high concentrations were probably due to flushing of residual debris from 27 acres of forested land cleared in 1979 for fire protection around the mine portal and road right-of-ways. (Waddell and others, 1983a)

Perched systems in the Blackhawk formation have limited storage and recharge capacities, and when they are intercepted by mining operations the resulting in-mine flows decline rapidly. Draining of these perched systems may cause individual springs or seeps to disappear, but should have little impact on the hydrologic balance of the area. Flows into the mines that persist for more than 30 days are typically considered as *possibly* intercepting surface water through a natural, or subsidence induced fracture system. In the case of the Skyline Mine, the majority of inflow water is encountered in the floor and along fracture zones, and has been characterized by Canyon Fuel as likely coming from a deeper regional aquifer, but including a component of surface recharge. Studies carried out by Canyon Fuel Company and PacifiCorp have not confirmed the source of this inflow water. The studies are discussed in more detail elsewhere in this CHIA.

In the case of the Kinney #2 mine, only limited amounts of groundwater have been encountered within the permit boundary. All but three of the monitoring wells drilled were dry. Groundwater inflows similar to conditions observed in other perched groundwater systems within the Blackhawk formation are expected to be encountered at the Kinney #2 mine during the operational phase of mining. The Eagle Canyon springs and seeps and two small ponds are located on the eastern margin of the Kinney #2 permit boundary. There exists approximately 500 feet of cover between the surface and where the Hiawatha coal seam is located. Furthermore, the dip of the coal seam is to the northwest, providing additional overburden cover between the springs/seeps/ponds.

Surface-mining methods employed at the White Oak mine temporarily disrupted the shallow groundwater and diverted surface flows in the area. Seeps and surface flows that formerly reported to Whisky Creek have been re-established in the reclamation of the mine site. The Division (AMR section) constructed several French drains to ensure that the flow from significant seeps reports to the surface, and eventually to the Whisky Creek drainage.

Operations at the Skyline Mine have drawn down the potentiometric surface of the Star Point regional aquifer, and to a much lesser degree in the Blackhawk. This drawdown can induce increased recharge and downward flow through the overlying unsaturated zone through fracture zones. This would have a minimal, probably undetectable effect on perched aquifers or soil moisture because of the generally low hydraulic conductivity of the Blackhawk Formation. Since Canyon Fuel finished mining in the southwestern portion of the mine, the Star Point potentiometric surface has started to recover.

Groundwater flow patterns have the potential to be interrupted at the Kinney #2 mine based on mining operations advancing through the coal seam and draining any small perched systems in the Blackhawk formation. Most of these springs and seeps located in Eagle Canyon do not have a water right associated with them, with the exception of the small spring-fed ponds located in the higher elevations of Eagle Canyon. The mine is not anticipating any subsidence activities based on the fact that only first mining practices will be employed. However, the Permittee has put forth a plan to actively monitor the water levels in the spring-fed ponds located in Eagle Canyon. If any diminution of the water resource of this pond does occur, the Permittee

has committed to providing a contingency plan to provide water replacement for the estimated volume of water lost due to mining activities.

Water users have expressed concerns that water intercepted underground may be discharged into a watershed other than the one where the ground water was originally destined. According to the Utah Coal Mining and Reclamation Act and rules, a mine may divert water underground and discharge to the surface, if material damage to the hydrologic balance outside of a permit area is prevented; and disturbance to the hydrologic balance within the permit area is minimized (R645-301-731.214.1). Furthermore, any state-appropriated water affected by contamination, diminution, or interruption resulting from underground mining must be replaced (R645-301-731.530). The Division evaluates a mine's Probable Hydrologic Consequences Determination (PHC) and updates the CHIA prior to permitting, and reviews water monitoring data during mining and post-mining reclamation to determine if adverse hydrologic impacts, *as defined by the rules*, can be demonstrated. Underground mining may result in some diversions of intercepted ground water into drainages that are not topographically within (above) the area where the water was encountered. The PHCs of the mines in the Mud Creek / Upper Huntington Creek CIA have demonstrated that the large quantities of water intercepted underground are *mostly* ancient. Therefore, the inflow water is hydrologically isolated from surface expression of springs, seeps, and streams. Water monitoring activities in the area show no change to water quantity in streams, springs, or wells located in the Blackhawk Formation; except those quantity changes that can be directly attributed to the drought. If it is subsequently demonstrated that the mining has caused, or will cause a diminution, contamination, or interruption of an *appropriated* water right, or a material impact to the hydrologic balance (either within or outside of the permit area), the Permittee will be required by the Division to minimize the impact and replace any appropriated water right.

Table 17

Parameters of Importance and Other Indicators for Predicting Future Impacts	M **Sediments** M **Fish and Macroinvertebrates**	M **Flow** M **Sediments** M **Fish and Macroinvertebrates**	M **Sediments** M **TDS** M **pH** M **Nutrients** M **Specific cations and anions** M **Oil and Grease** M **Fish and Macroinvertebrates**	M **Flow** M **Sediments** M **Fish and Macroinvertebrates**	M **Flow** M **Sediments** M **Fish and Macroinvertebrates** M **TDS** M **pH** M **Nutrients** M **Specific cations and anions**	M **Flow** **Age dating** **Tracer dye** **Geophysics** **Groundwater monitoring** Age dating	M **Flow**
Possible Cumulative Effect Outside Permit Areas	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
POTENTIAL HYDROLOGIC IMPACTS	M ***Increased sediment yield from disturbed areas -*** **Alteration or loss of fisheries in streams and reservoirs. Increased rate of sedimentation in reservoirs. Coal spillage from hauling operations and storage. Loss of riparian habitat.**	M ***Flooding or streamflow alteration -*** **increase or decrease in streamflow.**	M ***Contamination of ground and surface water from acid- or toxic-forming or toxic materials -*** **Contamination of surface water from coal hauling operations and storage. Hydrocarbon contamination from above-ground storage tanks or from the use of hydrocarbons in the permit area. Contamination from road salting. Gypsum used in dust control contaminating mine discharge. Nutrients in mine discharge.**	M ***Subsidence damage to springs and streams -*** **increased sediment load, diminution of flow, physical barrier to fish migration.**	M ***Alteration or destruction of fisheries and aquatic habitats -*** **loss of flow, loss of access to stream, loss of fish spawning habitat, increased sediment load, acute or chronic toxicity, eutrophication, loss of food supply.**	M ***Loss of ground water or surface water availability*** **- water rights, wildlife uses.**	M ***Reduction of flow due to inte-rbasin transport of intercepted water.***

VI. MATERIAL DAMAGE CRITERIA - RELEVANT STANDARDS AGAINST WHICH PREDICTED IMPACTS CAN BE COMPARED

Water within the CIA is used for watering livestock and wildlife, mining coal, domestic use, fisheries, and recreation. Downstream, the water is additionally used for irrigation and domestic and industrial needs. Land within the CIA is used for wildlife habitat, grazing, recreation, and mining coal. Anticipated post-mining uses are for wildlife habitat, grazing, and recreation.

Quality

Water quality standards for the State of Utah are found in R317-2, Utah Administrative Code. The standards are intended to protect the waters against controllable pollution. Waters, and the applicable standards, are grouped into classes based on beneficial use designations.

The Utah Division of Water Quality has classified (latest classification December 7, 2001) Scofield Reservoir as:

1C - protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
2B - protected for secondary contact recreation such as boating, wading, or similar uses
3A - protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
4 - protected for agricultural uses including irrigation of crops and stock watering.

Scofield Reservoir:

- Is a culinary water source.
- Is one of the top four trout fishing lakes in Utah.
- Has over a one million dollar annual recreational fishing value.

E-mail from Louis Berg, UDWR, to Division dated February 4, 2002).

The Utah Division of Water Quality has classified (latest classification December 7, 2001) Electric Lake as:

2B - protected for secondary contact recreation such as boating, wading, or similar uses
3A - protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
4 - protected for agricultural uses including irrigation of crops and stock watering.

Electric Lake:

- Provides cooling water for the Huntington Power Plant, and
- Is a major source of agricultural water for the Huntington Cleveland Irrigation Company.

Streams in both basins are classified as: 1C, 3A, and 4.

In addition, surface waters located within the outer boundaries of a USDA National Forest, with specific exceptions, are designated by the Utah Division of Water Quality as High Quality Waters - Category 1 and are subject to the state's antidegradation policy. This antidegradation policy states that waters shall be maintained at existing high quality, and new point source discharges of wastewater (treated or otherwise) are prohibited (Utah Administrative Code, R317-2-3.2 and R317-2-12.1). All of the upper Huntington Creek drainage and most of the headwater drainages of east flowing tributaries to Mud Creek, (including the Skyline Mine disturbed area) are within USDA Forest Service boundaries and are therefore protected by this policy. The White Oak Mine, both loadouts, the Skyline mine waste rock disposal site and the Kinney #2 mine are outside forest boundaries.

The Utah Water Quality Board agreed in their September 24, 2001 meeting to reclassify Electric Lake as High Quality Waters – Category 2. Category 2 is defined as "…designated surface water segments which are treated as High Quality Waters – Category 1; except that a point source discharge may be permitted, provided that the discharge does not degrade existing water quality." Both the effluent and the lake were to be sampled for a period of two years for a full suite of metals and nutrients to ensure that the mine water is not of a lower quality of water than exists in Electric Lake. Unfortunately, due to equipment failure and high TDS, the JC-3 well (which discharged directly from the mine into Electric Lake) is no longer pumping. Canyon Fuel and PacifiCorp have continued to sample the water quality of Electric Lake and the JC-1 well.

The Utah Department of Environmental Quality, Division of Water Quality can authorize a coal mine to discharge into surface waters under the Utah Pollutant Discharge Elimination System (UPDES). The permits for the mines contain site-specific limitations on TDS, total suspended solids (or total settleable solids for precipitation events), iron, oil and grease, and pH. The Skyline Mine UPDES permit has an additional limitation on sulfate for discharges into Eccles Creek, and a whole suite of metals and nutrients for discharges into Electric Lake. The

Kinney #2 UPDES has the standard site-specific limitations on TDS, total suspended solids (or total settleable solids for precipitation events), iron, oil and grease, and pH with additional limitations of total phosphorus and dissolved oxygen. The compounds have been identified as constituents of concern for the Scofield Reservoir.

The water quality standard for nitrate in Class 1C waters is 10 mg/L. Nitrate levels above 4 mg/L are considered an indicator of pollution, usually from sewage, in all waters. For trout, the long term LC_{50} exposure level to nitrate is 1,060 mg/L.

There is no water quality standard for nitrite, but concentrations in excess of 0.06 mg/L produce mortality in cutthroat trout (UDWR, 1988).

The water quality standard for Class 3A waters for phosphorus is 0.05 mg/L. Levels in excess of 0.04 mg/L are not toxic to trout, but are excessive and promote eutrophication (UDWR, 1988). By state standards for Class 1C, 2A, 3A, and 3B waters, phosphate in excess of 0.05 mg/L is a pollution indicator.

The recommended limit for MBAS, a detergent or surfactant, is 0.2 mg/L (Steve McNeil, Utah Dept. of Health, personal communication in the Division, 1988). This surfactant was detected in the sediment pond effluent at the Skyline mine. No surfactant use is anticipated at the Kinney #2 mine.

There is no water quality standard for oil and grease, but the UPDES permit limit for the White Oak, Skyline and Kinney #2 Mines is 10 mg/L. A 10 mg/L oil and grease limit does not protect fish and benthic organisms from soluble oils such as those used in longwall hydraulic systems, and UDWR has recommended soluble oils be limited to 1 mg/L (Darrell H. Nish, Acting Director UDWR, letter dated April 17, 1989 to Dianne R. Nielsen, Director the Division of Oil, Gas, and Mining).

Increased TDS has not been identified as a problem in any of the fisheries. There is no water quality standard for TDS for aquatic wildlife, but 1,200 mg/L is the established limit for Class 4, agricultural use.

Physical or chemical indicators alone do not fully evaluate water quality in streams. Macroinvertebrates are excellent indicators of stream quality and can be used to evaluate suitability of a stream to support a trout fishery and other aquatic life. Baseline studies of invertebrates by the USGS (Waddell, 1982) and Winget (1980) and studies done in conjunction with mine operations (Coastal States, 1993; ERI, 1992) provide standards against which actual stream conditions can be evaluated. Cutthroat trout populations are also excellent indicators of stream quality. UDWR surveys of trout populations in Eccles, Winter Quarters, and Huntington Creeks have established baseline conditions.

The maximum temperature for Class 3A waters is 20° C (68° F). The maximum allowable change for Class 3A waters is 2° C (3.6° F).

Sedimentation

Sedimentation of reservoirs and the eventual loss or diminution of their value is inevitable. Waddell and others (1983a and b) examined sedimentation in Scofield Reservoir. A bathymetric survey was done to:

a) Estimate total sediment yield from inflowing streams; and
b) Provide detailed bathymetric measurements at selected cross sections to allow more accurate evaluation of future deposition.

The rate of sediment accumulation and deposition was estimated by using ^{210} lead to determine the relative ages of sediment samples from cores. Increased sedimentation in the reservoirs due to mining in the adjacent drainages might be detectable using such techniques, but direct monitoring of inflowing streams is probably more effective.

Changes in sediment size distribution in streams can be determined by comparison with past studies (Winget, 1980; Coastal States, 1993, Table 2.8-3). Winget identified 15% or more of materials finer than 0.85 mm in diameter as a critical measure of biotic potential, in other words whether or not fish eggs and fry and many macroinvertebrates would be suffocated.

Quantity

There are no prescribed standards to assess impacts to water quantity as there are for water quality. It has been determined that the flow regime in the Mud Creek – Upper Huntington Creek, the Pleasant Valley fault and Eagle Canyon graben may be complicated with preferential fracture-flow and flow along faults. A component also related to quantity is the mixing of water from more than one source. To help assess and evaluate any impacts to the flow regime, the waters need to be characterized with as many unique identifiers as possible. As outlined earlier in this report, they include, but are not limited to the following: significant reduction in historic flows that cannot be attributed to drought conditions; age-dating, solute water analysis, field parameters, tracer-dye, geophysics, hydrologic modeling, and routine surface- and ground-water monitoring all contribute to identifying the origin of waters. The Division will use measurements of flow (both receiving and source waters), characterizing the water, and impacts to the receiving and source waters in assessing impacts to quantity.

Based on correlations of low flows in several streams in the southern Wasatch Plateau, Wadell (Waddell et al., 1983b) found that with 5 years of continuous discharge records, monthly flows for August, September, and October could be estimated with a standard deviation of 20%. From measurements taken in 1979 and 1980, it was calculated that the average ratio of the low flows of Mud and Fish Creeks was 0.42 (calculated for October, the low-flow month with the least variation).

Waddell (Waddell et al., 1983b, p. 129) approximated the amount of water that would need to be diverted from, or to the Mud Creek basin, before it could be detected. Assuming the following:

1) A 20% standard error,
2) An average flow ratio of 0.42 between Mud Creek and Fish Creek, and
3) An average flow of Fish Creek in October of 330 acre-ft/year (5.4 cfs).

He calculated the amount as follows:

$$(\pm 0.20)(330\text{acrefeet})(0.42) = \pm 28\text{acrefeet} = \pm 0.45\text{cfs}.$$

A long-term increase or decrease of flow in Mud Creek of at least 0.45 cfs would be detected 68% of the time, by correlating the October flows of Mud and Fish Creeks. The USGS had a stream-gauging station on Eccles Creek during 1979 and 1980. They have had stream gauging stations on Mud, and Fish Creeks since 1978 and 1931, respectively; and as of January 2011, continued to monitor them on a regular basis.

Eccles Creek and Mud Creek have obviously received excessive amounts of mine discharge water since 2001. Most of this water appears to originate from the Star Point Sandstone. This is at least partially supported by the fact that streams and springs in the Upper Huntington, Upper Eccles, and Upper Mud Creek drainages do not appear to be depleted as a result of the increased mine discharge.

Unfortunately, long-term flow data for Burnout, Boulger, and Huntington Creeks draining into Electric Lake are not available. In June 2002, PacifiCorp began monitoring cumulative inflow. This was at a time when the lake was at a historic low. The monitoring continued through mid-April 2003, using a flume located in the lake bottom immediately opposite James Canyon. This flume also measures mine water discharge input from the James Canyon wells to the lake. Based on measured data, PacifiCorp estimates the flows of unmeasured side tributaries below James Canyon to be approximately 14% of the Huntington Creek flow during times when it is not possible to measure them. The flume opposite James Canyon was installed in June 2002 and became non-functional in April 2003 due to the spring runoff, which was still far from “normal” levels, but higher than in the previous “extreme” drought year. The flume was recalibrated in June of 2003 and continues to collect flow data when not inundated. Because the lake level was rising, PacifiCorp installed a second flume further upstream, but still below Boulger Creek. Estimated discharge from the upper Huntington Creek basin is 16,000 acre feet per year (22 cfs) based on the measured discharges from Burnout and Huntington Creeks. This estimated number is supported by comparing the continuous flow recorded at the mouth of Eccles Creek (Table 3) and using the same flow volume per acre of land for the Upper Huntington basin.

The flow data being collected in the upper Huntington drainage will document the flow information necessary to make a quantifiable determination of whether any quantity of water is

being lost from the basin. Other crucial information will be the data supplied by PacifiCorp in regards to Electric Lake such as discharge records from the dam, long-term precipitation data, long-term evaporation data, and long-term stage-volume records for the lake.

VII. ESTIMATE OF THE PROBABLE FUTURE IMPACTS OF MINING ON THE HYDROLOGIC RESOURCES

Quality

Mine discharges of water to both Eccles Creek and Electric Lake are being closely monitored to ensure that the mixing of mine water does not create any degradation of the existing hydrologic regime.

In 2009, with operations of the Skyline mine advancing northward, the Operator submitted plans to build a ventilation shaft, escape shaft, and access slope in Winter Quarters Canyon. The Winter Quarters Ventilation Fan facility will disturb approximately 8 acres near the center of Section 1, T. 13S, R. 6E. The Winter Quarters Ventilation Fan facility will operate under the Skyline Mine UPDES permit. A sedimentation pond and other sediment control measures are designed to prevent additional contributions of sediment to stream flow or to runoff to Winter Quarters Creek and to prevent the violation of applicable water quality standards or effluent limitations. The Winter Quarters Ventilation Fan decline slope portal will be at a lower elevation than portions of the mine workings. To prevent gravity discharge from the Winter Quarters Ventilation Fan, the Permittee will seal and backfill both the shafts and slope (MRP Sections 4.9 and 4.11.9).

Water quality standards are outlined in Section VI. Any future estimates of impacts will be based on the outlined criteria. As of January 2006, no adverse impacts are being observed for the Skyline mine, but any possible adverse trends are being documented.

Quantity

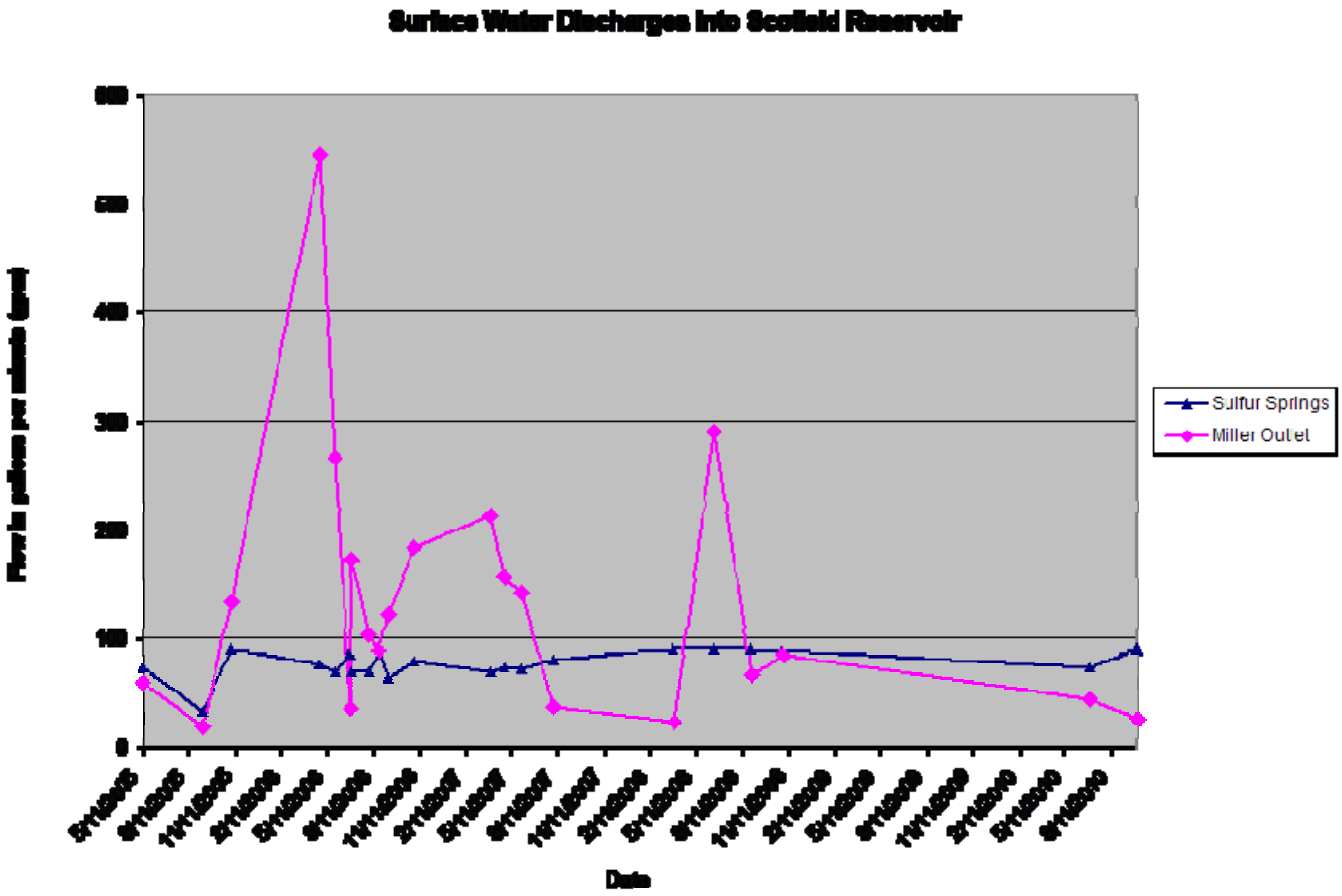
Increased Streamflow

Average discharge from the White Oak #1 Mine between 1981 and 1989 was 0.19 cfs (Table 724.100a). No water had been discharged from the White Oak #2 Mine as of 1993. Discharge from Pond 004 was sporadic from 1995 through 2000 with no discharges after August 1999. Average discharge flow from 1995 through 1999 was 74 gpm/day. Coal production from both mines has averaged approximately 0.5 million tons per year, so a very rough estimate of water production is 0.4 cfs per million tons of coal mined. Records indicate that only sporadic flows were encountered. Water is no longer being discharged from the White Oak Mine.

Skyline's records show that Mine #3 (CS-12) first discharged water in 1983, and Mine #1 (CS-14) first discharged water in 1989. Through the end of 2000, the average discharge from Mine #1 was 0.47 cfs, and 0.58 cfs from Mine #3. This water was always discharged into Eccles Creek through the sediment pond. When streamflow was naturally low in the late summer to

early autumn, the discharge from the Skyline Mine was estimated to account for as much as 60% to 70% of the baseflow in Eccles Creek.

An increase of flow to the Miller Creek approximately one and one half miles north of the Kinney #2 permit boundary is possible due to the northward progress of mining in the Hiawatha coal seam that could potentially be opening up voids that drain isolated perched aquifer systems. The flow from these systems could migrate down dip to the north/northwest and ultimately reach Miller Creek. Low flow and high flow periods measured from Miller Outlet have varied quite a bit over the 2005-2010 baseline monitoring period with flow measurements recorded between 17 gpm up to 545 gpm.



In October of 2003, pumping of mine inflow waters from Skyline Mine into Eccles Creek increased the streamflow from normal amounts of approximately 300 gpm, to as high as 10,500 gpm. From August 2001 to December 2005, the average discharge to Eccles Creek has been 5,601 gpm. Eccles Creek is well armored and has shown little or no visual indication of erosional impacts. These increased mine-water discharge flows have increased the average flow in Mud Creek to about 1.2 times normal (pre-1999) amounts. Mud Creek has always shown some minor visual indication of stream bank erosion, and very little has changed with the increased flows. Both streams are being continuously monitored to determine possible impacts.

Studies carried out on Eccles and Mud Creeks so far show that there have been no significant morphological changes to the creeks (EarthFax 2002, 2003, 2004). Discharge into Eccles and Mud Creeks dropped to approximately 3,500 gpm with the addition of the JC-3 Well. Since JC-3 was shut down, the flow has averaged just 3,856 gpm. This is mostly because the southwest portion of the mine was allowed to fill, and steady-state inflows are much decreased. Based on the current information and conditions, the observed and estimated impacts due to increased streamflow from mine-water discharges are minimal.

The Winter Quarters Ventilation Fan decline slope portal, at an elevation 8,120 feet, will be at a lower elevation than portions of the mine workings. Because of this lower elevation, gravity discharge from the Winter Quarters Ventilation Fan portal would be a possibility at the time mine dewatering were to cease and reclamation begin. To safeguard against such gravity discharge, the Permittee will seal and backfill both the shafts and slope at the Winter Quarters Ventilation Fan facility to prevent discharge (Skyline MRP Sections 4.9 and 4.11.9).

Mine In-flows

Prior to January 2000, mine discharge from the Skyline Mine was typically below 500 gpm. Additional waters (any flows above the 500 gpm) encountered in the mine were used in the operation of the mine. Figure 10 (Appendix A) illustrates the amount of water discharged from the mine and how it has increased with time. As outlined earlier, these inflows appear to be originating predominantly from faults and the fractured Star Point Sandstone located below the mine. Figure 11 (Appendix A) illustrates the cumulative discharge of water from the mine since 1999. As outlined in Table 1, mine-inflows most recently totaling on the order of 3,100 gpm are of concern to the Division because of the potential impact to the surface- and ground-water being used in the Mud Creek and Huntington drainages. The Division is concerned that these increased flows may have an adverse impact on the receiving streams/reservoirs and any waters that are being used within the basin. The Division must ensure that existing waters and water rights are not being diminished. Other than making a determination on impacts to the receiving streams\reservoirs, and surface- and ground-water being used in the basin, the Division does not regulate the use or distribution of mine-discharged waters. Current information indicates the water being discharged is not adversely impacting the receiving streams/reservoirs, or diminishing flows within the respective basins.

For the foreseeable future, Well JC-1 is anticipated to discharge approximately 4,000 gpm of groundwater to Electric Lake, providing about 530 acre-ft of water per month to Electric Lake. Photos 1 through 3 (Appendix B) illustrate the armoring provided by PacifiCorp to minimize any impacts to the lake bottom at the point of discharge. The ability to provide high quality water at a significant rate to the lake is considered a positive impact on the hydrologic resource of Electric Lake.

Underground mining may result in some diversion of intercepted ground water into drainages that are not topographically within (above) the area where the water was encountered. If it is *demonstrated* that mining has caused or will cause a diminution, contamination, or

interruption of an *appropriated* water right, or a material impact either within or outside of the permit area, the Permittee will be required by the Division to address means of minimizing the impact and replacing any appropriated water rights. Evaluations of PHCs and the preparation of this CHIA do not indicate that there is any convincing direct evidence that such impacts have or will result from the mining in the Mud Creek / Upper Huntington Creek CIA. As a consequence, there is no reason to require operators to propose alternatives for disposing of the displaced water or other possible actions as part of the MRP at this time. The MRP does contain a water replacement plan for those State-Appropriated Water Rights that may be impacted by mining.

With no apparent adverse impacts to the receiving stream, the increased discharge of mine in-flows to the Mud Creek and Huntington Creek drainages are considered to have a positive impact, providing additional water to the Scofield and Electric Lake reservoirs.

Studies Related to Mine Inflows

I. PacifiCorp has conducted several geophysical studies in an attempt to establish a flow path along the known faults trending from Electric Lake to the Skyline Mine. These studies have proven to be inconclusive. A Resistivity/IP survey indicated that the faults contained water, however it also indicated saturation *above* the elevation of the lake. In addition, it suggested that portions of the saturated zones contain saline water. There are several reasons why this study does not help to conclusively prove a connection between the lake and the mine:

- The depth of the survey was at least 350-feet above the elevation of the Mine,
- The studies were conducted approximately one year after the Mine began encountering significant water from the faults. If the portion of the fault associated with both the lake and mine had a direct connection, the faults would be devoid of water above the elevation of the Lake by that time,
- The only significant fault-related inflow that Skyline Mine has encountered has come from the floor of the mine. Any inflows encountered from the roof have been of limited duration, consistent with Blackhawk formation function, and
- No saline water has been encountered within the Mine.

II. PacifiCorp also conducted an induced-electrical geophysical survey (AquaTrack – Sunrise Engineering, Inc.), which showed a potential flow path from Electric Lake to the Skyline Mine. However, the preferential flow path did not follow known fault lines, and the survey does not indicate a flow direction, or whether there is flow at all. The presence of water with little flow is consistent with known Blackhawk geology. Also, the faults that were the focus of the study also trend through Electric Lake to the south – no study was conducted on the other side of the Lake to see if conditions were consistent throughout the faults. A study less-biased toward one preconceived solution would be more in line with the Scientific Method. In any case, the Division, as an unbiased arbiter, must take into account the big picture, and investigate all reasonable possibilities for Electric Lake's water loss and the Skyline Mine inflows. The Division has scrutinized all of the information available, from all possible resources in an attempt to fully understand the situation. Unfortunately, none of the studies done to date can *conclusively* show what is happening.

III. Canyon Fuel Company commissioned a numeric groundwater model of the Skyline area in an effort to define the outer limit of where the water is being drawn (HCI 2002, 2003, 2004). This model concluded that:

- The majority of the inflow water comes from the Star Point Sandstone,
- The water flows through the fractured fault system in faults with less than 50 ft. displacement,
- The groundwater gradient in the Star Point Sandstone is from south to north, and
- The system is confined by faults with large displacements (>100 ft.)

The Division has several reservations about this model, and is skeptical about the reliability of the results. Among the reasons the Division cannot solely rely on the results of this model are:

- The model is based on just 20 wells to model a 140 mi^2 area,
- Half of the data was acquired after the inflows began,
- Many assumptions had to be made to complete the model, including critical parameters, and,
- The model was generated using proprietary software, therefore the Division was unable to attempt to repeat the experiment and do sensitivity testing.

IV. Canyon Fuel also studied the chemical composition of the inflow water vs. that of the lake (Skyline PHC, Appendix G). The findings indicated that:

- The chloride content of Electric Lake waters is nearly four times that of mine inflow waters. Chloride is considered a conservative species, meaning that it is not attenuated from a groundwater system, other than by dilution (Fetter, 1988)

- Mine inflow waters contain about 50% greater bicarbonate concentrations than lake waters, and over 3 times the magnesium content of lake waters. Since the Electric Lake waters are supersaturated with respect to calcite and dolomite, they cannot dissolve carbonates to "pick-up" bicarbonate or magnesium without an external source of CO_2. The $\delta^{13}C$ composition of the groundwater shows that it has not been influenced by external sources of CO_2.

- The temperature of the major mine inflows (issuing from the floor) ranges from 56-60 °F; mine inflows from the roof (Blackhawk) have a temperature range of 48-50 °F.

- The dissolved oxygen in the inflows is 10 times less than that of the lake water. It is possible to lose the dissolved oxygen, but more unlikely if there is a direct connection.

V. To better characterize the origin/residence of waters, significant study of the age of water has been conducted by both PacifiCorp and Canyon Fuel Company.

Va. Canyon Fuel Company continues to collect information on tritium and other age-dating parameters. Using tritium analysis, which functions as an indicator of modern water (in

contact with the atmosphere post 1950's), Figure 9 (Appendix A) outlines the relative ages of waters sampled in-mine. The presence of tritium suggests that there is some percentage of modern water present in the water being discharged from Well JC-1. Tritium unit values (TU) for samples collected in Electric Lake to date range from 7.00 to 12.6 TU, and average 8.02 TU for samples collected in 2002 and 2003. The tritium levels in Electric Lake continue to be monitored, however with the significantly lower-tritium water of JC-1 continually being added to the Lake (4.01 TU below the James Canyon flume), the lake numbers appear to be getting lower. Tritium values for springs located within the permit area (Blackhawk Formation) range from 10.6 to 21.6 TU and average 16.1 TU. The only mine inflow where trace amounts of tritium were measured is the 10L inflow.

Other age-dating methods used include radiocarbon and environmental tracers (CFC's, He, Ne, N_2, Ar). ^{14}C dating shows the 10-Left inflow waters to be 4,600 years old and JC-1 well waters (in the same fault as 10-Left) to be 6,300 years old. Helium isotope ratios suggest a percentage of the water located in the 10-Left area of the Skyline Mine is about 5 years old $\pm$ 3 years. The studies and analyses (Petersen, 2002; Appendix G of October 2002 Addendum to the PHC) suggest a component of the water being discharged from the Skyline Mine is of modern origin (20 to 35%). The report (Petersen 2002) goes on to say that with existing data Canyon Fuel cannot determine the source of the modern component of the water. They do not say if further studies could reveal the source. They posit that: "*…the modern water is likely derived from either 1) leakage from shallow or intermediate depth, active groundwater systems that surround the coal seams in the vicinity of the fault inflow, 2) losses from nearby surface water systems that contain abundant tritium, or 3) a combination of both of these sources … Although the precise origin of the small modern water component has not been determined, it is clearly evident that Electric Lake water cannot be a primary source of the fault-inflows." (Petersen 2002)*

Vb. PacifiCorp completed their own draft analysis of the tritium and environmental tracers in July of 2005. The study concluded that:

- "The tritium, dissolved gas, and dye tracer results are consistent with a model of *rapid* fluid flow along fractures with mass exchange via diffusion with the surrounding porous matrix",
- "The systematic increase in tritium in JC 1 and other underground monitoring points is strong evidence for a fracture controlled flow system that is conveying water (5,000 gpm from lake) from surface sources towards underground workings and dewatering wells",
- "Water discharging from well JC 1 is currently a mixture of approximately 22 to 45 % modern water that is derived from surface sources,"
- "The tritium content of JC 1 will continue to increase, but will approach a value that is less than the modem value of surface water … more than 10 years are required before the tritium value will stabilize", and
- Just 365 fractures with an aperture of 0.25 mm would be needed to carry the 5,000 gpm from the lake to the underground workings.

Some of the Division's concerns with this report include:

- The "cubic law" seems to have been applied incorrectly (used vertical gradient instead of gradient along fracture length– instead of the 350 (0.25 mm aperture) fractures the report says are needed to move the 5,000 gpm between the lake and the mine, the calculation along the fracture shows that 3,727 fractures of that size would be needed to move that volume),
- JC-1 is not a 1:1 surrogate for the mine,
- Wells are hardly ever completed in such a manner that surface water does not leak into them from above, and therefore one cannot assume that 100% of the tritium measured in JC-1 is coming from the aquifer,
- The inputs to the CRAflush model were not measured or calibrated, and
- No drawdown has been measured in wells completed in the Blackhawk Formation, while considerable drawdown was measured in wells completed in the Star Point Sandstone.

VI. In February 2003, PacifiCorp initiated a tracer dye study in Electric Lake to help determine whether water from the lake is flowing into and being discharged from the Skyline Mine. A very minor amount of Eocene and Fluorescein dye were used at the time. In April 2003, an additional 50 pounds of Eocene dye was placed along the Diagonal fault in the lake and 35 pounds of Fluorescein dye was placed along the Connelville Fault in the lake. So far, Canyon Fuel Company indicates that no trace of either dye has been encountered in collection packets inside the mine, or the mine-water discharge; nor has their laboratory found any in collection packets located at the JC-1 well. However, they have noted numerous positive dye signatures downstream of the dam. PacifiCorp states that they found small traces of dye in 3 of 5 non-consecutive samples taken from JC-1 between May 29 and July 14, 2003 (Aley, 2005). Prior to the first dye hit, they had sampled 12 collection packets with no hits between February 27 and May 29, 2003. Though they continued sampling, they did not find any other hits after the July 7-July14 packet. PacifiCorp added more dye to the lake in February 2004 (75 pounds of Fluorescein dye along the Diagonal Fault, and 125 pounds of Fluorescein dye along the Connelville Fault). They report small concentrations of the dye in 10 of 13 non-consecutive samples taken at JC-1 from December 28, 2004 to May 12, 2005. They also had hits in Huntington Creek below Dam 1, below Dam 2, above the Left Fork of the Huntington Confluence, and at Little Bear Campground. This study shows that there *may* be a connection between the lake and the mine, but the Division cannot fully accept the conclusions. Some of the Division's reservations about this report include:

- No attempt to quantify the flow, or develop a mass balance is made,
    - The Benchmark study, which is used to explain why no mass balance study can be done, used freshly crushed, dry rock, which would behave quite differently than saturated fractures,

- Also in relation to the Benchmark Study, and their reasoning for not being able to conduct a mass balance analysis, Mr. Aley states on page 3 of appendix B that "*Unfortunately, neither I nor anyone else with whom I am familiar has a good suite of data on dye detection rates through a lake similar to Electric Lake. As a result, we are in the realm of opinions without a highly relevant data base to support the opinions"*, which indicates that a good baseline knowledge is lacking in regard to dye adsorption and travel-rates,

- During the early phase of the study (2003) the Ozark lab was sampling dye packets for both PacifiCorp and Canyon Fuel Company. Canyon Fuel has stated that they submitted the samples to the lab "blind" (labeled by number code, not as JC-1), and the lab indicated no hits for the same period of time that is now reported to have hits in 3 of 5 samples at JC-1. This is a serious concern, and
- This study and others attempt to use the JC-1 well as a 1:1 surrogate for the mine, which it is not since it is drilled into the fracture system 70 feet below the mine.

Though the majority of the water seems to be coming from the Star Point Sandstone (Canyon Fuel observations, age-dating data, and chemical composition studies), there seems to be a component of modern water (tritium studies) that ***may*** be coming from Electric Lake. The connection with Electric Lake, though a possibility, has not yet been shown in a manner that the Division can fully accept. In order to make such a conclusion, the Division's concerns with the various reports would have to be answered in a satisfactory manner.

Thus far, no one has attempted to provide a mass balance of where the Electric Lake losses are going – such a study would be of tremendous value. Also of great value would be to gauge what happens to the "lost" water quantity, the mine inflow rate, and the reservoir function during a test shut-down of JC-1 for a period of several months. PacifiCorp planned such a test, and shut down the JC-1 pump on September 15, 2005. Because of underground pumping problems and other in-mine concerns, Canyon Fuel asked PacifiCorp to turn the JC-1 pump back on just 15 days later (Sept. 30). Because the inflow sites are now inaccessible, it is unclear how much the inflow to the Skyline Mine increased with the JC-1 shutdown.

Subsidence

Especially where overburden is minimal or fracturing is extensive, there is potential for the capture of ground water or surface water by subsidence cracks (Engineering-Science, 1984; Valley Camp, 1993, Appendix R645-301-724.600). Subsidence impacts are largely related to extension and expansion of existing fracture systems and upward propagation of new fractures. Because vertical and lateral movement of ground water in the permit area appears to be largely controlled by fracture conduits, readjustment or realignment of the conduit system may potentially produce changes such as increased flow along fractures that are opened and diversion of flow along new fractures. Increased flow rates would potentially reduce residence time and improve water quality. Some of the perched, localized aquifers could be dewatered. Ground water diverted from seeps or springs fed by such systems would most likely emerge nearby at

another surface location rather than drain down into the mine. Sealing of subsidence cracks by clays in the Blackhawk is expected to minimize long-term effects of subsidence on the hydrologic systems (see section 2.3 of the Skyline Mine MRP).

Mines are designed to restrict subsidence to the permit areas. Because the perched aquifers of the Blackhawk Formation are lenticular and localized, there is little potential for the effects from dewatering these aquifers to extend beyond the permit area. Where mining and subsidence occur within the saturated rocks of the regional aquifer there will be a large increase in permeability locally. With time, permeability will decrease as fractures close and the potentiometric surface will establish a new equilibrium. Residual impacts should be restricted to the previously mined area and will probably be negligible. The addition of the Winter Quarters / North Lease area has been a source of concern because portions of Winter Quarters and Woods Creeks are perennial in nature and support aquatic life. However, the combination of extensive overburden, the sealing and pliability of the overlying Blackhawk Formation (see section 2.3 of the Skyline Mine MRP), and the proposed mining of only one (1) coal seam drastically reduces the potential for any adverse impacts to occur due to subsidence.

In 2009, with mine operations at Skyline advancing northward, the Operator submitted plans to build a ventilation shaft, escape shaft, and access slope in Winter Quarters Canyon. These will not result in any subsidence.

The Kinney #2 mine will employ first mining practices only and therefore the depth of mining, the coal seam thickness and the mine design are anticipated to have negligible subsidence effects to water supplies that exist on the surface.

VIII. MATERIAL DAMAGE DETERMINATION

Mine In-flows

Most of the major inflow water encountered by mining at the Skyline Mine is most likely generated from the deeper Star Point Sandstone. Studies done to date have not been able to conclusively prove or disprove a connection to Electric Lake, though a percentage of the inflow is of modern origin. The deep Star Point Sandstone does not contribute directly to the water budget of the Mud Creek or Upper Huntington Creek basins. However, changes in the potentiometric surface in the Star Point Sandstone may influence recharge and movement of ground water through the overlying unsaturated zone. Because the potentiometric surface is expected to recover to approximate pre-mining conditions after mining ceases, the overlying unsaturated zone should also be expected to recover to approximate pre-mining conditions.

Current information suggests no adverse impacts are being observed in Eccles Creek/Mud Creek or Electric Lake due to the increased discharges of water. Monitoring of mine in-flows, groundwater, and surface water within the Mud Creek – Upper Huntington Creek basins is being conducted to adequately identify any future impacts. Information is continually being updated and re-assessed to evaluate any impacts.

The Kinney #2 mine has encountered only limited amounts of groundwater resources based on initial drilling activities. Data collected from the springs and seeps in and around the permit area have not demonstrated a significant amount of groundwater recharge based upon seasonal collection of data. Furthermore, the presence of low permeable geologic strata between the coal seam to be mined indicates a lack of significant groundwater movement in the subsurface. Greater groundwater movement is observed along the faults that bound the Kinney #2 mine to the east and the west; however mining is not anticipated to cross these faults. As a result, there appears to be little potential to encounter significant volumes of in-mine water.

Loss of Habitats for Cutthroat Trout and Invertebrates

The critical spawning habitat for Yellowstone cutthroat trout in Burnout Creek is entirely within the Skyline permit area. Upper Huntington Creek and several of its tributaries are within the permit area, with the uppermost reaches of Huntington Creek extending upstream beyond the permit boundary. Large numbers of cutthroat trout have been seen in James Creek during spawning season, and it functions as a spawning stream when there is enough water for the fish to move through the culvert below the land bridge, or over the top of the land bridge. Lower Burnout Creek is a spawning stream, and Boulger Creek has been modified to facilitate access by spawning trout (installation of a fish ladder), but it has not been officially determined whether fish are now able to move upstream of the dam.

Subsidence could produce physical barriers or loss of water flow sufficient to block fish from reaching spawning areas. Sedimentation caused by subsidence or other mine related

activities could bury gravels used for spawning. These effects would probably be mitigatable by removal of barriers; restoration of flow, or sediment control and no material damage would result. A study done in Burnout Creek indicates that any impacts to the streams would be temporary and minimal. The study was conducted while mining two different seams under Burnout Creek for a number of years. Subsidence in the area was found to be on the order of 7 feet, and the DOGM/OSM Evaluation Team found no observable effects in 2005.

Cutthroat trout are found in Eccles Creek and other streams of the Mud Creek drainage. This trout population has been heavily decimated by sedimentation, eutrophication, or toxicity several times in the past. These negative impacts generally have been caused by human activity in Eccles Canyon, namely road construction and coal mining. Beaver dams, which are natural traps for fine sediment, have interacted with the additional fine sediments produced by human activities to further reduce trout habitat in Eccles Creek. Trout populations have recovered when the impacting activities have ceased, been modified, or otherwise mitigated, although recovery has not been determined to be 100%.

No material damage to habitats for trout or invertebrates is anticipated for current or planned mining and reclamation, and monitoring is ongoing.

Increase or Decrease in Stream-flow

There should be no noticeable change of flow in streams in the Huntington Creek drainage. In Electric Lake however, the JC-1 and JC-3 wells have a potential to provide roughly 46 percent of the total volume of the lake on an annual basis, should pumping continue. With the drought conditions experienced from 1999 thorough 2003 the added water is appreciated downstream. When the current drought conditions reverse, and if mine-water discharges continue, excessive flows entering the lower Huntington drainage could potentially cause erosional impacts to the stream channel.

The impacts of mine inflows being pumped to Eccles Creek are minimal to that stream. It's well armored and shows little sign of degradation. The impacts to Mud Creek have a potential to be greater than those to Eccles, but these are also minimal. As indicated previously, the potential negative impact to Mud Creek from the increased flows is not the interruption of agricultural activity but the acceleration of instability in the channel banks and increased erosion of the stream channel in reaches of the channel that are not well vegetated. The area impacted would be very small in relation to the acreage being pastured and would be negligible to the total production of the pastures. As discussed previously, there appears to be no hydrologic connection between the perched isolated groundwater systems in the Kinney #2 permit boundary and Mud Creek due to the difference in elevation of the coal seam to be mined. The presence of the Pleasant Valley fault essentially acts a barrier to the alluvial/colluvial groundwater system that is present in the Mud Creek drainage. Mud Creek and Eccles Creek are being monitored continuously and possible impacts should be detected.

At the cessation of mining, flows in Eccles Creek should return to pre-mining levels because mine discharges will cease. Though the mine will most likely fill with water, no gravity discharge is expected because the natural potentiometric surface is much lower than the mine portals. Less flow during drought periods would be the most noticeable of the possible effects. Future expansion plans for the Kinney #2 mine will call for the operation to move further eastward and therefore away from Pleasant Valley. There is no present or foreseen material damage resulting from changes in flow due to present or projected discharge from the mines.

Water Quality

Historically, sulfate and TDS have increased in Eccles and Mud Creeks as a direct result of mining activities. UPDES limits were exceeded for a time at the Skyline sedimentation pond. The suspected source of the problem, gypsum used for dust control, was eliminated and water quality began to recover.

Prior to the 2001 inflows, Whisky Creek contributed approximately 6 percent of the flow in Eccles Creek and 2 percent of Mud Creek, respectively. Because it is such a small percentage of total flows, and the channel has been restored, Whisky Creek will have a minimal impact on the water quality within the Mud Creek basin.

In the late 80's and early 90's excessive nitrogen and phosphorous compounds were introduced into Eccles Creek by mining activities. Sewage was suspected as the source of the contamination at one time, but emulsified oil from longwall hydraulic systems and detergents were determined to be the sources. Fish and invertebrate populations were greatly reduced or eliminated from much of the stream, either because of avoidance or toxicity. Populations recovered after the causes of the contamination were eliminated. The possibility that excessive nitrogen and phosphorous nutrients in inflowing streams could lead to eutrophication of Scofield Reservoir is a possible concern, but has not been an issue since the emulsified oil and detergents were changed. Water Quality problems arising from operations at the Kinney #2 mine are expected to be negligible. The approximate one square mile size of the permit boundary and a 38-acre surface disturbance area will limit the amount of pollutants that could ultimately discharge to sensitive water resources in the region. Furthermore, the surface facilities disturbance will comply with the Surface Mining Control and Reclamation Act with all disturbed drainage being directed to a sediment pond. Discharge from the sediment pond will be permitted through the Kinney #2 UPDES minor industrial permit No. UTG040028 which regulates the amounts of oil and grease, TDS, total iron, total suspended solids, dissolved oxygen and total phosphorus.

The increased flows in Eccles and Mud Creeks, resulting from the pumping from the Skyline Mine, may have had a beneficial impact by diluting normal in-stream levels of dissolved solids with lower-TDS water. The impacts on sedimentation and nutrient loading in Scofield Reservoir have not been fully determined. However, in the short term, the increased flow has been beneficial in maintaining water above the dead-storage level during the recent four years of drought.

Water quality problems have so far proven to be mitigatable. No material damage to water quality is expected, but water quality must continue to be monitored diligently to avoid even short-term problems.

The quality of water entering Electric Lake will be closely monitored both at the discharge and within the lake, to ensure that no degradation of water occurs.

Erosion and Sedimentation

Fine sediments in Eccles Creek have increased as a result of road construction and coal mining related activities. Coal fines are a notable addition to the fine sediment load. One impact of the increase in fine sediment has been reduced trout and invertebrate populations because of suffocation of trout eggs and fry, burial of gravel used for trout spawning, and loss of suitable invertebrate habitats.

Reconstruction of Upper Whisky Creek and reclamation of the area of the White Oak Mine that was surface mined was completed in late 2005. A reclamation project undertaken the by Division of Oil, Gas and Mining beginning in 2010 seeks to repair a segment of Whiskey Creek that was damaged by severe storm activity that occurred in the late 2000s. Fine sediments and runoff associated with that work were mitigated by having all flows report to sedimentation ponds until surface roughening and seeding of all areas was complete. Native stream channel sediments in Upper Whisky Creek were removed and stockpiled for later reconstruction of the channel. Long-term effects to the Mud Creek drainage system should be minimal.

A long-term concern is the loss of water storage capacity in Scofield Reservoir from sedimentation. In the past, sediment traps have been suggested as a means of removing the fine sediments originating in the Eccles Creek drainage. The increased flow in Eccles and Mud Creeks, resulting from the pumping from the Skyline Mine, may have had a beneficial impact by flushing more fine sediment from these streams. The impacts to sedimentation in Scofield Reservoir have not been determined yet.

Sedimentation has not been a problem in the Huntington Creek drainage. To ensure the discharge of the JC wells did not scour the lake bottom and create a suspended solids problem, PacifiCorp supplied extensive armoring of the lake bottom at the point where the discharge enters the lake. Photos 1 through 3 illustrate the armoring of the lake bottom and the channel constructed to carry the discharge water from the pipe to the Huntington Creek channel.

Material damage from erosion or sedimentation is not anticipated in Mud Creek, Miller Creek, or Huntington Creek, but monitoring is ongoing and will continue until mining and reclamation are complete.

IX. STATEMENT OF FINDINGS

No evidence of material damage from the actual mining operations has been found. No probability of material damage from actual or anticipated mining operations has been found. The actual and proposed coal mining and reclamation operations have been designed to prevent material damage to the hydrologic balance outside the permit areas.

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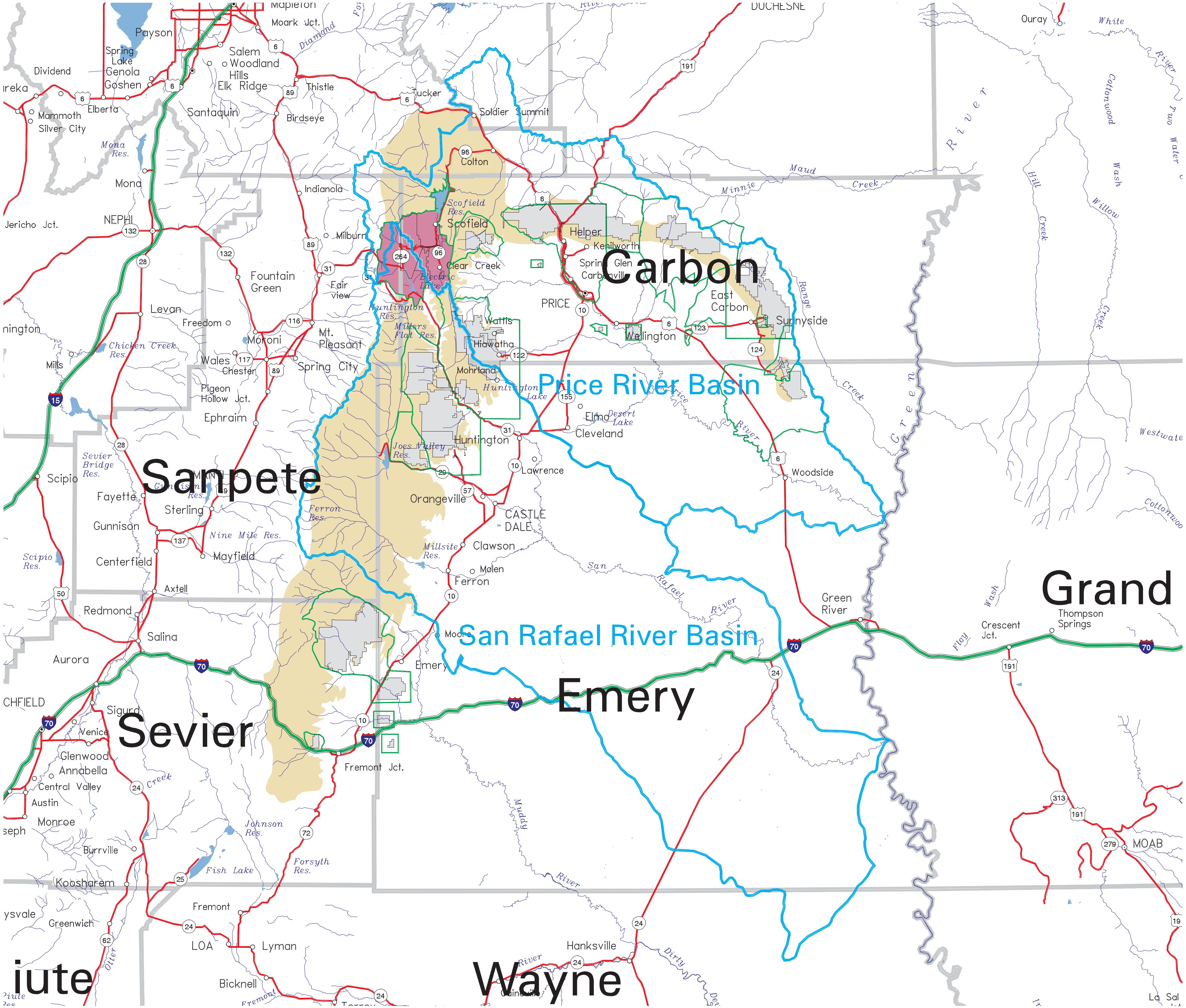
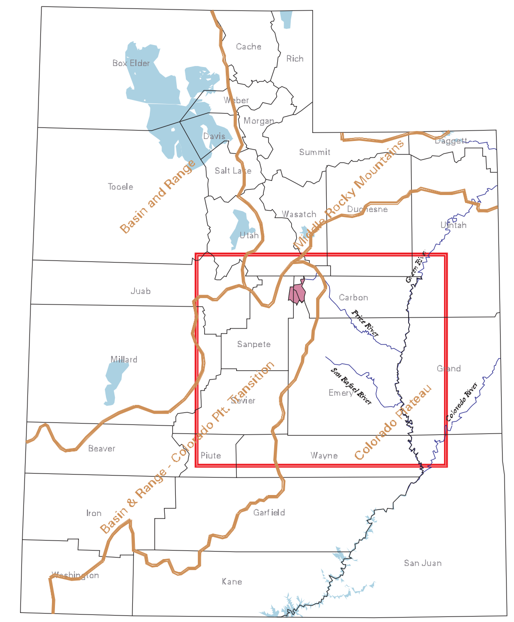
Appendix A





Location Map

- Mud Creek –Upper Huntington Creek Basin CIA Area
- Coal Fields
- Coal Permit Areas
- County Boundary
- CIA Areas
- Hydrologic Unit Boundary

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining

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Cumulative Hydrologic Impact Assessment
Mud Creek - Upper Huntington Creek Basin

Figure 1
LOCATION MAP

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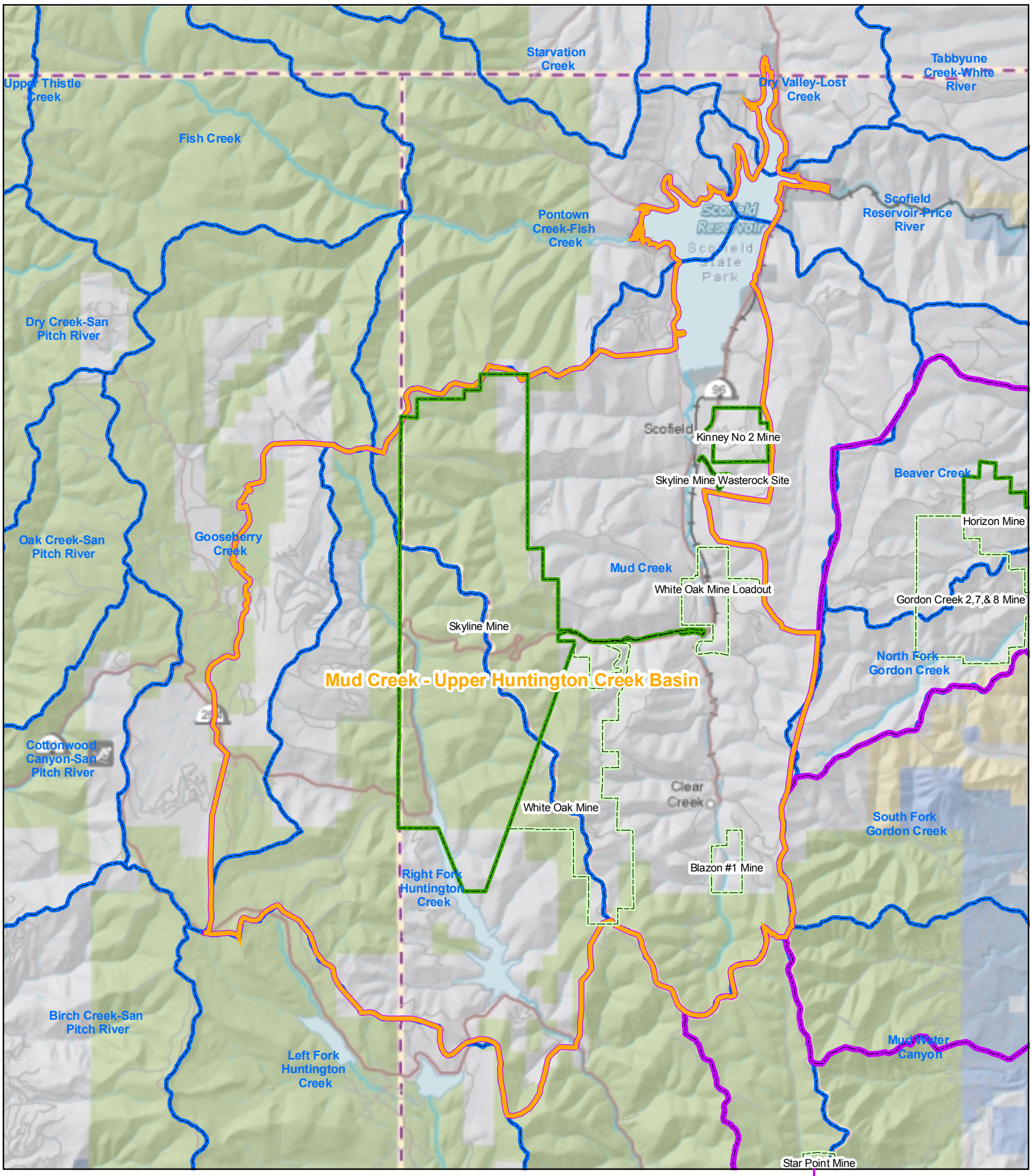
Compiled by: Dan Smith Date: August 21, 2003



Cumulative Impact Area Mud Creek - Upper Huntington Creek Basin

Figure 2

Location Map

May 2011

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Mine Area

STATUS

- Active
- In Reclamation
- Mud Creek - Upper Huntington Creek Basin
- Other CIA Areas
- Subwatersheds

0 0.35 0.7 1.4 2.1 2.8 Miles

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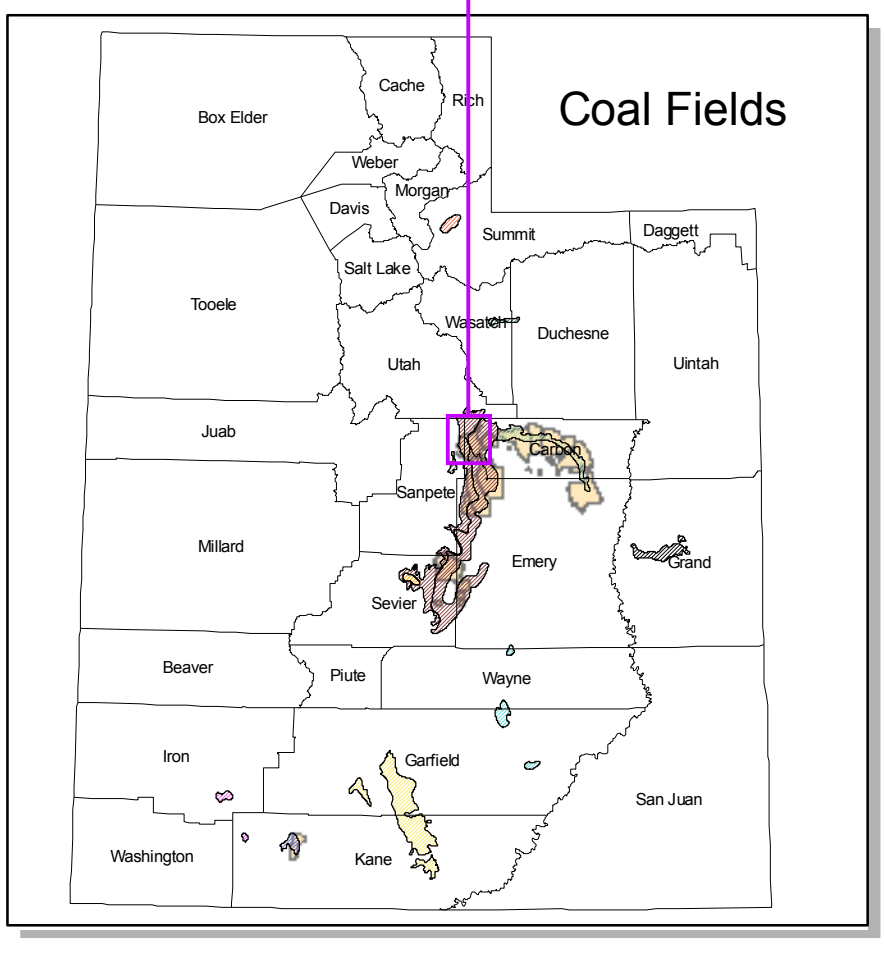

Skyline Mine

White Oak Mine

White Oak Mine

Blazon #1 Mine

Diagonal Fault

Connelville Fault

O'Connor Fault

Valentine Fault

Pleasant Valley Fault

S R 6 E

T 1

Pre-SMCRA, Pre-1977 Mining

Streams

Major Faults

Piezometric Surface Oct 2001

Piezometric Surface Infered Oct 2001

Dikes

Ground Monit.

Surface Water Monit. Site

UPDES Monit. Site

Cumulative Hydrologic Impact Assessment
Mud Creek - Upper Huntington Creek Basin

Figure 3a - Skyline Mine
Mining and Geology

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Compiled by: Dan Smith Date: October 24, 2005

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining

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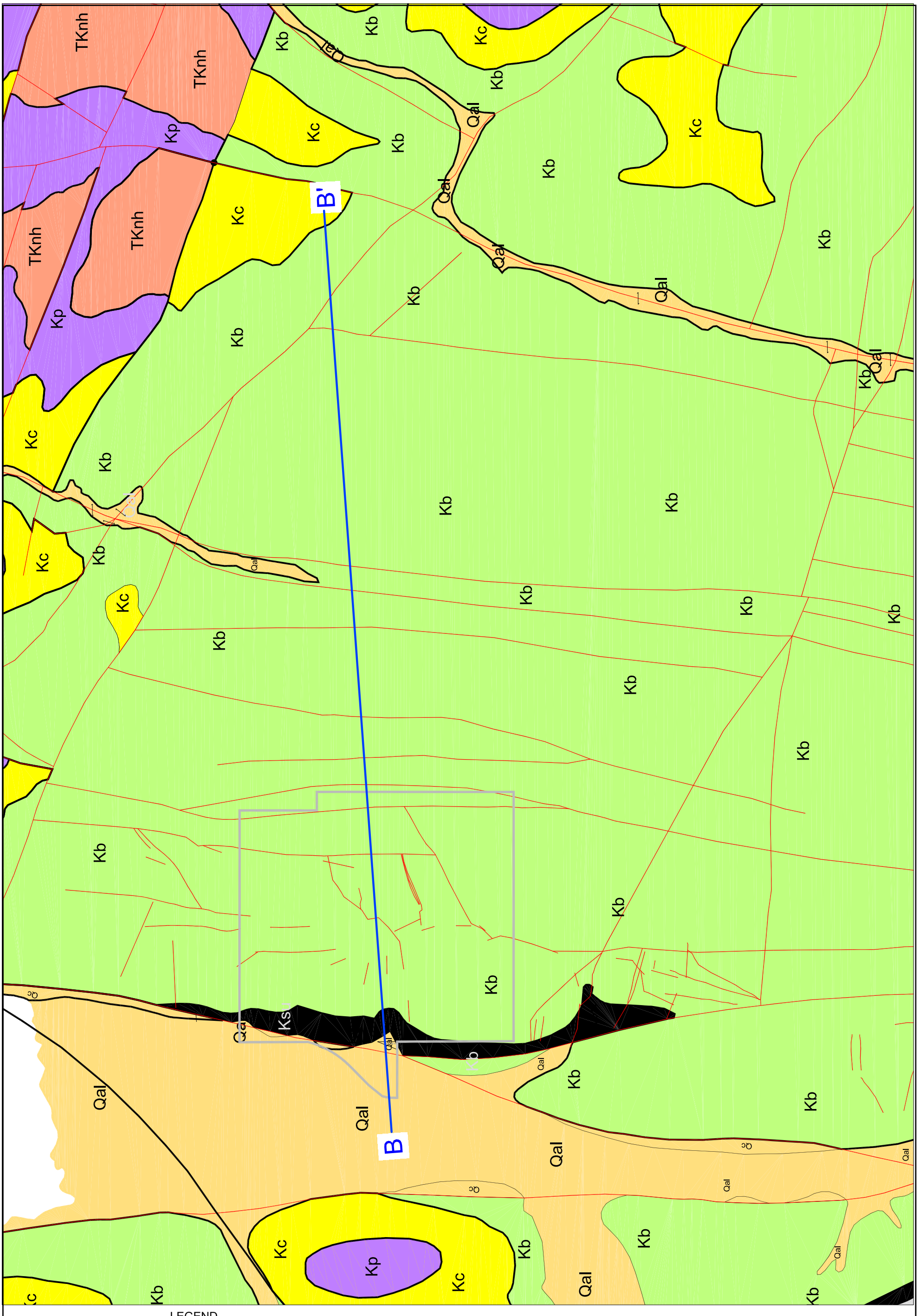
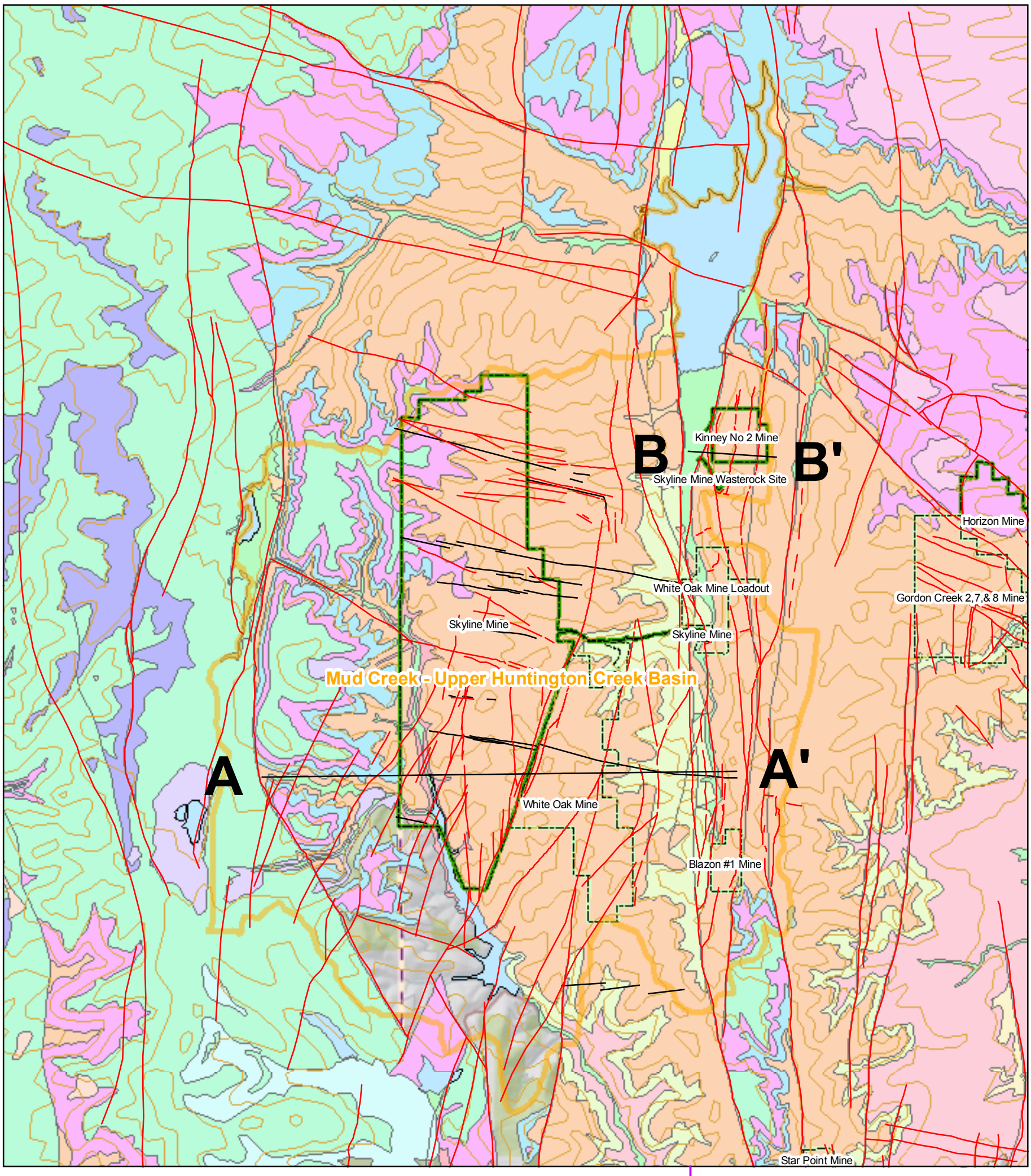
Colton
Scofield Res.
Scofield
Milburn
Clear Creek
Electric Lake
Fairview
Huntington Res.
Millers Flat Res.
Mt. Pleasant
Wattis
Hiawatha

Location Map


B
B'
Qal
Qc
Kb
Kc
Kp
Ks
TKnh
LEGEND
Qal = ALLUVIUM
Qc = COLLUVIUM
TKns = NORTH HORN FORMATION
Kp = PRICE RIVER FORMATION
Kc = CASTLE GATE SANDSTONE
Kb = BLACKHAWK FORMATION
Ksu = STAR POINT SANDSTONE UPPER
Ksm = STAR POINT SANDSTONE MIDDLE
Ksl = STAR POINT SANDSTONE LOWER
Kmt = MANCOS SHALE TONGUE
FAULTS
A A'
CROSS SECTION LOCATIONS
PERENNIAL STREAM
INTERMITENT STREAM
EPHEMERAL STREAM
OLD MINE PORTAL
SPRING
ROADS
RAIL ROAD
ELECTRICAL LINES
PERMIT BOUNDARY
0 2,000 ft
SCALE: 1:15,000 or 1" = 1,250'
This map is in the Kinney Coordinate System (KCS). It was projected from State Plane NAD83 to a vertical datum of 8,000 ft. using a Combined Factor (CF) of 1.0047927. To project back, add 7,000,000 to Northing and 1,700,000 to Easting, then divide by the CF.
Kinney # 2 Mine
Figure 3B
Regional Geology
w/ B-B' X-Section Line
DRAWN BY: GLH DATE: 6-23-2011
APPROVED BY: BG DATE:
Carbon Resources
Coal For Carbon County
P.O. Box 954
Sandia Park, NM 87047
File: CHIA Figure 3B Regional Geology



Cumulative Impact Area Mud Creek - Upper Huntington Creek Basin Figure 3

Geology Map

May 2011

File Location: N:\GIS\coal\ciamaps\mudcreek

Faults
Dikes
Mud Creek - Upper Huntington Creek Basin
Main Road
Graded Road
Dirt Road
Contours

Mine Area

STATUS
Active
In Reclamation

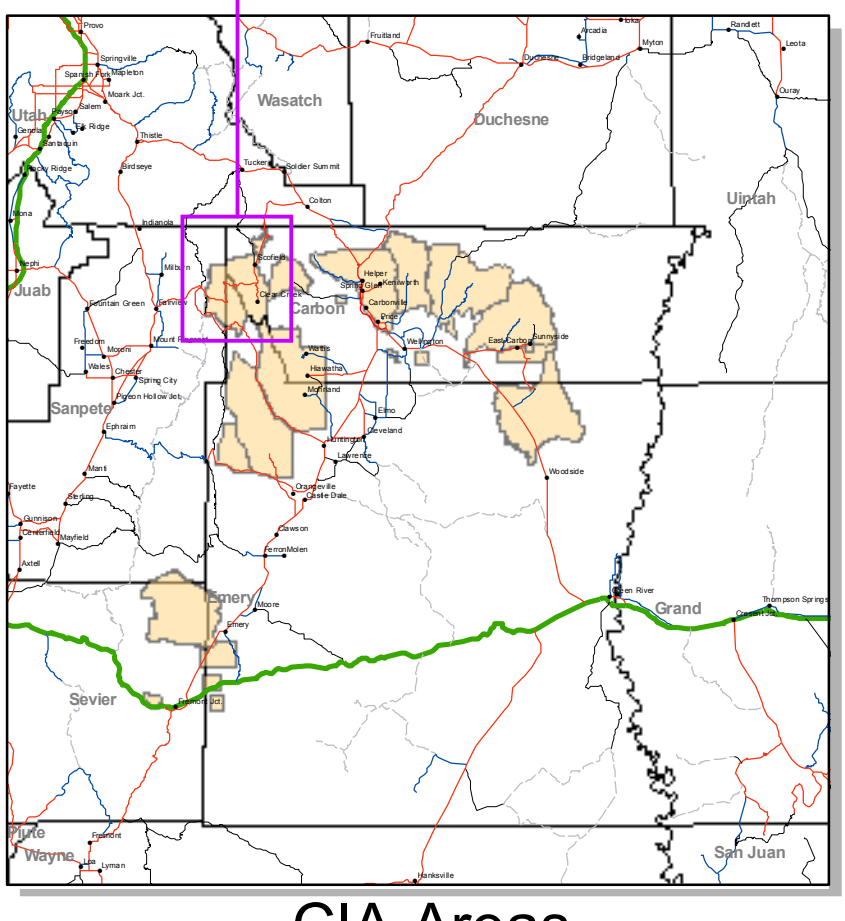
Geology

UNITNAME
Alluvium
Blackhawk Formation
Castlegate Sandstone
Coalesced alluvial-fan deposits
Colluvium
Colton Formation
Colton Formation and Flagstaff Limestone, undivided
Emery Sandstone Member of the Mancos Shale
Flagstaff Limestone
Flagstaff Limestone and North Horn Formation, undivided
Green River Foramation
Indianola Group, undivided
Landslide deposits
Landslide blocks of the Green River Formation
Mass-wasting deposits
Morainic deposits
North Horn Foramation
Pediment mantle
Price River Formation
Star Point Sandstone
Terrace deposits
Upper part of the Blue Gate Member of the Mancos Shale
water

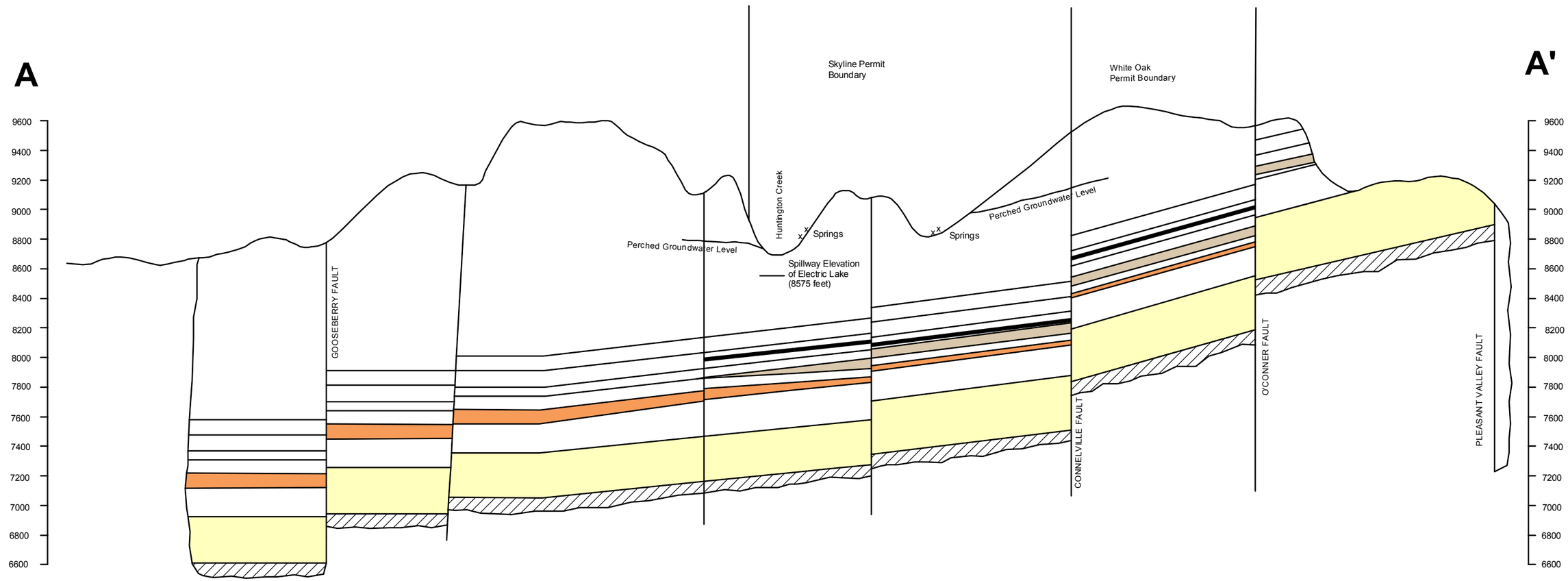
A-A' Location approximate

0 0.250.5 1 1.5 2 Miles

1:110,000



CIA Areas



Hydrogeologic Cross-Section

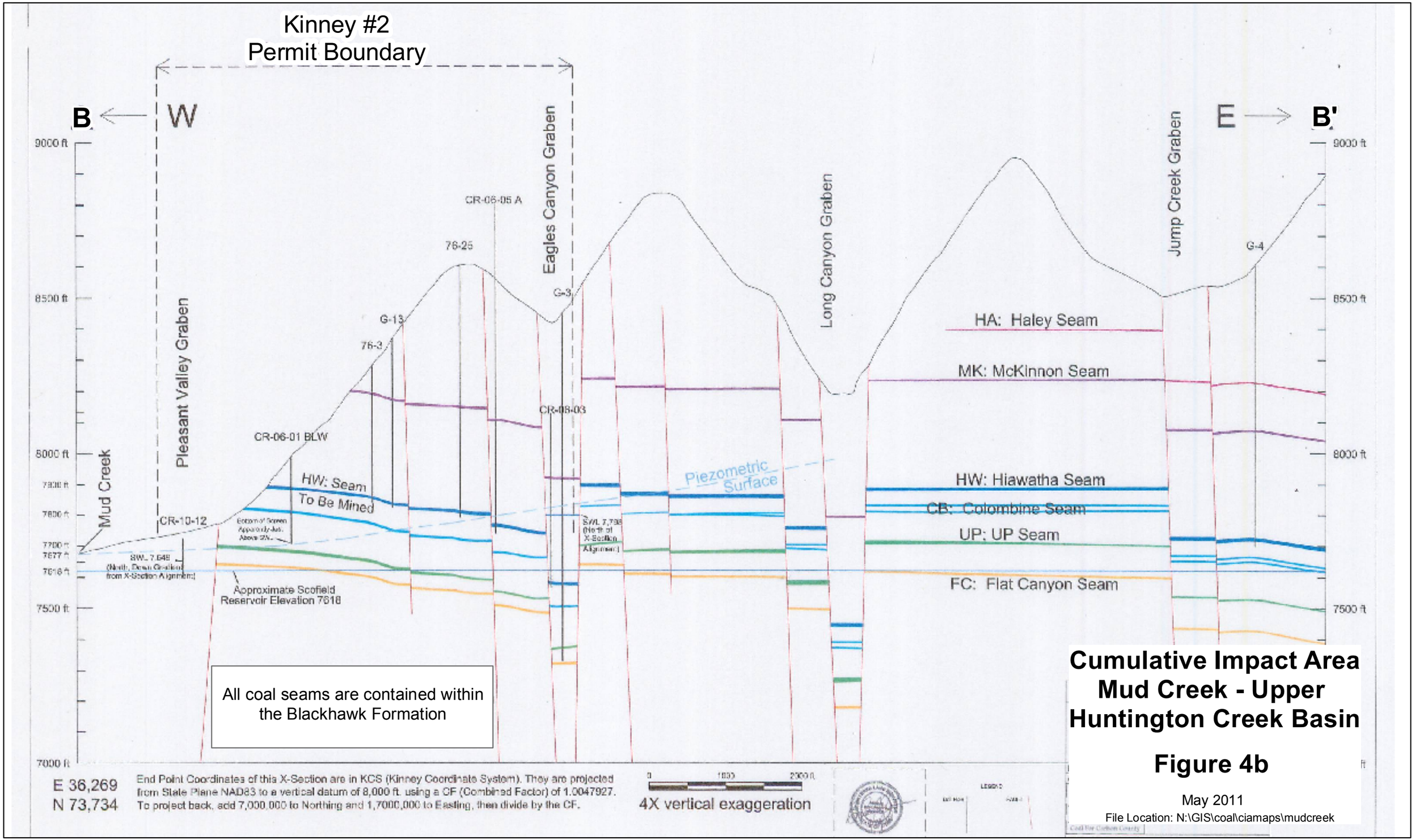
No Flow Boundary | Panther Sandstone | Starpoint Sandstone | Storrs Sandstone

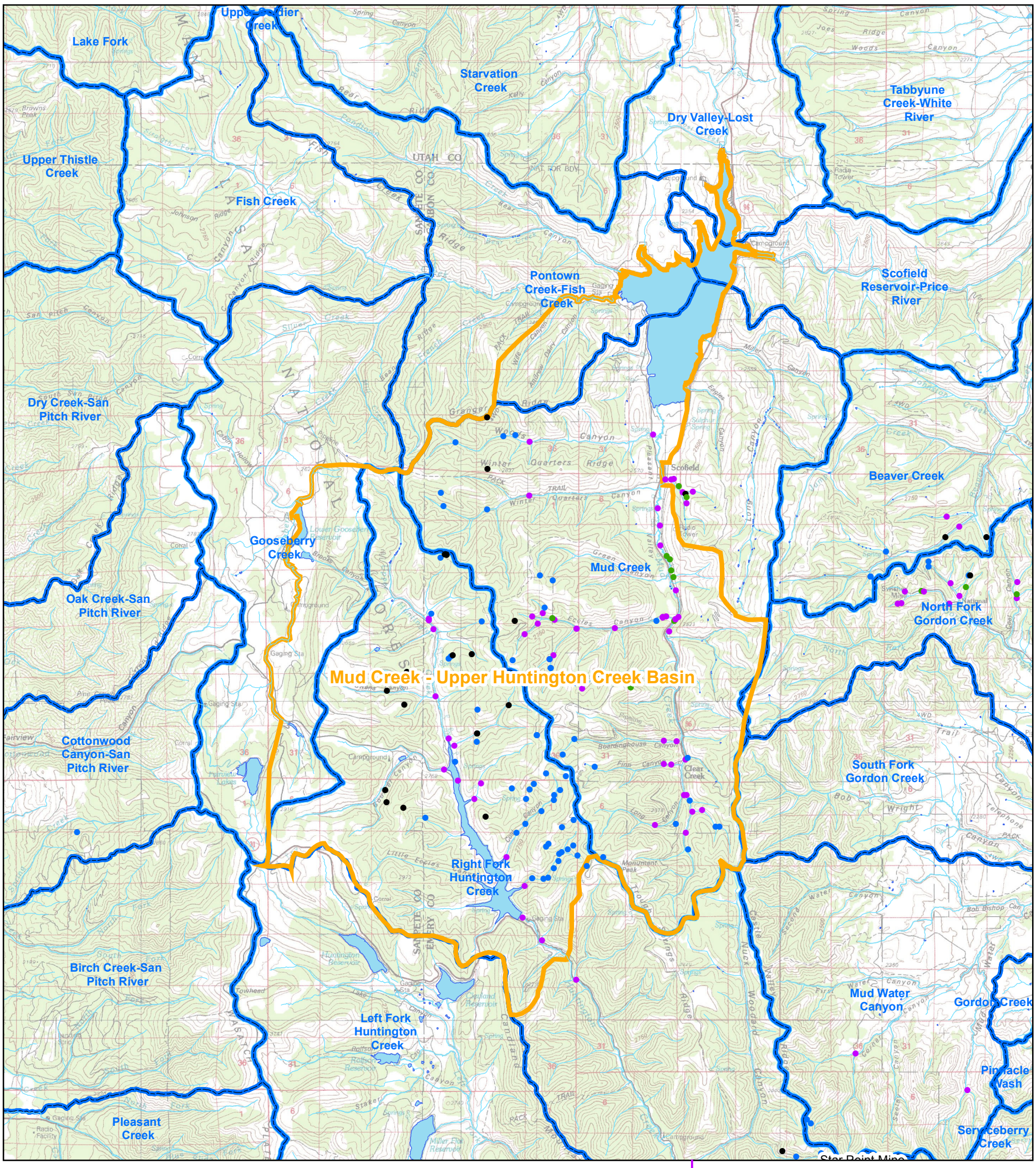
Cumulative Impact Area Mud Creek - Upper Huntington Creek Basin

Figure 4a

May 2011

File Location: N:\GIS\coal\ciamaps\mudcreek


Kinney #2
Permit Boundary
B
W
E
B'
9000 ft
8500 ft
8000 ft
7500 ft
7000 ft
Mud Creek
Pleasant Valley Graben
Eagles Canyon Graben
Long Canyon Graben
Jump Creek Graben
CR-06-05 A
76-25
G-3
G-13
76-3
CR-06-03
CR-06-01 BLW
CR-10-12
G-4
HW: Seam
To Be Mined
Piezometric
Surface
HA: Haley Seam
MK: McKinnon Seam
HW: Hiawatha Seam
CB: Colombine Seam
UP: UP Seam
FC: Flat Canyon Seam
Approximate Scofield
Reservoir Elevation 7618
All coal seams are contained within
the Blackhawk Formation
E 36,269
N 73,734
End Point Coordinates of this X-Section are in KCS (Kinney Coordinate System). They are projected
from State Plane NAD83 to a vertical datum of 8,000 ft. using a CF (Combined Factor) of 1.0047927.
To project back, add 7,000,000 to Northing and 1,7000,000 to Easting, then divide by the CF.
4X vertical exaggeration
Cumulative Impact Area
Mud Creek - Upper
Huntington Creek Basin
Figure 4b
May 2011
File Location: N:\GIS\coal\ciamaps\mudcreek



Cumulative Impact Area Mud Creek - Upper Huntington Creek Basin

Figure 5

Hydrology Map

Oct 2013

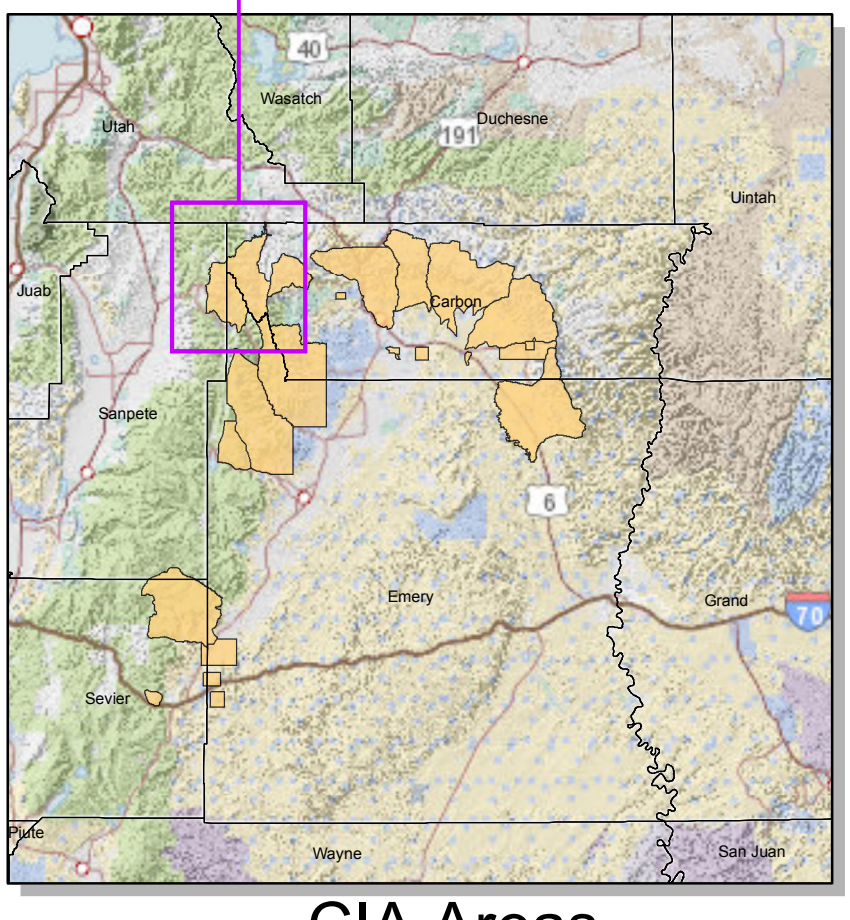
File: N:\GIS\Coal\ciamaps\mudcreek\Figure05-Hydrology.mxd

Water Monitoring Sites
- Spring
- Well
- Stream
- UPDES

- Drainage
- Water Body
- Mud Creek - Upper Huntington Creek Basin
- Subwatersheds

0 0.275 0.55 1.1 1.65 2.2 Miles

1:131,228



CIA Areas

Figure 4a - Star Point Formation / Blackhawk Formation Well Comparison

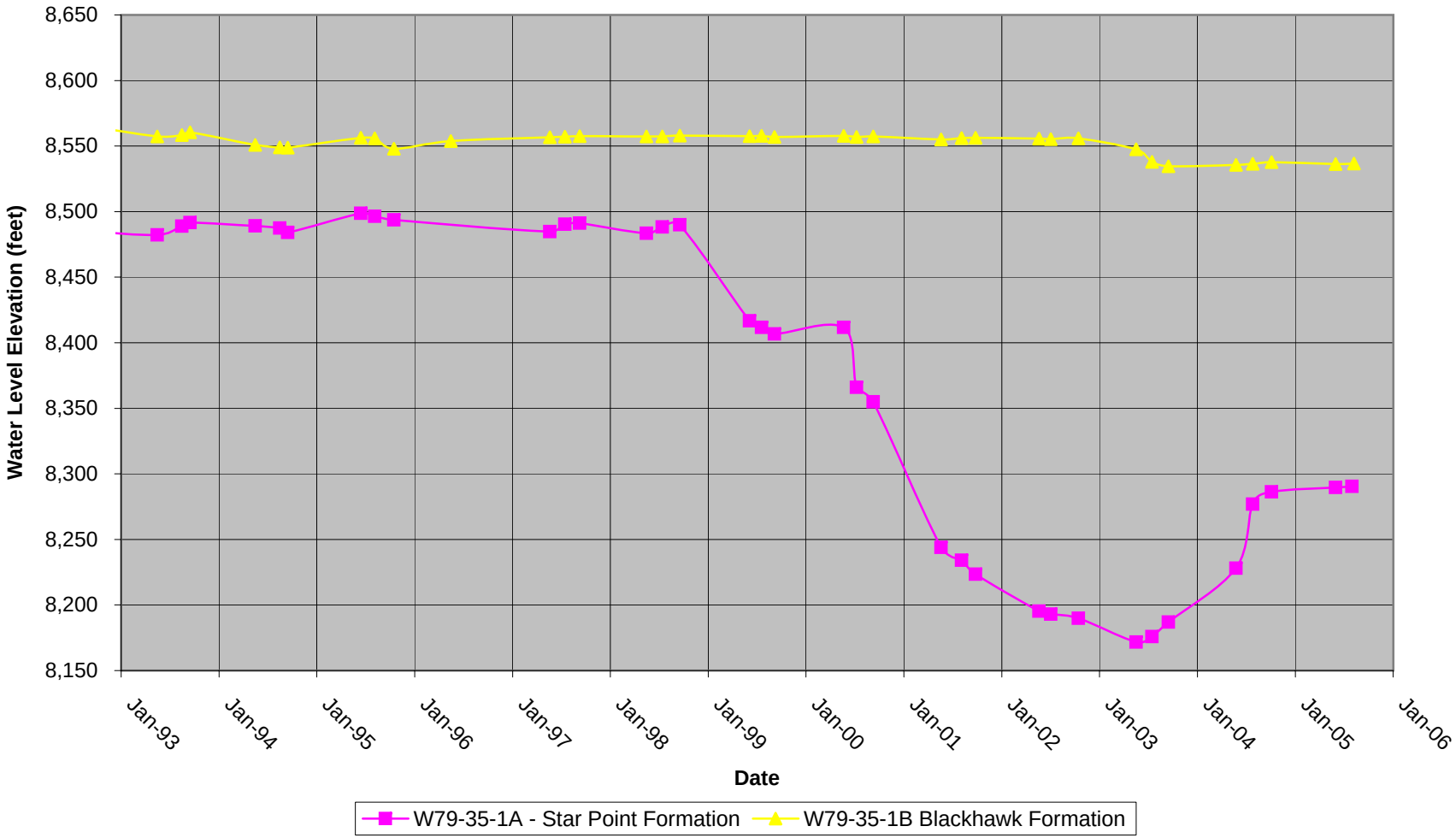


Figure 5a - Springs vs. SWSI

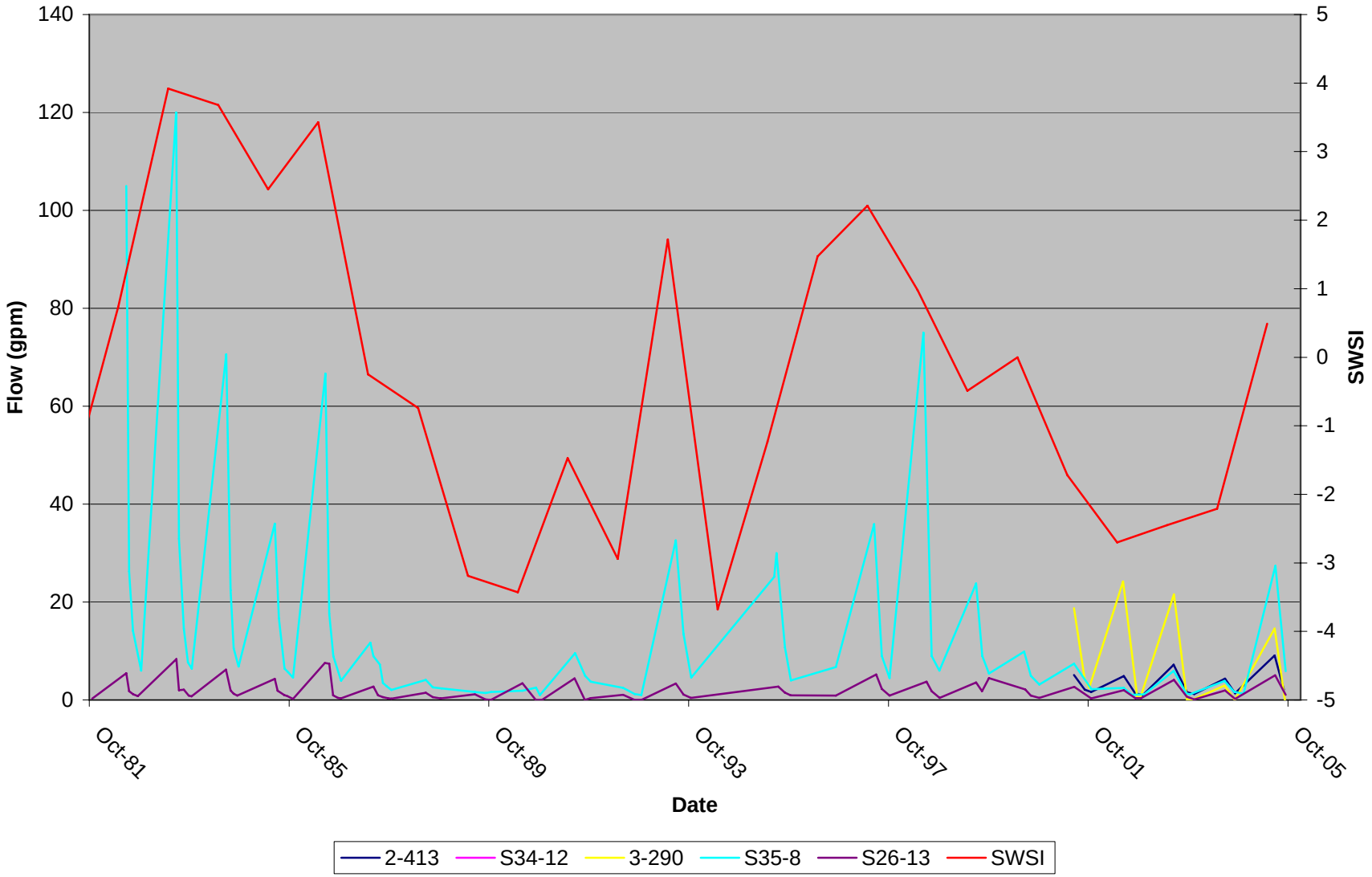


Figure 5b - Streams vs. SWSI

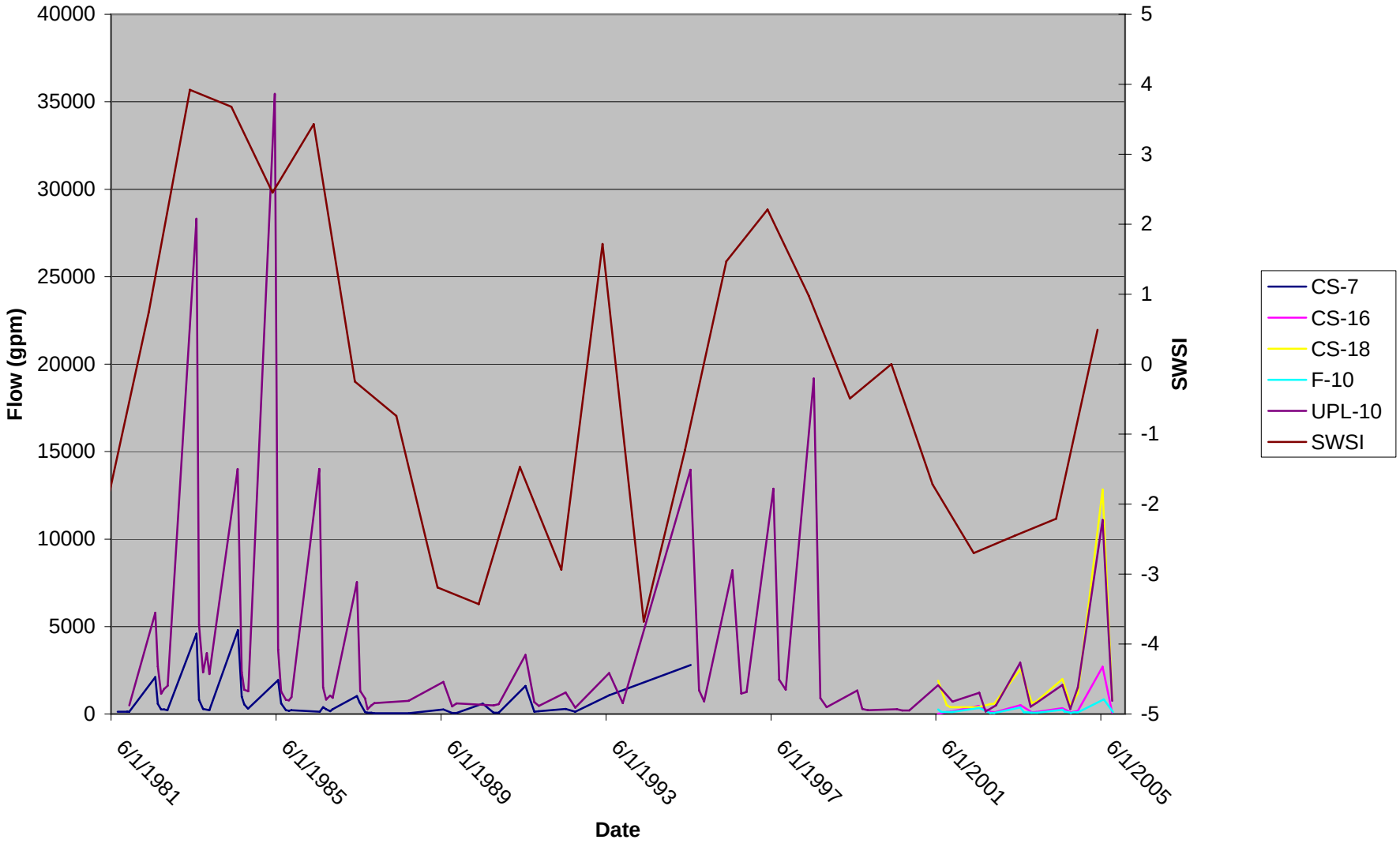


FIGURE 6A

TDS in Lower Eccles Creek

CS-2, VC-6, CS-6, &VC-9 1981-2002

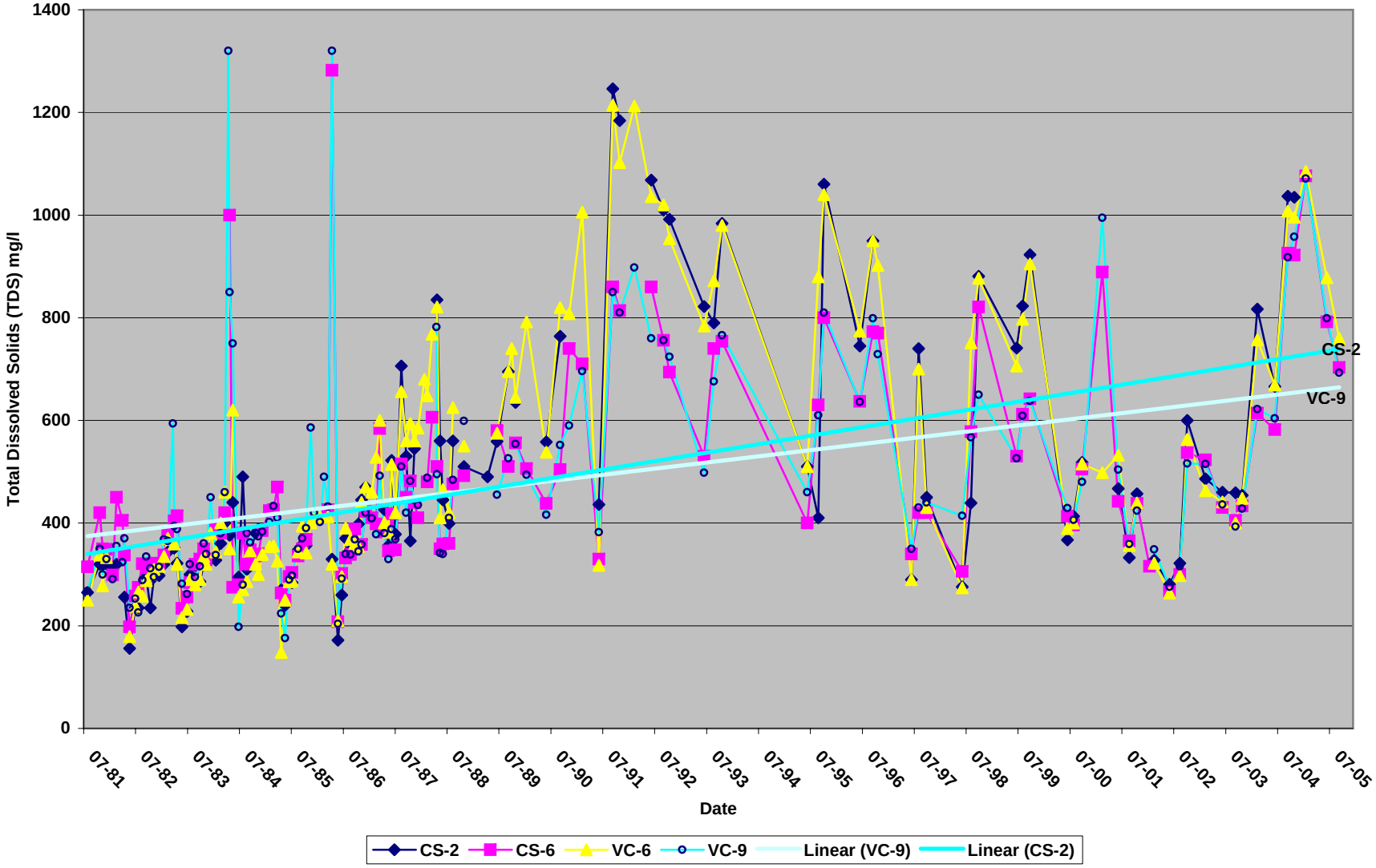


FIGURE 6B
TDS in Upper Eccles Creek
CS-3, CS-4, CS-9, &CS-11 1978-2002

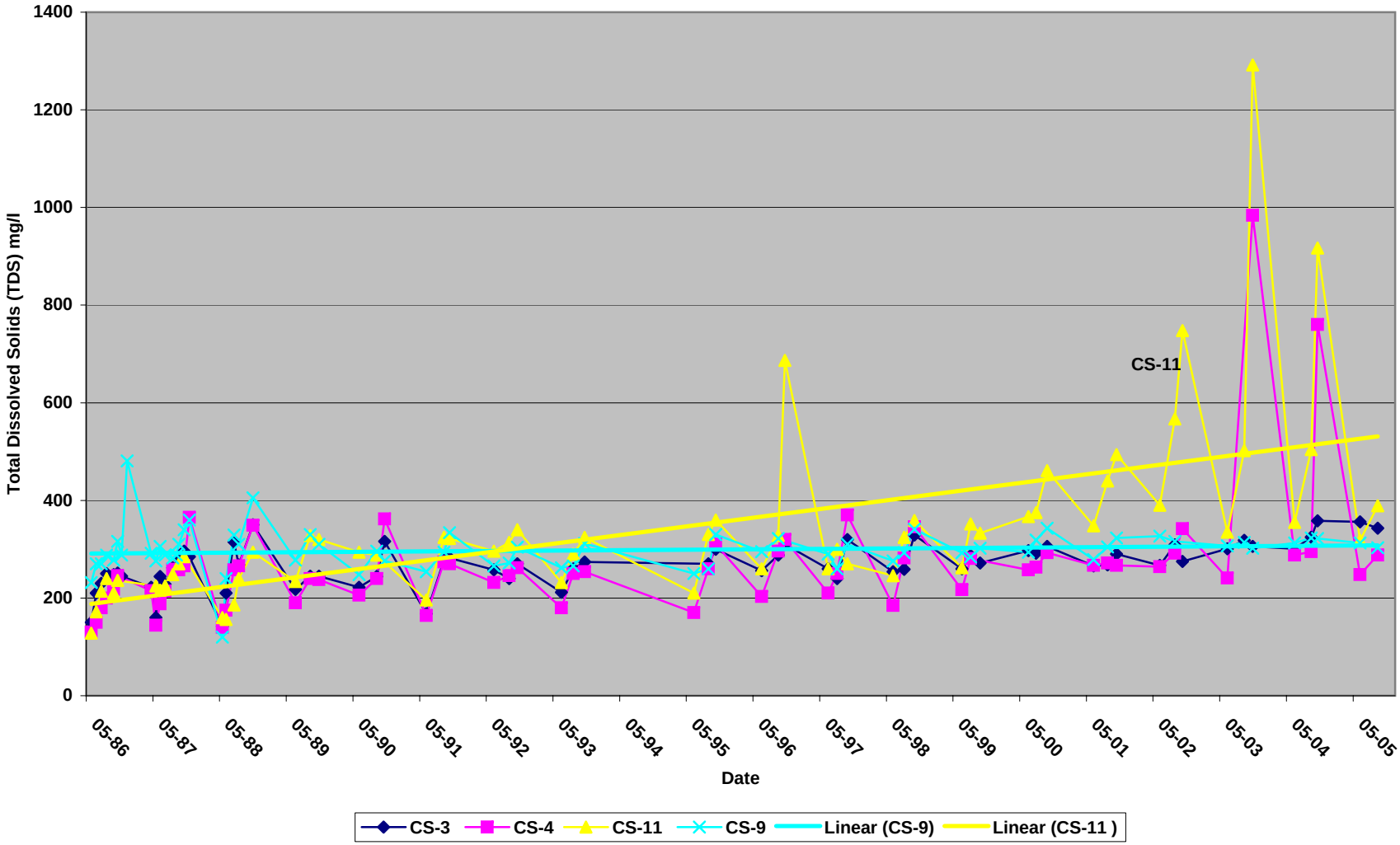


FIGURE 6C

TDS in South Fork of Eccles Creek

CS-1 & VC-10 1978-2002

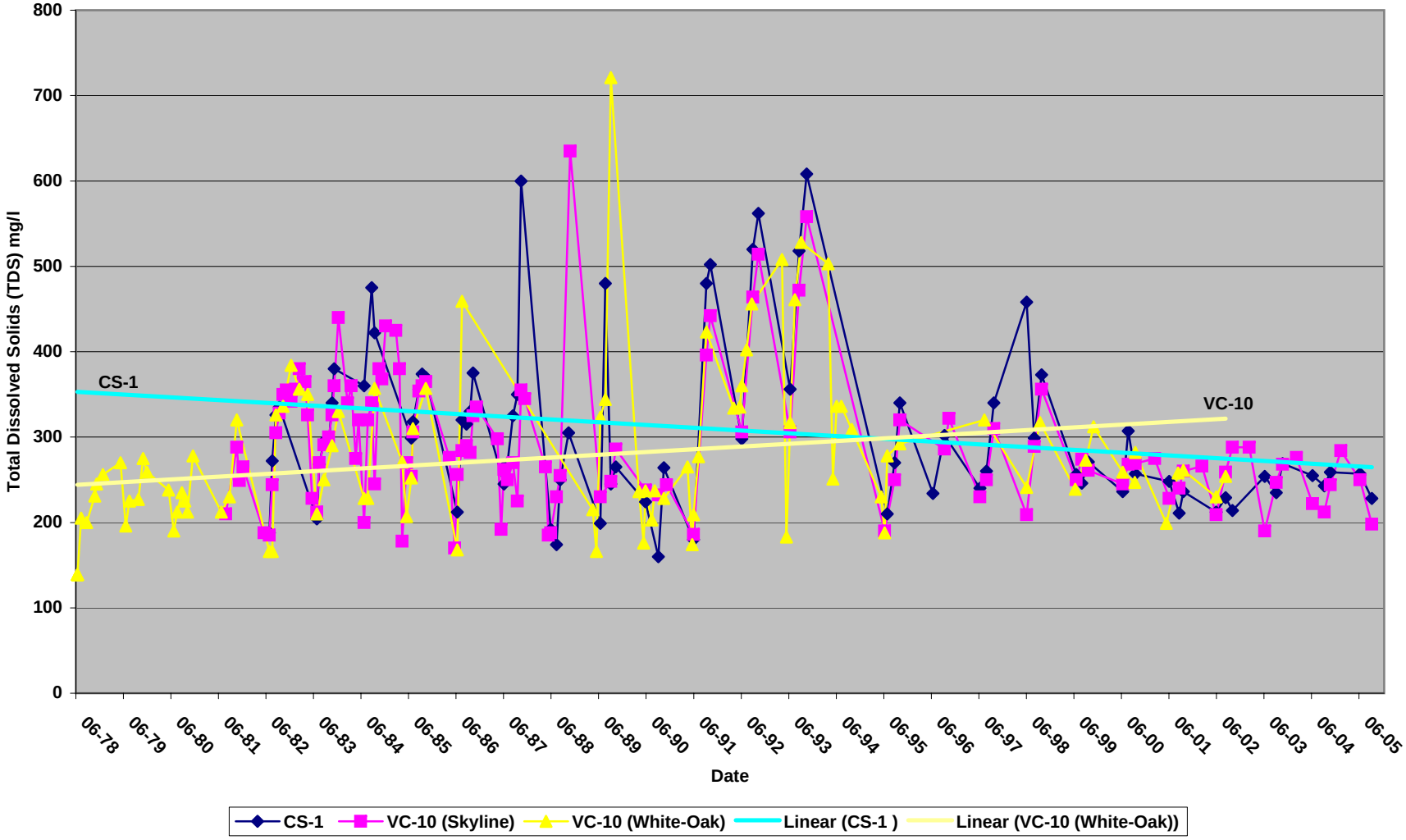


FIGURE 6D
TDS in Whiskey Creek
VC-4 & VC-5 1977-2001

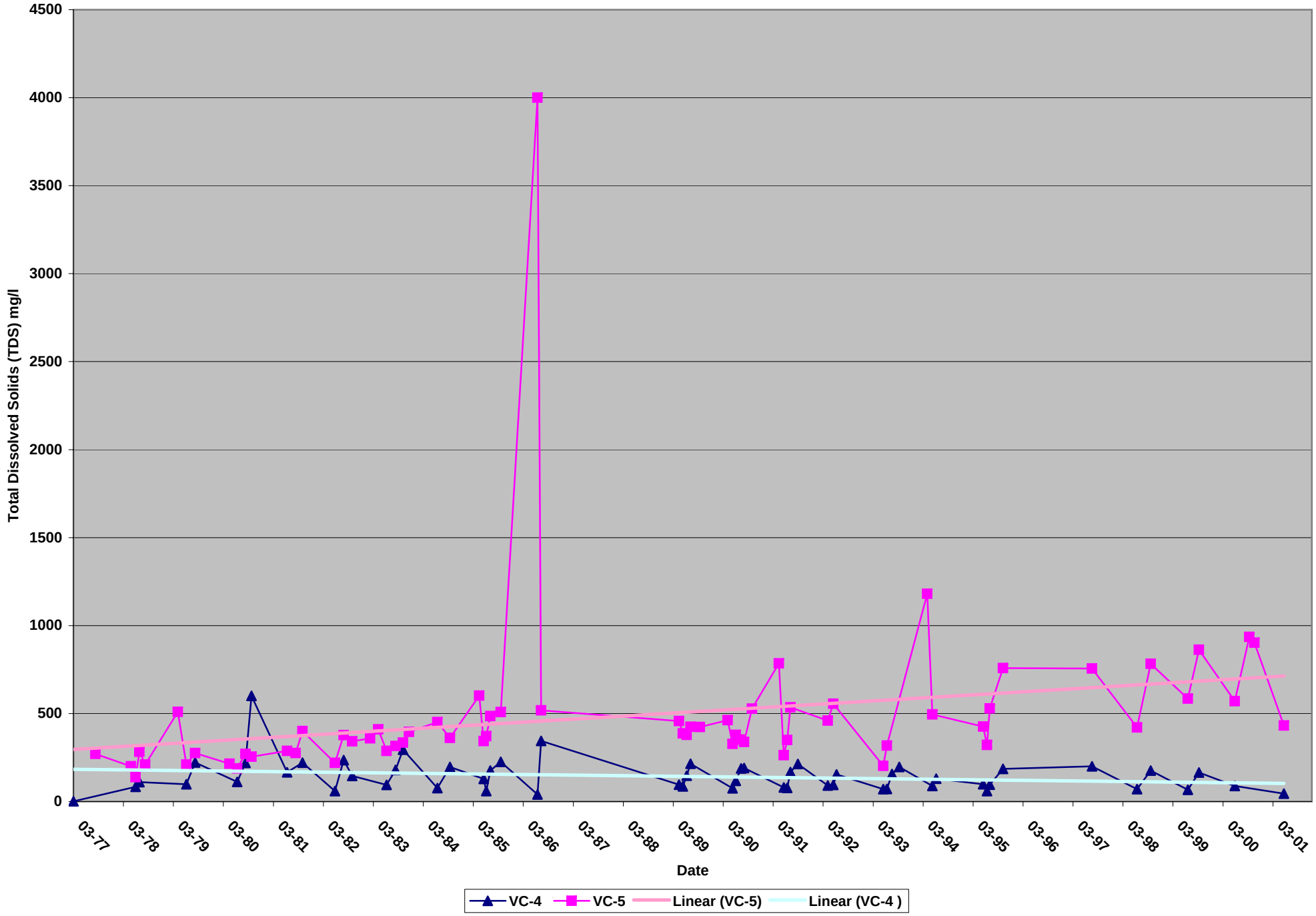


FIGURE 7

TDS in Mud Creek Below Eccles

VC-1 &VC-2 1977-2002

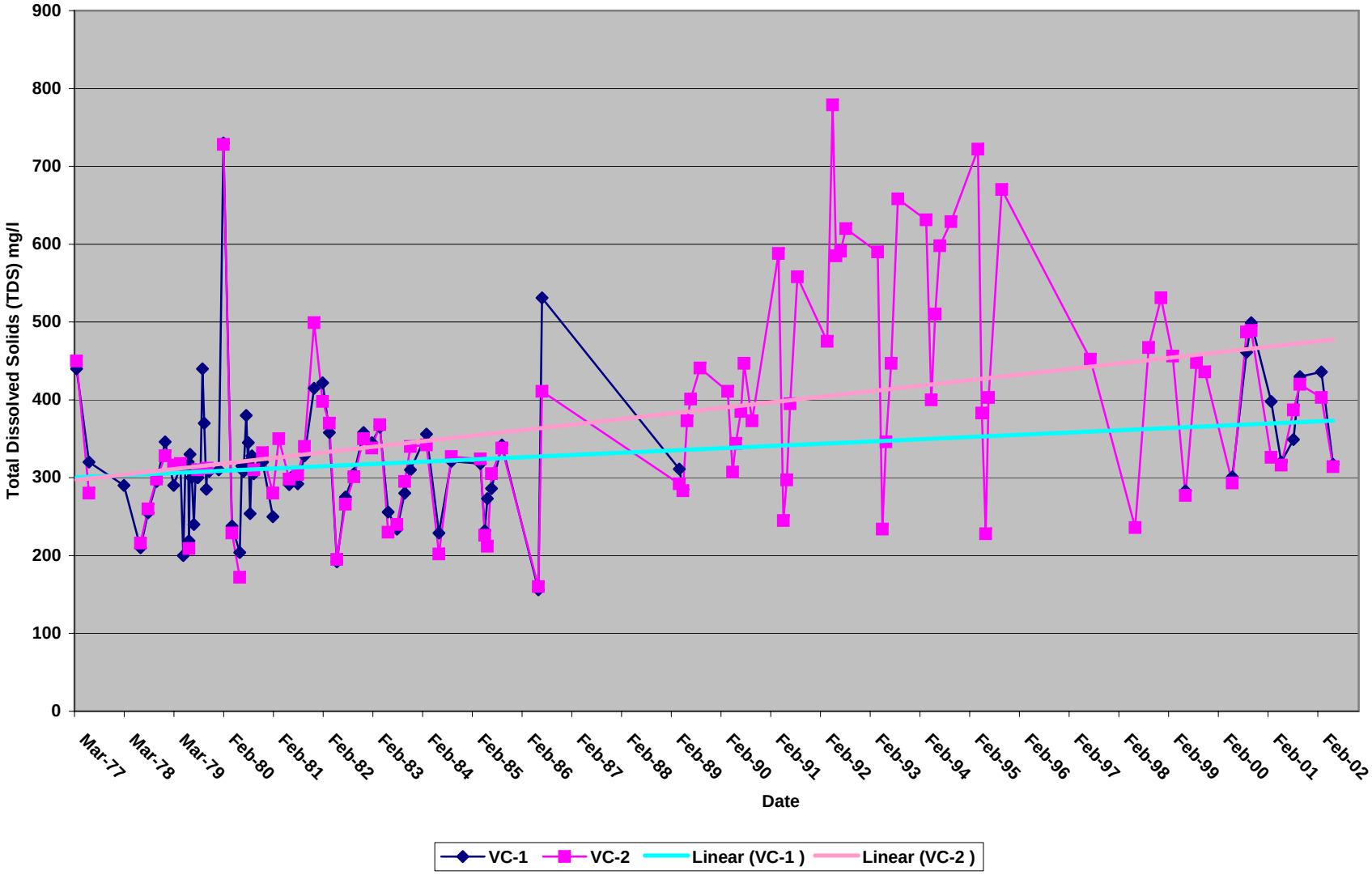


FIGURE 8
TDS in Upper Huntington Creek
CS-7, CS-8, CS-10 & UPL-10 1981-2002

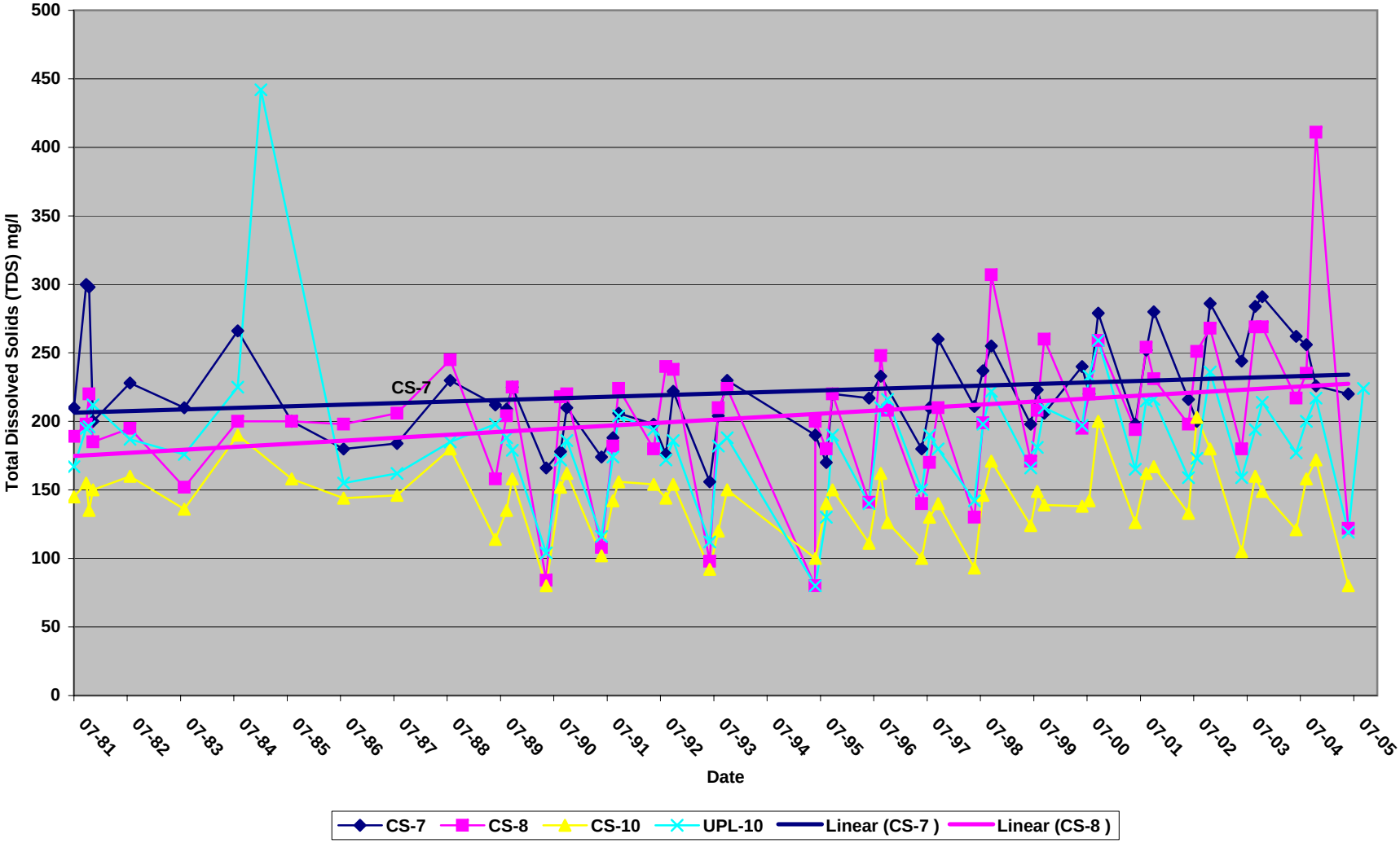


Figure 9 - Tritium Analysis

Note: Electric Lake Tritium Ranges from 7.67 to 13 TU and averages 9.85 TU

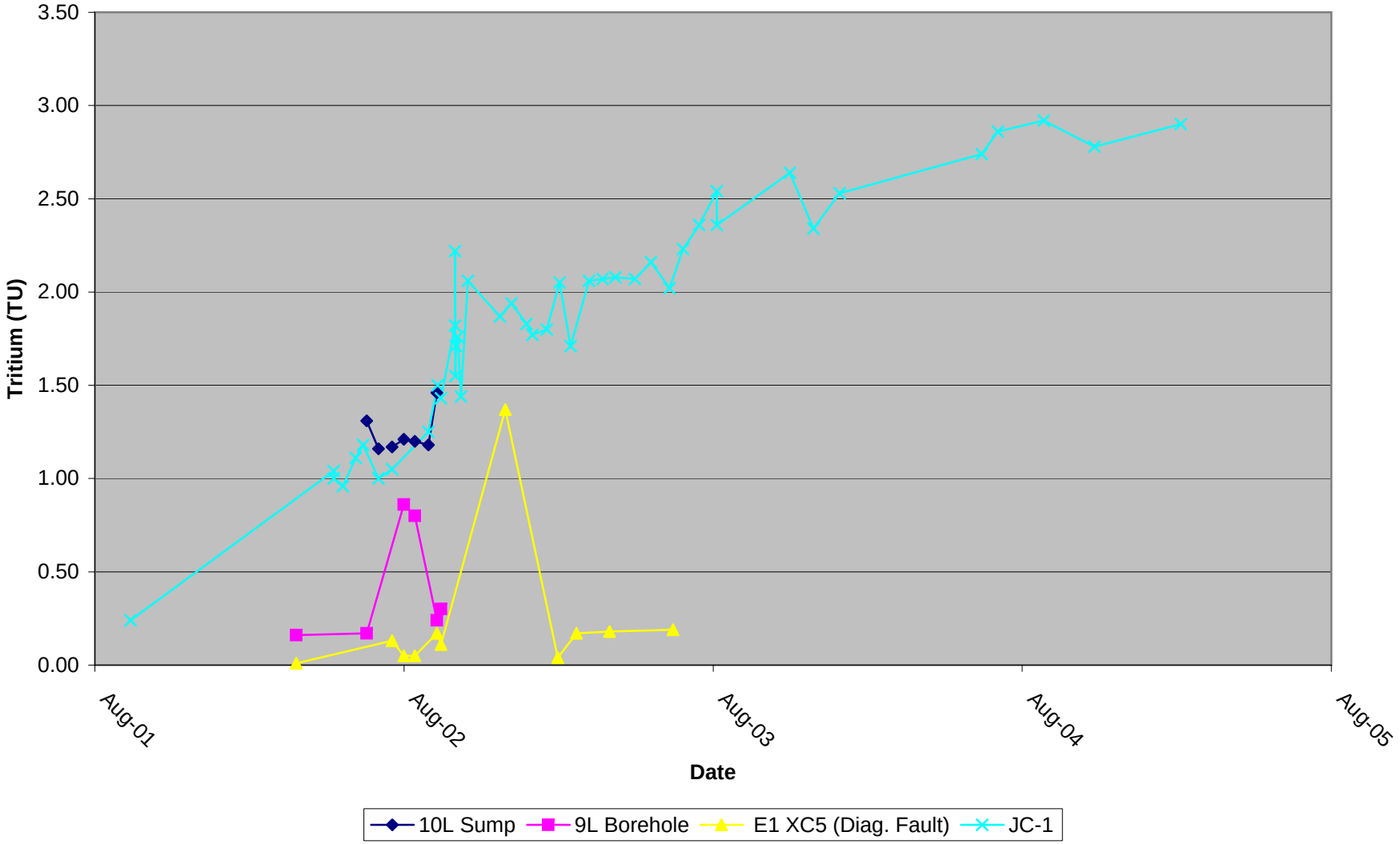


Figure 10 - Skyline Discharge to Eccles Creek

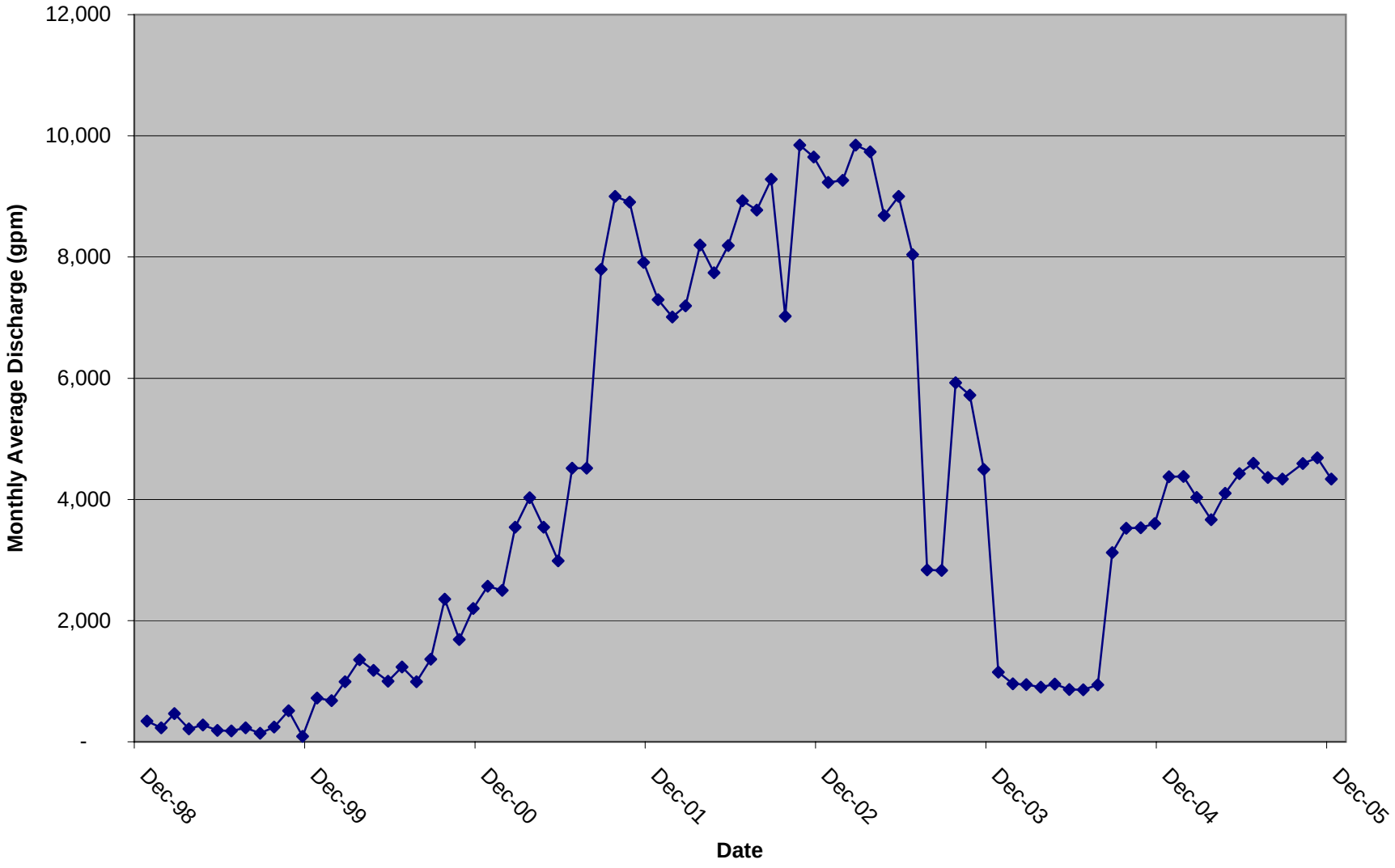


Figure 10a - Eccles Flow vs. "Normal"

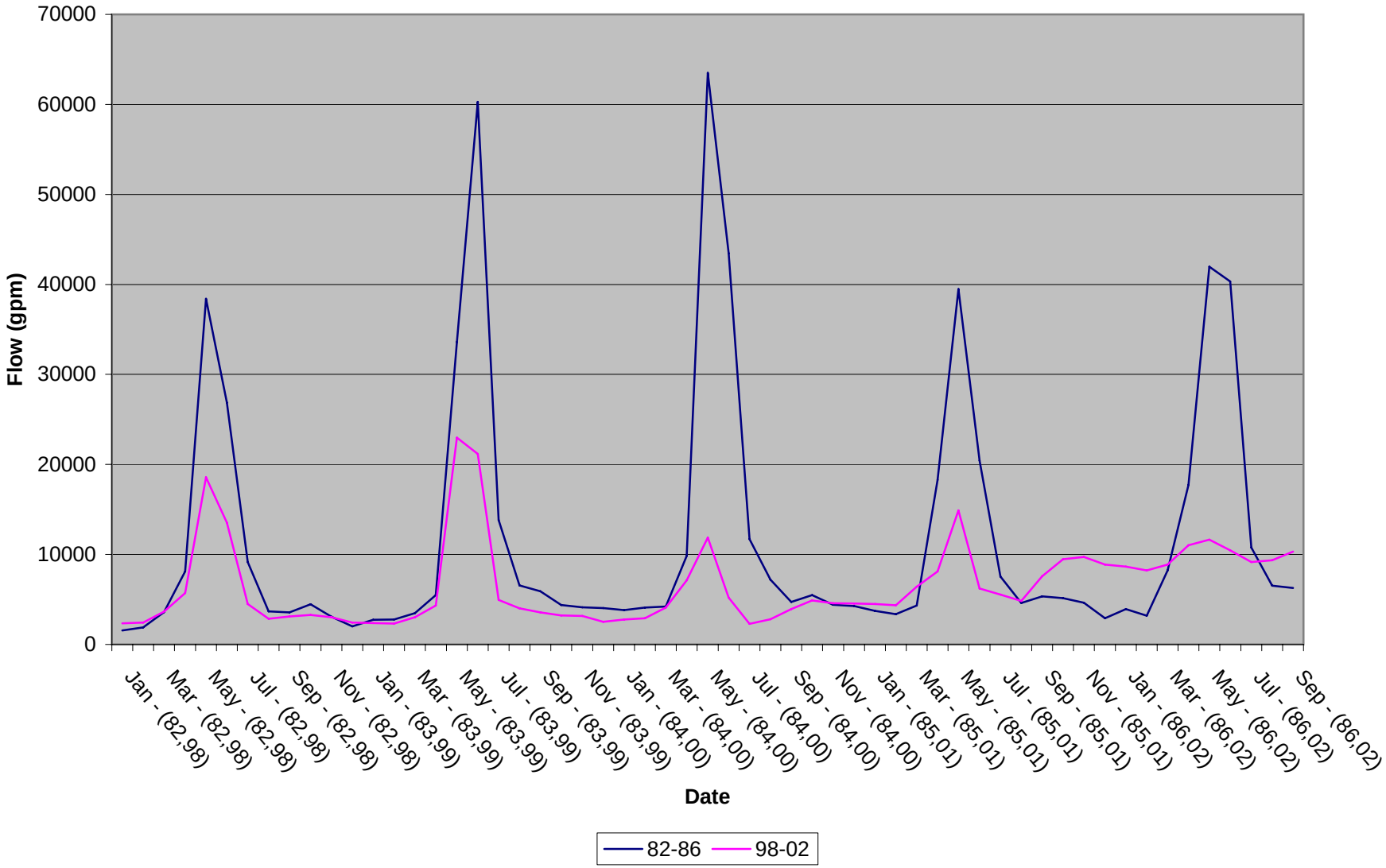


Figure 11 - Skyline Actual and Projected Cumulative Discharge by Drainage

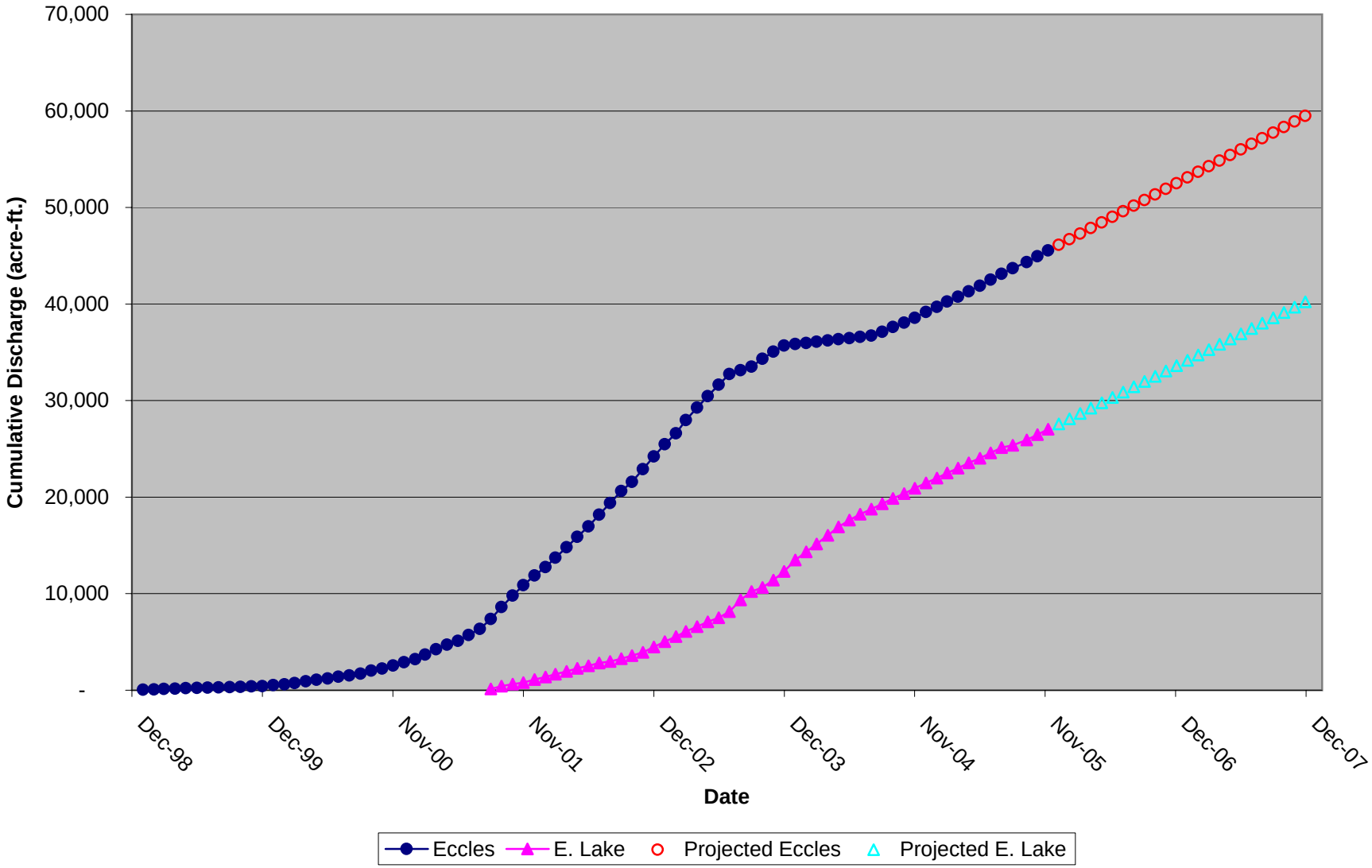


Figure 12 - Total Phosphorous in Mud Creek

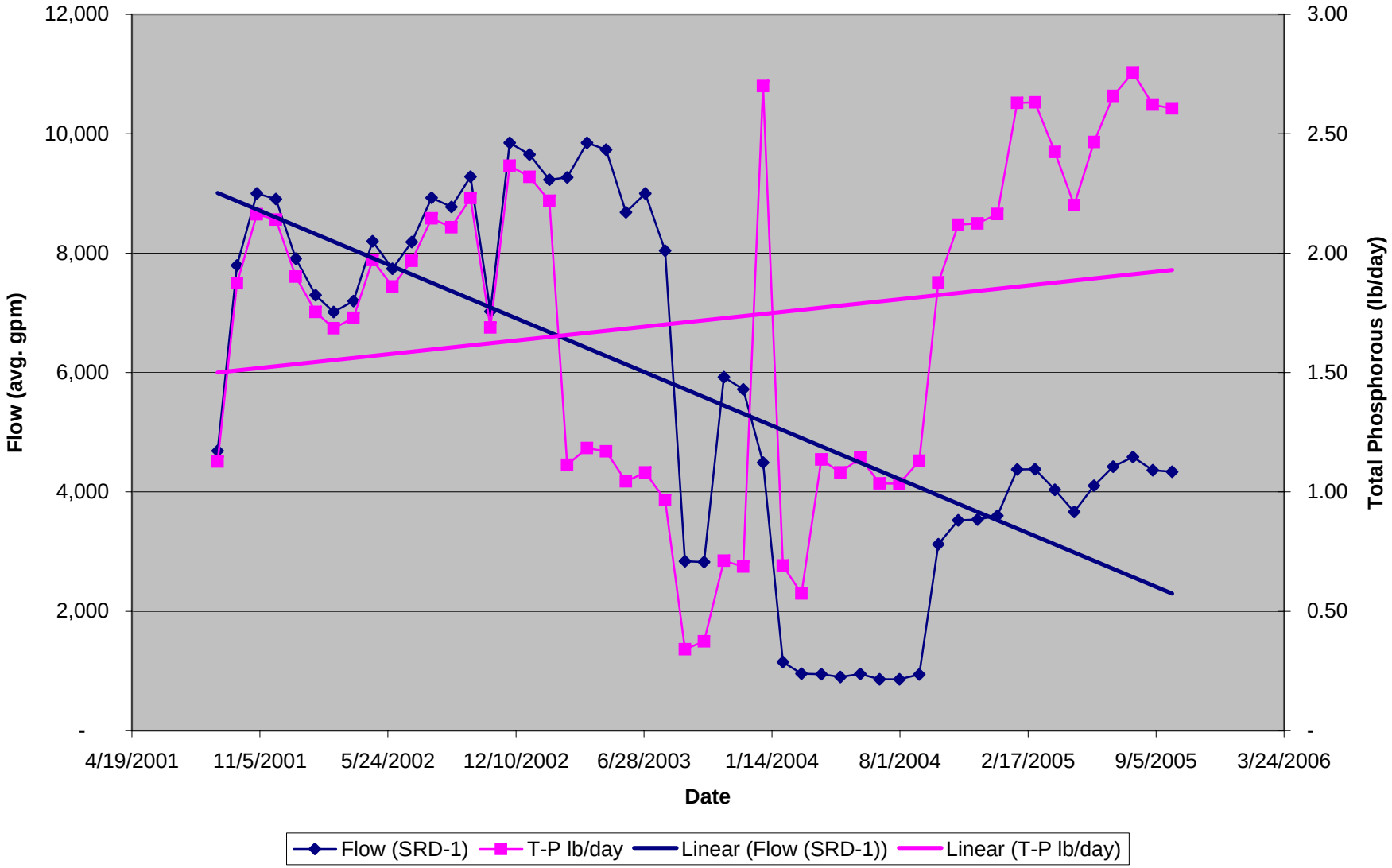


Figure 13 - Electric Lake Storage vs. Discharge

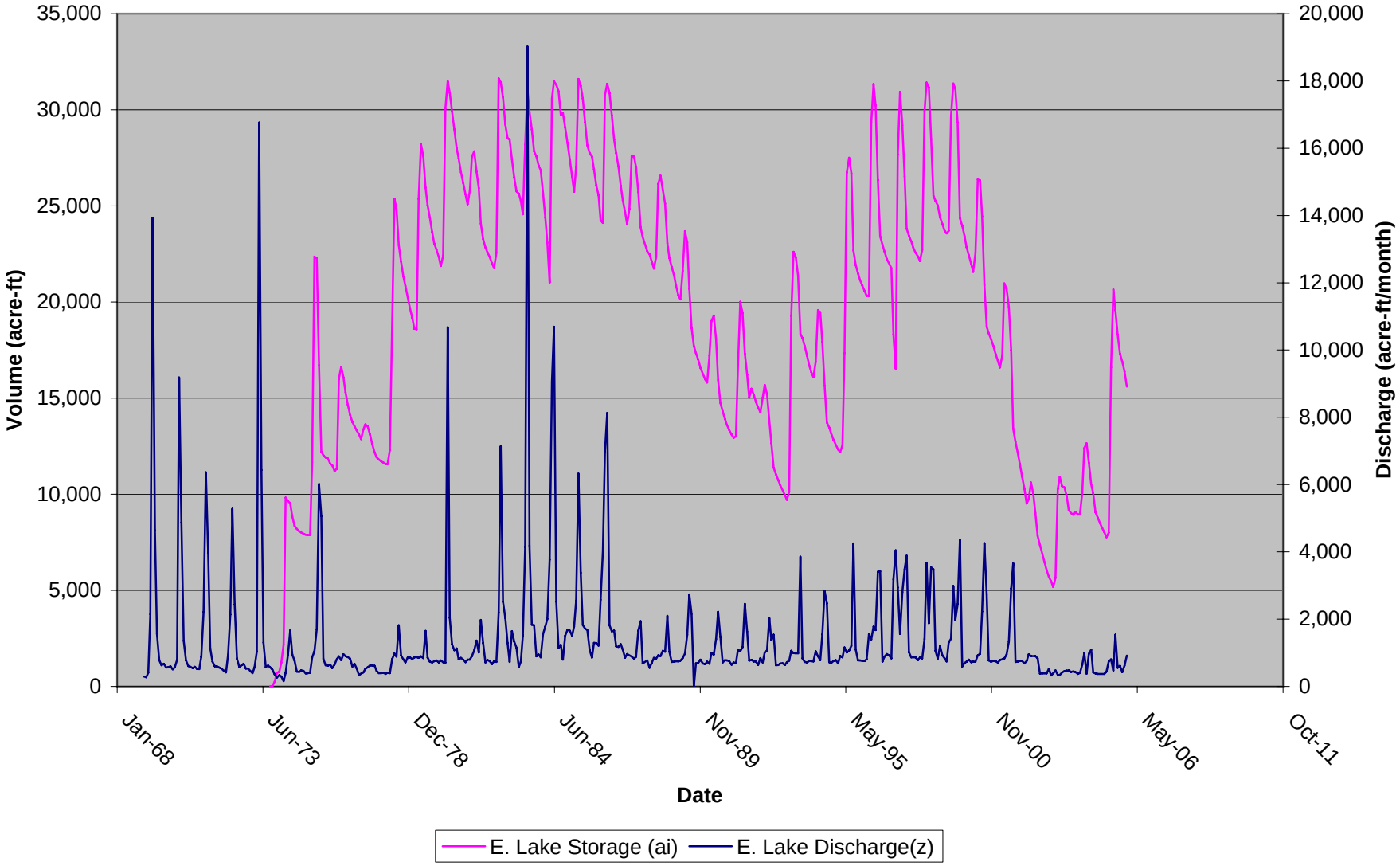


Figure 14 - Electric Lake, Calculated vs. Measured Inflows

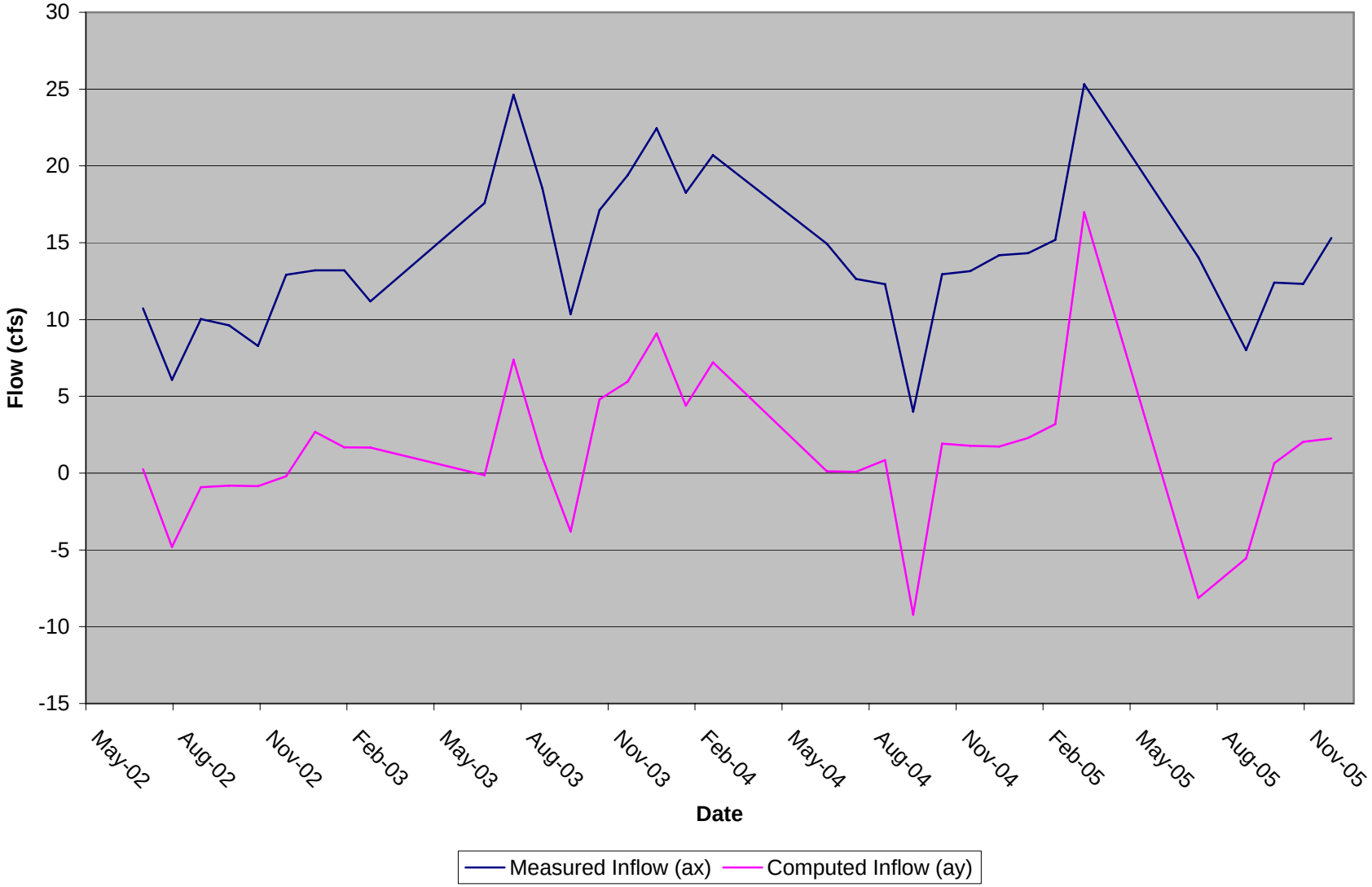


Figure 15 - Electric Lake vs. Surface Water Supply Index (SWSI)

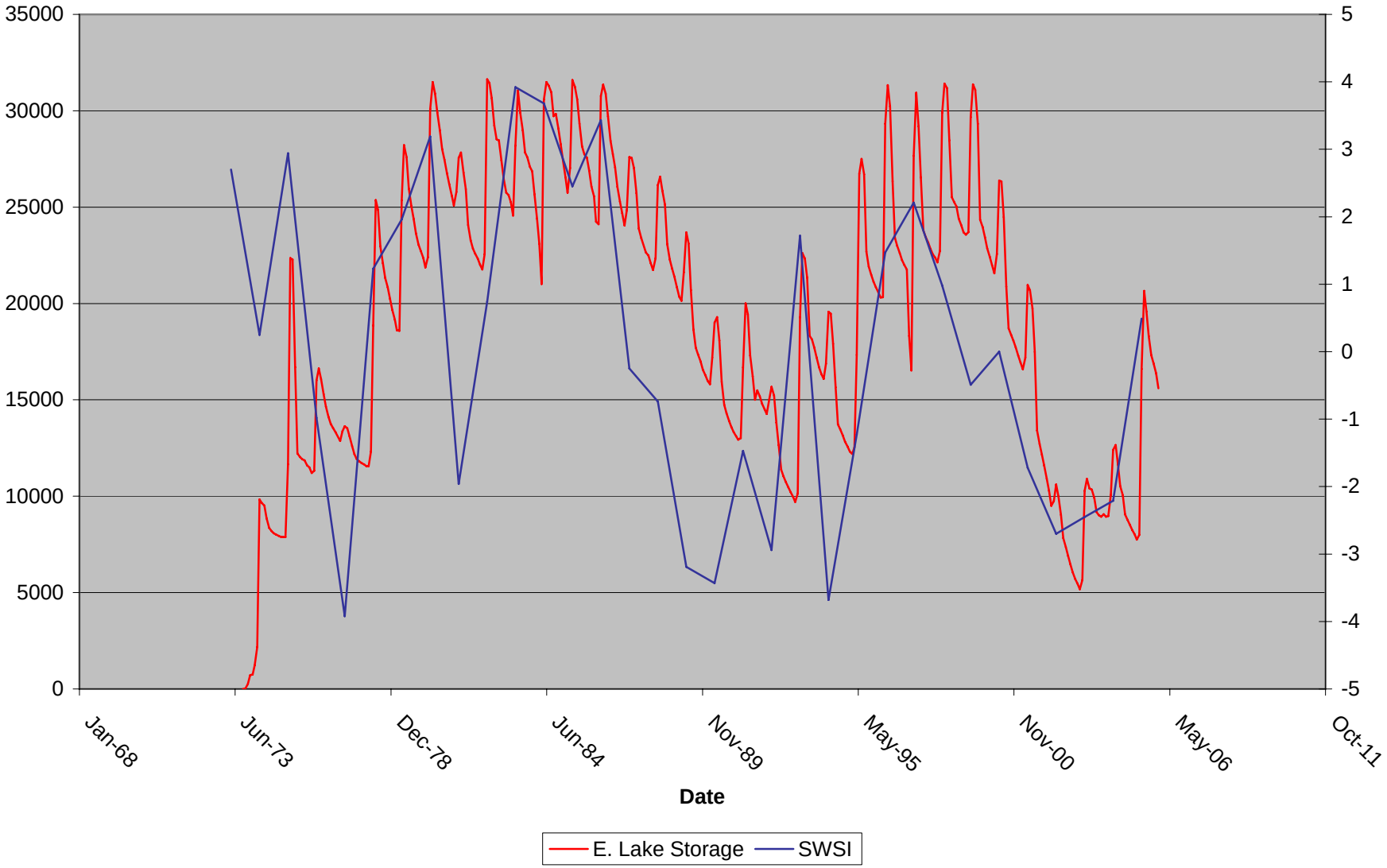


Photo 4. The slope that is to be the future site of the Kinney #2 mine. View looking northeast and due east of Scofield Reservoir

Photo 5 Eagle Seep 3 located in Eagle Canyon along the eastern margin of the Kinney #2 Permit Boundary

Photo 6 Aspen Spring - a spring-fed pond located in Eagle Canyon on the eastern margin of the Kinney #2 permit boundary

BLM

U.S. Department of the Interior
Bureau of Land Management

And

U.S. Department of Agriculture-Forest Service
Manti-La Sal National Forest

Environmental Assessment (EA)

November 2011

Modification of Winter Quarters Federal Coal Lease UTU-67939 (Skyline North)

Carbon County, Utah

U.S. Department of the Interior
Bureau of Land Management
Price Field Office
125 West 600 South
Price, Utah 84501

U.S. Department of Agriculture-Forest Service
Manti-La Sal National Forest
Ferron-Price Ranger District
599 West Price River Drive
Price, Utah 84501

Office of Surface Mining Reclamation and Enforcement
Denver Field Division
1999 Broadway, Suite 3320
Denver, Colorado 80202

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CHAPTER 1

INTRODUCTION AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

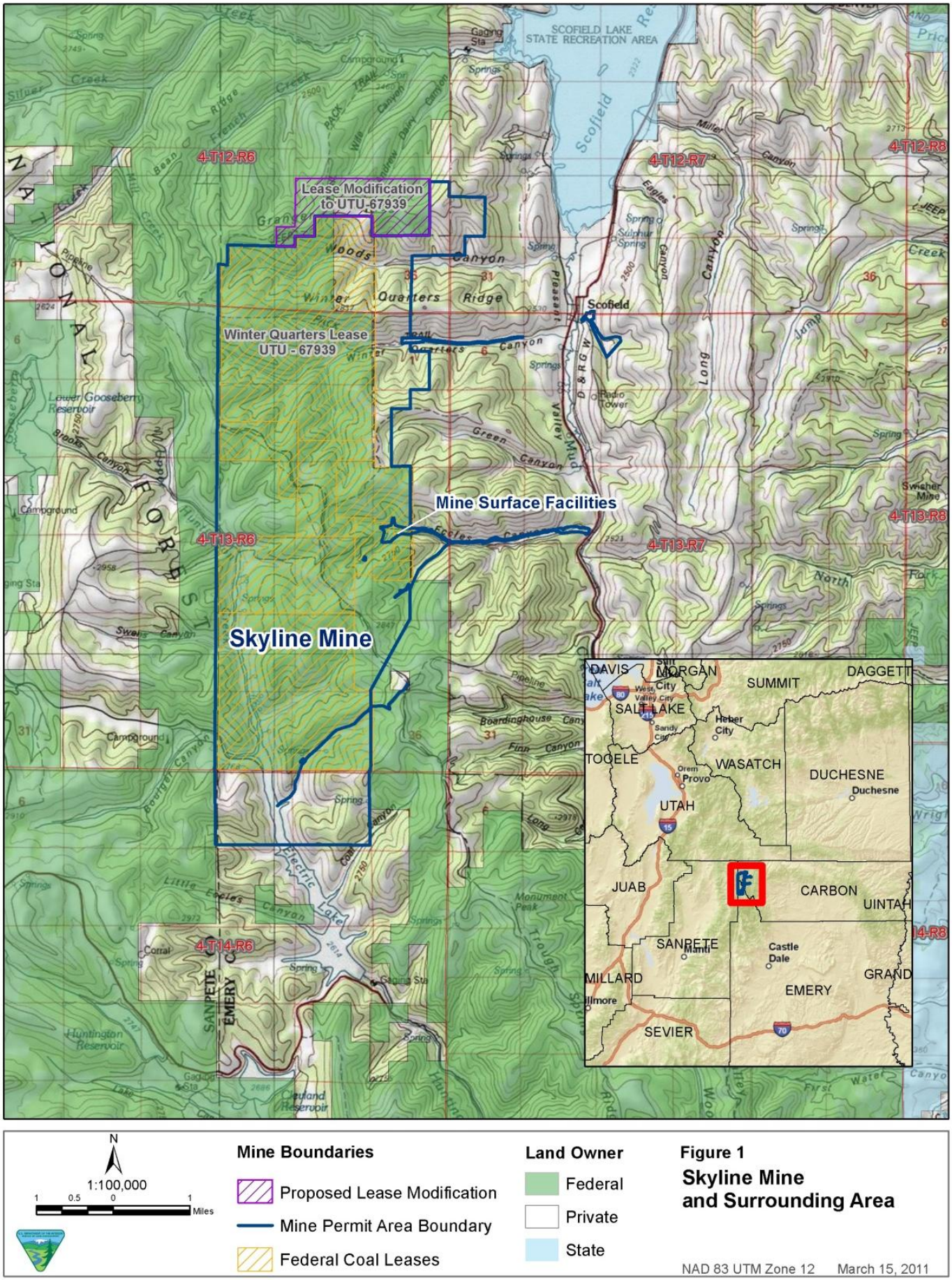
On April 13, 2010, Arch Coal, Inc., (Arch) through its wholly-owned subsidiaries Ark Land Company (Ark) and Canyon Fuel Company, LLC (CFC), applied for a federal coal lease modification to the Winter Quarters Federal Coal Lease UTU-67939 through the U.S. Department of Interior, Bureau of Land Management (BLM), Utah State Office. The lease modification would facilitate recovery of unleased federal coal reserves that might otherwise be bypassed. The coal would be used for the generation of electricity, other industrial uses, and would provide economic returns to the federal, state, and local economies.

The Lease Modification Area, hereafter known as the modification area, is located approximately 28 miles northwest of Price, Utah on the Ferron-Price Ranger District of the Manti-La Sal National Forest (MLNF) (**Figure 1**).

The Proposed Action is to modify Winter Quarters Federal Coal Lease UTU-67939 to include an approximate additional 770 acres of federal coal reserves. The modification area is adjacent and north of the existing leases and the current permitted area for the Skyline Mine. The reserves would be recovered by underground coal mining methods. This modification would be subject to existing lease terms, conditions, and stipulations from the original lease found in **Appendix A**. In November 2010, the BLM considered this to be a non-competitive coal lease modification based upon the agency's findings regarding the Energy Policy Act of 2005 (EPA); Title IV; Sub-title D; Section 432 (Coal Leasing Amendments Act of 2005) and compliance with the regulations at 43 CFR 3432.1 for a non-competitive coal lease modification. It is unlikely that any other company could economically access or mine this reserve because the coal does not come to the surface (outcrop) within or adjacent to the modification area. An Environmental Assessment (EA) is required pursuant to 43 CFR 3432.3 (c) and in accordance with 40 CFR 1500 through 1508.

The modification area boundary was reviewed by an Interagency Team to assure that the boundary is reasonable and meets requirements of the responsible agencies. The modification area encompasses federal coal reserves in the Wasatch Plateau Coal Field within the northern portion of the Wasatch Plateau Known Recoverable Coal Resource Area (KRCRA) in Carbon County, Utah. The modification area is described as follows (**Figure 2**):

Township 12 South, Range 6 East, Salt Lake Base Meridian, Carbon County, Utah
- Section 25: Lots 3, 4, SW4NE4, SW4, W2SE4;
- Section 26: Lots 1-4, N2SW4, SW4SW4, N2SE4 (private); and
- Section 34: NE4NE4. Containing approximately 770 acres, more or less.


Lease Modification to UTU-67939
Winter Quarters Lease UTU - 67939
Mine Surface Facilities
Skyline Mine
SCOFIELD LAKE STATE RECREATION AREA
Scofield
4-T12-R6
4-T12-R7
4-T12-R8
4-T13-R6
4-T13-R7
4-T13-R8
4-T14-R6
SANPETE CO
EMERY CO
DAVIS
MORGAN
SUMMIT
DAGGETT
SALT LAKE
TOOELE
WASATCH
DUCHESNE
UTAH
JUAB
CARBON
UINTAH
SANPETE
MILLARD
EMERY
GRAND
SEVIER
Mines
Castle Dale
Fillmore
Heber City
Provo
Duchesne
Sandy City
West Valley City
Salt Lake City
Orem
N
1:100,000
1 0.5 0 1 Miles
Mine Boundaries
Proposed Lease Modification
Mine Permit Area Boundary
Federal Coal Leases
Land Owner
Federal
Private
State
Figure 1
Skyline Mine and Surrounding Area
NAD 83 UTM Zone 12
March 15, 2011

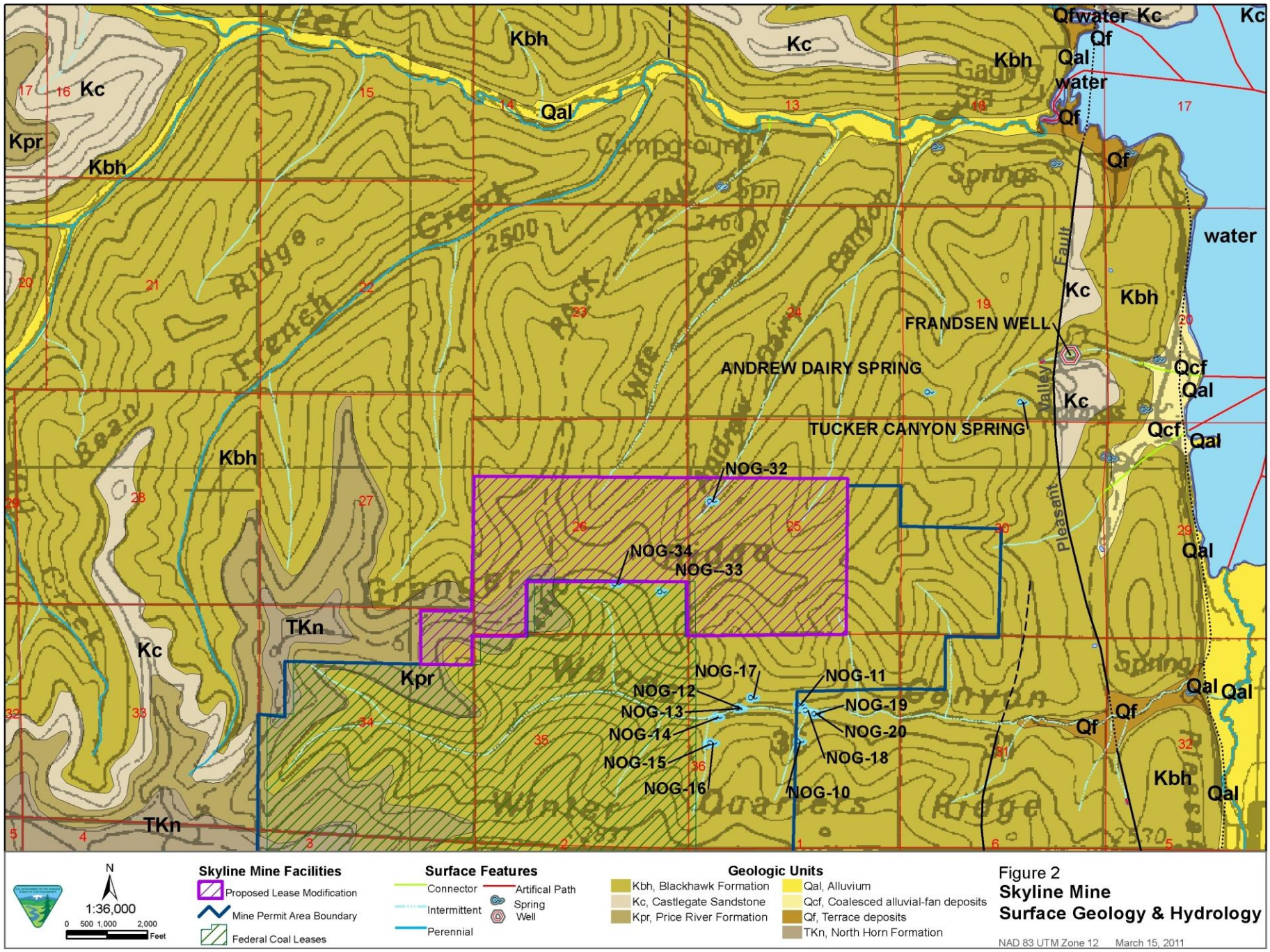


Figure 2
Skyline Mine
Surface Geology & Hydrology

Background Imagery: Surface Geology- USGS 1997; Hydrology- NHD 2011

Of the total modification area acreage, approximately 690 acres are overlain by National Forest System (NFS) lands administered by the U.S. Department of Agriculture-Forest Service (FS) MLNF, and 80 acres are overlain by surface private (fee) lands (**Figure 1**). Under the Proposed Action, the total coal mineral acreage (all federal) would be added to the existing Winter Quarters Federal Coal Lease UTU-67939.

Since the Proposed Action involves surface lands administered by the FS, and in accordance with interagency agreements between the BLM and FS, the FS is a joint-lead agency in this analysis. The BLM and FS have determined that this EA shall be based in part and tiered from the 1995 joint EA analysis (BLM/FS 1995) and 1996 decision (BLM/FS 1996) for the Winter Quarters Federal Coal Lease UTU-67939. The Proposed Action would retain the BLM lease terms associated with the existing lease, including the Special Coal Lease Stipulations from Appendix C in the original lease EA, which include stipulations for protecting nonmineral resources on NFS lands. The Office of Surface Mining Reclamation and Enforcement (OSM) participated as a cooperating agency.

The BLM has the leasing authority for all federal coal reserves under the Mineral Leasing Act of 1920 (MLA), as amended, by the Federal Coal Leasing Amendments Act of 1976 (FCLAA), and regulations at 43 CFR 3400. As the surface land administrator, the Forest Supervisor, MLNF, must decide:

- Whether or not to consent to BLM modifying the lease under authority of the MLA, and
- If additional coal lease stipulations are needed for the protection of non-mineral resources in the modification area beyond those already applied to the original lease.

If the FS consents to the lease modification, then the BLM Deputy State Director – Lands and Minerals must decide:

- Whether or not to modify Winter Quarters Federal Coal Lease UTU-67939 to include an area north of the present lease, and
- If additional stipulations are needed on the lease to ensure compliance with the MLA.

Since the FS and BLM have individual decisions to make, and each agency has separate and distinct procedures and appeals, the agencies would release separate decision documents based on this EA.

The OSM, a cooperating agency, is the agency responsible for permitting mining on a lease under the terms of the Surface Mining Control and Reclamation Act of 1977 (SMCRA) and Federal Regulations 30 CFR 700. SMCRA gives OSM primary responsibility to administer programs that regulate surface coal mining operations and the surface

effects of underground coal mining operations. In January, 1981, pursuant to Section 503 of SMCRA, the Utah Division of Oil, Gas, and Mining (DOGM) developed, and the Secretary of the Interior approved, a permanent program authorizing Utah DOGM to regulate surface coal mining operations and surface effects of underground mining on non-federal lands within the State of Utah. In March 1987, pursuant to Section 523(c) of SMCRA, Utah DOGM entered into a cooperative agreement with the Secretary of the Interior authorizing Utah DOGM to regulate surface coal mining operations and surface effects of underground mining on federal lands within the state.

The subsequent Resource Recovery and Protection Plan change, extending the mine plan and additional tons to the recoverable reserve base, requires both federal (BLM) and state (Utah DOGM) approval (largely because of resulting subsidence and potential hydrologic effects).

Additional documentation, including more detailed analyses for project area resources, may be found in the project planning records located at the BLM Price Field Office and MLNF Office in Price, Utah.

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

The BLM and FS have identified a need to modify the Winter Quarters Federal Coal Lease UTU-67939 to include 770 acres of currently unleased federal coal, to facilitate the subsequent development and maximum economic recovery of federal coal resources that would otherwise be bypassed. The purpose of the agencies' actions is to facilitate continued development and recovery of mineral resources in an environmentally sound manner. The Proposed Action responds to the federal government's overall policy to foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs (Mining and Minerals Policy Act of 1970).

The Proposed Action would facilitate recovery of an estimated 6.9 million tons of federal coal reserves north and outside of the currently leased and permitted area of the Skyline Mine. The lease modification would be a logical extension of the Skyline Mine, providing federal (and state) royalty revenue from the sale of the coal while avoiding potential bypassing of the coal resource. If the lease modification is issued, it could extend the life of the mine by two to three years at current production levels.

The lease modification would serve the interests of the United States. The BLM coal-leasing program encourages development of domestic energy sources and the reduction of U.S. dependence on foreign energy sources. Coal energy developed from mining of underground coal deposits made available by the Proposed Action would be available for consumption and the royalty payments would be made to the United States (with half distributed to the State of Utah). As a result of the lease modification and the

mining of federal coal resources, the public would receive lease bonus payments, lease royalty payments, rentals, and a supply of secure low cost energy from coal for electrical power generation and industrial uses.

As part of the November 2010 BLM Determination of Lease Modification Qualification, it was determined that CFC, due to geological, economical, and access constraints present within the area of the lease modification, would be the sole operator economically capable of developing the proposed lease modification coal deposits. Therefore, neither a competitive lease sale nor associated mine access alternatives are required.

1.3 CONFORMANCE WITH FEDERAL LAND USE PLANS

Leasing coal in the modification area has been determined to be in conformance with the BLM Price Field Office Record of Decision (ROD) for the Environmental Impact Statement (EIS) and Resource Management Plan (RMP) approved in October 2008. Federal coal included in the Proposed Action falls within an area identified as "Coal Available for Further Consideration for Leasing" (BLM 2008). A lease modification qualification review performed by the BLM in January 2011 indicated the lease modification qualified for leasing.

Leasing federal coal is an integral part of BLM's leasable minerals program under authority of the aforementioned MLA, as amended. The intent of the MLA and its regulations is to allow and encourage lessees to explore for and develop coal resources underlying public lands. Under FLPMA, BLM is mandated to manage public lands on the basis of multiple use (43 U.S.C. 1701(a)(7)). Mineral development is identified as one of the principal uses of public lands under Section 103 of FLPMA (43 U.S.C. 1702(c)). BLM will consider approval of the Proposed Action in a manner that avoids undue or unnecessary degradation of public lands, as required under FLPMA.

Under authorities granted in the MLA and FCLAA, the FS Responsible Official must decide whether or not to consent to the BLM modifying the lease, and identify what conditions (stipulations) are necessary for protection of non-mineral resources. The FS, as the surface management agency, will take into consideration impacts to resources that the agency administers under authority of the National Forest Management Act of 1976 (NFMA) and in conformance with the MLNF Plan.

The MLNF Plan direction states that leasing may be limited or denied where certain conditions occur (FS 1986). The potential for these conditions to occur are addressed in this EA. These include: degradation of water quantity or quality, impairment to quality of recreation, occurrence of National Recreation Trails, unacceptable or unmitigateable impacts to wildlife and fish, operations that could aggravate land instability, need for the coal cannot be demonstrated, unacceptable or unmitigateable impacts to communities, or unacceptable or unstable traffic flows. The MLNF Plan identifies the modification area as being in a Coal Development Potential Area by meeting the

unsuitability and multiple-use evaluation criteria that make the lease modification area available for lease. The MLNF Plan states that mining be conducted using underground methods. The multiple-use evaluation criteria state that "Further lease action considerations other than for supplying existing operations will be delayed …." (FS 1986).

The MLNF applied the Unsuitability Criteria for Coal Mining as defined in 43 CFR 3461. Twenty criteria were analyzed for lease unsuitability. The result of this analysis at the Plan level showed that eleven criteria were determined to be not applicable and the remaining nine criteria were determined to be not applicable because of exception or exemption (MLNF Plan Appendix C, Table C-1). Application of the Unsuitability Criteria on these site specific lands did not result in any lands being identified as unsuitable, or in identification of any additional stipulations.

The modification area is encompassed by non-mineral management direction emphasized in the MLNF Plan and as well as management direction for mineral development. MLNF Plan emphasized uses in the modification area include range, timber, and semi-primitive recreation resources. Coal leasing would be consistent with the management direction for these emphasized uses on the modification area.

The Range Management Unit emphasis is for "the production of forage and cover for domestic livestock and wildlife" (FS 1986, page III-64). Management direction for the modification area provides for the following (FS 1986, page III-66):

- 01 "Provide appropriate mitigation measures to assure continued livestock access and use"
- 02 "Those authorized to conduct developments will be required to replace losses through appropriate mitigations, where a site specific development adversely affects long-term production or management."

The Timber Resource Management Unit emphasis is for "the production and use of wood-fiber for a variety of wood products" (FS 1986, page III-67). Management direction for the modification area provides for the following (FS 1986, page III-25):

- 03 "Manage timberlands not suitable for commercial harvest to maintain forest cover species, but emphasis should be on production of other forest resources and uses."
- 04 "Require those authorized to conduct activities to replace losses through appropriate mitigations where a site-specific development adversely affects long-term production or management."

The Semi-primitive Management Unit emphasis is for "providing semi-primitive motorized and non-motorized recreation opportunities" (FS 1986, page III-55). Management direction for the modification area provides for the following (FS 1986, page III-57):

- 01 "Allow mineral activities that are designed to cause the least impact and facilitate final reclamation."

Portions of the modification area are in the Price River Inventoried Roadless area (IRA) and would be subject to restrictions on road construction and timber harvest pursuant to rules and regulations of the Secretary of Agriculture pertaining to roadless area management applicable at the time such activites may be proposed on the lease. Locations of any proposed surface use would be verified for relationship to IRA boundaries using site-specific maps if/when surface operations are proposed.

1.4 RELATIONSHIPS TO STATUTES, REGULATIONS, AND OTHER PLANS

Leasing federal coal is an integral part of the BLM's leasable minerals program under authority of the MLS, FLPMA and FCLAA. The Proposed Action is regulated under 43 CFR 3432, Lease Modifications, and is required to comply with regulatory requirements and plans where applicable. If the lease modification is issued, CFC would be responsible for securing other required approvals and permits for future mining operations in the project area as required by the following jurisdictional agencies:

- OSM and DOGM – Submit a permit amendment application and receive approval of such for the expansion of the current mine permit area under Section 503 of the SMCRA.
- U.S. Environmental Protection Agency - Compliance with applicable air, water, and hazardous materials requirements under programs administered by the Utah Department of Environmental Quality (DEQ).
- U.S. Army Corps of Engineers (ACE) – Compliance with Section 404 of the Clean Water Act as it relates to potential construction and stream realignment.
- Mine Safety and Health Administration (MSHA) – Compliance with applicable requirements relating to mine facilities and operation.
- U.S. Fish and Wildlife Service (FWS) – Compliance with the Endangered Species Act, Bald Eagle Protection Act, and Migratory Bird Act.
- Utah Department of Wildlife Resources (DWR) – Compliance with applicable wildlife protection measures.
- Utah State Historical Preservation Office (SHPO) – Compliance with applicable provisions of the National Historic Preservation Act (NHPA).
- Carbon County – Compliance with Zoning Regulations and applicable requirements for special building and water and sewer permits.

1.5 PROJECT SCOPING

Project scoping is an integral part of the environmental analysis process which involves solicitation of comments from federal, state, and local agencies, and interested organizations and individuals. The goal is to assure that the most accurate and current

environmental information and public issues are incorporated into planning and decision-making.

Project scoping began in November 2010 and a legal notice of opportunity to comment was published in the Sun Advocate on May 17th, 2011. Letters were sent to individuals who earlier had expressed interest in such proposals. Five letters were received during scoping from the following:

- The Hopi Cultural Preservation Office
- The Utah State Historical Preservation Office
- The Paiute Indian Tribe of Utah
- The Utah Environmental Congress and the Grand Canyon Trust
- The Utah State Governor's Office

Responses to the comments received were prepared and directly address the comment or direct the reader to the appropriate section of the EA where the comment was addressed. **Appendix B** contains the comments received and responses to those comments. Letters received from interested parties are also contained in the project file at the BLM Price Field Office.

Internal scoping of resource issues was conducted by BLM and FS resource specialists. The results of internal agency scoping, which included an analysis of resource issues to be carried forward for further analysis in Chapter 4 of the EA is presented in **Appendix C** as the Interdisciplinary Team (IDT) Analysis Record Checklist.
As a result of public and interagency scoping, no action alternatives beyond the No Action and Proposed Action Alternatives were determined to be necessary. The No Action and Proposed Action Alternatives are presented in Chapter 2.

CHAPTER 2

DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

Based on public and interagency scoping, two alternatives were carried forward for further consideration and analyses: 1) The Proposed (Lease Modification) Action Alternative, and 2) No Action Alternative. The two alternatives are discussed in Sections 2.3 and 2.4 of this chapter.

2.2 ALTERNATIVES DISCUSSED AND DISMISSED FROM FURTHER CONSIDERATION

No issues were raised by the public or interagency scoping that resulted in the need to consider another alternative. This lease modification is being processed according to regulatory procedures in 43 CFR 3400, which include screening the subject lands according to the Unsuitability Criteria in 43 CFR 3461. The result of this screening did not include identifying any lands as unsuitable, or result in additional stipulations being identified. Similarly, review of the applicable land management plans did not result in any lands being identified as unavailable for leasing. **Appendix B** contains responses to public comments and **Appendix C** summarizes issues developed by agency resource specialists.

2.3 PROPOSED ACTION ALTERNATIVE

Under the Proposed Action Alternative, the FS would consent to the BLM modifying the Winter Quarters Federal Coal Lease UTU-67939 by adding 690 acres of unleased federal coal reserves on NFS lands, and BLM would then modify the lease to include the 690 acres of NFS lands and an additional 80 acres of privately held surface lands overlying federal coal reserves. Modifying the existing lease would facilitate recovery of an additional 6.9 million recoverable tons of coal.

The Proposed Action assumes that if the lease is modified, coal would be recovered through extensions of existing underground workings of the Skyline Mine. Coal resources associated with modification of the Winter Quarters Federal Coal Lease UTU-67939 are anticipated to increase the current 10 year Skyline Mine life of operations by at least two years at current production levels. The existing work force would remain employed to implement the Proposed Action.

The modification area is located near the town of Scofield in Carbon County, approximately 28 miles west of Price, Utah, and within the northern portion of the Wasatch Plateau Coal Field, in the Wasatch Plateau KRCRA. Coal beds of economic interest in this part of the Wasatch Plateau Coal Field occur in the Blackhawk Formation. Strata in this Late Cretaceous formation include thin sandstones, carbonaceous shales, and thicker coals at or near the base, and less carbonaceous shales, thinner coals, and

thicker sandstones at the top. The formation is characterized by facies changes associated to delta-plain depositional environments. In the Proposed Action, one coal bed of economic interest occurs in the mid to lower portion of the formation, the Lower O'Connor A Seam. While other seams also exist (Lower O'Connor B, Upper O'Connor, and Flat Canyon seams), only the Lower O'Connor A Seam is of adequate thickness to be considered economically mineable.

A reasonably foreseeable mine scenario calls for access to, and mining of the Lower O'Connor A Seam by main entries driven from the south from the existing Skyline Mine within the previously issued Winter Quarters Federal Coal Lease UTU-67939. The coal would be mined using primarily longwall mining methods. Development of the mine to support longwall mining would consist of using a continuous miner to mine mains along the end of the longwall panels. Gate roads separating the longwall panels, installed to facilitate personnel and equipment access and transportation of the coal, would be driven to the west approximately 6,500 to 7,400 feet. Longwall panels would be approximately 10 feet in height and 1,000 feet in width. Existing mine surface facilities located south of the coal tract at the Skyline Mine would be used to handle and load the coal for transport. No surface disturbances, including gob vents or surface exploratory drill borings, are foreseen on the lease modification area. Ground surface subsidence resulting from mining of the coal, based on a subsidence study performed on the adjoining longwall panel for the mine operator by Agapito and Associates, is anticipated to be up to a maximum of six feet (Agapito 2010).

Coal haulage to the surface would be by the existing and expanded underground conveyor belt system. Roof bolters, scoops, power centers, and other auxiliary support equipment systems would be used in all mining sections. Full roof bolting plans and ventilation plans from MSHA would be mandatory and required to be followed throughout the operational areas associated with the Proposed Action as an assumed extension of the mine. All mining would be done according to the current federal lease stipulations, current laws, and applicable Federal Code of Regulations.

The Lower O'Connor A Seam is expected to be 10 to 12 feet in thickness on average in the modification area. There are no known partings in the seam and the seam is considered high quality. The strata in this area dip to the west-northwest approximately three degrees, and overburden thickness ranges from 1,000 to 1,500 feet (from east to west) above the seam. Coal would be mined only from the Lower O'Conner A Seam of the Blackhawk Formation. The approximate coal rank of the Lower O'Conner A Seam near the coal tract is a high-volatile C bituminous coal. The heating value is estimated to be between 11,200 and 11,700 British thermal units per pound (Btu/lb) (BLM 2010).

Existing Special Coal Lease stipulations which include protections for nonmineral (i.e. surface resources) from the existing Winter Quarters Federal Coal Lease UTU-67939 and BLM standard stipulations, as amended would be applied to the lease modification area and can be found in **Appendix A.**

As a Proposed Action commitment and as part of the DOGM permitting process subsequent to this EA, hydrological monitoring of springs, seeps, creeks, and potentially impacted water supply wells would be performed during the pre-mine and operational phases of the mine and continue through the remainder of the permit term. A detailed list of required monitoring locations, flow measurements, field and laboratory analysis requirements, and potential mitigation measures would be included in the Permit Application Package to be developed in coordination with DOGM. The monitoring would be conducted to determine if impacts to municipal supply watersheds, water supply wells, or surface resources have occurred. DOGM is responsible for ensuring impacts from mining activities are properly addressed in the final approved mine permit and during the entire permit term.

2.4 NO ACTION ALTERNATIVE

The No Action Alternative is to not modify the Winter Quarters Federal Coal Lease UTU-67939. Under this alternative, the FS would not consent to BLM issuing the modification, and BLM would not modify the tract. It has been assumed that since unleased federal coal would not be included in the lease modification, it would continue to remain undeveloped. Rejection of the Proposed Action Alternative and acceptance of the No Action Alternative would not affect future applications to lease the unleased federal coal. If the proponent's application is rejected, Skyline Mine would continue to mine coal in their existing leases as outlined within the current DOGM-approved mine and reclamation plan.

If the coal resource is not to be mined by Skyline Mine, the unleased portion of the federal lease would be bypassed and would not be mined by any other coal operator. Since no underground mining of the unleased federal coal resource would occur, this would result in the loss of coal energy and revenues for the public. The coal reserve would not be used to provide for the household electrical needs of some 3.6 million members of the public for two or more years (**Table 1**). It is anticipated that the Skyline Mine life of operations would be approximately two years less than would otherwise be realized if the Proposed Action were approved.

Table 1 - Energy Contribution from the Proposed Winter Quarters Federal Coal Lease UTU-67939 Modification		
Energy Contribution of Coal		Comments
Tons	6,900,000	projected recoverable tons in the lease modification
Average BTU / lb	11,200	
KiloWatt Hours of Electrical Generation	14,893,042,976	Tons in 2009 x (2000 lb per ton x Average BTU per lb /10,378 BTU per Kwh) *http://www.eia.doe.gov/cneaf/electricity/epa/epat5p3.html*
KiloWatt Hours of annual electrical energy use per U.S. household	10,656	*http://www.eia.doe.gov/emeu/recs/recs2001/enduse2001/enduse2001.html*
Number of U.S. households provided with one year of residential electrical energy	**1,397,620**	
USA Persons per household, 2000	2.59	http://quickfacts.census.gov/qfd/states/49000.html
Number of U.S. persons provided with one year of residential electrical energy	**3,619,837**	
OR		
Utah Persons per household, 2000	3.13	*http://quickfacts.census.gov/qfd/states/49000.html*
Utah persons who could be provided with one year of residential electrical energy	**4,374,552**	assumes US and Utah household electricl usage rates are equal
Utah Population, 2001 estimate	2,269,789	U.S. Census Bureau State and County *QuickFacts*
Percent of Utah persons who could be provided with one year of residential electrical energy	**193%**	

CHAPTER 3

AFFECTED ENVIRONMENT

3.1 INTRODUCTION AND GENERAL SETTING

This chapter presents the potentially affected resources identified in the IDT Analysis Record Checklist (**Appendix C**). This chapter provides the baseline for comparison of environmental impacts described in Chapter 4.

Initial Affected Environment Review

A review of the resources present in the area of the Proposed Action was performed by the BLM and the FS during a November 23, 2010 IDT meeting. Based on potential resource issues identified during the IDT meeting and from resource specialist review between December 2010 and February 2011, an IDT Analysis Record Checklist was prepared (**Appendix C**). This review determined whether a critical element or other resource/concern was not present, present but not impacted, or potentially impacted. Other state and federal agencies with an interest in the Proposed Action area were contacted in regards to specific resource considerations. A Biological Evaluation/ Biological Assessment was prepared for special status wildlife and vegetation species and is presented as **Appendix D**.

Rationale for findings of "not present" and "present but not impacted" are included within the IDT Analysis Record Checklist. During the November 23, 2010 IDT meeting, it was determined that based on an evaluation of subsidence potential within the lease modification boundary, also referred to as the project area, future ground surface subsidence from potential subsurface coal mining would be up to six feet (Agapito 2010). In general, the amount of expected subsidence and the type of resources occurring in the project area will eliminate or minimize the potential for impacts to surface resource concerns.

Based upon the IDT Analysis Record Checklist resource analyses, water resources and greenhouse gas (GHG) emissions were the only resources identified as having the potential to be impacted by the Proposed Action. These resources have been carried forward for further analyses and the issues associated with these resources include:

Water Resources

- Mining-induced subsidence could cause increases or decreases in groundwater flow to springs/seeps and wells in and adjacent to the project area.
- Mining-induced subsidence could cause changes in aquifer recharge due to surface water infiltration.

- Mining activities could cause changes in water quality that could impact public water supplies and 303(d) beneficial uses of surface water resources listed in the Clean Water Act.

Greenhouse Gas Emissions

- Leasing and subsequent mining could affect direct mine operation contributions of carbon dioxide equivalent (CO_2e) emissions.
- Indirect CO_2e emission contribution of burning of coal for electrical generation could influence climate change.
- Cumulative contribution to CO_2e emissions globally and potential general effects of CO_2e emissions on climate change.

Physiographic and Climatic Setting

The Proposed Action is located in the northern Wasatch Plateau, Wasatch Plateau Coal Field, in the Wasatch Plateau KRCRA. Precipitation on the Wasatch Plateau varies from 40 inches at the highest elevations to less than 10 inches at lower elevations and more than 30 inches per year on the higher ridges and in the upper Huntington, Fish, and Mud Creek basins (Waddell et al. 1986). Seventy to eighty-percent of the total precipitation falls as snow between October and April. Skyline Mine has a weather reporting station, where precipitation averages between 22 and 26 inches per year are recorded. Actual and potential evapotranspiration rates which express the evaporative demand of the atmosphere, are roughly equal (less than 18 inches per year) in the upper elevations of the Wasatch Plateau (DOGM 2006). Precipitation is the primary source of groundwater recharge to the groundwater system (Price and Arnow 1985).

The lease modification area is bisected by an east-west topographic high, known as Granger Ridge. There are several small drainages coming north and south from the Ridge, intercepting Woods Canyon to the South and Fish Creek to the north; both tributaries to Scofield Reservoir.

Geologic Setting

The project area is located in rocks of the Mesaverde Group. The Mesaverde Group is comprised of the Star Point Sandstone, Blackhawk Formation, Castlegate Sandstone, and Price River Formation. The coal resource proposed to be leased is located in the base of the Blackhawk Formation. Strata in this Late Cretaceous formation include thin sandstones, carbonaceous shales, and thicker coals at or near the base, and less carbonaceous shales, thinner coals, and thicker sandstones at the top. The formation is characterized by transgressive/regressive facies changes associated with delta-plain depositional environments.

The coal bed of economic interest, the Lower O'Connor A Seam, occurs in the lower 350 foot portion of the 1,500 to 1,900 foot thick Blackhawk Formation. While other seams also exist (Lower O'Connor B, Upper O'Connor, and Flat Canyon seams), only the Lower O'Connor A Seam is of adequate thickness to be considered economically mineable. The Blackhawk Formation makes up the near surface substrate in the project area and has a dip of approximately three to five degrees toward the west-northwest. Two surface occurrences of the Castlegate Sandstone are present in the western portion of the project area capping the Blackhawk Formation. The maximum thickness of the Castlegate Sandstone in these areas is an estimated 80 to 120 feet.

The Star Point Sandstone directly underlying the Blackhawk Formation is reported to be over 1,000 feet thick in the vicinity of the project area. The sandstone is reportably almost devoid of shale in the Scofield area (DOGM 2006).

While no faulting is believed to be present in the project area, minor, and major faulting are present somewhat near to it. The closest significant fault is the Pleasant Valley Fault that is located approximately one mile east of the project area boundary along the western side of Scofield Reservoir. The Pleasant Valley Fault is a normal fault with displacement of the project area upwards relative to the eastern side of the fault by approximately 1,000 feet. A smaller unnamed fault with a similar displacement type is located approximately three-quarters of a mile east-southeast of the project area. Igneous intrusives have formed dikes in some of the fault and fracture zones in adjacent mine workings. An igneous dike(s) forms the northern limited of mining in the project area.

Biologic Setting

Soils in the project area are generally moderately deep, well drained loams, with moderate permeability. The soils are moderately susceptible to water erosion (NRCS, 1988). The vegetation is comprised mostly of conifer and sage communities. The area provides habitat for raptors, elk (*Cervus canadensis*), and mule deer (*Odocoileus hemionus*). Streams within the Proposed Action area are not capable of supporting game fish. A variety of migratory bird and small mammal species are potentially present that are typical of the montane forest and shrub communities.

3.2 WATER RESOURCES

3.2.1 Groundwater

Groundwater is present in some of the formations overlying the coal that would be mined, primarily in perched, discontinuous saturated zones. The movement of both shallow ground and surface water fluctuates with seasonal rain/snow events. The Blackhawk Formation is the only likely source of water potentially to be encountered in the mine. Recharge in this area is slow due to the overlying mudstone and shale units.

Water periodically encountered in the mine has been age-dated to be between 3,000 and 30,000 years old. Currently at the Skyline Mine, water is periodically produced as mining advances, and typically dries up as the isolated, saturated zone is depleted. This water is being pumped into the Mud Creek drainage which is southeast of the coal tract.

The Star Point Sandstone, Blackhawk Formation, Castlegate Sandstone, and Quaternary deposits all contain the potential for storing and transmitting water. Surficial bedrock in the project area is comprised primarily of the Blackhawk Formation. The formation exceeds 850 feet in thickness in the project area. Erosionally isolated portions of the Castlegate Sandstone cap the Blackhawk Formation in the western portion of the project area.

The Blackhawk Formation is made up of interbedded deposits of fine grained sandstones, siltstones, claystones, and coal seams that limit vertical migration of water (DOGM 2006). The discontinuous nature of the higher permeability rock types isolate water bearing units and perch water in various zones in the formation. The perched water bearing zones form springs and seeps where they emerge on the surface. The water bearing zones form local flow systems that can produce some water flow, but due to their discontinuous nature do not provide enough baseflow to sustain perennial streams (DOGM 2006). Some flow from the springs may contribute to the alluvial and colluvial water tables in the drainage bottoms.

Water that makes it through the Blackhawk Formation as recharge likely moves downdip (to the west away from Scofield Reservoir) through higher permeability units. Some recharge water is likely captured as isolated storage in higher permeability units that are pinched out by clay and siltstone beds. Unsaturated zones are present between the perched water bearing zones in the Blackhawk Formation and the underlying Star Point Sandstone regional aquifer. Age dating of water in the Blackhawk Formation indicates the water was in relatively recent contact with the atmosphere (DOGM 2006).

The Star Point Sandstone and the basal Blackhawk Formation are believed to be hydrogeologically connected (DOGM 2006). They make up what is believed to be a regional aquifer in the area (Star Point aquifer). The Star Point aquifer is generally considered a poor aquifer where it is not fractured or faulted due at least partly to the occurrence of interbedded shales (Waddell et al. 1986). Recharge areas for the Star Point aquifer are likely south of the project area. Potentiometric surfaces of water in these units has allowed for water inflow from the mine floor to Skyline Mine's workings to the south of the project area. This is in contrast to low inflows seen in the roof of mine workings in the same areas. Hydraulic conductivity values for the Star Point Sandstone have been tested to be in the 10^{-2} feet per day range. Transmissivity of the entire Star Point aquifer indicate a range of 20 to 200 feet^2 per day is possible.

An igneous dike(s) forms the northern limit of mining in the project area. South of the project area east-west trending igneous dikes, and east of the project area north-south

trending faults, reportably affect groundwater movement (DOGM 2006). Fractures due to faulting in the Blackhawk Formation have shown to seal themselves due to the high clay content, inhibiting vertical flow of water downward. Fracturing in the underlying Star Point Sandstone is believed to increase its secondary permeability, promoting groundwater flow.

While not evident in data (Nephi 30x60 USGS Quadrangle Map) used to create **Figure 2**, more detailed geologic mapping conducted by Steven Knowles (UGS 1996) indicates the Star Point Sandstone outcrops to the east of the site and may be in contact with alluvium in the lower Fish Creek and Woods Canyon drainages. This could make this regional aquifer an important contributor to the base flow of Fish Creek and lower Woods Canyon. Southeast of the project area, Mud Creek and springs along the Pleasant Valley Fault zone have relatively large discharges and low seasonal variability of baseflow indicating the Star Point aquifer has a large storage coefficient and relatively high transmissivity (Waddell et al. 1986).

Water quality of groundwater in the area is generally of a calcium bicarbonate type with total dissolved solids (TDS) concentrations ranging between 200 and 700 milligrams per liter (mg/L). However, higher TDS values have been detected in water historically discharged from within the Skyline Mine (DOGM 2006). Elevated sulfate concentrations from rock dust in flooded areas of the mine have been identified as a source of elevated TDS values. A 2010 spring and seep survey conducted at and south of the project area confirm a calcium-magnesium-bicarbonate water type with a TDS ranging between 300 to 500 mg/L (Petersen 2011). The location of the spring sampled, NOG-17, is presented in **Figure 2**.

3.2.2 Surface Water

Peripheral to the project area two perennial streams are present. The first (Fish Creek) is located north of the project area and the second (Woods Canyon) is located south of the project area. Both streams flow eastward into Scofield Reservoir. Spring and seep flow from the Blackhawk Formation and water from the underlying Star Point aquifer are primary contributors to baseflow for the streams. Snowmelt is the major source of water for the perennial streams during late winter and spring. Intense summer thunderstorms may cause short-term flooding. Side drainages to Fish Creek, including Wife and Andrew Dairy Canyons, are listed as intermittent (NHD 2011) but likely exhibit ephemeral flow in segments.

Based on data presented by the United States Geological Service (USGS) National Water Information System, mean annual stream flows in Fish Creek have ranged from 18 to 81 cubic feet per second (cfs) since 1990. Limited monitoring conducted by Petersen Hydrologic indicates that Woods Canyon Creek had a discharge flow range between 0.07 to 4.6 cfs (Peterson 2011). The mean annual flow on Woods Canyon is substantially smaller than that measured on Fish Creek.

As presented on **Figure 2**, several springs/seeps have been monitored in the Woods Canyon drainage as has the creek. These springs have measured flows ranging from moist to peak flows in the mid to high teen gallons per minute (gpm) (Petersen 2011). Two springs have been identified on the upper south flank of Granger Ridge in the project area and one spring is on the north flank of Granger Ridge. These springs are included in the Skyline Mine spring and seep monitoring program. **Appendix E** presents a spring and seep monitoring report prepared for CFC for the Woods Canyon area with data collected between 2006 and 2010. Outside of the project area to the east at least two springs are listed in the Utah Division of Water Rights (UDWR) database.

Scofield Reservoir is a culinary water source and is known for its trout fishery. It has Utah Division of Water Quality (UDWQ) use classifications for 1C – domestic uses with treatment, 2B – secondary contact recreation, 3A – cold water fishery, and 4 – agricultural uses. The UDWQ has been monitoring Scofield Reservoir for phosphorus loading and have set a Total Maximum Daily Load Target for the reservoir at 29 pounds per day (DOGM 2006).

3.2.3 Water Supply Sources

Based on records kept by UDWR (UDWR 2011), numerous water supply points of diversion are identified in or surrounding the project area. The majority are point-to-point water diversions for a section of stream facilitating livestock watering. Four of these point-to-point water diversions are listed as being located within the project area boundary. Many of the remaining points of diversion are springs used for stock watering or by wildlife. **Appendix F** presents results of a UDWR Point of Diversion database search for the project area and surrounding area.

Four public water supply point sources are located north and east of the project area between one-half to one and one-half miles from the project area, based on a Utah Division of Drinking Water (UDDW) (UDDW 2011) record search. Three of the four sources are springs and one is a groundwater well. The two springs and one well located north-east of the project area have protection zones assigned to them that intersect the project area. The protection zones are listed as Zone 4 and T4, meaning a 10 to 15 year groundwater time of travel to the point of diversion is possible. Water use from the three springs is listed as being transient.

The spring points of diversion appear to source water from discontinuous water bearing zones in the Blackhawk Formation above the Star Point aquifer. However, it is possible there is some interconnectivity between two of the springs and the underlying Star Point aquifer. The groundwater well (Frandsen Well) located approximately one and one quarter mile east of the project area, is located in or immediately adjacent to the Pleasant Valley Fault. This fault may act as a high permeability conduit for water flow parallel to the fault (toward the well) while simultaneously inhibiting groundwater flow

perpendicular to the fault. The Frandsen Well is potentially completed in the Star Point aquifer, which underlies the Blackhawk Formation. The Star Point Sandstone is mapped as outcropping on the western edge of the fault by Steven Knowles (UGS 1996). Source protection plans on file with the UDDW indicate that water flow to the well is assumed to be from the west and has a travel time of up to 15 years to reach the well (UDDW 2011). However, given the well's proximity to the Pleasant Valley Fault, its effective capture zone for inflow is likely in a north-south orientation corresponding to fracture zones parallel to the fault. There would also likely be a strong vertical component of upward groundwater flow from depth due to confined conditions in the Star Point aquifer. If the Frandsen Well is located on the east side of the Pleasant Valley Fault, flow to the well would be from the down dropped and likely fault- isolated portion of the Blackhawk Formation that adjoins Scofield Reservoir.

Scofield Reservoir is listed as a culinary water source and its UDWQ use classification of 1C – domestic uses with treatment, the reservoir, Fish Creek, and the surrounding ground surfaces are identified as being in Zones 2 (250 days) and 4 (15 years) for water time of travel. A Zone 2 travel time area encompasses an area where it would take groundwater a maximum of 250 days to reach a surface water body or well. The Zone 2 areas for Scofield Reservoir and Fish Creek extend from Scofield Reservoir's shoreline and Fish Creek's stream banks, respectively, outward as a narrow buffer.

3.3 GREENHOUSE GAS EMISSIONS

Ongoing scientific research has identified the potential impacts of anthropogenic (man-made) GHG emissions and changes in biological carbon sequestration due to land management activities on global climate. Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially carbon dioxide (CO_2) and methane) from fossil fuel development; large wildfires; activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. It is believed that GHGs can have a sustained climatic impact over different temporal scales.

Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO_2e concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. CO_2e represents the compilation of all gases released that have the ability to cause climate change, factored to be representative of the equivalent amount of CO_2. Gases that have the ability to influence climate change include nitrogen oxide and methane. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since

the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations" (IPCC 2007).

Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006 (GISS 2007). Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24° N) have exhibited mean surface temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability, and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change (NAS 2008).

In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 2.5 to 10.4°F above 1990 levels. The National Academy of Sciences has confirmed these findings, but also has indicated there are uncertainties regarding how climate change may affect different regions (NAS 2008). Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor in the atmosphere, and reduce soil moisture, increasing generalized drought conditions, while at the same time increasing the frequency of intense of storm events.

Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict. The science involved with evaluating the impacts of climate change has not advanced to the point where specific impacts associated with a specific action can be determined. In addition, the level of significance of an action's impact due to GHG emissions has not been found to be determinable.

In Utah, activities generating GHGs accounted for 69 million metric tons of CO_2e emissions in 2005 (CCS 2007). Utah's primary sources of GHG emissions are electricity production (37 percent from in-state electrical use), transportation (25 percent), and fuel combustion for residential, commercial, and industrial uses (18 percent). Utah's emission of GHGs has increased by 40 percent between 1990 and 2005. Estimated emissions of CO_2 resulting from the generation of electricity in the United States in 1999 were 2.2 billion metric tons (DOE 2000). Worldwide emissions of CO_2 from any source in 2008 were estimated at 30 billion metric tons with the United States contributing 5.6 billion metric tons to the total (UN 2011).

CHAPTER 4

ENVIRONMENTAL IMPACTS

This chapter provides an analysis of potential environmental impacts of the Proposed Action Alternative and the No Action Alternative. It is assumed that the Proposed Action would be carried out as described in Chapter 2. Section 4.1 discusses direct and indirect impacts. Cumulative impacts are presented in Section 4.2.

4.1 DIRECT AND INDIRECT IMPACTS

Modifying the lease in itself would have no direct impacts on any resource. Subsequent post-leasing, mining, and subsidence may affect resources; however, these effects will be minimized or negated through the application of lease stipulations. Post-leasing development that includes surface disturbing activities such as road building and exploration drilling would be subject to additional required review analysis. The indirect impact assessment area for water resources is inclusive of the watersheds containing lower Fish Creek and its tributary French Creek on the north and west, respectively. To the east of the project area Scofield Reservoir and to the south Woods Canyon's watershed make up the remaining portion of the water resources impact assessment area.

4.1.1 Proposed Action Alternative

4.1.1.1 WATER RESOURCES

Substantive analysis of the impacts of subsurface coal mining to water resources at the Skyline Mine has been performed and reported in the Cumulative Hydrologic Impact Assessment (CHIA) prepared by DOGM, dated February 28, 2006 (DOGM 2006). The area analyzed in the CHIA includes the Mud Creek Basin and portions of watersheds that the project area resides in. These watersheds, including Fish Creek, are the major tributaries to Scofield Reservoir. The effects of mining in the project area are expected to be similar to those discussed for the mining of the Winter Quarters North Lease. While the CHIA indicates that no evidence of material damage from the Skyline mining operation has been found or is probable, this EA's analysis addresses specific issues associated with the project area, Woods Canyon, Fish Creek, and water sources potentially impacted by the mining activity.

As discussed in Chapter 3 the issues identified for impact analyses include:

- Mining-induced subsidence could cause increases or decreases in groundwater flow to springs/seeps and wells in and adjacent to the project area.
- Mining-induced subsidence could cause changes in aquifer recharge due to surface water infiltration.

- Mining activities could cause changes in water quality that could impact public water supplies and 303(d) beneficial uses of surface water resources listed in the Clean Water Act.

4.1.1.1.1 Groundwater

Recharge rates due to surface water infiltration of the Blackhawk Formation in and adjoining the project area should remain similar to current rates. The expected subsidence overlying the longwall panels and mine gate roads may cause tensional cracking at the ground surface that could temporarily increase the infiltration potential of the near surface soils. These surface features are typically temporary in nature where sediments and soil overlie bedrock. The high clay content of the Blackhawk Formation impedes infiltration of precipitation and aids in the sealing of vertical fractures as has been seen in fault traces in former Skyline Mine workings south of the project area (DOGM 2006).

Disruption of recharge of the Star Point aquifer would not be anticipated, based upon the Star Point aquifer recharge areas believed to be south of the Skyline Mine where the formation outcrops. Evidence of this has been seen in age dating of the Star Point aquifer groundwater, indicating that the water has an age between 3,000 and 30,000 years old (DOGM 2006). This would indicate that the majority of recharge of the Star Point aquifer has occurred at distal locations requiring long periods of time to travel to the project area portion of the basin. Reported unsaturated zones in the Blackhawk Formation tend to support a more distal recharge area for the Star Point aquifer as well. Recharge rates of the Star Point aquifer from the overlying Blackhawk Formation is likely very small, based on reports of minor roof inflows in existing Skyline Mine workings in contrast to the more substantial mine floor inflows (from Star Point aquifer) (DOGM 2006). Evidence of aquifer contributions to base flow at Eccles Creek would be expected to be mirrored in base flow to Fish Creek and Woods Canyon, due to the similar geology in the drainage bottoms.

During mining, water would be removed from the mine and discharged to the Mud Creek drainage system. No loss or transfer of water from the watershed would be experienced. The potentiometric surface of the Star Point aquifer would be depressed to or just below the bottom of the coal bed to be mined in the near vicinity of the longwall panels during mining. Based on previous experience south of the project area, little water inflow comes from the roof of the mine with most inflow coming from the active mine face and channel sandstones. An average inflow rate of 10 gpm was noted for the active mine faces with the exception of areas where faults were encountered (DOGM 2006). Where faulting was present, inflows from the mine floor were substantially greater. However, no faults are mapped in the project area.

Subsidence fracturing in the Blackhawk Formation overlying the longwall panels has the potential to truncate water bearing sandstones and siltstones. These units could be

dewatered or water could be transferred between units. Due to the lenticular and discontinuous nature of the higher permeability units in the Blackhawk Formation the lateral extent of effects of dewatering are expected to be limited. Some spring and seep flows could be modified and exhibit increased or decreased flows. The surface location of spring water emerging could also manifest itself at another location. The predominance of fine grained clays and silts in the Blackhawk Formation are expected to seal many of the subsidence fractures thereby minimizing the long term effects of the subsidence.

Following mining, groundwater levels are expected to recover to premining or near premining conditions in the Star Point aquifer. Bulkheads placed in key gate road or mine entries are expected to hydrologically isolate portions of the underground workings allowing for independent hydrologic regimes to be re-established. The groundwater zone in the longwall panel area would have a higher permeability than the surrounding rock.

The quality of groundwater left in the ground following mining is expected to be similar to that seen at the current Skyline Mine operations south of the project area. Previous experiences at the Skyline Mine have guided the operators to eliminate practices and materials that historically caused elevated TDS levels in discharged groundwater. This has substantially improved surface water quality in the Mud Creek drainage (DOGM 2006). TDS concentrations ranging from 400 to 1200 mg/L are possible in the remaining groundwater. TDS concentrations in this range are suitable for livestock consumption and do not present a concern. In addition, it is possible that higher TDS concentrations would dissipate over the long term as the groundwater flux through the area mixes waters. Sulfate concentrations are expected to be in the 100 to 200 mg/L range, with spikes in that concentration followed by a decrease in concentrations possible with the recovery of the water table in the mine workings. The sulfate concentrations expected to be encountered would fall within an acceptable range relative to their impact to TDS concentrations. Metal concentrations are expected to remain below applicable drinking water standards; however, some temporarily elevated concentrations of metals had been noted in groundwater collected from historical Skyline Mine workings. The 2006 CHIA indicated that the igneous dikes intruding the area may be partially responsible for some of the historically elevated metals concentrations. The project area does not have any mapped igneous intrusions in the planned longwall panel configuration. The average pH of water expected to remain in the mined out area would be 7.5, based on measurements collected in similar conditions south of the project area. Based on the above analysis, chemical alterations to groundwater in the project area are anticipated to be short term in duration and have a minimal impact to groundwater quality. Groundwater will remain of an adequate quality for potential use for livestock watering and supportive of other uses where it intersects ground surface as a spring or seep.

Active monitoring of the formation water elevations and spring production is proposed to be performed pre-, during, and post mining by CFC for the project area.

Modifications to the mine's DOGM permit would take into account any required additional monitoring necessary to ensure no material impacts occur and, if so, that they are mitigated.

4.1.1.1.2 Surface Water

Watershed scale surface water quantity and quality are not anticipated to change with the mining of the project area. Local increases or decreases in spring and seep flows are possible in areas of the Blackhawk Formation that are in hydrologic communication with the subsidence fracturing. The discontinuous and lenticular shape of water bearing units and the ductile nature of the Blackhawk Formation are expected to limit the lateral extent of spring and seep alterations. Regardless, it is possible that new springs and seeps would express themselves as subsidence fracturing advances. Some of these features would be temporary due to sealing of fractures with fine grained clays within the Blackhawk Formation. The net discharge of groundwater as spring and seep flow should remain the same over the long term with potential changes in location and magnitude at those locations being the primary impact.

Stream flow variations are believed to be primarily impacted by snowmelt and precipitation events. These variations in stream flow are expected to occur without discernable impact from implementation of the Proposed Action. Baseflow contributions from the Star Point aquifer in the lower reaches of Woods Canyon and Fish Creek are expected to remain similar to pre-mine conditions. However, it is possible that coal seam dewatering could have a short term effect on baseflow contributions to lower Woods Canyon Creek. The presence of fracturing and presumed higher permeability nature of the Star Point Sandstone associated with the Pleasant Valley Fault may act as a continuing source of water for stream gains from groundwater. This may act to offset a decrease in the potentiometric groundwater surface caused by mine dewatering. Stream flow contributions from springs and seeps emanating from the mid and upper Blackhawk Formation in Woods Canyon have been shown to have a high seasonal variability. It is expected that some temporary and small disruption of spring flow to Woods Canyon Creek may occur. However, due to the vertical separation of the mining area from the springs by interbedded fine grained units of the Blackhawk Formation, net discharge of spring flow to alluvium, and colluvium in Woods Canyon should remain similar.

Stream flow contributions from springs and seeps emanating from the mid and upper Blackhawk Formation close to Fish Creek are expected to stay fairly similar, based on the horizontal and vertical distance of these springs relative to the project area. Spring flow contributions to intermittent streams in the headwaters of Andrew Dairy Canyon, Wife Canyon, and the east fork of French Creek may be altered in location and magnitude due to subsidence effects, but the net contribution is expected to remain similar to pre-mine conditions.

Water quality changes in Woods Canyon would be expected to be short term in duration and may include increases in temperature due to lower creek flows, and possible increases in TDS and total suspended solids (TSS) due to spring location movement. Water quality changes to Fish Creek are not expected to be measurable due to the separation distance between the project area and the creek, and the ability of the relatively high flows in Fish Creek (18 to 81 cfs) to assimilate the assumed low flows of spring sourced water intermittently flowing from the headwaters of tributaries contained in the project area. The headwater springs could exhibit short term increases in TDS and TSS due to spring location movement.

Existing operations at the Skyline Mine have been able to mitigate water quality issues primarily associated with surface operations and mine water discharges in the Eccles and Mud Creek drainages. Based on the monitoring data collected for the Winter Quarters Lease Area and an extension of the current operational practices for the Proposed Action, no material damage to water quality that would affect 303(d) beneficial uses designated for Scofield Reservoir or its tributaries as outlined in Section 313 of the Clean Water Act are expected due to the implementation of the Proposed Action.

Similar to proposed groundwater monitoring, monitoring of surface water quality and quantity is proposed from baseline through closure. This monitoring is expected to determine early-on whether impacts are occurring to flow regimes and water quality as a result of mining of the project area. Mitigation may be required depending on the impacts detected. Monitoring and mitigation measures, which are required to be fully defined in the DOGM mine permit, should protect water resources in the event an adverse impact occurs.

4.1.1.1.3 Water Supply Sources

Water supply disruptions or alterations to springs developed for stock watering within the project area are expected to be minimal, based on the vertical separation distance from the mine workings. Several other point-to-point water rights are listed for the area adjoining the project area. Impacts to these water rights are anticipated to be negligible.

The Andrew Dairy and Tucker Canyon springs are the closest springs to the project area (approximately 0.5 to 1 mile) that are listed as public water systems. They both list source protection zones that overlap the project area. It is assumed these springs represent perched water bearing units in the upper to mid Blackhawk Formation that receive recharge from vertical flow from precipitation infiltration. While it is possible for these springs to see increases or decreases in flow during mining due to subsidence, it is expected that the limited lateral extent of the Blackhawk Formation water bearing units effectively isolates them from the mine's subsidence features. An approximate overlying surface recharge area of 1 to 1.5 miles is available to the two springs.

No water quality changes are expected due to the springs' distances from the project area and the water bearing units filtering capacity.

One domestic use groundwater well (Frandsen Well) is present 1.25 miles east of the project area. The well has a source protection zone listed with the UDDW that overlaps the project area. The well is constructed in the Pleasant Valley Fault zone. It is not clear whether the well is located on the east side of the fault or in the fault zone.

If the well is located on the east side of the fault it is likely completed in the Blackhawk Formation. Based on the documented influence of other faults in the area on water flow (DOGM 2006), the fault could be acting as a low permeability boundary allowing only water from the Blackhawk Formation on the east side of the fault to be available to the well.

If the well is located in the fault zone, it is likely in hydrologic communication with the fault-fractured Star Point aquifer. Groundwater flow to the well would be heavily influenced by the fracturing with preferential flow directions toward the well being parallel to the fault. As mentioned in Section 3.2, the source area to the Star Point aquifer is distal to the area and mining would occur above the Star Point Sandstone portion of the Star Point aquifer. In either of the well placement scenarios, no water quality or quantity impacts to the well are anticipated as a result of mining in the project area.

4.1.1.2 GREENHOUSE GAS EMISSIONS

The direct and indirect impact assessment area for GHG emissions is based on a comparison of the mine's contribution of GHGs relative to regional GHG emissions. As regional impacts are potentially similar to global impacts for comparative environments, a general analysis of typical impacts associated with GHG emissions is presented in the cumulative impacts section.

As presented in Chapter 3, the issues identified for GHG impact analyses include:

- Mine operations could directly contribute CO_2e emissions influencing climate change.
- Indirect CO_2e emission contribution of burning of coal for electrical generation could influence climate change.
- Cumulative contribution to CO_2e emissions globally and potential general effects of CO_2e emissions on climate change.

Coal production at the Skyline Mine operation in the project area is projected to remain similar to current levels if the lease modification is successfully obtained by CFC. No additional sources of GHGs are anticipated to be created during the Proposed Action mining period. Mine activities currently acting as direct and indirect sources of GHGs

include electrical use, heating, mobile equipment usage, and methane venting from the mine workings. Because methane concentrations vented during coal production approximately correlate to coal production rates, the amount of emitted methane at the mine is not expected to differ greatly from the 2010 methane emission rate. The amount of CO_2e estimated to be emitted at the mine during the mining of the project area is 58,832 metric tons. **Table 2** presents the breakdown of CO_2e for each source at the mine.

Table 2 - CO_2e Emissions For Source Types, During Mining of Project Area

Carbon Source Use At Mine	Carbon Source	Quantity of Carbon Source	Units	Estimated CO2e Annual Emissions in metric tons
Electricity[1]	Electricity	62,062,927	Kwh	25,541
Heating[1]	Propane	-	Gallons	-
	Natural Gas	44,987	Gallons	3
	Kerosene	-	Gallons	-
	Coal	-	Tons	-
	Used Oil	-	Gallons	-
Mobile Equipment Fuel[1]	Gasoline	10,276	Gallons	90
	Diesel Fuel	129,442	Gallons	1,334
Methane Liberation[2]	CH_4 From MSHA Quarterly Reports	215,853	CF/Day	31,865
Total				**58,832**

[1] - Data provided by Skyline Engineering/Environmental Department
[2] - Data taken from Mining Safety and Health Administration Quarterly Monitoring Report
Standard emission factors used in calculations are from The Climate Registry (TCR) or EPA, and updated through 2009.
Global Warming Potential (GWP) values used in these calculations are from EPA published data or from manufacturer's data sheet.

Assuming coal mine production (3.45 million short tons) is equivalent to electrical generation consumption per year, coal production and electrical generation occur in the same year, and a Kwh to CO_2 conversion of 1.244 pounds CO_2 per Kwh (ICF 1999), approximately 4.46 million tons of CO_2 (4.0 million metric tons) would be emitted from the burning of coal mined from the tract per year. Including the estimated emissions of CO_2e's from activities at the mine (venting of methane and combustion associated with

vehicles and other power equipment (58,832 metric tons)), a total yearly CO_2e emission of up to 4.06 million metric tons would occur due to implementation of the Proposed Action.

The annual emissions of CO_2e from the mining and burning of coal mined from the tract represent 6.6 percent of potential CO_2e emissions in Utah, based on state-wide emission data from 2005 for all sources (CCS 2007). The annual emissions of CO_2e from the mining and burning of coal mined from the tract represent 0.2 percent of potential CO_2e emissions in the United States, based on nationwide emission data from 1999 (DOE 2000). However, while these comparisons are presented for context, coal from the project area is sold to entities that may or may not use the coal for electrical generation, consume it in Utah or the United States, or consume it over a two year time period.

As mentioned in Chapter 3, the science involved with evaluating the impacts of climate change has not advanced to the point where specific impacts associated with a particular action can be determined. In addition, the level of significance of an action's impact due to GHG emissions cannot be determined at this time. Impacts associated with climate change are cumulative and global in nature and as such a discussion of those impacts are discussed in the cumulative impacts section of this EA.

4.1.2 No Action Alternative

Under the No Action Alternative, no activities associated with the leasing of federal coal would take place in the project area. As such, there would be no environmental impacts in this area anticipated beyond what was analyzed in the CHIA (DOGM 2006) for the existing Skyline Mine.

4.1.2.1 WATER RESOURCES

4.1.2.1.1 Groundwater

Additional groundwater potentiometric surface drawdown would not occur in the lease modification area due to the extension of the mine. Alterations in flows and water quality to springs/seeps and wells due to the lack of potentiometric surface alteration would not occur. Potentiometric surface recovery in the lease modification area due to mining in the Winter Quarters Lease Area would occur sooner than if the lease modification area was mined.

4.1.2.1.2 Surface Water

Surface water quality and quantity are anticipated to be similar to that under the Proposed Action. However, there is a lower potential for changes in water quality and quantity to occur. Monitoring of mine water discharges, streams, springs, and seeps would continue south of the lease modification area. Cumulative mine life quantities of

water and TDS discharged would be less than under the Proposed Action. Existing compliance criteria as outlined by state regulatory agencies would remain in place.

4.1.2.1.3 Water Supply Sources

The public water supply sources would be less likely to be impacted by mining activities at the Skyline Mine. Monitoring of the water supply sources by CFC would not occur.

4.1.2.2 GREENHOUSE GAS EMISSIONS

Emissions of greenhouse gases related to the mining of coal in the project area and consumption of the coal for electrical generation would not occur. However, coal or other natural resources necessary for the end use of the project area coal would have to be obtained from other existing sources. Impacts resultant from the change in an energy source to CO_2e emissions and climate change would be expected to be minimal and not measureable.

4.2 CUMULATIVE IMPACTS

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Cumulative impacts are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions.

4.2.1 Past, Present, and Reasonably Foreseeable Actions

Past, present, and reasonably foreseeable actions within the water resources cumulative impact assessment area include those actions associated with the operation of the Skyline Mine. The water resources cumulative impact assessment area includes the project area and the watersheds that have portions contained in the project area. This area includes Fish Creek, including its contributing drainages coming off of the north slope of Granger Ridge; Woods Canyon; and extending eastward from Granger Ridge to Scofield Reservoir. The area also includes that portion of Mud Creek that receives mine water discharge from the Winter Quarters North Lease Area.

The Skyline Mine has been producing coal on and off since 1980. Dewatering of the coal seam during mining and subsequent recovery of the water table following mining has progressed from the Winter Quarters South Lease Area northward to the Winter Quarters North Lease Area located south of the project area. Much of this area is outside of the cumulative impact assessment area, with the northern most portion of the mine being the exception. Groundwater drainage from Skyline Mine's historic workings has increased flow to Mud Creek, a tributary of Scofield Reservoir (DOGM 2006). The flow of surface water in Mud Creek is expected to remain relatively stable for the foreseeable future.

The Skyline Mine currently has a two-year mine life remaining that could be increased by an additional two years with the development associated with the Proposed Action. No future extension of the Skyline Mine is anticipated beyond that presented in the Proposed Action. Other past, present, and reasonably foreseeable actions in the cumulative assessment area include grazing, timber production, recreation, wildlife habitat, and infrastructure construction (roads, campgrounds, and residential development).

Past, present and reasonably foreseeable actions within the greenhouse gas emission cumulative impact assessment area include those actions associated with previous, current, and continued global emissions of greenhouse gases whether anthropogenic in nature or naturally occurring. The greenhouse gas emission cumulative impact assessment area is global in scale. According to the IPCC, human activities have led to an increase in CO_2e since before the inception of the industrial time. Recent CO_2e global emission growth between 1970 and 2004 can primarily be attributed to energy generation (145 percent increase) and transportation (120 percent increase) sectors of the world economy. Lower rates of emission growth are present due to industrial production, land use, land use change, and forestry practices (IPCC 2007). Projected global growth in per capita income and population is expected to increase the need for electrical production, transportation, and other activities responsible for GHG production throughout the 21st century.

4.2.2 Water Resources

4.2.2.1 GROUNDWATER

Subsurface mining would be progressive within the mine, with no additional mining capacity being added during the mining of the project area. Groundwater potentiometric surface declines due to coal seam dewatering in the Winter Quarters area are expected to extend into the project area. Pumping and/or natural drainage of water from the longwall cut faces in the project area would enlarge the potentiometric surface expression from the Winter Quarters Lease. The resultant potentiometric surface depression would be temporary, with recovery of the groundwater table to or near the pre-mining condition. No other plans for water development or withdrawals are known for the cumulative impact assessment area that would impact groundwater. Current usage of groundwater in combination with mining related groundwater withdrawals in the Blackhawk Formation in the cumulative impact assessment area could lower groundwater elevations more than the current condition. Discharges of groundwater to the Mud Creek drainage are not anticipated to change in quality or quantity during the mining of the project area.

4.2.2.2 SURFACE WATER

Surface water impacts from mining in the Winter Quarters Lease may impact springs and seeps in the Woods Canyon area. Cumulative impacts from mining the project area may increase already existing disruptions in spring and seep flows in Woods Canyon. Changes in water quality in springs and seeps in Woods Canyon may be longer lasting due to the extension of mining in the project area. Cumulative impacts would tend to be short lived with some residual spring relocations potentially occurring due to subsidence.

Mine water discharges to the Mud Creek drainage would remain consistent with those currently being allowed at the mine. The existing UPDES permit would guide the amount of discharges and location of those discharges. No modification to the existing UPDES permit has been requested and as such permit limitations on quantity and quality would remain the same. Future surface disturbances initiated by the Skyline Mine would be regulated under DOGM and the UDWQ and are not expected to cumulatively impact surface water. This would be accomplished through the topsoil stockpiling, erosion control, and reclamation measures outlined in existing stipulations and methane drainage well amendments to the DOGM-approved mine and reclamation plan.

4.3 GREENHOUSE GAS EMISSIONS

If current or increased GHG emission levels are maintained, this would continue to cause changes in the earth's climatic temperature and precipitation patterns. Changes in desert distribution, sea level, species distribution, species survivability, ocean salinity, availability of fresh water, and disease vectors are other alterations to the environment that are expected to occur (IPCC 2007).

Climatic changes are expected to vary spatially over time. This may cause increased snow fall in some areas and decreased snow fall in others. Arctic regions may experience loss of year round ice packs and glaciers. Wildlife species may be forced to move to more suitable habitats, or if none are available, the population base in that area may not survive. According to the IPCC's synthesis report (IPCC 2007):

> *Continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would be very likely to be larger than those observed during the 20th century.*
>
> *There is high confidence that by mid-century, annual river runoff and water availability would increase at high latitudes and in some tropical wet areas and decrease in some dry regions in the mid-latitudes and tropics. There is also high confidence that many semi-arid areas (e.g., Mediterranean Basin, western United*

States, southern Africa and northeast Brazil) would suffer a decrease in water resources due to climate change. Anthropogenic warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedbacks, even if greenhouse gas concentrations were to be stabilized.

Anthropogenic warming and sea level rise could lead to some impacts that are abrupt or irreversible, depending upon the rate and magnitude of the climate change.

There is high agreement and much evidence that all stabilization levels assessed can be achieved by deployment of a portfolio of technologies that are either currently available or expected to be commercialized in coming decades, assuming appropriate, and effective incentives are in place for their development, acquisition, deployment and diffusion and addressing related barriers.

It is generally recognized that there are uncertainties regarding how climate change may affect different regions. Based on computer model predictions, increases in temperature would not be equally distributed, but are likely to be more pronounced at higher latitudes (NAS 2008).

The annual contribution of GHGs from mining and burning of coal with the implementation of the Proposed Action would be approximately 0.01 percent of the total annual global contributions based on 2007 estimates. Mining the project area would result in a negligible contribution to cumulative impacts. The global cumulative impacts cannot be accurately shown either qualitatively or quantitatively. The current uncertainties are weighted with the potential for reductions in CO_2 emissions that are expected with technological advancements in the future.

CHAPTER 5

PERSONS, GROUPS, AND AGENCIES CONSULTED

5.1 INTRODUCTION

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 4. **Appendix C** provides the rationale for issues that were considered but not analyzed further. The issues were identified through public and agency involvement. The persons, agencies, and organizations consulted for this EA are presented in **Table 3**. Those who prepared and reviewed this document are listed in **Table 4**.

5.2 PERSONS, GROUPS, ORGANIZATIONS, AND AGENCIES CONSULTED

On November 3, 2010 the BLM posted notification of the EA process via the Environmental Notification Bulletin Board (ENBB) to solicit comments during the data gathering and analyses process from persons, groups, and organizations that may have an interest (often referred to as stakeholders), and local, state and other federal agencies with control or an interest in the lease modification and surrounding areas. No comments have been received resulting from the ENBB posting. The FS initiated cultural and Native American consultations on November 3, 2010. The SHPO, Ute Indian Tribe, Paiute Indian Tribe of Utah, Navajo Nation Aneth Chapter, Hopi Cultural Preservation Office, White Mesa Ute Council, and Ute Mountain Ute Tribe were consulted as a part of the EA process. To date, only SHPO, Paiute Indian Tribe of Utah, and Hopi Cultural Preservation Office have responded. A legal notice was published in the Sun Advocate on May 17th, 2011 soliciting comments on the Proposed Action. Comments resulting from that posting were received from the Utah State Governor's Office, and the Utah Environmental Congress and the Grand Canyon Trust. The comments and responses are presented in **Appendix B**.

Table 3 - List of Persons, Agencies, and Organizations Consulted

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
BLM	The BLM is the agency responsible for leasing federal coal lands under the MLA, as amended by the FCLAA.	Initiate leasing and NEPA Analysis for modification of Winter Quarters Federal Coal Lease UTU-67939. Posted public notification on ENBB.
FS	The FS is the agency responsible for administering federal surface lands and resources overlying the majority of the coal lease. As the federal surface land administrator, the FS has the responsibility to consent or not to the coal lease modification.	FS resource specialists were responsible for the preparation of the IDT checklist, SHPO and Native American consultation, FS public scoping, and reviews

Table 3 - List of Persons, Agencies, and Organizations Consulted		
Name	**Purpose & Authorities for Consultation or Coordination**	**Findings & Conclusions**
		of the EA.
OSM	Consulted for concerns regarding leasing of coal and performed reviews of internal draft EA	Participated in process. No comment on EA.
Private Land Owner	Private surface land owner notified of proposal to lease coal underlying trust property.	No response from trust.
UDDW	Request access to database listing source water protection plans.	Public sources of water are present nearby.
DOGM	Regulate the exploration and development of Utah's oil, gas, and minerals.	Coordination for anticipated mine plan revisions.
Tribe	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531)	Review and reply to comments received from Tribes during the consultation process.

Table 4 - List of Preparers and Reviewers		
BLM and FS Preparers and Reviewers - Price Field Office/Ferron-Price Ranger District of Manti-La Sal National Forest - Interdisciplinary Team		
Name	**Project Role**	**Responsible for the Following Section(s) of this Document**
Vaughn Hughes	BLM Project Lead - NEPA Coordination	NEPA Compliance
Joe DiBenedetto	FS Project Lead – IDT Member	Geology/Mineral Resources/ Energy Production, Paleontology
Tom Lloyd	FS MEL Staff	Resource Specialist Oversight
Steve Rigby	BLM Assistant Field Manager Coal	Field Office Review and Socio-Economics
Jeff McKenzie	BLM State Office Coordination	State Office Review
Dale Harber	Leasable Minerals Coordinator, Geologist	FS Draft Final EA Document Review
Liane Mattson	Solid Leasable Minerals Geologist	FS Draft Final EA Document Review
Foster Kirby	OSM Acting Federal Lands Coordinator	OSM Review
Kris Rutledge	NEPA Coordinator	FS Draft Final EA Document Review
Patricia Clabaugh	NEPA Process Review	BLM Input on EA Deliverable Format

Table 4 - List of Preparers and Reviewers		
BLM and FS Preparers and Reviewers - Price Field Office/Ferron-Price Ranger District of Manti-La Sal National Forest - Interdisciplinary Team		
Stephanie Howard	IDT Member	Air Quality, Greenhouse Gas Emissions
Kathryn Lloyd	IDT Member	Areas of Critical Environmental Concern (ACECs), Natural Areas, Wilderness/WSA, Areas of Wilderness Character, Visual Resources, Recreation
Charmaine Thompson	IDT Member	Cultural/Historical Resources, Native American Religious Concerns
Marlene DePietro	IDT Member	Environmental Justice, Roadless, Wilderness/WSA, Wild and Scenic Rivers
Dana Truman	IDT Member	Farmlands (Prime or Unique), Rangeland Health Standards
Kevin Albrecht	IDT Member	Fish and Wildlife, Migratory Birds, Threatened/Endangered/Candidate Wildlife Species
Pam Jewkes	IDT Member	Fish and Wildlife
Jeff Jewkes	IDT Member	Fish and Wildlife
Bob Davidson	IDT Member	Floodplains, Hydrologic Conditions, Soils, Water Resources/Quality, Wetlands/Riparian Zones
Daron Reynolds	IDT Member	Fuels/Fire Management
Matt Meccariello	IDT Member	Invasive Species/Noxious Weeds, Threatened/Endangered/Candidate Plant Species
Nate Lewis	IDT Member	Lands/Access, Visual Resources
Don Riddle	IDT Member	FS Law Enforcement/Public Safety
Lance Sudweeks	IDT Member	Livestock Grazing
Bill Broadbear	IDT Member	Recreation, Wilderness/WSA
Daniel Luke	IDT Member	Wastes (hazardous or solid)
Diane Cote	IDT Member	Woodland/Forestry
Mike Tweddell	IDT Member	Wild Horses and Burros
Non-BLM/FS Preparers and Reviewers- Tetra Tech, Inc.		
Name	**Title**	**Responsible for the Following Section(s) of this Document**
Michael Egan	Project Manager	NEPA Document Preparation, Water Resources, Greenhouse Gas Emissions
David Steed	Project Manager	NEPA Strategy, QA/QC
Naomi Kisen	GIS Analyst	Figure Preparation
Jill Reid	Biologist	Technical Editing and Project Record Compilation
Jen Fullmer	Project Assistant	Technical Editing

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APPENDIX A

STIPULATIONS INCORPORATED AS PART OF THE PROPOSED ACTION

APPENDIX B

RESPONSES TO SCOPING COMMENTS

APPENDIX C

INTERDISCIPLINARY TEAM ANALYSIS RECORD CHECKLIST

APPENDIX D

BIOLOGICAL EVALUATION AND BIOLOGICAL ASSESSMENT

APPENDIX E

SEEP AND SPRING INVENTORY OF WOODS CANYON

APPENDIX F

UTAH DIVISION OF WATER RIGHTS POINT OF DIVERSION SEARCH

BLM

U.S. Department of the Interior
Bureau of Land Management

And

U.S. Department of Agriculture-Forest Service
Manti-La Sal National Forest

Decision Record (DR)

December 2011

Modification of Federal Coal Lease UTU-67939
(Winter Quarters-Skyline North)

Carbon County, Utah

U.S. Department of the Interior
Bureau of Land Management
Price Field Office
125 West 600 South
Price, Utah 84501

U.S. Department of Agriculture-Forest Service
Manti-La Sal National Forest
Ferron-Price Ranger District
599 West Price River Drive
Price, Utah 84501

Office of Surface Mining Reclamation and Enforcement
Denver Field Division
1999 Broadway, Suite 3320
Denver, Colorado 80202

DECISION RECORD
Environmental Assessment
DOI-BLM-UT-G023-2011-0001-EA
Modification of Winter Quarters Federal Coal Lease UTU-67939
(Skyline North)

Based upon my review of the Modification of Winter Quarters Federal Coal Lease UTU-67939 Environmental Assessment (EA), I have decided to implement the Proposed Action Alternative, which would modify the Winter Quarters Federal Coal Lease UTU-67939 by adding 770.52 acres of unleased federal underground coal to the existing underground coal lease area associated with the Skyline Mine (operated by Canyon Fuel Company (CFC)). Of the total proposed acreage, 690.52 acres are overlain by surface lands administered by the U.S. Department of Agriculture, Forest Service (FS) Manti-La Sal National Forest (MLNF), while 80 acres are overlain by surface private (fee) lands. The Proposed Action would facilitate recovery and avoid bypassing an estimated 6.9 million tons of federal coal reserves north and outside of the currently lease. The coal would provide economic returns to the federal, state, and local economies. Existing lease terms, conditions, and special stipulations from the original lease will remain in effect for the lease modification (EA Appendix A) and Proposed Action Alternative commitments are presented in Chapter 2 of the EA.

Authorities: The U.S. Department of the Interior, Bureau of Land Management (BLM), charged with administration of the mineral estate on these federal lands, has the legal authority and responsibility to issue leases for economic development of federally-owned minerals. The FS, as the Surface Management Agency, considers consenting to the BLM issuing leases and conducting other leasing actions on lands under its jurisdiction.

The authority for this decision is contained in the Mineral Leasing Act of 1920, as amended, the Federal Coal Leasing Amendments Act of 1976, and regulations in 43 CFR 3400.

Compliance and Monitoring: CFC will be responsible for securing other required approvals and permits for future mining operations in the project area as required by the following jurisdictional agencies:

- Office of Surface Mining (OSM) and Utah Division of Oil, Gas, and Mining (DOGM) – Submit a permit amendment application and receive approval of such for the expansion of the current mine permit area under Section 503 of the SMCRA. Permit outlines specific environmental monitoring and reporting requirements CFC will be required to perform.
- U.S. Environmental Protection Agency (EPA) - Compliance with applicable air, water, and hazardous materials requirements under programs administered by the Utah Department of Environmental Quality (DEQ).
- U.S. Army Corps of Engineers (ACE) – Compliance with Section 404 of the Clean Water Act as it relates to potential construction and stream realignment.
- Mine Safety and Health Administration (MSHA) – Compliance with applicable requirements relating to mine facilities and operation.

- U.S. Fish and Wildlife Service (FWS) – Compliance under the Endangered Species Act, Bald Eagle Protection Act, and Migratory Bird Act.
- Utah Department of Wildlife Resources (DWR) – Compliance with applicable wildlife protection measures.
- Utah State Historical Preservation Office (SHPO) – Compliance with applicable provisions of the National Historic Preservation Act.
- Carbon County – Compliance with Zoning Regulations and applicable requirements for special building and water and sewer permits.

As a part of the DOGM permitting process, hydrological monitoring of springs, seeps, creeks, and potentially impacted water supply wells would be required prior to and during the operational phase of the mine and continuing through the remainder of the permit term. A detailed list of required monitoring locations, flow measurements, field and laboratory analysis requirements, and potential mitigation measures would be included in the Permit Application Package to be developed in coordination with DOGM. The monitoring would be done to determine if impacts to municipal supply watersheds, water supply wells, or surface resources occur. DOGM is responsible for ensuring impacts from mining activities are properly addressed in the final approved mine permit and during the entire permit term.

Terms/ Conditions/ Stipulations: Existing stipulations and mitigation measures in the existing Winter Quarters Federal Coal Lease UTU-67939 would be applied to the lease modification area. Appendix A in the EA contains the existing stipulations and mitigation measures to be implemented for the Proposed Action. BLM and FS shall monitor actions performed to ensure compliance with the terms, conditions, and stipulations of the lease grant.

Plan Conformance and Consistency

The Proposed Action and alternatives have been reviewed and found to be in conformance with the following BLM Land Use and FS Forest Plans and associated decisions:

- BLM Price Field Office Record of Decision for the Environmental Impact Statement and Resource Management Plan approved in October, 2008. Federal coal included in the Proposed Action falls within an area identified as "Coal Available for Further Consideration for Leasing" (Map R-24)

- The MLNF Land and Resource Management Plan approved in November, 1986.

Alternatives Considered: Two alternatives were brought forward for consideration and analyses 1) The Proposed (Lease Modification) Action Alternative, and 2) No Action Alternative. A Competitive Lease Sale of the lease modification coal was determined not to be viable and was dismissed from further consideration and not carried forward for analysis in the EA. The Offering of Unleased Federal Coal through Competitive Sale would have required the BLM to offer through competitive sale the proposed modification portion of the Winter Quarters Federal Coal Lease UTU-67939. Since CFC is currently operating the Skyline Mine through recovery of federal coal in this lease and because access to the unleased portions of the adjacent coal is limited by private land ownership and extreme topography, it was concluded that CFC was the only likely operator capable of economically accessing the coal reserve. The small size

of the unleased coal in the project area (770.52 acres) north of the existing Skyline Mine operations would likely preclude commercial viability of developing a new mine.

Rationale for Decision:
Implementation of the No Action Alternative would not meet the purpose or need for the action outlined in the EA. Under this alternative, it was assumed that since unleased federal coal would not be included in the lease modification, it would continue to remain undeveloped. Rejection of the Proposed Action Alternative and acceptance of the No Action Alternative would not affect future applications to lease the unleased federal coal. If the coal resource is not mined by Skyline Mine, the unleased portion of the federal lease would be bypassed and would not be mined by any other coal operator. No underground mining of the unleased federal coal resource would occur, which would result in a potential loss of coal energy and revenues for the public. The coal would not be used to provide for the household electrical needs of some 3.6 million members of the public.

No issues were raised by the public that created another alternative and no resource concerns or additional mitigation actions were identified which warranted consideration for additional alternatives.

The Proposed Action Alternative meets the purpose and need as outlined in the EA. As stated in the attached Finding of No Significant Impact, this action was analyzed in the EA and found to have no significant impacts. The Proposed Action conforms to the existing land use plans.

On November 3, 2010 the BLM posted notification of the EA process via the Environmental Notification Bulletin Board to solicit comments during the data gathering and analyses process from persons, groups, and organizations that may have an interest, (often referred to as stakeholders), and local, state and other federal agencies with control or an interest in the lease modification and surrounding areas. The FS initiated cultural and Native American consultations on November 3, 2010. Letters were sent to the SHPO, Ute Indian Tribe, Paiute Indian Tribe of Utah, Navajo Nation Aneth Chapter, Hopi Cultural Preservation Office, White Mesa Ute Council, and Ute Mountain Utah Tribe as part of the EA process. The FS initiated scoping on May 17, 2011 and concluded on June 18, 2011. The legal notice was published in the Sun Advocate on May 17th, 2011. Letters were sent to individuals who earlier had expressed interest in such proposals. To date, letters have been received from the Hopi Cultural Preservation Office, the Utah State Historical Preservation Office, the Paiute Indian Tribe of Utah, the Utah Environmental Congress and the Grand Canyon Trust, and the Utah State Governor's Office. Comments received were addressed and are contained in Appendix B of the EA. None of the comments received changed the analysis or warranted the need for other alternatives.

Protest/Appeal Language: This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR Part 4. Public notification of this decision will be considered to have occurred on December 15, 2011. Within 30 days of this decision, a notice of appeal must be filed in the office of the Authorized Officer at 125 South 600 West, Price, Utah 84501. If a statement of reasons for the appeal is not included with the notice, it must be filed with the Interior Board of Land Appeals (IBLA), Office

of Hearings and Appeals, U.S. Department of the Interior, 801 North Quincy St., Suite 300, Arlington, VA 22203 within 30 days after the notice of appeal is filed with the Authorized Officer.

If you wish to file a petition for stay pursuant to 43 CFR Part 4.21(b), the petition for stay should accompany your notice of appeal and shall show sufficient justification based on the following standards:

- The relative harm to the parties if the stay is granted or denied,
- The likelihood of the appellant's success on the merits,
- The likelihood of irreparable harm to the appellant or resources if the stay is not granted, and
- Whether the public interest favors granting the stay.

If a petition for stay is submitted with the notice of appeal, a copy of the notice of appeal and petition for stay must be served on each party named in the decision from which the appeal is taken, and with the IBLA at the same time it is filed with the Authorized Officer.

A copy of the notice of appeal, any statement of reasons and all pertinent documents must be served on each adverse party named in the decision from which the appeal is taken and on the Office of the Regional Solicitor, U.S. Department of the Interior, 6201 Federal Building, 125 South State Street, Salt Lake City, Utah 84138-1180, not later than 15 days after filing the document with the Authorized Officer and/or IBLA.

Patricia A. Clabaugh
Authorized Officer

12-15-2011
Date

BLM

U.S. Department of the Interior
Bureau of Land Management

And

U.S. Department of Agriculture-Forest Service
Manti-La Sal National Forest

Finding of No Significant Impact (FONSI)

December 2011

Modification of Federal Coal Lease UTU-67939 (Winter Quarters-Skyline North)

Carbon County, Utah

U.S. Department of the Interior
Bureau of Land Management
Price Field Office
125 West 600 South
Price, Utah 84501

U.S. Department of Agriculture-Forest Service
Manti-La Sal National Forest
Ferron-Price Ranger District
599 West Price River Drive
Price, Utah 84501

Office of Surface Mining Reclamation and Enforcement
Denver Field Division
1999 Broadway, Suite 3320
Denver, Colorado 80202

FINDING OF NO SIGNIFICANT IMPACT
Environmental Assessment
DOI-BLM-UT-G023-2011-0001-EA
Modification of Winter Quarters Federal Coal Lease UTU-67939
(Skyline North)

INTRODUCTION

The U.S. Department of the Interior, Bureau of Land Management (BLM) and the U.S. Department of Agriculture, Forest Service (FS) Manti-La Sal National Forest (MLNF) jointly have conducted an environmental analysis (DOI-BLM-UT-G023-2011-0001-EA) for a Proposed Action to address a coal lease modification of the Winter Quarters Federal Coal Lease UTU-67939 in the Winter Quarters area in Carbon County, Utah. The project would add 770.52 acres of unleased federal underground coal to the existing underground coal lease area associated with the Skyline Mine. Of the total proposed acreage, 690.52 acres are overlain by surface lands administered by the FS MLNF, while 80 acres are overlain by surface private (fee) lands. If approved, underground longwall mining proposed by Canyon Fuel Company (CFC) would cross into the lease modification area in approximately April 2012. The underlying need for the proposal would be met while accomplishing the following objective:

> The BLM coal-leasing program encourages development of domestic energy sources and the reduction of U.S. dependence on foreign energy sources. Coal energy, developed from mining of underground coal deposits made available by the Proposed Action, would be available for consumption and the royalty payments would be made to the United States (with ½ distributed to the State of Utah). As a result of leasing and the subsequent mining and sale of federal coal resources, the public would receive lease bonus payments, lease royalty payments, rentals, and a supply of secure low cost energy from coal for power generation and industrial uses.

The lease modification area (project area) is located in the Wasatch Plateau Coal Field within the northern portion of the Wasatch Plateau Known Recoverable Coal Resource Area. The legal description for the project area is as follows:

Township 12 South, Range 6 East, Salt Lake Base Meridian, Carbon County, Utah
- Section 25: Lots 3, 4, SW4NE4, SW4, W2SE4;
- Section 26: Lots 1-4, N2SW4, SW4SW4, N2SE4 (private); and
- Section 34: NE4NE4.

The environmental assessment (EA), available at the BLM Price Field Office and the BLM Utah State Office, is incorporated by reference for this Finding of No Significant Impact (FONSI). A No Action Alternative and Proposed Action Alternative were analyzed in the EA.

FINDING OF NO SIGNFICANT IMPACT:

Based upon a review of the EA and the supporting documents, I have determined that the project is not a major federal action and will not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects meet the definition of significance in context or intensity as defined in 40 CFR 1508.27 and do not exceed those effects described in the Price Resource Management Plan/Final Environmental Impact Statement and the Manti-La Sal National Forest Land and Resource Management Plan. Therefore, an environmental impact statement is not needed.

This finding is based on the context and intensity of the project as described:

Context: The project is a site specific action involving approximately 770.52 acres of BLM administered mineral estate of which 690.52 acres are overlain by FS administered surface estate. The action by itself does not have international, national, regional, or state-wide importance.

Intensity: The following discussion is organized around the Ten Significant Criteria described in 40 CFR 1508.27 and incorporated into resources and issues considered (includes supplemental authorities Appendix 1 H-1790-I) and supplemental Instruction Memorandum, Acts, regulations, and Executive Orders.

The following have been considered in evaluating intensity for the proposal:

1. **Impacts may be both beneficial and adverse.** The Proposed Action would impact resources as described in the EA. Mitigating measures to reduce potential impacts to water supplies were incorporated in the design of the Proposed Action Alternative. In addition, standard BLM stipulations and FS Conditions of Approval were incorporated to protect surface resources administered by the FS. None of the environmental effects discussed in detail in the EA and associated appendices are considered significant.

   Economic benefits to the area include the continued employment of the existing work force for an additional two years.

2. **The degree to which the selected alternative will affect public health or safety.** There will be no significant effects on the public health and safety because the Proposed Action is not anticipated to impact public health or safety. If domestic water supply is disrupted due to impacts from the mining of the coal the project proponent is required to mitigate the impacts from the water supply disruption.

3. **Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wilderness, wild and scenic rivers, or ecologically critical areas.** There will be no significant effects on unique characteristics of the area. Historic and cultural resources of the project area have been inventoried and no significant occurrences of those resources were found to be present within the project area. The Proposed Action does not contain provisions for surface disturbance. As such, impacts to environmental resources in the project area would be minor.

4. **The degree to which the effects on the quality of the human environment are likely to be highly controversial.** Based on involvement of FS resource specialists, BLM, and members of the public, I do not expect the effects of the Proposed Action on the quality of the human environment to be highly controversial in a scientific context.

5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.** The project is not unique or unusual. The BLM has experience implementing similar actions in similar areas. The environmental effects to the human environment are fully analyzed in the EA. There are no predicted effects on the human environment that are considered to be highly uncertain or involve unique or unknown risks.

6. **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.** The actions considered in the Proposed Action Alternative do not establish precedence or a decision in principle for future proposals. Separate future proposals for the site that would result in surface disturbance or those proposed actions otherwise determined to warrant analysis of the human environment would undergo required analyses in accordance with NEPA.

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts – which include connected actions regardless of land ownership.** The interdisciplinary team evaluated the possible actions in context of past, present, and reasonably foreseeable actions. Cumulative effects are considered negligible for the Proposed Action. A complete disclosure of the effects of the Proposed Action is contained in Chapter 4 of the EA.

8. **The degree to which the action may adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.** The project will not adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor will it cause loss or destruction of significant scientific, cultural, or historical resources. A Class I Cultural Resources Report has been completed for the Proposed Action and no cultural resources were found. The FS determination was that the Proposed Action would have "no adverse effect". Consultation with the State Historical Preservation Office (SHPO) has been completed in accordance with Section 106 of the National Historic Places Act and they have concurred with a "no adverse effect" on cultural resources. The SHPO letter is contained in the project file and the comment regarding concurrence with the "no adverse effect" is contained in Appendix B of the EA.

9. **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973, or the degree to which the action may adversely affect: 1) a proposed to be listed endangered or threatened species or its habitat, or 2) a species on BLM's sensitive species list.** A Biological Evaluation and Biological Assessment (BE/BA) was prepared by the FS for special status wildlife and vegetation species and is contained in Appendix D of the EA. Nine federally listed species were evaluated for the project area. The FS determined that there would be "no effect" to any of the nine federally listed species due to the absence of suitable habitat or absence of the species in the project area. The FS also evaluated 23 FS sensitive species, five management indicator species, and 30 migratory bird species and determined that there would be "no impact" to these species. The BE/BA determination of "no effect" and/or "no impact" were based on one or more of the following criteria: habitat for the species is not present in the project area; habitat is present but the species does not occur in the project area; or habitat for the species is present, the species occurs or may occur in the project area, but the project would not have any direct, indirect, or cumulative effects on the species.

10. **Whether the action threatens a violation of a federal, state, or tribal law, regulation or policy imposed for the protection of the environment, where non-federal requirements are consistent with federal requirements.** The project does not violate any known federal, state, local, or tribal law or requirement imposed for the protection of the environment. State, local, and tribal interests were given the opportunity to participate in the environmental analysis process. Furthermore, letters were sent to six Native American tribes concerning consulting party status. Letters were received from the Hopi Cultural Preservation Office and the Paiute Indian Tribe of Utah and are contained in the project file and their comments are addressed in Appendix B of the EA. In addition, the project is consistent with the applicable land management plans, polices, and programs.

Patricia A. Clabaugh — 12-15-2011

Authorized Officer — Date

DECISION NOTICE
MODIFICATION OF WINTER QUARTERS FEDERAL COAL LEASE
UTU-67939
(SKYLINE NORTH)
U.S. FOREST SERVICE
MANTI-LA SAL NATIONAL FOREST
FERRON-PRICE DISTRICT
CARBON COUNTY, UTAH

DECISION

Based upon my review of the Modification of Winter Quarters Federal Coal Lease UTU-67939 Environmental Assessment (EA), I have decided to consent to the BLM's modification of Federal Coal Lease UTU-67939 and allow the implementation of the Proposed Action Alternative. Existing stipulations and mitigation measures in the existing Winter Quarters Federal Coal Lease UTU-67939 would be applied to the lease modification area. The selected Alternative would modify the Winter Quarters Federal Coal Lease UTU-67939 by adding approximately 770 acres of unleased federal underground coal to the existing underground coal lease area associated with the Skyline Mine. Of the total proposed acreage, approximately 690 acres are overlain by surface lands administered by the U.S. Department of Agriculture, Forest Service (FS) Manti-La Sal National Forest (MLNF), while 80 acres are overlain by surface private (fee) lands.

DECISION RATIONALE

The Proposed Action will best meet the Purpose and Need identified in the EA and is in conformance with the MLNF Land and Resource Management Plan of 1986, as amended. The FS and BLM identified the need to respond to the lease modification application to modify the Winter Quarters Federal Coal Lease UTU-67939 to include approximately 770 acres of currently unleased federal coal, in order to facilitate the subsequent development and maximum recovery of federal coal resources. The purpose of the agencies' actions is to facilitate continued development and recovery of mineral resources in an environmentally sound manner. The Proposed Action responds to the federal government's overall policy to foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs (Mining and Minerals Policy Act of 1970).

The BLM, charged with administration of the mineral estate on these federal lands, has the legal authority and responsibility to issue leases for economic development of federally-owned

DECISION NOTICE
MODIFICATION OF WINTER QUARTERS FEDERAL COAL LEASE
UTU-67939
(SKYLINE NORTH)
U.S. FOREST SERVICE
MANTI-LA SAL NATIONAL FOREST
FERRON-PRICE DISTRICT
CARBON COUNTY, UTAH

DECISION

Based upon my review of the Modification of Winter Quarters Federal Coal Lease UTU-67939 Environmental Assessment (EA), I have decided to consent to the BLM's modification of Federal Coal Lease UTU-67939 and allow the implementation of the Proposed Action Alternative. Existing stipulations and mitigation measures in the existing Winter Quarters Federal Coal Lease UTU-67939 would be applied to the lease modification area. The selected Alternative would modify the Winter Quarters Federal Coal Lease UTU-67939 by adding approximately 770 acres of unleased federal underground coal to the existing underground coal lease area associated with the Skyline Mine. Of the total proposed acreage, approximately 690 acres are overlain by surface lands administered by the U.S. Department of Agriculture, Forest Service (FS) Manti-La Sal National Forest (MLNF), while 80 acres are overlain by surface private (fee) lands.

DECISION RATIONALE

The Proposed Action will best meet the Purpose and Need identified in the EA and is in conformance with the MLNF Land and Resource Management Plan of 1986, as amended. The FS and BLM identified the need to respond to the lease modification application to modify the Winter Quarters Federal Coal Lease UTU-67939 to include approximately 770 acres of currently unleased federal coal, in order to facilitate the subsequent development and maximum recovery of federal coal resources. The purpose of the agencies' actions is to facilitate continued development and recovery of mineral resources in an environmentally sound manner. The Proposed Action responds to the federal government's overall policy to foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs (Mining and Minerals Policy Act of 1970).

The BLM, charged with administration of the mineral estate on these federal lands, has the legal authority and responsibility to issue leases for economic development of federally-owned

minerals. The FS, as the Surface Management Agency, considers consenting to the BLM issuing leases and conducting other leasing actions on lands under its jurisdiction.

The Proposed Action would facilitate recovery of an estimated 6.9 million tons of federal coal reserves north and outside of the currently leased and permitted area of the Skyline Mine. The lease modification would be an extension of the Skyline Mine, allowing for the generation of federal (and state) royalty revenue from the sale of the coal while accessing the coal resource in an environmentally sound manner. The lease modification would extend the life of the mine by two to three years at current production levels.

Two alternatives were carried forward for consideration and analyses: 1) The Proposed (Lease Modification) Action Alternative, and 2) No Action Alternative. The consideration for a Competitive Lease Sale was dismissed from further consideration during the lease qualification process. Since Canyon Fuel Company is currently operating the Skyline Mine through recovery of federal coal in Federal Coal Lease UTU-67939 and because access to the unleased portions of the adjacent coal is limited by private land ownership and extreme topography, it was concluded that Canyon Fuel Company was the only likely operator capable of economically accessing the coal reserve. Also, the relatively small size of the unleased coal in the project area (approximately 770 acres) north of the existing Skyline Mine operations would likely preclude commercial viability of developing a new mine due in large part to the lack of surface access. No issues were raised by the public that created another alternative.

The Modification of Winter Quarters Federal Coal Lease UTU-67939 EA documents the environmental analysis and conclusions upon which this decision is based.

PUBLIC INVOLVEMENT

The Proposed Action proposal was initially posted on the BLM's Environmental Notification Bulletin Board on November 3, 2010 and has been updated periodically during the analysis. The public was invited to review and comment on the proposal through FS scoping that was initiated on May 17, 2011. The legal notice of opportunity to comment was published in the Sun Advocate on May 17, 2011 for a 30 day comment period. Letters were mailed to individuals who had previously requested to be notified of proposals of this nature. The EA lists agencies and people consulted on pages 8-9, 34-35, and in Appendix B.

FINDINGS REQUIRED BY OTHER LAWS AND REGULATIONS

After considering the environmental effects described in this document, I have determined that these actions will not have a significant effect on the quality of the human environment considering the context and intensity of impacts (40 CFR 1508.27). Thus, an environmental impact statement will not be prepared.

Forest Plan Consistency
The project was designed in conformance with Forest Plan standards. According to the MLNF Land and Resource Management Plan of 1986, as amended, the surface management emphasis for the lease modification area is for providing range management, timber resource management, and semi-primitive motorized and non-motorized recreation opportunities. The EA lists management unit direction for minerals management on pages 6-8, and in general, mineral activities are allowed in all three of these management units as long as they minimize impacts and apply appropriate mitigation measures. Leasing and subsequent mining of the coal is consistent with the management direction for the Forest Plan identified management emphasis.

BLM Resource Management Plan Consistency
Leasing coal in the modification area has been determined to be in conformance with the BLM Price Field Office Record of Decision (ROD) for the Final Environmental Impact Statement (EIS) and Approved Resource Management Plan (RMP) approved in October 2008. Federal coal included in the Proposed Action falls within an area identified as "Coal Available for Further Consideration for Leasing" (BLM 2008).

National Forest Management Act
National Forest management must be consistent with Forest Plans prepared under authority of the National Forest Management Act (NFMA), 16 U.S.C. 1604 and 36 CFR 219. The Act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. Approval of this project is consistent with the Forest Plan which is consistent with NFMA.

Endangered Species Act
The Endangered Species Act of 1973, as amended, provides a program for the conservation of threatened and endangered (TE) plants and animals and the habitats in which they are found. The US Fish and Wildlife Service (USFWS) currently maintain a list of 1,264 TE species. This decision is consistent with the Act in that Biological Assessment / Biological Evaluation (BA/BE) was completed and found that there would be "No Effect" to the listed TE species (See BA/BE in project record).

National Historic Preservation Act
The National Historic Preservation Act created the Advisory Council on Historic Preservation (ACHP) to promote the preservation, enhancement, and sustainable use of our nation's diverse historic resources. The ACHP is authorized to review and comment on all actions licensed by the Federal government which will have an effect on properties listed in the National Register of Historic Places. The Utah State Historical Preservation Office (SHPO) has been consulted for these activities and concurred with the determination of "No Effect".

Congressionally Designated Areas:
The project area is not within or adjacent to any congressionally designated areas, such as wilderness, wilderness study areas, wild and scenic rivers, or national recreation areas.

Inventoried Roadless Areas:
Portions of the modification area are located within the Price River Inventoried Roadless Area (IRA) and would be subject to restrictions on road construction and timber harvest pursuant to rules and regulations of the Secretary of Agriculture pertaining to IRA management. These regulations would be applicable if such activities were proposed on the lease. Locations of any proposed surface use would be verified for relationship to IRA boundaries using site-specific maps if/when surface operations were proposed. The act of modifying the lease itself will have no affect on the Price River IRA.

Research Natural Areas:
No portion of the project area is part of a research national area.

Clean Water Act, Floodplain Management (Executive Order 11988), and Protection of Wetlands (Executive Order 11990)
The selected alternative, which includes specified environmental protection measures, is designed to minimize impacts to soils. The potential for erosion and impacts to water quality complies with the Clean Water Act and Utah's anti-degradation policy. Executive Orders 11988 and 11990 require that executive agencies take special care when undertaking actions that may affect wetlands or floodplains, directly or indirectly, by avoiding the disruption of these areas wherever there is a practicable alternative and by minimizing any environmental harm that might be caused by federal actions. Floodplains and wetlands are not present in the project area.

Migratory Bird Treaty Act
The Migratory Bird Treaty Act implements various bilateral treaties and conventions between the U.S. and four other countries for the protection of migratory birds and their habitat. Under the Act, taking, killing or possessing migratory birds is unlawful. This decision is consistent with the Migratory Bird Treaty Act in that there will be raptor surveys conducted during the nesting season prior to the implementation of surface disturbance activities. At this time no surface disturbance activities are proposed.

Environmental Justice (Executive Order 12898)

Executive Order 12898 requires all federal agencies to take actions, to the extent practical and permitted by law, to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human effects of its programs policies and activities on minority populations and low income populations in the United States and its possessions. This decision complies with Executive Order 12898 because the lease modification will not occur within or near any low income or minority population areas. Therefore, there will be no disproportionately high adverse effects on these populations with the implementation of this project.

ADMINISTRATIVE REVIEW (APPEAL) OPPORTUNITIES

This decision is subject to administrative review (appeal) pursuant to Forest Service regulations at 36 CFR 215. Appeals must meet the content requirements of 36 CFR 215.14. Only individuals or organizations who submitted comments or otherwise expressed interest in the

project during the comment period may appeal. The Appeal Deciding Officer is Harv Forsgren, Regional Forester for the USFS Intermountain Region. Appeals must be sent to Mr. Forsgren at: Appeal Deciding Officer, Intermountain Region USFS, 324 25th Street, Ogden UT 84401; phone (435) 896-9233, fax: (801) 625-5277; e-mail: appeals-intermtn-regional-office@fs.fed.us. E-mailed appeals must be submitted MS Word (*.doc) or rich text format (*.rtf). Appeals may also be delivered to the above address, during regular business hours of 8:00 a.m. to 4:30 p.m., Monday-Friday, excluding federal holidays. The appeal, including any attachments, must be postmarked or received by the Appeal Deciding Officer within 45 calendar days following the date of publication of the legal notice for this decision in the Sun Advocate. The date of publication of this legal notice in the Sun Advocate is the exclusive means for calculating the time to file an appeal. Those wishing to file an appeal should not rely upon dates or timeframe information provided by any other source.

IMPLEMENTATION DATE

If no appeal is received within the 45-day time period, implementation of this decision may begin on, but not before, the 5th business day following the close of the appeal filing period. If an appeal is received, implementation may not occur for 15 days following the date of appeal disposition.

CONTACT

If you have any questions or would like a copy of the Decision Memo sent to you, please contact Tom Lloyd, Manti-La Sal National Forest Ferron-Price District, 599 West Price River Drive, Price, UT 84501, (435) 637-2817.

FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT
MODIFICATION OF WINTER QUARTERS FEDERAL COAL LEASE
UTU-67939
(SKYLINE NORTH)
U.S. FOREST SERVICE
MANTI-LA SAL NATIONAL FOREST
FERRON-PRICE DISTRICTS
CARBON COUNTY, UTAH

This Finding of No Significant Impact (FONSI) has been prepared for the attached Environmental Assessment (EA) for the modification of the Winter Quarters Federal Coal Lease (UTU-67939). The U.S. Department of Agriculture, Forest Service (FS) Manti-La Sal National Forest (MLNF) and the U.S. Department of the Interior, Bureau of Land Management (BLM) have jointly conducted an environmental analysis (DOI-BLM-UT-G023-2011-0001-EA) of a proposal to modify of the Winter Quarters Federal Coal Lease UTU-67939 in the Winter Quarters area in Carbon County, Utah. The modification would add approximately 770 acres of federal underground coal to the existing underground coal lease area associated with the Skyline Mine. Of the approximately 770 acres, approximately 690 acres are overlain by surface lands administered by the FS MLNF, while 80 acres are overlain by surface private (fee) lands.

After considering the environmental effects described in the EA, I have determined that modification of the Winter Quarters Federal Coal Lease will not have a significant effect on the quality of the human environment considering the context and intensity of impacts. To make this FONSI determination, the significance of environmental impacts has been considered in terms of context and intensity. The significance of the proposal has been analyzed in several contexts such as society as a whole (human and national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. In the case of this site-specific action, significance refers to the severity or degree of impact. (40 CFR 1508.27)

CONTEXT

The lease modification area (project area) is located in the Wasatch Plateau Coal Field approximately three miles northwest of Scofield, Utah. Figure 1 on page 2 of the EA is a map of the project area location. The project area encompasses a portion of Granger Ridge. Woods Canyon and Fish Creek are the closest drainages to the project area and are located outside of and south and north, respectively, of the project area. The legal description for the project area is as follows:

Township 12 South, Range 6 East, Salt Lake Base Meridian, Carbon County, Utah
Section 25: Lots 3, 4, SW4NE4, SW4, W2SE4;
Section 26: Lots 1-4, N2SW4, SW4SW4, N2SE4 (private); and
Section 34: NE4NE4.

No perennial streams are located within the project area, however, surface water flows go to Scofield Reservoir. Groundwater in the project area is not utilized, however, groundwater resources outside of the project area are used for stock watering and domestic purposes. Land use in the project area is for recreation (primarily hunting and hiking), wildlife habitat, timber management, and livestock grazing.

The Proposed Action has been evaluated for potential impacts in the sub-watershed area for all resources with the exception of global warming. The evaluation indicated that the action by itself does not have international, national, regional, or state-wide importance. The Interdisciplinary Team Checklist (Appendix C) in the EA summarizes the resource issue evaluation used in determining the presence of impacts for resources present at the project area.

INTENSITY

The intensity of effects was considered in terms of the following:

1. **Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that, on balance, the effect will be beneficial.**

   Based on the evidence contained in the EA and its Project Record, the activities described in this decision do not include any significant adverse impacts to any resource (40 CFR 1508.27(b) (1)). Implementation of my decision will not create significant resource commitments or any significant irretrievable losses of vegetation, soils, water, or wildlife and fish habitats. The project will employ project design features and incorporates Best Management Practices, Soil and Water Conservation Practices, and Forest Plan and BLM mineral leasing stipulations, standards and guidelines that provide adequate protection of Forest resources.

2. **The degree to which the proposed action affects public health or safety.**

   It is my determination that the existing lease stipulations for wildlife, water, soils, air quality, and recreation, will insure that the Proposed Action will have no significant adverse effects on public health and safety. Design features and monitoring mandated under the Surface Mining Control and Reclamation Act of 1977 and implemented by the Utah Division of Oil, Gas, and Mining and Forest and BLM stipulations are in place to insure no significant adverse effects occur.

3. **Unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.**

There will be no significant effects on unique or ecologically critical areas because the Project Area is not in proximity to any park lands, prime farmlands, or wetlands (EA, Appendix C). There are no known cultural or historic sites within the project area; therefore no cultural or historic sites will be affected by this project (EA, Appendix C).

4. **The degree to which the effects on the quality of the human environment are likely to be highly controversial.**

   The effects on the quality of the human environment are not likely to be highly controversial. There are no known scientific controversies over the impacts of the Proposed Action. While some individuals have expressed concern with parts of the project, no evidence has been provided that indicates that the environmental effects of the project have been wrongly predicted; therefore the effects are not likely to be highly controversial.

5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.**

   The Agency has considerable experience with actions like the one proposed. The analysis shows the effects are not uncertain, and do not involve unique or unknown risk. The environmental effects to the environment are fully analyzed in the EA. There are no predicted effects from the Proposed Action on the human environment that are considered to be highly uncertain or involve unique or unknown risks.

6. **The degree to which the action may establish a precedent for future actions with significant effects, or represents a decision in principle about a future consideration.**

   The action is not likely to establish a precedent for future actions with significant effects, because the actions considered in the selected Proposed Action Alternative were considered by the interdisciplinary team within the context of past, present, and reasonably foreseeable future actions and significant cumulative effects were not predicted. Future actions involving surface disturbances associated with project area would require separate analyses under NEPA.

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.**

   The cumulative impacts are not significant. The interdisciplinary team evaluated the possible actions in context of past, present, and reasonably foreseeable actions. A complete disclosure of the effects of the Proposed Action is contained in the EA.

8. **The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed, or eligible for listing, in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.**

   The action will have no significant adverse effect on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor will it cause loss or destruction of significant scientific, cultural, or historical resources. A Class I Cultural Resources Report has been completed for the Proposed Action and no cultural resources were found. A FS determination was made that the Proposed Action

would have "No Adverse Effect". Consultation with the State Historical Preservation Office (SHPO) has been completed in accordance with Section 106 of the National Historic Places Act and they have concurred with a "No Adverse Effect" on cultural resources. The SHPO letter is contained in the project record and the comment regarding concurrence with the "no adverse effect" is contained in Appendix B of the EA.

9. **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.**

   The action will not adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973. A Biological Evaluation and Biological Assessment (BE/BA) was prepared by the FS for special status wildlife and vegetation species for the project area. Nine federally listed species were evaluated. The FS determined that there would be "No Effect" to any of the nine federally listed species due to the absence of suitable habitat or absence of species in project area. The FS also evaluated 23 FS sensitive species, five FS management indicator species and 30 migratory bird species, and determined that there would be "No Impact" to these species. The BE/BA determination of "No Effect" and/or "No Impact" was based on one or more of the following criteria: Habitat for the species is not present in the project area; habitat is present but the species does not occur in the project area; or habitat for the species is present, the species occurs or may occur in the project area, but the project would not have any direct, indirect, or cumulative effects on the species. The BE/BA is contained in Appendix D of the EA.

10. **Whether the action threatens to violate federal, state, or local law or requirements imposed for the protection of the environment.**

    The action will not violate federal, state, local, or tribal laws or requirements for the protection of the environment. Applicable laws and regulation were considered in the EA. State, local, and tribal interests were given the opportunity to participate in the environmental analysis process. Furthermore, letters were sent to six Native American tribes concerning consulting party status. Letters were received from the Hopi Cultural Preservation Office and the Paiute Indian Tribe of Utah and are contained in the project file and their comments are stated in Appendix B of the EA. The action is consistent with the MLNF Land and Resource Management Plan of 1986, as amended.

After considering the effects of the actions analyzed, in terms of context and intensity, I have determined that these actions will not have a significant effect on the quality of the human environment. Therefore, an environmental impact statement will not be prepared.

Elizabeth G. Close November 23, 2011

Elizabeth G. Close — Date

Acting Forest Supervisor

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State of Utah
DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining
JOHN R. BAZA
Division Director

GARY R. HERBERT
Governor

GREGORY S. BELL
Lieutenant Governor

June 15, 2012

Wess Sorensen, General Manager
Canyon Fuel Company, LLC
HCR 35, Box 380
Helper, Utah 84526

Subject: Determination of Administrative Completeness for North Lease Modification, Canyon Fuel Company, LLC, Skyline Mine, C/007/0005, Task ID #4092

Dear Mr. Sorensen:

The Division has completed a review of the information you submitted on May 2, 2012. This application is considered to be administratively complete. A copy of our review worksheet is enclosed for your information and records.

At this time you should publish a Notice of Complete Application for the North Lease Modification of UTU-67939 to the Skyline Mine as required by R645-300-121. A copy of the publication should be sent to the Division as soon as it is available. You should also insure that a copy of the application is on file at the appropriate County Courthouse. The Division will complete a technical analysis, which must find that your application is technically complete. We anticipate that additional information may be necessary to make your application technically complete and look forward to working with you throughout the permitting process.

Please call me at (801) 538-5325 if you have any questions.

Sincerely,

Daron R Haddock

Daron Haddock
Coal Program Manager

DRH/PWB/sqs
Enclosure
cc: Price Field Office
O:\007005.SKY\WG4092\4092ADMCOMP.DOC

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114 -5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*

UTAH DNR OIL, GAS & MINING

ADMINISTRATIVE COMPLETENESS REVIEW WORKSHEET
(R645-100)

DATE: June 15, 2012

REVIEWER(S): Priscilla Burton, Ken Hoffman, Ingrid Campbell, James Owen, April Abate, Suzanne Steab

APPLICANT: Canyon Fuel Company, LLC

MINE NAME: Skyline Mine **FILE NO.:** C/007/005

"Administratively Complete Application" means an application for permit approval or approval for coal exploration, where required, which the Division determines to contain information addressing each application requirement of the State Program and to contain all information necessary to initiate processing and public review.

Directions: **The categories listed below correspond to the minimum requirements for information necessary to initiate processing and public review. If a category is checked the Applicant has met the Completeness requirement for that category. If a category is not checked, the Completeness requirements have not been met. The comments column will identify the deficiency and what is necessary to correct it.**

			Comments
301-112	Identification of Interests	X	
100	Applicant's Business Structure	X	no change
210	Applicant's Name/Address/Phone	X	no change
220	Resident Agent's Name/Address/Phone	X	no change
230	Name/Address/Phone of AML Fees Payer	X	no change
300	Corporate Structure & Ownership	X	Current information in MRP General Contents volume.
400	Identify Other Mining Operations in US	X	no change
500	Surface & Mineral Ownership	X	Information is provided on Dwg 1-6.3 and 1-6.1 and in Right of Entry Section 114 of the MRP.
600	Ownership Contiguous to Permit	X	no change
700	MSHA Numbers	X	no change
800	Interest in Contiguous Lands	X	no change

301-113	Violation Information	X	5/2/12 AVS Evaluation indicates no violations associated with permit.
100	Suspension or Revocation Information	X	no change
300	List of Violations - **3 Previous Years**	X	no change

301-114	Right of Entry	X	A deficiency will be written regarding figures presented on revised Table 1.114 which may not correlate with previous table. Second deficiency regarding total underground coal mining and reclamation lease acreage on p. 1-39 which appears to be greater than total lease acreage (given on Table 1.114) + surface disturbance acreage (given on p. 1-37).

301-115	Status of Unsuitability Claims	X	no change

301-116	Permit Term	X	5 yr permit is dated 4/30/2012, with successive right of renewal. Mine plan extends life of mine for 7 years to 2019.

301-117	Insurance	X	Current Certificate of Liability Insurance on file with Division 7/31/11 to 7/31/12.
	Proof of Publication	X	Draft of publication will be revised to include a map to clearly identify the location of the lease expansion location (R645-301-121.120.
	Facilities and Structures Used in Common	—	NA

301-118	Filing Fee	—	N/A

301-123	Notarized Signature of Responsible Official	X	Wesley K Sorensen, General Manager 4/30/2012.

301-130	Information Collection: **Technical Data Accompanied by Names of Persons or Organizations that Collected and Analyzed the Data - Dates of Collections - and Analysis of the Data and Description of the Methodology Used to Collect and Analyze Data**	—	

301-200	Soils	X	
211	Description of Pre-mining Soil Resources	—	N/A no surface disturbance
221	Prime Farmland Investigation	X	Updated discussion Sec. 2.14 p. 2-161, but did not provide the referenced correspondence from Joe Dyer in Appendix Volume A-2.
222	Soil Survey	—	N/A no surface disturbance
224	Substitute Topsoil Info (When Proposed)	—	N/A no surface disturbance
230	Operation Plan **Topsoil Handling/Removal/Storage**	—	N/A no surface disturbance
240	Reclamation Plan **Soil Redistribution/Stabilization**	—	N/A no surface disturbance

301-300	Biology	X	
320	Vegetation Information	X	A vegetation study is provided in Appendix A-2
322	Fish and Wildlife Information	X	A survey for threatened and endangered species is provided. No perennial streams are being undermined so no aquatic wildlife information was provided. No surface impacts are anticipated other than subsidence to effect wildlife. A raptor survey was conducted in 2011.
323	Maps/Photos **Vegetation-Fish-Wildlife Areas**	X	Vegetation types listed on incorporated plate 2.7.1-1a. No surface impacts are anticipated.
330	Operation Plan **Vegetation-Fish-Wildlife Protection**	X	No surface impacts anticipated. No extraction mining will occur under perennial streams.

341	Reclamation Plan for Revegetation	X	No surface disturbance is anticipated
342	Fish & Wildlife Plan for Reclamation Phase	X	No surface disturbance is anticipated. Subsidence impacts to wildlife will be minimal.

301-400	Land Use and Air Quality	X	
411	Pre-Mining Land Use Information **(Includes Cultural Resources)**	X	Section 2.12, grazing allotments. No cultural resource inventories are provided in application. However, CSES 95-1 includes an inventory of seismic lines on Granger Ridge.
412	Post-Mining Land Use Information	X	No change

301-500	Engineering	—	
510 520	General Description of Operation Plan **(Maps, Locations, Cross-Sections, Narrative, Descriptions & Calculations)**	X	Maps depicting coal ownership, mine permit area, surface water rights, ground water rights, hydrologic monitoring points, land use, mining projections, and expected subsidence are included.
522	Coal Recovery Description	X	Map 3.3-2, five year mining projections, details coal recovery method and plans. Descriptions are also included in the application.
523	Mining Methods	X	Timing of operations is included in 3-Section 3.3. Map 3.3-2, five year mining projections, details coal recovery method and plans.
524	Blasting and Explosives Plan	—	N/A
525	Subsidence Control Plan	X	A pre-subsidence survey map for the North Lease was included with the application (dwg# 4.17-3-1A). The subsidence plan will comply with what is currently approved in the MRP.
526	Mine Facilities Description **(Narrative, Plans, Maps) Including Existing Structures & Support Facilities**	—	N/A
527	Transportation Facilities **(Including Plans & Maps)**	—	N/A
528	Coal Mine Waste Plans **(Description & Designs)**	—	N/A

529	Management of Mine Openings **(Design)**	__	N/A
531	General Plans for Structures	__	N/A
532	Sediment Control	__	N/A
533	Impoundments	__	N/A

301-534	Roads **(Plans, Drawings, Designs, & Specifications)**	__	N/A
535	Spoil	__	N/A
536	Coal Mine Waste	__	N/A
537	Regraded Slopes	__	N/A
540 541-542	Reclamation Narrative, Maps and Plans	__	N/A
551	Casing and Sealing **Underground Openings**		N/A
553	Backfilling and Grading Description	__	N/A

301-600	Geology	X	Geology description for the expansion area already covered in the MRP
621	Description of Geology **(Permit & Adjacent Area)**	X	Expansion Area is covered in the General Geologic Map DWG. No. 2.2.1-1
622	Geologic Cross-Sections, Maps, and Plans	X	Winter Quarters Area (Sec. 35) and area to the north is covered on DWG. No. 2.3.4-1A
630	Plans for Casing and Sealing Holes	X	Information already included in the plan

301-700	Hydrology	X	
721	Description of Hydrologic Resources **(Permit and Adjacent Area)**	X	Section 2.5 includes discussion of the hydrologic resources

722	Cross-Sections and Maps **Subsurface Water - Surface Water - Monitoring Stations - Wells**	X	Figure 2.3.5.1-1 includes surface water locations; Figure 2.3.5.2-1 includes water rights; Figure 2.3.6-1 includes the new sampling location.
723	Sampling and Analysis	X	Table 2.3.7-1 includes the sampling plan.
724	Baseline Information **Ground Water - Surface Water - Geology - Climatological & Supplemental; If Needed**	X	Baseline data will be collected from the new location and submitted to the online database before mining is begun.
728	PHC Determination	X	no change
730	General Operation Plan **Minimize Disturbance to Hydrologic Balance & Compliance with Clean Water Act**	X	Sections 2.3 and 2.5 includes discussion of the hydrologic balance
731	Ground and Surface Water Protection	X	Section 2.5 includes discussion of surface water protection. Section 2.3 includes discusion of groundwater protection
732	Ground and Surface Water Monitoring	X	Table 2.3.7-3 and 2.3.7-1 include a sampling location for the expansion

301-740	Plans and Designs **Operation and Reclamation Plan Sediment Control Measures**	__	no change to existing plan. N/A
	Siltation Structures	__	no change to existing plan. N/A
	Sediment Ponds	__	no change to existing plan. N/A
	Other Treatment Facilities	__	no change to existing plan. N/A
	Diversions	__	no change to existing plan. N/A
	Road Drainage	__	no change to existing plan. N/A
	Impoundments	__	no change to existing plan. N/A
	Discharge Structures	__	no change to existing plan. N/A
	Disposal of Excess Spoil	__	no change to existing plan. N/A
	Coal Mine Waste	__	no change to existing plan. N/A
	Disposal of Non-Coal Mine Waste	__	no change to existing plan. N/A
	Casing and Sealing of Wells	__	no change to existing plan. N/A

301-800	Bonding and Insurance	__	N/A

820	Applicant **Have Adequate Bond at Permit Issuance**	__	N/A
830	Bond Estimate and Calculations Provided	__	N/A
890	Certificate of Insurance Provided	__	N/A

302-200	Special Categories of Mining	__	N/A
210	Experimental Practices Mining	__	N/A
220	Mountaintop Removal Mining	__	N/A
230	Steep Slope Mining	__	N/A
240	Auger Mining	__	N/A
250	In Situ Processing Activities	__	N/A

302-260	Coal Processing Plants **(Not Located Within Permit Area of Mine)**	__	N/A
270	Variances From Approximate Original Contour Restoration Requirements	__	N/A
280	Variances for Delay in Contemporaneous Reclamation Requirement in Combined Surface and Underground Coal Mining Activities	__	N/A
290	Small Operator Assistance Program **(SOAP)**	__	N/A

302-300	Special Areas of Mining	__	N/A
301	Prime Farmland	__	N/A
302	Alluvial Valley Floors	__	

AFFIDAVIT OF PUBLICATION

STATE OF UTAH)

ss.

County of Carbon,)

I, Richard Shaw, on oath, say that I am the Publisher of the Sun Advocate, a twice-weekly newspaper of general circulation, published at Price, State of Utah a true copy of which is hereto attached, was published in the full issue of such newspaper for 4 (Four) consecutive issues, and on the Utah legals.com website, the first publication was on the 22nd day of January, 2013, and that the last publication of such notice was in the issue of such newspaper dated the 12th day of February 2013.

Richard Shaw – Publisher

Subscribed and sworn to before me this 12th day of February, 2013.

Notary Public My commission expires January 10, 2015 Residing at Price, Utah

Publication fee, $ 537.60

LINDA THAYN
NOTARY PUBLIC - STATE OF UTAH
COMMISSION# 604351
COMM. EXP. 01-10-2015

LEGAL NOTICE

Canyon Fuel Company, LLC, has filed a complete application with the Division of Oil, Gas and Mining for a revision of the existing Mining and Reclamation Plan, C/007/0005 for the Skyline Mine. Canyon Fuel Company, LLC operates the Skyline Mines with surface facilities located in Eccles Canyon which is approximately 4 miles southwest of the town of Scofield, Utah. The revision includes the addition of acreage associated with Federal Coal Lease, UTU-67939. The lease modification will increase the lease acreage by approximately 770.52 acres, with no additional surface disturbance proposed.

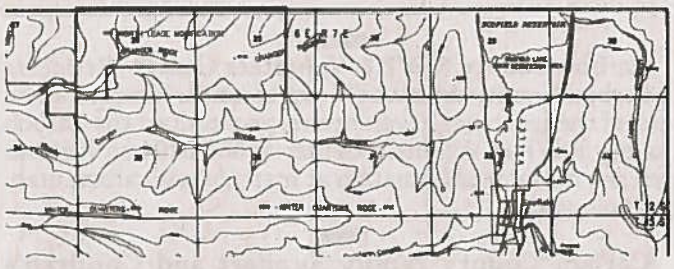
Underground coal mining will take place in coal reserves owned or leased by Canyon Fuel Company, LLC. A legal description of the proposed areas for additional underground mining activities is described as follows:

Proposed Additional Areas Authorized for Coal Mining and Reclamation Activities

Township 12 South, Range 6 East, SLBM

Section 25:	lots 3 and 4, SW¼NE¼, W½SE¼, SW¼
Section 26:	lots 1-4, N½ S½, SW¼ SW¼
Section 34:	NE¼NE¼

Total acres within Federal Coal Lease UTU-67939: 4,061.52



The address of the applicant is: Canyon Fuel Company, LLC
225 North 5th Street, Suite 900
Grand Junction, CO 81501

After filing, copies of this permit renewal application will be available for inspection at the following location: Utah Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, Salt Lake City, Utah, and the Utah Division of Oil, Gas, and Mining website under the Coal Permit files.

Written comments or requests regarding this permit renewal must be made within 30 days of the last publication of this notice, and may be addressed to the Utah Division of Oil, Gas and Mining, 1594 West North Temple, Suite 1210, Salt Lake City, Utah 84114-5801.

Published in the Sun Advocate January 22, 29, February 5 and 12, 2013.

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

October 22, 2013

To: Internal File

From: Daron R. Haddock, Coal Program Manager

Subject: 510 (c) Recommendation for Canyon Fuel Company, LLC, Skyline Mine, C/007/0005, Task ID #4407

As of writing of this memo, there are no NOVs or COs which are not corrected or in the process of being corrected for the Skyline Mine. There are no finalized civil penalties, which are outstanding and overdue in the name of Canyon Fuel Company, LLC. Canyon Fuel Company, LLC does not have a demonstrated pattern of willful violations, nor have they been subject to any bond forfeitures for any operation in the state of Utah.

Attached is a recommendation from the OSM Applicant Violator System for the Skyline Mine that states there are no outstanding violations.

O:\007005.SKY\PERMIT\2013\510c.doc

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*

UTAH DNR OIL, GAS & MINING

U.S. Department of the Interior Office of Surface Mining
Applicant/Violator System

Click for the Office of Surface Mining Website

suzanne.steab (UT) | Logo

Home ▸ ENTITY ▸ APPLICATION ▸ PERMIT ▸ VIOLATION ▸ REPORTS ▸

HOME > ENTITY EVALUATE

Evaluation on Application Number: ACT007005 SEQ:7
0 Violations

Print Report

Application Evaluation

Application Number	ACT007005 SEQ:7
Applicant Name	142816 Canyon Fuel Company LLC
Date of Request	10/22/2013 9:25:33 AM
Requestor	suzanne.steab

CAUTION: The Applicant/Violator System (AVS) is an informational database. Permit eligibility determinations are made by the regulatory authority with jurisdiction over the permit application not by the AVS. Results which display outstanding violations may not include critical information about settlements or other conditions that affect permit eligibility. Consult the AVS Office at 800-643-9748 for verification of information prior to making decisions on these results.

There were no violations retrieved by the system

Evaluation OFT

Entities: 9

254566 Bowie Resource Holdings, LLC - ()
---128807 James J Wolff - (Chief Financial Officer)
---129465 Eugene E Diclaudio - (Chief Operations Officer)
---142816 Canyon Fuel Company LLC - (Subsidiary Company)
------128807 James J Wolff - (Chief Financial Officer)
------129465 Eugene E Diclaudio - (Chief Operations Officer)
------129465 Eugene E Diclaudio - (Director)
------129465 Eugene E Diclaudio - (President)
------153972 Paul Warner - (Vice President)
------254572 John Siegel - (Chief Executive Officer)
------254573 Brian Settles - (General Counsel)
------254573 Brian Settles - (Secretary)
------254573 Brian Settles - (Vice President)
------254617 Bruce Lindsay - (Vice President)
------254618 Grant Quasha - (Vice President)
---153972 Paul Warner - (Vice President)

---254572 John Siegel - (Chief Executive Officer)
---254573 Brian Settles - (General Counsel)
---254573 Brian Settles - (Secretary)
---254573 Brian Settles - (Senior Vice President)
---254617 Bruce Lindsay - (Vice President)
---254618 Grant Quasha - (Vice President)

Narrative

Request Narrative

C/007/005 Incoming
cc: Priscilla
Ken

#4092
K

Price River Watershed Conservation District

540 W Price River Drive, Price, UT 84501 - Phone (435) 637-0041 ext 28 - Fax (435) 637-3146

Chairman: Dale Mathis, Vice Chairman: Tom Matthews, Treasurer: William Butcher Supervisors: Andy Schmidt & Tom Bruno

July 20, 2012

RECEIVED
JUL 27 2012
DIV. OF OIL, GAS & MINING

Daron Haddock
Coal Regulatory Program
Division of Oil, Gas and Mining
P O Box 145801
Salt Lake City, Utah 84114-5801

RE: Agency Notification of Skyline Mine North Lease Modification

Dear Mr. Haddock,

This letter is in response to your letter received by the Price River Watershed Conservation District dated June 18, 2012. The letter is in reference to "Agency Notification of Skyline Mine North Lease Modification, Canyon Fuel Co, LLC, Skyline Mine, C/007/0005, Task ID #4092." We appreciate the opportunity to comment on this application.

The Price River Watershed Conservation District is charged with protecting the natural resources of the Carbon County area. We, as the District Board of Supervisors, lend our support of this application. However, we ask that surface disturbance be at a minimum and that any water encountered, either surface or underground, remain or be returned to the watershed of origination. It is also highly important that great care be taken to maintain the water quality of our streams and reservoirs, and that they be protected from contaminants. Please consider our concerns.

Sincerely,

Price River Watershed Conservation District Board:

W. Dale Mathis, Chair
Tom Matthews, Vice Chair
Tom Bruno
Andy Schmidt
Bill Butcher

Price River Watershed Conservation District is legally classified as a limited purpose local government entity and a political subdivision of the State of Utah (Title 17D – Chapter 03).

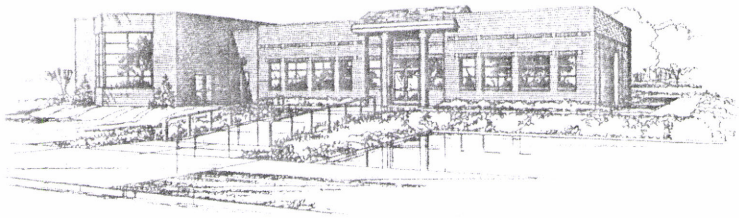
C/007/005 Incoming
CC: priscilla

SOUTHEASTERN UTAH ASSOCIATION OF LOCAL GOVERNMENTS

#4092
K

Jeff W. Horrocks
Chairman

Deborah L. Hatt
Executive Director



375 South Carbon Ave.
P.O. Box 1106
Price, Utah 84501
(435) 637-5444
FAX (435) 637-5448

AREA WIDE CLEARINGHOUSE REVIEW

Federal Action _____ ***State Action*** _____ ***Approved*** (x) Yes ( ) No

Other (indicate) _____

Applicant or State Agency Name/Address:

Oil, Gas & Mining
1594 West North Temple #1210
SLC, UT 84114

Name Daron Haddock
Phone 801-538-5325

Title/Project Description: Skyline Mine North Lease Modifications

Add 770.52 sub-surface lease acres to federal lease UTU--67939.

[ ] No Comment
[x] See comment below

Comments: Favorable comment recommended.

Lorraine Bernhei
SEUALG

08/15/12
DATE