Outgoing
C0070047
#3860
OK

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 30, 2011

Clay Wisdom
Carbon Resources, LLC
P. O. Box 954
Sandia Park, New Mexico 87047

Subject: Decision Document and Application Approval, Carbon Resources, LLC
Kinney #2 Mine, C/007/047, Task ID #3860, Outgoing File

Dear Mr. Wisdom:

The Decision Document for the Kinney #2 Mine is enclosed. The Division has made a decision to approve your application with conditions. Please note the conditions attached to the proposed permit. Once the permit is issued, Carbon Resources, LLC will be required to adhere to the permit requirements and conditions.

Pursuant to R645-300-200, you, or interested parties, may file a request for a hearing before the Board of Oil Gas and Mining regarding the reasons for the decision within 30 days. The 30 days request period will end August 1, 2011 at 6:00 pm.

Issuance of the actual permit is pending the posting of the reclamation bond along with the reclamation agreement. Please contact Angela Nance at 801-538-5264 for the necessary paper work to complete this requirement. Also, in accordance with R645-301-112.900 and R645-301-113.400 you must also update, correct or indicate that no change has occurred in the information previously submitted under R645-301-112.100 through R645-301-112.800 and R645-301-113.

A copy of your approved (stamped incorporated) Operation and Reclamation Plan will be returned to you for your records. If you have any questions, please call me at (801) 538-5334 or Daron Haddock, Coal Program Manager at (801) 538-5325.

Sincerely,

John R. Baza
Director

JRB/DRH/sqs
Enclosures
cc: Greg Hunt, GeoHunt Consulting
Kenneth Walker, OSM
Walt Baker, DEQ
Price Field Office
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File in:
☐ **Confidential**
☐ **Shelf**
☒ **Expandable**
Date Folder 063011 C/0070047
Outgoing

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

UTAH DIVISION OF OIL, GAS AND MINING
STATE DECISION DOCUMENT
AND APPLICATION APPROVAL

Carbon Resources, LLC
Kinney No. 2 Mine
C/007/047
Carbon County, Utah

June 30, 2011

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ADMINISTRATIVE OVERVIEW

Carbon Resources, LLC
Kinney No. 2 Mine
C/007/047
Carbon County, Utah

June 30, 2011

PROPOSAL

Carbon Resources, LLC is applying for a permit to conduct coal mining operations at its site located one half mile north of Scofield, Utah and east of Utah State Highway 96. The proposed Kinney #2 Mine permit area covers an area of approximately 448.14 acres. Surface facilities will be located at the outcrop of the Hiawatha Coal Seam, on relatively flat areas near the portal and adjacent the highway. The proposed mine facilities area has been extensively disturbed by previous mine development, highway construction, and AMR projects completed in the 1980's. To the extent possible, the Applicant has tried to site the facilities to minimize additional disturbance, and entry will be via an approximately 600 foot wide corridor between old abandoned mine workings.

The underground mining operations are planned to recover coal from the Hiawatha Coal Seam, using continuous mining techniques, with no pillar recovery planned at this time. Mining will be restricted to fault-bounded blocks, and numerous faults will need to be crossed during mining operations. The Applicant has designed the mine for a nominal annual production rate of 800,000 tons of coal, with a projected life (within the currently proposed boundary) of approximately three years; there is a potential to extend the mine life significantly through acquisition of coal reserves to the south and east. Additional permitting work will be required for these expansions.

BACKGROUND

On February 21, 2008 Carbon Resources, LLC submitted a new permit application for the Kinney #2 Mine. The application was reviewed and determined to be incomplete on April 22, 2008. Supplemental information was submitted by Carbon Resources, LLC, for the Kinney #2 Mine on June 13, 2008. On June 24, 2008 the application was determined to be administratively complete and a technical review of the application commenced. Public notification, through the Sun Advocate Newspaper, occurred from June 24, 2008 to July 15, 2008. On September 24, 2008, the Division sent a notice of deficiencies to Carbon Resources informing them that they must address the deficiencies in order for the Division to further process the application. In the mean time, an informal conference was requested by the Center

for Water Advocacy and held on September 30, 2008 in Price Utah and at the Mine site. Opportunity for additional comments was allowed through October 3, 2008 with no comments received.

Due to the lack of response from the applicant, processing of the application was suspended for a period of time and finally on January 7, 2010 the Division returned the proposed mine application to Carbon Resources. After some time, Carbon Resources chose to pursue the application again and republished the notice of complete application again on June 10, 17, 24 and July 1, 2010. They also resubmitted a revised and reformatted (prompted by DOGM) application on October 4, 2010.

The review process consisted of the Division identifying deficiencies in the application and the applicant (Carbon Resources, LLC) providing responses. Input from the public and other agencies was requested and considered during the process. Numerous meetings were held to discuss the results. Carbon Resources, LLC provided additional information on October 12, 2010, November 3, 2010, November 8, 2010, March 21, 2011, April 5, 2011, May 10, 2011, and June 13, 2011. Finally on June 28, 2011 the last clean copy submittal was made which incorporated all of the updates made throughout the review process and the application was considered to be complete and accurate, contingent upon a side-by-side review being completed to verify that all of the appropriate and approved changes have been incorporated into the MRP.

RECOMMENDATION

All of the information submitted by Carbon Resources, LLC has been found adequate to approve the application for a new permit for the Kinney #2 Mine. A Technical Analysis has been completed which indicates that the application is considered to be complete and accurate. A Cumulative Hydrologic Impact Assessment has been completed that has determined that the mining and reclamation operation has been designed to prevent material damage to the hydrologic balance outside the permit area. This notice of permit application was published in the Carbon County Sun Advocate on June 24, July 1, 8, and 15, 2008. An informal conference was held on September 30, 2008 where comments on the application were received. The opportunity for comment as a result of the informal conference was allowed until October 3, 2008 but no comments were received. Due to the extended nature of the application process, an additional opportunity for comment and public hearing was provided through another public notice published on June 10, 17, 24, and July 1, 2010. The comment period ran for 30 days after the last publication with no comments and no requests for a hearing received.

An OSM-AVS recommendation was requested on June 29, 2011, which indicated no outstanding violations.

It is, therefore, recommended that the application submitted by Carbon Resources, LLC for the Kinney #2 Mine be approved. Once an adequate reclamation bond has been posted for the project and the Applicant has updated, corrected or indicated that no change has occurred in the information previously submitted under R645-301-112.100 through R645-301-112.88 and R645-301-113, a permit for the Kinney #2 Mine can be issued.

PERMITTING CHRONOLOGY

Kinney No. 2 Mine
Carbon Resources, LLC
C/007/0047
June 30, 2011

February 21, 2008	Carbon Resources, LLC submits application for Kinney #2 Mine permit. The Division also receives permit fee from Carbon Resources, LLC.
April 22, 2008	Application for permit was Determined Not Administratively Complete by the Division.
June 13, 2008	Carbon Resources, LLC submits supplemental information for application for Kinney #2 Mine permit.
June 24, 2008	The Division determines application to be administratively complete.
June 24 thru July 15, 2008	Carbon Resources, LLC publishes notice for proposed mine permit for four consecutive weeks in the Sun Advocate requesting comments prior to August 14, 2008.
June 25, 2008	The Division notifies agencies of Determination of Administrative Completeness requesting comments prior to August 29, 2008.
August 26, 2008	The Division receives concurrence from the State Historic Preservation Office of no adverse effect to historic properties.
September 16 thru September 25, 2008	The Division receives comments prior to August 14, 2008 requesting an informal conference. The Division scheduled the informal conference for September 30, 2008 and publishes notice of the informal conference in the Sun Advocate for four consecutive weeks.
September 24, 2008	The Division sends a notice of deficiencies to Carbon Resources informing them that they must address the deficiencies in order for the Division to further process the application.
September 30, 2008	The Division held the requested Informal Conference. Opportunity was provided to all who wished to speak and to provide comments. The informal conference and opportunity to participate by comment on the proposed mine application closed on October 3, 2008.

October 3, 2008	No additional comments were received.
January 7, 2010	The Division returns the proposed mine application to Carbon Resources, LLC due to the lack of response.
June 10, 17, 24 July 1, 2010	Carbon Resources, LLC publishes another notice for a proposed mine permit for four consecutive weeks in the Sun Advocate requesting comments prior to August 1, 2010
October 4, 2010	Carbon Resources, LLC resubmits proposed mine application (reformatted to the R645 rules) for the Kinney #2 Mine.
October 12, 2010	The Division receives additional information from Carbon Resources, LLC for the proposed mine application.
October 12, 2010	The Division notifies agencies of proposed mine permit application requesting comments prior to December 1, 2010.
November 3, 2010	The Division receives additional information from Carbon Resources, LLC for the proposed mine application.
November 8, 2010	The Division receives additional information from Carbon Resources, LLC for the proposed mine application.
December 1, 2010	No comments were received.
January 27, 2011	The Division sends Carbon Resources, LLC a list of deficiencies in the proposed permit application to be addressed.
March 21, 2011	Carbon Resources, LLC submits additional information to the Division to address deficiencies outlined in the January 27, 2011 correspondence.
April 5, 2011	The Division receives additional information from Carbon Resources, LLC for the proposed mine application.
May 2, 2011	The Division sent Carbon Resources, LLC a list of deficiencies in the proposed permit application to be addressed.
May 10, 2011	Carbon Resources, LLC submits additional information to the Division to address deficiencies outlined in the May 2, 2011 correspondence.
June 6, 2011	The Division sent Carbon Resources, LLC a list of deficiencies in the proposed permit application to be addressed.
June 13, 2011	The Division receives additional information from Carbon Resources,

FINDINGS

Carbon Resources, LLC
Kinney No. 2 Mine
C/007/047
Carbon County, Utah

June 30, 2011

1. The permit application for the Kinney #2 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 June 30, 2011 (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. The post-mining land uses will not change from the existing uses and the site will be returned to its pre-mining land uses. See TA dated June 30, 2011, also MRP section 411.110 (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 June 27, 2011. 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 area (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 mining operations (R645-300-133.220);

    b. not within an area under study or administrative proceedings to have an area designated as unsuitable for coal mining and reclamation 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. is within 100 feet of Utah Highway 96, however the company has obtained approval from the Utah Department of Transportation for access to the

highway. Also public notice and opportunity for a public hearing was provided in two separate newspaper notice published in the Sun Advocate. No requests for a hearing on the road issue were received and it has been determined that the interests of the public with regard to roads have been protected. (R645-300-133.220); and

e. There is one occupied structure (convenience store) within 300 feet of the proposed mining operations. Volume 2, exhibit 4 of the MRP contains a written waiver from Jim Levanger, President of L2H Enterprises Inc. which waives any and all objections to coal mining operations within 300 feet of the property. (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 June 30, 2011 (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 June 30, 2011. (R645-300-133.600)

7. The applicant has the legal right to enter and complete mining activities in the permit area through various leases with the following lessors: Evangelos George Telonis, ETAL. (Surface), Carbon County (Coal). (R645-300-133.300)

8. A 510 (c) report has been run on the Applicant Violator System (AVS), which shows that: there are no prior violations of applicable laws and regulations or that all prior violations have been corrected; neither Carbon Resources, 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 June 29, 2011, see memo to file dated June 29, 2011. (R645-300-133.730)

9. The 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.

10. The applicant has provided a cost estimate for reclamation of the proposed disturbance associated with the Kinney #2 Mine. Prior to the permit being issued the Applicant will file with the Division a bond covering the identified increment of land within the permit area upon which the operator will initiate and conduct coal mining and reclamation operations. (R645-300-134, R645-301-820).

11. No lands designated as prime farmlands or alluvial valley floors occur on the permit area. Alluvial valley floors adjacent to the permit area have been adequately characterized.

See Technical Analysis dated June 30, 2011 (R645-302-313.100 and R645-302-321.100)

12. The proposed postmining land-use of the disturbed area is the same as the pre-mining land use and has been approved by the Division.

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

14. All procedures for public participation required by the Act, and the approved Utah State Program are in compliance. The notice of permit application was published in the Sun Advocate on June 24, July 1, 8 and 15, 2008 and again on June 10, 17, 24 and July 1, 2010. Both publications identified the mine being within 100 feet of Utah highway 96. An informal conference was requested and held on September 30, 2008. No comments were received after the second public notice. (R645-300-120)

15. The applicant has indicated that there are no existing structures that will be used for the mining operation. (See Technical Analysis dated June 30, 2011) (R645-300-133.720).

16. Carbon Resources, LLC agrees to pay all reclamation fees as required by 30 CFR Part 870. (R645-300-133.730)

Permit Supervisor

Associate Director of Mining

Director

NON-FEDERAL | PERMIT C/007/0047 | August 1, 2011

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801
(801) 538-5340

This permit, C/007/0047, is issued for the State of Utah by the Utah Division of Oil, Gas and Mining (DOGM) to:

CARBON RESOURCES, LLC
P. O. Box 954
Sandia Park, New Mexico 87047
(505)980-1841

for the Kinney #2 Mine. Carbon Resources, LLC is the owner or lessee of the 38.13 acre surface area to be disturbed within the 448.14 acre permit area. A performance bond is filed with the DOGM in the amount of $2,210,000.00, payable to the state of Utah, Division of Oil, Gas and Mining. 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 reclamation activities on the following described lands within the permit area at the Kinney #2 mine, situated in the state of Utah, Carbon County, and located:

Beginning at the Northwest corner of the Southwest Quarter of the Northwest Quarter of Section 33, Township 12 South, Range 7 East, Salt Lake Base & Meridian; thence East 1320 feet, more or less along the North line of the South half of the Northwest Quarter of said Section 33, which is the South line of Parcel 2A-226 in the Carbon Country records; thence 1320 feet, more or less to the North-South center line of said Section 33; thence along the North line of the Southwest Quarter of the Northeast Quarter thence along the East line of said Southwest Quarter of the Northeast Quarter 1320 feet more or less, which line is the West property line of Parcel 2A-226 in the Carbon County records, to the Southeast corner of said Northeast Quarter of the Southeast Quarter, which is the South line of Parcel 2A-226 in the Carbon County records; thence South 2640 feet, more or less to the South line of the Southeast Quarter of said Section 33; thence South 617 feet, more or less; thence West 223.47 feet more or less to the West line of Lot 1 of Section 4, Township 13 South, Range 7

East, Salt Lake Base & Meridian; thence West 4183.47 feet, more or less along the South line of said Lot 1, and the South lines of Lots 2, 3 and 4 of said Section 4 to the West line of said Section 4; thence North 617 feet, more or less to the Southwest corner of said Section 33, Township 12 South, Range 7 East, Salt Lake Base & Meridian; thence North 1320 feet, more less to the Northwest corner of the Southwest Quarter of the Southwest Quarter of said Section 33; thence S89°59'00"W 920.00 feet, more or less along the South line of the Northeast Quarter of the Southeast Quarter of Section 32, Township 12 South, Range 7 East, Salt Lake Base & Meridian, which is the North line of Parcel 1B-485 in the Carbon County records to the intersection of the east right-of-way line of Utah State Road 96; thence in a Northerly direction along said east right-of-way line 317.10 feet; thence N45°32'00" E along said highway right-of-way line 465.40 feet; thence in a Northeasterly direction along said highway right-of-way line 733.00 feet, more or less to the intersection of said highway right-of-way line, and the East boundary of Section 32, which is the West boundary of Section 33; thence N 00°14"11"W 1258.08 feet along the east line of said Section 32, which is the East boundary of Parcel 2A-224 and the West boundary of Parcel 2A-227 in the Carbon County records to the point of beginning.

Excepting a parcel more particularly described as follows:

Commencing at the Southeast quarter of said Northeast quarter of the Southeast quarter of said Section 32, running thence North along the section line 330 feet, more or less to a point 50 feet North of the railway track of the Union Pacific Railway running across said land; thence in a Southwesterly direction parallel with and 50 feet distance from center line of said track, 412.5 feet, more or less to the South line of said Northeast quarter of the Southeast quarter; thence East 132 feet, more or less to the point of beginning. Containing 1 acre, more or less.

Total acreage of the parcel is 448.14 acres.

This legal description is for the permit area (448.14 acres) of the Kinney #2 Mine and included in the operation and reclamation plan on file at the Division. The permittee is authorized to conduct coal mining and reclamation operations connected with an underground mine on the foregoing described property subject to the leases, including all conditions and all other applicable conditions, laws and regulations.

Sec. 3 **COMPLIANCE** - The permittee will comply with the terms and conditions of the permit, all applicable performance standards and requirements of the State Program.

Sec. 4 **PERMIT TERM** - This permit becomes effective on August 1, 2011 and expires on August 1, 2016 (5 year term).

Sec. 5 **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. 6 **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. 7 **SCOPE OF OPERATIONS** - The permittee shall conduct coal mining and reclamation operations only on those lands specifically designated as within the permit area 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.

Sec. 8 **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. 9 **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 which prevents violation of any applicable state or federal law.

Sec. 10 **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.

Sec. 11 **EXISTING STRUCTURES** - As applicable, the permittee will comply with R645-301 and R645-302 for compliance, modification, or abandonment of existing structures.

Sec. 12 **RECLAMATION FEE PAYMENT** - The operator shall pay all reclamation fees required by 30 CFR part 870 for coal produced under the permit, for sale, transfer or use.

Sec. 13 **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. 14 **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. 15 **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.

Sec. 16 **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. 17 **APPEALS** - The permittee shall have the right to appeal as provided for under R645-300.

Sec. 18 **SPECIAL CONDITIONS** - There are special conditions associated with this permitting action as described in Attachment A.

The above conditions (Secs. 1-18) 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: **(PROPOSED)**

Date: _____

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

1. Carbon Resources, LLC will submit water quality data for the Kinney #2 Mine in an electronic format through the Electronic Data Input web site, http://linux1.ogm.utah.gov/cgi-bin/appx-ogm.cgi.
2. Once information on Water Right #91-4026 has been verified, Carbon Resources, LLC must update Section 731.800 - Water Rights of the MRP within 60 days. Maps 30 and 31 will need to be updated accordingly to reflect the water right(s) associated with the ponds. Exhibit 13 will need to be updated with the water rights database record. Please add language to the PHC to account for these ponds and discuss preventing or minimizing water loss from the ponds.
3. At the Kinney #2 mine, surface water stations Miller Outlet, RES-1 and Mud Creek reported orthophosphate concentrations in their baseline dataset. Orthophosphate is one form of phosphate and may not be an accurate representation of the total phosphate present in a sample. Total phosphate is a listed Total Maximum Daily Load (TMDL) pollutant for Scofield Reservoir by the Utah DEQ (http://www.waterquality.utah.gov/TMDL/Scofield_Res_TMDL.pdf), Kinney #2 mine will be required to modify the surface water component of their water monitoring plan to monitor for total phosphate instead of orthophosphate with 60 days of permit approval.
4. A bond in the amount of $2,210,000 must be posted with the Division prior to the permit being issued. Within 60 days of permit approval, Carbon Resources, LLC will be required to make the necessary corrections to the escalation section of the bond calculation summary. The minimum required bond to be posted is $2,210,000.
5. In compliance with R645-302-320, the permittee must conduct vegetation surveys and analyses of the areas identified as potential Alluvial Valley Floors adjacent to the permit area. The surveys must be completed and the analyses and results submitted to the Division for incorporation in the MRP by the end of the calendar year 2011.

0005

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
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

OK

June 24, 2008

Greg Hunt, Agent
Carbon Resources, LLC
16577 Columbine Lane
Cedaredge, Colorado 81413

Subject: Administrative Completeness Review – Determined Complete, Carbon Resources LLC, Kinney #2 Mine, C/007/0047, Task ID #2989, Outgoing File

Dear Mr. Hunt:

On June 13, 2008 Carbon Resources, LLC provided the Division with supplemental information to be incorporated into the February 29, 2008 Kinney #2 Mine application package for a surface coal mining operation near Scofield, Utah. The full application has been determined to be complete. A copy of the Administrative Completeness Review (ACR) is enclosed.

Carbon Resources, LLC must now provide public notification of the proposal as required by R645-300-121.100. The notice must be in a local newspaper at least once a week for four consecutive weeks and must contain all the information described in R645-300-121.100 *et seq*. Please note our comments on the attached ACR form before proceeding with public notice. Carbon Resources, LLC must provide a copy of the complete application for public review at the Carbon County Courthouse by the time of the first public notice (R645-300-121.200). A copy of the publication should be sent to the Division as soon as it is available. An affidavit of publication will also be required to be in the final application.

We will proceed with our obligation to notify local, state and federal government agencies of your intent to conduct surface coal mining on the approximately 450-acre tract of land located in Carbon County, T.12 S., R.7 E., Sections 32 and 33, T.13 S., R.7 E., Section 4, northeast of the town of Scofield on the east side of State highway # 96 (R645-300-121.300 *et seq*).

A technical review of your plan will be initiated. Review of new surface mine permit applications may not exceed one year (R645-300-131.114). Prior to approval, the Division must find that your application is technically complete. We expect to convey our progress to you in ninety days (September 19, 2008), which will allow time to incorporate any public comment into our review. The Division will also coordinate with other agencies and incorporate their comments into our review process.

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

We look forward to working with you throughout the permitting process. Please contact Joe Helfrich at (801) 538-5290 or myself at (801) 538-5325 with your questions.

Sincerely,

Daron R. Haddock
Permit Supervisor

JCH/an
Enclosure
cc: Dana Dean
Price Field Office
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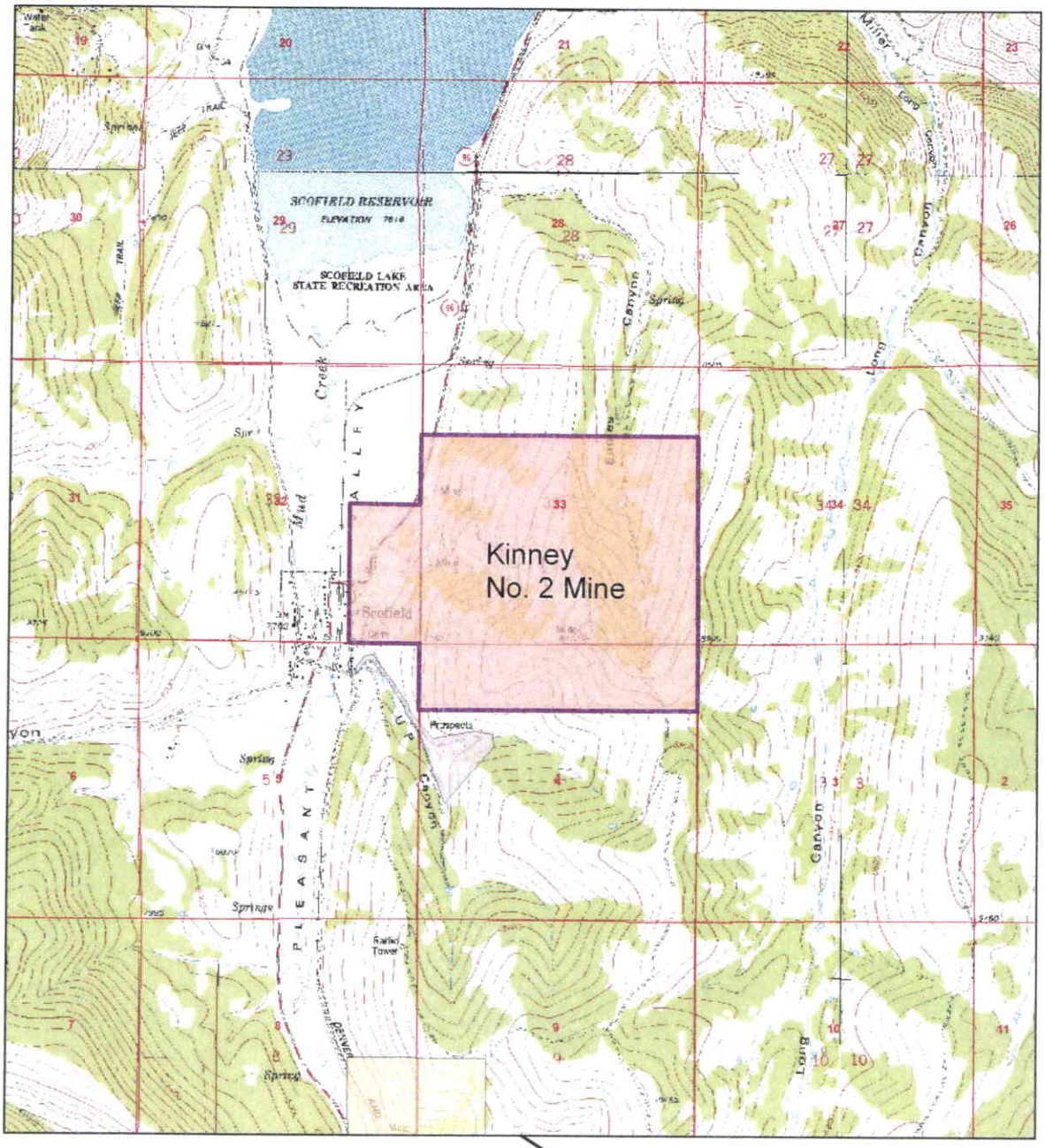

Kinney No. 2 Mine

C0070047
Carbon County, Utah

Township 12 South Range 7 East
Township 13 South Range 7 East

Permit Area
Proposed Mine Plan Modification (If shown)
Proposed State Permit Modification
Active Permit
In Reclamation
Retained-Final Bond Release

0 0.15 0.3 0.6 Miles

1:24,000

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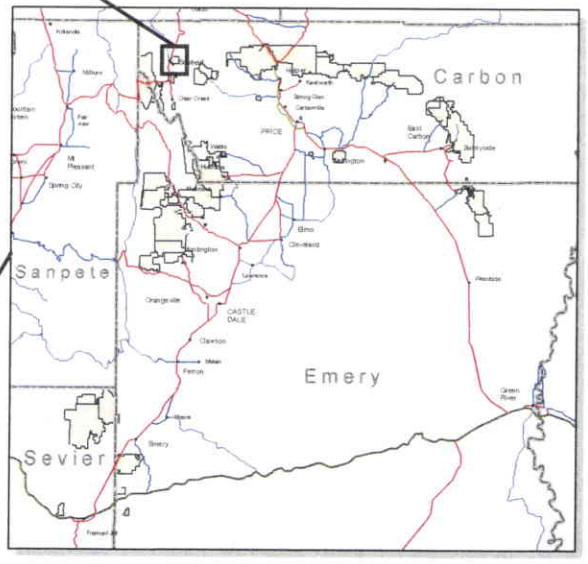

Locator Map

State of Utah

Coal Regulatory Program

Kinney #2
Carbon Resources, LLC
Technical Analysis
June 30, 2011

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TECHNICAL ANALYSIS DESCRIPTION

The Division ensures that coal mining and reclamation operations in the State of Utah are consistent with the Coal Mining Reclamation Act of 1979 (Utah Code Annotated 40-10) and the Surface Mining Control and Reclamation Act of 1977 (Public Law 95-87). The Utah R645 Coal Mining Rules are the procedures to implement the Act. The Division reviews each permit or application for permit change, renewal, transfer, assignment, or sale of permit right for conformance to the R645-Coal Mining Rules. The Applicant/Permittee must comply with all the minimum regulatory requirements as established by the R645 Coal Mining Rules.

The regulatory requirements for obtaining a Utah Coal Mining Permit are included in the section headings of the Technical Analysis (TA) for reference. A complete and current copy of the coal rules can be found at http://ogm.utah.gov.

The TA is organized into section headings following the organization of the R645-Coal Mining Rules. The Division analyzes each section and writes findings to indicate whether or not the application is in compliance with the requirements of that section of the R645-Coal Mining Rules.

GENERAL CONTENTS

IDENTIFICATION OF INTERESTS

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

Analysis:

The applicant has met the requirements to provide ownership and control information for the operation and surface lands affected in Chapter 1, Section 112. The applicant and operator is Carbon Resources, LLC, a limited liability company. The company is registered with the Utah Department of Commerce; this registration expires on December 1, 2011.

Carbon Resources, LLC corporate office is in Albuquerque, New Mexico. The telephone number and address is provided. Chapter 1, pages 1-10 and 11 include all company officers' names and addresses and telephone numbers along with their employer identification numbers and % ownership.

Ronald C. Barker is the resident agent and is responsible for paying the Abandoned Mined Land royalty fee.

Surface and coal ownership are displayed on Maps 11 and 12, respectively. Section 645-301-112.500 provides the names and addresses of the permit area surface owners. The permit area surface is owned by two parties: Carbon Resources LLC and the Evangelos George Telonis Trust, administered by Nick Sampinos. The Telonis surface has been leased to the applicant (Section 645-301-114.100 provides the Carbon County Recorder's book and page number).

R645-301-112.330 provides the name and addresses of the owners of the coal to be mined. Within the permit area, the coal is owned by Carbon County, Carbon Resources LLC and by Peabody Natural Resources. The coal to be mined was subleased from Carbon County through Western Reserve Coal Inc. and through WRCC, LLC.to Carbon Resource LLC (Section 645-301-114.100 provides the Carbon County Recorder's book and page number).

Adjacent surface and subsurface ownership is also shown on Maps 11 and 12. The legal description provided in Section 645-301-114.100 indicates that coal leases subleased by Carbon Resources, LLC are on the west side of Scofield Reservoir (T 12 S., R. 6 E. Sec 24, 25, and 36). Only a portion of the lease description in Sec. 645-301-114.100 is within the permit area. Federal and fee coal is adjacent. An interest in adjacent coal is described in R645-301-112.500-600. (See related request for information under Legal Description deficiencies R645-301-112.800 and R645-300-141.)

The MSHA Permit Identification has been issued as per correspondence dated February 9, 2011. ID #42-02566.

Findings:

The information provided meets the requirements of the Regulations for Identification of Interests.

VIOLATION INFORMATION

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

Analysis:

Section R645-301-113 of the application state that there are no violations, suspensions, revocations, or forfeitures on record for Carbon Resources, LLC or its affiliates.

The Division can complete a check of the Applicant Violator System for and Carbon Resources, LLC. The ID numbers for Carbon Resources, LLC, Western Reserve Coal Company, Inc. and WRCC, LLC are included in the application.

Findings:

The applicant has met the requirements of the Rules for Violation Information.

RIGHT OF ENTRY

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

Analysis:

The permit area surface is owned by two parties: Carbon Resources LLC (15.3 acres) and the Evangelos George Telonis Trust, administered by Nick Sampinos (437.2 acres) as described in Section R645-301-114.100. The applicant has surface right of entry to 38.1 acres as described in Sec. R645-301-114. Approximately twenty three acres (22.88 acres) of the Telonis surface has been leased to the applicant.

The applicant also has underground right of entry to coal in T. 12 S., R. 6 E.; T. 12 S., R. 7 E.; T 13 S., R. 6 E.; and T. 13 S., R. 7 E. Salt Lake Meridian R645-301-114.100. Only a portion of the lease description is within the 448.14 acre permit area.

Findings:

The information provided meets the requirements of the Regulations for Right of Entry.

LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS

Regulatory Reference: 30 CFR 778.16; 30 CFR 779.12(a); 30 CFR 779.24(a)(b)(c); R645-300-121.120; R645-301-112.800; R645-300-141; R645-301-115.

Analysis:

Public Lands Policy Coordinating Office (PLPCO) and State Historic Preservation Office (SHPO) were notified of the administrative completeness on June 25, 2008 (2008/Outgoing/0006.pdf).

The reviewer is referred to pages 1-18 and 1-19, R645 301-114.100, (Documentation of Ownership). They include legal descriptions of the Fee surface and Leased surface boundaries. Page 1-20 includes a legal description of the of the permit boundary. The text on pages 1-18 and 19 of the application include a reference to a lease area and permit area boundary maps 11 and 12. The maps are to a scale of 1"=1000' that clearly show the boundaries of the lease and permit areas in order to verify the legal description.

The Regional Coal ownership is accurately described on Map 12 and in the text on page1-19. Ranges 6 and 7 east have been added to the map.

The land within the proposed permit area is all privately owned surface. A public road runs within 100 ft of the permit area, State Route 96. Operations within 100 feet of a public road, require a hearing in accordance with UAC Section 40-10-24-(4)(c), and a written finding must be made, that the interests of the public and the landowners affected will be protected. The Applicant states that they have obtained approval for access to SR 96, from the County.

Chapter 5, Page 5-37, Section 526-116 has been revised to include a commitment to provide UDOT approval prior to any highway work.

There is one occupied dwelling within 300 feet of the proposed mining operations. Volume 2 exhibit 4 contains a written waiver from Jim Levanger, President of L2H Enterprises Inc. The reference to the information contained in Exhibit 4 is provided for in Volume 1, Chapter 1; page 1-20 Section R645-301-115.300.

UCA Section 40-10-24(1)(a) restates SMCRA Section 522(a)(4) and 522(a)(5) which requires that on non-federal lands, the board and the division have an obligation to establish a planning process enabling objective decisions based upon competent and scientifically sound

data and information as to which, if any, lands in the State are unsuitable for mining. Such determinations should be integrated with the land use planning processes at the local and state and federal levels. UAC Section 40-10-24(1)(c) describes the unsuitability criteria that must be balanced against the economic impact in a cost-benefit analysis. They include incompatibility with current land use plans; the affect on fragile or historic and cultural lands; the affect on aesthetic values and natural systems; the affect on renewable resource lands, in particular the water supply and aquifer recharge; and areas subject to flooding or unstable geology.

UCA Section 40-10-24(4) places prohibitions on mining in National Parks, designated Wild and Scenic Rivers, National Recreation Areas etc. Pertinent to this proposal is UAC, Section 40-10-24(4)(b) which prohibits adverse effects on historic sites unless approved jointly by the division and state or local agency with jurisdiction over the historic site.

Lands to be disturbed by coal mining and reclamation are not "unsuitable" as defined by 40-10-24(4) of the Act. Coal mining and reclamation operations would not adversely affect the publicly owned Scofield State Park or Scofield town buildings placed on the National Register of Historic Places (R645-103-236). A mitigation plan will be developed for the adverse effect on three eligible historic sites within the disturbed area (2008/Incoming/0007.pdf).

The Center for Water Advocacy in their letter received August 18, 2008, requested and informal conference on unsuitability issues. An informal conference is scheduled for September 30, 2008 at the Price Field Office (2008/Outgoing/0007.pdf).

Commenters may file an unsuitability claim under R645-103-237, for the proposed permit area. However, under R645-103-431.600, the Division may decide not to process the part of the pertaining to lands to which an administratively complete permit application has already been received. A petitioner must meet an "injury in fact" test as described by R645-103-421 and provide a description of the impact of the designation (R645-103-422.300 and R645-103-422.800). Petitioners should also keep in mind the criteria for designating land as unsuitable (R645-103-320).

There is one occupied dwelling within 300 feet of the proposed mining operations. Volume 2 exhibit 4 contains a written waiver from Jim Levanger, President of L2H Enterprises Inc. The reference to the information contained in Exhibit 4 is provided for in Volume 1, Chapter 1; page 1-20 Section R645-301-115.300.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

PERMIT TERM

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

The permit term of five years is requested. The applicant has not requested a longer term, but has projected a twenty year life of mine. The mining sequence is shown on Map 15 for the 448.14 acre permit area. Table 4.5-1 of the application describes the development five entries and mining of 671,863 tons of coal from the Hiawatha seam, using a continuous miner, during the first five year permit term. An annual tonnage rate of 180,000 to 490,000 tons/year (0.18 to 0.49 million tons) of coal for the first permit term.

Findings:

The information provided meets the requirements for a five-year mining permit.

PUBLIC NOTICE AND COMMENT

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

Analysis:

Carbon Resources, LLC provided public notice for the proposed mine on June 24, July 1, 8 and 15, 2008 in the Sun Advocate. In response to the public notice, the Division received one comment from the Center for Water Advocacy (2008/Incoming/0006.pdf). The commenter requested an informal conference. That conference is scheduled for September 30, 2008 at the Price Field Office.

The Governor's Resource Development Coordinating Council also had a public/agency comment period which ended August 22, 2008. The RDCC has not yet provided comments to the Division.

Findings:

The information provided by the Applicant has met the requirements for public notification. The Division is attempting to fulfill its requirement to include the public in the permitting process.

FILING FEE

Regulatory Reference: 30 CFR 777.17; R645-301-118.

Analysis:

This $5.00 fee was paid with the application (2008/Incoming/0001.pdf).

Findings:

The Applicant has met the requirements of the filing fee.

PERMIT APPLICATION FORMAT AND CONTENTS

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

Analysis:

A notarized statement of the mine permit application's veracity and accuracy from Clay Wisdom, the Chief Financial Officer for Carbon Resources, LLC accompanied the application in the cover letter (2008/Incoming/0002.pdf).

Findings:

The information provided is in a format prescribed by the Division and meets the requirements of R645-301-121.300. Elsewhere in this technical analysis, the Division makes requests for further information or requests clarification.

REPORTING OF TECHNICAL DATA

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

Analysis:

Chapter 7, page 7-105, Section 731.120, Mine Water Supply Withdrawals includes a description of CR's plans for constructing a surface mine water storage tank. Chapter 5, Page 5-37, Section 526, Mine Drainage Control and Dewatering, states that "potential mine inflows are expected to be minimal and there will be sufficient storage capacity in both the existing abandoned underground mine workings and in inactive working areas that transfer of mine drainage to the surface water system is unlikely".

Findings:

The information is adequate to meet the requirements of this section of the regulations.

MAPS AND PLANS

Regulatory Reference: 30 CFR 777.14; R645-301-140.

Maps and plans are referenced in the Environmental Resource Information, Operational Plan and Reclamation Plan section of the Technical Analysis.

COMPLETENESS

Regulatory Reference: 30 CFR 777.15; R645-301-150.

Analysis:

The Kinney #2 Mine plan application was received on February 19, 2008 (2008/Incoming/0002.pdf)with supplemental information received on June 13, 2008 (2008/Incoming/0004.pdf). The mine plan application was determined to be administratively complete on June 24, 2008(2008/Outgoing/0005.pdf). The Division notified local, state, and federal governing agencies on June 25, 2008 (2008/Outgoing/0006.pdf). Val Payne, John Harja and Mike Mower of the Public Lands Policy Coordination Office (PLPCO) were included in the distribution.

Findings:

The Applicant has met the completeness requirements.

ENVIRONMENTAL RESOURCE INFORMATION

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

The proposed Kinney #2 Mine is located in Pleasant Valley, one half mile north of Scofield, Carbon County, Utah and east of and adjacent to Utah State Highway 96. The proposed Kinney #2 Mine permit area covers an area of approximately 448 acres. Surface facilities will be located at the outcrop of the Hiawatha Coal Seam, on relatively flat areas near the portal and adjacent the highway. The proposed mine facilities area has been extensively disturbed by previous mine development, highway construction, and AMR projects completed in the 1980's. To the extent possible, the Applicant has tried to site the facilities to minimize additional disturbance, and entry will be via an approximately 600 foot wide corridor between old abandoned mine workings.

The proposed mine location is dry and sparsely populated by quaking aspen, fir, and brush. Within the proposed permit area, topographic relief ranges from 7,650 feet near the highway to over 8,800 feet on the ridge to the east. All drainage eventually reports to Scofield Reservoir. With the exception of two perennial streams, drainages flow only in response to spring snowmelt or major thunderstorm events.

The underground mining operations are planned to recover coal from the Hiawatha Coal Seam, using continuous mining techniques, with no pillar recovery planned at this time. Mining will be restricted to fault-bounded blocks, and numerous faults will need to be crossed during mining operations. The Applicant has designed the mine for a nominal annual production rate of 800,000 tons of coal, with a projected life (within the currently proposed boundary) of approximately three years; there is a potential to extend the mine life significantly through acquisition of coal reserves to the south and east.

GENERAL

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

Analysis:

The Mining and Reclamation Plan (MRP) meets the Environmental Resource Information Requirements as provided in the State of Utah R645-Coal Mining Rules. The MRP provides a description of the existing, pre-mining environmental resources within the proposed permit and adjacent area.

A description of the existing, pre-mining hydrologic resources within the permit and adjacent areas is provided beginning in Section R645-301-710. The Permittee provides a general

description and references to the ground and surface water resources that may be affected or impacted by the proposed coal mining and reclamation operation.

The MRP includes a description of the engineering-related existing and pre-mining environmental resources within the proposed permit area and adjacent areas that may be affected or impacted by the proposed underground mining activities of the Kinney No.2 Mine. This information is included on pages 5-5 through 5-16. General descriptions and environmental resource information can be found on pages 1-1 through 1-9.

Findings:

The MRP meets the General Environmental Resource Information requirements relative to hydrology. Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

PERMIT AREA

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

Analysis:

The MRP includes a description of the permit boundary and permit area. The description identifies the lands subject to coal mining operations and the anticipated area for which permits for mining are sought. The description can be found on pages 1-19 and 1-20. The permit also includes a table that describes the acreages for permit area and disturbed area and lists the owners of the areas. The table can be found on page 1-17.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

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

Analysis:

In the application for the proposed coal mine, a cultural resource inventory, pedestrian survey of 394.7 acres, for the areas to be disturbed in (T12S, R7E, Sections 32 and 33), in Carbon County Utah. The field work was conducted between May 16 and 25, 2007 by Keith Montgomery, Patricia Stavish and Adam Thomas. The inventory resulted in the location of one

previously located site (42 cb2436), the documentation of three previously recorded sites (42cb477, 42cb479 and 42cb1032) and the documentation of five new sites (42cb2622 through 42cb 2626). Five of these sites are located within the proposed mine facilities disturbed area (42cb477, two locations, 42cb479, 42cb2622 and 42cb1032). Of these five, three were eligible (42cb477, 42cb479 and 42cb1032), under Criterion A for the NRHP and would be eliminated by the development of the surface facilities for the proposed mine. The SHPO had requested that the applicant develop a mitigation plan for the eligible sites that would be eliminated by the development of the mining operations (correspondence from Jim Dykman to Joe Helfrich dated August 26, 2008). This correspondence was emailed to the applicant and Jody Patterson on September 11, 2008.

Additional file searches include:

Marty Thomas at the Division of State History in Salt Lake City on May 15, 2007 to identify previous cultural resource inventories. According to the information in the application the following surveys had been conducted in the area where the mining activities are proposed:

1981 class II survey identified 166 new sites and 17 previously recorded, none of which were located in the proposed location of the mine facilities.

1985 Desert West completed an archaeological evaluation of several historic coal mining sites including the Scofield area. Sites 42cb477, 78 and 79 are located in the project area. Site 42cb477, the Jones Mine, was determined to be eligible to the NRHP.

After a telephone conference held on September 14, 2010, the Division revised its determination of Archeological clearance for the Kinney #2 mine. A letter and map from Montgomery Archaeological Consultants, (MOAC), prepared by Jody Patterson provided additional information and clarification about the three eligible sites, (42cb477, 42cb479 and 42cb1032), at the proposed Kinney #2 mine location. Previously a file search was conducted on May 15, 2007 and a class three pedestrian survey identifying these eligible sites was conducted by MOAC between May 16 and 25, 2007.

According to the additional information, Site 42cb477 will be avoided although fencing is recommended. Site 42cb479, the original Kinney mine opened in 1920, contained 12 features. All but one of these features could be avoided. Only feature 12, thought to be a tipple area, would be potentially affected by the footprint of the disturbed area. The feature was 7 to 10 feet away from the disturbance area and only 4% of the site might be encroached upon by the proposed mine. Site 42cb1032 was a minor spur of the Utah and Pleasant Valley Railway. In as much as the adjoining rail system had been continually upgraded and maintained into the 1970's, two minor impacts to the spur would not have an adverse impact on the railroad grade.

MOAC had recommended a "no historic properties adversely affected" determination for the three sites as discussed in the additional information and site map provided.

The Division agreed with MOAC's recommendation and made a determination of no adverse effect to historic properties. Concurrence from the SHPO was received by the Division on October 13, 2010. Volume I, chapter IV, page 4-16 has been revised to reflect the current status of the SHPO consultation. Exhibit 21 includes a copy of the SHPO clearance.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations. Volume I, chapter IV, page 4-16 has been revised to reflect the current status of the SHPO consultation. The applicant however referred the reviewer to page 4-14 where there were no text updates or changes. Exhibit 21 includes a copy of the SHPO clearance.

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

The MRP meets the Climatological Resource Information requirements of the State of Utah R645-Coal Mining Rules.

The MRP provides the climatological information for the proposed permit and adjacent area in Section R645-301-724.400. The data was obtained from multiple SNOTEL meteorological reporting stations (Clear Creek #1, Clear Creek #2, Scofield Dam and Price, UT) located in close proximity to the proposed permit and adjacent area. The Clear Creek stations provide the temperature, precipitation and snowfall data. The Price, UT, SNOTEL station provided the wind data. Table 13 provides a summary of temperature data. Table 14 provides a summary of precipitation data collected at the Scofield Dam. Table 15 provides a summary of wind data obtained in Price, UT.

Based on the presented climatological data, the region of the permit and adjacent area is semi-arid. Due to significant elevation differences within the proposed permit and adjacent area, climatic conditions can vary. The area is characterized as temperate with summer high temperatures ranging from 75 to 80 degrees Fahrenheit and corresponding winter temperature ranges from 0 to -5 degrees Fahrenheit. The average annual precipitation for the area is approximately 14.6 inches.

Generally, temperature values are lower on the exposed high plateaus when compared with the lower slope/valley areas. Precipitation amounts also exhibit variation due to changes in topography, exposure and wind direction.

Findings:

The MRP meets the Climatological Resource Information requirements of the State of Utah R645-Coal Mining Rules.

VEGETATION RESOURCE INFORMATION

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

Analysis:

Section R645-303-321 of the application includes a description of the vegetation information. Exhibit 7 includes a vegetation survey, (TE&S species included), for the proposed disturbed area prepared by Mount Nebo Scientific. Vegetative communities, reference areas and TE&S plant species surveys are included in the exhibit. A current list of the TE&S plant, animal and fish species for Carbon County is included in the application and can be located in Volume 1, chapter 3, Section 301-322.210, Table1, Pages 3-7,8, 9 and 10. The list of maps section in volume 1 page LOM-I identifies map 1-A as "Facilities Area Vegetation". The TE&S list also includes a description and rationale of their presence or absence.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

FISH AND WILDLIFE RESOURCE INFORMATION

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

Analysis:

Section R645-301-322 of the application includes a description of the fish and wildlife information. A list of the TE&S animal species for Carbon County is included. The list is dated October 17, 2006. A current list of the TE&S plant, animal and fish species for Carbon County is included in the application and can be located in Volume 1, chapter 3, Section 301-322.210, Table 1, Pages 3-7,8, 9 and 10. The TE&S list also includes a description and rationale of their

presence or absence. The lists are usually updated every six months. Mapping of wildlife information on Map 2 and includes Mule Deer, Moose, Elk, Sage Grouse, Bald Eagle and Wetland areas.

According to the information in the Utah Natural Heritage Program database species of concern listed in the project area include the bald eagle and sandhill crane and river otter in the vicinity of the project area (letter from Sara Lindsey to Ben Grimes dated August 13, 2007). Additional information from the database indicates that there are no records of occurrence for any threatened, endangered or sensitive species in the project area. The TE&S information provided by the Utah Natural Heritage Program has been field verified by a qualified professional in the identification of TE&S species. Dr. Patrick Collins prepared the site specific comments for each species listed.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

Section R645-301-222 describes a 27.6 acre planned disturbance for the mine facilities area. The area was surveyed by Bruce Chessler in 2006 and 2007. According to the soil survey map, Figure 1 in Exhibit 6, 68,000 cubic yards may be recovered from 27.4 acres on the east side of SR 96. Table 8 in Exhibit 6 outlines the volume of salvage by map unit. Maps 34 and 37 show the proposed disturbed area boundary and the area of soil salvage. There is an estimated 12,000 cubic yards of buried coal fines buried that will be removed during the salvage operation (Section 232.100, Essential Step #13). Map 45 illustrates the known locations of buried coal fines.

The Order I soil survey in Exhibit 6 includes field description of soil pits, laboratory analysis of samples taken by horizon, and a soil map (Figure 1). The soil survey classifies the soil into five map units: DA (0 – 20% slopes previously disturbed land); DB (20 – 50% slopes previously disturbed land); 2A (Typic Argixeroll-Typic Haploxeroll complex, 0 – 35% slopes); 1B (Typic Argicryoll Consociation (35-70% slopes); 2B Typic Argixeroll Consociation (35 – 70 % slopes). These map units are described and representative pedons are provided for each unit.

Exhibit 7, Vegetation Information, provides total living cover estimates for both the disturbed (40%) and undisturbed (64%) vegetation types. Table 25 provides an estimate of productivity for each range type.

Previously disturbed soil, topsoil and subsoil will be salvaged for use in reclamation, no borrow soils will be needed.

Findings:

The information provided meets the requirements for baseline soil survey information as required by the R645 Coal Rules.

LAND-USE RESOURCE INFORMATION

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

Analysis:

The land use classifications begin on page 4-3 of chapter four and are identified as "Legislated Zones" that include Carbon County and Scofield Town zones. Within Carbon County are the Watershed, Mountain Range, the Scofield Town includes the Residential, Commercial and Agricultural zones. They are identified on map # 4; The Regional Land Use map. The Lakeshore and Pleasant Valley zones are located to the north of map 4 and have been removed from the text in chapter 4, page 4-5.

The text of the *"Watershed Zone all of map except as shown below"* in the legislated zones and legend has been revised as follows: Watershed Zone all of map except as shown in the legislated zones, Land Designations and legend.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Alluvial Valley Floor Determination

The alluvial valley floor is discussed in Chapter 9 and shown on Map 32. The Permittee notes that the requirements of R645-302-321.100 pertain solely to surface coal mining and reclamation operations. However, the Rule heading, R645-302-320, clearly applies to both underground and surface coal mining operations.

320. Alluvial Valley Floors. R645-302-320 applies to any person who conducts or intends to conduct coal mining and reclamation operations on areas or adjacent to areas designated as alluvial valley floors.

As stated in the Application, the information is collected, because it is pertinent to the probable hydrologic impact of the underground mining operation.

The existence of an alluvial valley floor with irrigated pastures and areas of subirrigation along Mud Creek in Pleasant Valley below the Utah No. 2 Mine (now the reclaimed White Oak Load Out) was previously established by the Division (1984 Technical Analysis of the Valley Camp Mine, ACT/007/001, and Valley Camp MRP Map R645-301-411.100 Premining Land Use Map).

Regional Surface Geology Map 6, Regional Geology Map, illustrates Mud Creek flowing through alluvial sediments adjacent to the mine site permit area. Map 1A identifies many acres of pastureland between Hwy 96 and the railroad tracks. The proposed site is situated in an area that has been zoned agricultural (Map 4, Regional Land Use Map). Mine Surface Facilities Map 14 illustrates the location of an irrigation ditch on the proposed mine site. Although the irrigation ditch is not in use (Chapter 9, R645-302-322.100), cross section A-A' on Map 16 Mine Surface Facilities Area Cross Sections, shows the irrigation ditch will be culverted during mining and restored after mining, to preserve the conveyance for future use.

As illustrated on Map 32, the AVF follows Mud Creek to the Scofield Reservoir. The AVF is outside of the proposed permit boundary, west of SR 96. Map 32 outlines an AVF (alluvial deposits) and a "Quasi-AVF" area (with a potential for flood irrigation), the soil map units, the locations of the Scofield Ditch Company ditches, and provides a table of AVF acreage by landowner. Productivity estimates are given for the Silas soil map unit as cited in the 1988 NRCS publication, Carbon County Soil Survey. Silas Soil is a the main component of both Map Unit 108 and 109, along stream channels and in low lands. The silas soil is in the Mountain Meadow range site, with an expected annual productivity of 3,000 lbs/ac, with an estimated carrying capacity of 1 AUM/acre (Chap 9, Livestock capability). The Division has observed that the Jones and Smiths run a sizeable calf/cow operation (landowners for areas 1 – 9), but that the Hammond land (area 10, across the highway from the proposed mine site) is not presently in agricultural use.

A comment was received during the (2008) public comment period that adequate information was not available in the application to ensure protection of renewable resource lands. In accordance with R645-302-320, the application includes a description of the potential for agricultural activity for the predominant Silas Loam soil within the adjacent AVF. The application describes Scofield Ditch system as the source of irrigation for the adjacent lands. The East Branch ditch divides as shown on Map 32. The last successful use of the ditch was 25 years ago, according (Productivity discussion, Chap 9). The applicant has provided a map identifying the adjacent [agricultural] landowners, identifying subirrigated (AVF) and potentially irrigated (Quasi-AVF) lands, showing all irrigation ditches, and defining the extent of the adjacent alluvial valley floor in Pleasant Valley.

Map Unit 108, Map 32 does not extend north to take in the mouth of Miller Creek. The Applicant indicates that Miller Creek will be addressed during future expansion (Chapter 9, Discussion).

According to the information in the application the Facilities Area Vegetation Map contains resource values consistent with the AVF criteria. The applicant has deleted this statement from the text. The applicant needs to define the boundaries of the AVF in relation to the proposed mining operations. The applicant has explained how the eight reasons stated on page 7.0-5 do not meet the criteria for an AVF. The reviewer is referred to chapter 9, pages 9-3-9-10 and 9-13. "Facilities Area Vegetation Map contains resource values consistent with the AVF criteria" has been deleted. The applicant has committed to a veg survey in the summer of 2011.

The applicant has deleted this statement from the text. The applicant's response also indicated that "a commitment had been added to chapter 3, page 3-68 stating Patrick Collins (Mount Nebo Scientific) will conduct a vegetation field study during the 2011 field season".

The MRP provides information that examines the presence of an Alluvial Valley Floor in Chapter 9, Section R645-302-320. As required by R645-302-321.300, the Division will determine that an alluvial valley floor (AVF) exists if it finds that:

1) Unconsolidated streamlaid deposits holding streams are present; and,
2) There is sufficient water to support agricultural activities as evidenced by:
3) The existence of flood irrigation in the area in question or its historical use;
4) The capability of an area to be flood irrigated, based on stream flow water yield, soils, water quality and topography; or,
5) Subirrigation of the lands in question derived from the ground water system of the valley floor.

Beginning on page 9-3, the MRP discusses AVF's within the permit and adjacent area. Based upon the aforementioned criteria, an AVF is located within the adjacent area (west of SR 96) of the permit area. Map 32, *AVF Evaluation Map* depicts the AVF location. Map 6, *Regional Surface Geology Map*, depicts alluvial material directly adjacent to Mud Creek on

either side of the stream channel. The areal extent of the alluvial material adjacent to Mud Creek is relatively small (limited to within less than 500 feet of the Mud Creek stream channel). However, an irrigation network has been identified; evidence to the existence of flood irrigation in the adjacent area. The source of the irrigation water for the AVF area is Mud Creek. The water from Mud Creek has been historically utilized for irrigation purposes in this area with an irrigation network originating well upstream from the permit area. The permit describes the Scofield Ditch System as the source of irrigation water for the adjacent land outside the permit area. The East Branch Ditch divides as shown on Map 32. One irrigation ditch flows through the southwestern corner of the permit area. Based upon research conducted by the Permittee, the irrigation ditch has not been utilized for approximately 25 years. The ditch will be routed into a culvert that will be maintained throughout the life of the mine. During reclamation, the pre-existing drainage characteristics of the ditch will be restored. Potential impacts to the function of the AVF are discussed in Section R645-302-322.100. The potential for the AVF to be impacted by the mining operations are considered negligible for the following reasons:

1) Mining will occur well above the regional water table (as presented in Chapter 7 of the MRP). As a result, the potential for ground water interception of the regional water table is considered negligible. Additional ground water investigations will be conducted as mining progresses eastward. However; based upon the baseline information provided by the Permittee, it appears that any ground water component that may contribute recharge to the AVF area adjacent to the permit area will not be affected by mining activity. Surface runoff will be controlled via the storm water drainage system (See Chapter 7). All surface runoff generated during snowmelt and precipitation events will be routed to Sediment Pond No. 1. A Utah Pollutant Discharge Elimination System has been obtained by the Permittee and establishes water quality/effluent standards for any discharge that could potentially enter the AVF area.

2) The source of irrigation water for the AVF area comes from Mud Creek at a diversion point located upstream of the mine site. As can be seen from Map 32, irrigation ditches supplying water to the AVF area are part of the Scofield Ditch system. The diversion point for this system is located approximately ¾ of a mile south of the most southern point of the permit area.

3) The only ditch that supplies water to the AVF that is located in close proximity to the mine site has not been utilized for an extensive period of time as evidenced by the vegetation present in the channel and general state of disrepair.

4) With the exception of the snow and rainfall that is captured within the disturbed area of the mine, all adjacent undisturbed drainage will be routed around the mine during operations and interim reclamation and thus still report to the adjacent AVF area.

The MRP identifies a "Quasi AVF" area that is much closer to permit area on Map 32. The existence of historic flood irrigation and the capability of the mine-site to be irrigated have

been documented. However, the unconsolidated streamlaid deposits required for an AVF are not present within this area and as such do not meet the criteria of an AVF. The MRP discusses the geology of the permit area relative to AVF's beginning on page 9-6. Pleasant Valley (located directly west of the permit area) is a graben produced by faulting. Based upon the extent of the valley floor relative to the size of the Mud Creek drainage and resulting flows, it seems apparent that the valley floor of Pleasant Valley was primarily the result of faulting and not by fluvial processes solely. The result of this explains the minimal amount of streamlaid deposits located directly adjacent to the Mud Creek stream channel (i.e. the identified AVF).

In summary, the coal seam to be mined is located well above the regional water table. As a result, the possibility that mining activity could interrupt or impact recharge to the identified AVF is minimal. In addition, the irrigation water that supplies the 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 its proximity to the drainages and the utilization of first mining practices only (i.e. no planned subsidence).

Findings:

The MRP meets the Alluvial Valley Floor Determination requirements as required by the State of Utah R645-Coal Mining Rules.

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

The NRCS determined the land was not prime farmland (Exhibit 2). The Division concurs with the NRCS, due to the fact that the land has been historically used for mining (Map 5) and was reclaimed by the Division under the Scofield Abandoned Mine Reclamation project (AMR/007/904). Although the remnants of a diversion ditch exist within the permit area (Map 14), it likely served the surrounding agricultural land shown on Map 4.

Findings:

The information provided meets the requirements for baseline soil survey information as required by the R645 Coal Rules.

GEOLOGIC RESOURCE INFORMATION

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

Analysis:

Geologic Resource Information is sufficient to meet the requirements of the Coal Mining Rules.

Chapter 6 contains descriptions of the Geology for the proposed mine site and adjacent area. These include stratigraphy, lithology, structure, and faults and joints, the coal seam to be mined, rider seams, and underlying and overlying strata. Sources for the geologic information are in Section 624.130

Information on acid- or toxic forming or alkalinity-producing materials and their content in the strata immediately above and below the coal seam to be mined is in Chapter 6 under Section 624. Table 4 lists Roof and Floor Samples with data from Acid Forming and Neutralization Potential Analysis. Table 4A shows characteristics of the "reclaimed coal" buried on-site by AML, and Exhibit 6 (Soils Information) contains the Lab analysis sheets. Table 5 presents the chemical analysis parameters used to evaluate coal, roof, and floor materials. Exhibit 19 contains the non-confidential data and confidential data are in the confidential folder. lab sheets. Additional lab sheets with data including Sulfur Forms of Hiawatha Seam Coal can be found in Exhibit 3 (confidential).

Section 624 discusses roof and floor rock characteristics. Table 4 presents % saturation, pH, EC, and acid and neutralization potential data for samples taken from the roof and floor of the Hiawatha Coal Seam. Map 7 shows borehole locations. Section 627 presents the information on overburden thickness and geology, and Table 5A contains information on strength of the roof and floor materials. The Applicant submitted confidential drilling data for nine holes drilled in 2006. The data include geophysical logs; core logs; cuttings logs; deviation logs; coal, roof, and floor quality analysis lab sheets; completion diagrams; and a data checklist. These document the lithologic character of coal and roof and floor lithologies. Table 5A in Chapter 6 depicts physical properties of coal, roof, and floor material. Exhibit 19 contains the Agapito Associates, Inc. rock mechanics report and lab sheets.

Lab data sheets documenting chemical analyses of the coal seam, including sulfur forms, are located in Exhibit 3 and with the previously submitted drilling data.

Because there will be only first mining and no pillar pulling, there is no subsidence control or subsidence monitoring plan.

Section 631 describes the method the Applicant will use to seal bore holes. Holes to be used for ground-water monitoring will be cased, completed and developed as a monitoring well

consistent with Figure 21 and as described in Chapter 7 Section R645-301-738. Conversion of a water-monitoring well to a water well will comply with R645-301-731.400.

Findings:

Geologic Resource Information is sufficient to meet the requirements of the Coal Mining Rules.

Analysis:

The MRP meets the Geologic Resource Information requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

Detailed geologic information is provided in Chapter 6 of the MRP. The geologic information was sufficient to determine the probable hydrologic consequences of the mining operation on quality and quantity of surface and ground water in the permit and adjacent areas. Additionally, the geologic information was sufficient to determine whether reclamation can be accomplished and that the mine plan has been designed to prevent material damage to the hydrologic balance.

The geologic information was obtained from a variety of sources including various studies/reports, previous mining activity in the area and geologic data obtained from approximately 70 drilling holes (26 of them within the permit boundary). Figures 2, *Drill Hole Locations & X-Section Lines* depict the locations. Figure 10, *Hiawatha Overburden Isopachs & Mining Blocks* provides the overburden thickness above the Hiawatha coal seam. Figure 3, Stratigraphic Column Kinney Area provides a stratigraphic cross-section of the geologic units located within and adjacent to the permit area.

Map 7A, *W-E X-Section A-A'* and Map 7B, *N-S X-Section C-C'* provide cross-sectional view of the permit and adjacent area. The cross-sections depict the locations of the monitoring wells that were advanced during the baseline data collection phase. Additionally, the cross-sections depict the approximate location of the regional water table's piezometric surface relative to the coal seam to be mined. The major fault systems present within the permit and adjacent area are also depicted.

Findings:

The MRP meets the Geologic Resource Information requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Alternative Water Source Information

The MRP meets the Alternative Water Source Information requirements. In Section R645-301-727, the Permittee commits to acquiring or purchasing surface and/or ground water rights or supplies from local sources (including Scofield Reservoir), in the event that mining activity impacts state appropriated water rights.

Sampling and Analysis

The MRP meets the Sampling and Analysis requirements of the State of Utah R645-Coal Mining Rules.

In section R645-301-723 of the MRP, the Permittee states, "*All water quality samples will be analyzed according to the most current copy of the Standard Methods for the Examination of Water and Wastewater, a joint publication of the American Public health Association, the American Water Works Association and the Water Pollution Control Federation.*"

Additionally, in Table 20, Hydrologic Monitoring Schedule, the Permittee indicates that quarterly lab water quality results will be submitted to the Division within 90 days of the end of the quarter and that an annual hydrologic review and summary of data will be submitted on or before June 1st.

Baseline Information

The MRP meets the Baseline Information requirements of the State of Utah R645-Coal Mining Rules.

The MRP presents baseline ground and surface water information in Chapter 7 beginning in Section R645-301-724.100. The hydrologic characterizations are based on available regional information as well as ongoing water monitoring. Exhibit 9 contains a spring and seep survey conducted in the permit and adjacent area. Exhibit 10 contains field measurements obtained from both ground and surface water resources in the permit and adjacent area. Exhibit 12 contains the analytical lab reports generated from the baseline data collection. Table 6, *Kinney #2 Baseline Monitoring Stations*, provides a comprehensive list of the ground and surface water resources that were monitored during the baseline data collection period. Map 10, *Regional Water Quality*, provides a depiction of the permit and adjacent area with Stiff Diagrams that

correspond to the various baseline water monitoring points. Figure 18, *Basic Water Quality*, provides charts of total dissolved solids (TDS), total manganese (T-Mn) and total iron (T-Fe) for baseline water monitoring stations. Additionally, Figure 19 provides charts of water quality versus flow for the baseline water monitoring stations. Table 10 provides a water quality summary for both ground and surface water.

Water right information has been compiled and presented in the MRP in several locations. Exhibit 13, *Water Rights* contains the print outs of the water rights located within the permit and adjacent area. Table 11, *Ground Water Rights* and Map 30, *Ground Water Rights Locations* provide a comprehensive listing and depiction of the ground water rights located within the permit and within a two mile radius from it. Table 12, *Surface Water Rights* and Map 31, *Surface Water Rights Locations* provide a comprehensive listing and depiction of the surface water rights located within the permit and within two mile radius from it.

Ground-water Information

The ground water characterizations and occurrences within the permit and adjacent areas were produced by the completion of a spring and seep survey, the completion of 11 water monitoring wells (completed within and outside the permit area at 8 different locations), geologic analysis of potential water-bearing strata and the analysis of water quality and quantity characteristics. Map 7, *Regional Hydrology* provides the names and locations of the seeps, springs and wells that are located within the permit and adjacent area. Map 8, *Works-Wells-Springs-Faults*, provides depicts the locations of the monitoring wells, identified springs and faults superimposed over the mine workings. Section 724.100 describes baseline water-quantity, seasonal flow rates and usage. Ground water rights are discussed on page 7-44 of the MRP. Map 30, *Ground Water Rights* depicts the location of the ground water rights located within and adjacent to the permit area. Table 11, *Ground Water Rights* lists the ground water rights depicted on Map 30. Field data collected from the monitoring wells is provided in Exhibit 10, *Surface and Ground Water Field Measurements*. Laboratory analytical reports generated from the baseline data collection process are provided in Exhibit 12 of the MRP.

Beginning in Section R645-301-724.100 of the application, the Permittee presents the baseline information utilized in characterizing the nature of the ground water systems in the permit and adjacent area.

The data presented in the MRP indicate that there are limited ground water resources within the permit and adjacent area. Based upon the information in the MRP and field investigations conducted by both the Permittee and the Division, a general lack of ground water in the permit and adjacent area due to the semi-arid conditions of the area, limited outcrop exposures for direct infiltration and steep slopes that accelerate storm water runoff thus limiting the amount of direct infiltration. In preparing the ground water baseline characterization of the area, the Permittee installed eleven monitoring wells at eight different locations within and

adjacent to the permit area. The monitoring wells were completed above, within and below the Hiawatha coal seam:

Above the Seam:
- CR 06-02 ABV (dry well)
- CR 06-03 ABV (water encountered)
- CR 06-09 ABV (water encountered)
- CR 10-11 (water encountered)
- CR 10-12 (water encountered)

In Seam:
- CR 06-01 (dry well)
- CR 06-02 (dry well)
- CR 06-05A (dry well)
- CR 06-09 (water encountered)

Below Seam:
- CR 06-01 BLW (dry well)
- CR 06-09 BLW (water encountered)

Water was encountered in four of the eleven wells (CR 06-03 ABV, CR 06-09, CR 10-11 and CR 10-12). Monitoring well CR 06-03 ABV is located just outside the permit area on the north-eastern extent. Water was obtained above the coal seam in this well. CR 06-09 was completed within the coal seam approximately ½ mile east of the north-east corner of the permit area. Monitoring wells CR 10-11 and CR 10-12 were installed within the Pleasant Valley Graben on the western extent of the permit area. At this location within the graben, the Hiawatha Coal Seam is approximately 600' below the monitoring wells due to the extensive displacement of the fault in this area. Mining will not occur in the area of wells CR 10-11 a CR 10-12 due to the vertical displacement produced by the fault at the western boundary of the Eagle Canyon Graben and the subsequent lowering of the Hiawatha Seam in this area.

Based upon Map 7A, *W-E Section A-A'*, the water levels obtained at monitoring wells CR 06-03 ABV, CR 06-09 ABV, CR 06-09 and CR 06-09 BLW indicate that the Hiawatha Coal Seam is potentially within the water table at these locations. However; the mining projections/plan provided in Map 15, *Mine Plan Layout and Production Schedule*, show that mining will not occur within the Eagle Canyon Graben where monitoring wells CR 06-03 ABV, CR 06-09 ABV, CR 06-09 and CR 06-09 BLW are located. Map 15 depicts the eastern most extent of mine workings stopping short of the western boundary of the Eagles Canyon Graben where monitoring well CR 06-03 ABV is located. As a result, the potential for impact of the ground water table in this location is minimal. However; in the future if mining activity is to be conducted east of the Eagle Canyon Graben, additional monitoring well installation and baseline

data collection will be required. Based upon the data obtained from the monitoring wells, the coal seam to be mined is located above the regional water table.

The MRP provides a discussion of the regional stratigraphy of the permit and adjacent area in Section R645-301-724.100 of the application. The geologic formations in the permit and adjacent area are contained within the Blackhawk Formation. Figure 3, *Stratigraphic Column Kinney Area*, provides a cross-Sectional view of the local geology. The geology is an important factor in determining the characteristics of the ground water systems in the area. The Blackhawk formation is a characterized by a sequence of alternating sandstone, mudstone and coal units. In ascending order, the major units of the Blackhawk Formation include the Panther Sandstone, Flat Canyon coal seam, Spring Canyon sandstone, Hiawatha coal seam, McKinnon coal seam and Haley Coal Seam. The sandstones are characterized as fine to medium-grained and are typically well cemented resulting in relatively low permeabilities. Ground water can be present in all of the major straigraphic units in the permit and adjacent area; however, all are considered to be poor to moderate aquifers.

Continuing in Section R645-301-724.100 the MRP identifies four aquifer systems within the permit and adjacent area. The four aquifer systems include: alluvial/colluvial aquifer system, perched/isolated ground water systems, stored mine water system and the regional ground water system. A detailed discussion of each of the four systems begins on page 7-25 of the MRP.

The Permittee is basing their ground water characterization upon the completion of a seep and spring survey in June of 2006 (See Exhibit 9), exploratory well drilling and baseline data collection and field observations. Table 6, *Kinney #2 Mine Baseline Monitoring Stations*, provides a depiction of the monitoring/sampling events conducted at the ground water monitoring sites. Table 20, *Hydrologic Monitoring Schedule*, provides a list of the water quality parameters that were analyzed during the baseline data collection period.

The seep and spring survey identified limited ground water resources within the permit and adjacent area. Six active seeps and 27 active springs were identified within the permit and adjacent area. Map 7, *Regional Hydrology*, depicts the locations of these ground water resources. Table 9, *Seep and Spring Flow Summary,* provides a flow summary from the June 2006 spring and seep survey. The Seep and Spring survey (the Survey) identified very few springs and seeps within the permit boundary. Eagle Springs 1, 1A, 2 and 3 as well as Aspen spring are the only springs identified within the permit boundary. However, the Survey identified many seeps and springs within Long Canyon (approximately ¾ of a mile from the eastern permit boundary), Miller Canyon and the UP Canyon moving east to west from the proposed permit area.

Initially during the baseline data collection period, Angle Spring was selected as a representative spring/seep within the permit and adjacent area (namely Aspen Spring, Eagle 1,

Eagle 1A, Eagle 2 and Eagle 3). The aforementioned springs are all located within the Eagle Canyon Graben. Angle Spring was sampled 11 times from September 2005 to September 2006 (See Exhibit 10, *Surface and Ground Water Field Measurements*) at which time, access to the spring was denied by the land owner. As a result, the Permittee selected Aspen Spring (located within the permit area, See Map 7, *Regional Hydrology*) for representative sampling of the seeps/springs within the permit and adjacent area. Aspen Spring has been visited 9 times with 5 of those visits producing measurable data (See Exhibit 10, Exhibit 12, Table 10 and Figure 17). Data collection at Aspen Spring was interrupted during 2009 due to lack of funding. No flow measurements were obtained from Aspen Spring.

Per R645-301-724.100, the Permittee is required to, at minimum, approximate rates of discharge or usage for ground water resources. To that end, the Permittee has provided an estimate of Aspen Springs flow in Exhibit 10. The approximation is based on a pan evaporation method that takes into account the size of the pond and utilizes a basic water balance approach. Based upon the estimates, the flow range of Aspen Spring is approximately 2-5 gpm. The Permittee has indicated that additional water monitoring will be conducted on Aspen Spring as well as Eagle Springs 1, 1A, 2 and 3 to more accurately assess the quantity of flow from these resources (See Table 7, *Kinney Mine Operational Monitoring Stations*). The Permittee commits to collecting an additional 2 years of data from the aforementioned springs.

Based upon the approximation that the maximum flow from Aspen Spring is 5 gpm, and that Aspen Spring is representative of Eagle Springs 1, 1A, 2 and 3, the Permittee provides a commitment in Section R645-301-731.800 that "*if the springs in the graben area are affected by mining, CR commits to replace the estimate quantity of Aspen Spring and the total of the flow measurements for the other springs in the graben area*". Based upon the maximum estimate of flow from Aspen Spring (i.e. 5 gpm), the Permittee would be required to replace 25 gpm in the event that mining impacts these resources.

In summary, the baseline data presented in the MRP indicates that ground water resources within the permit and adjacent area are limited. Ground water resources are found in 1) shallow alluvial/colluvial valley fill deposits in the valley area west of the permit area; 2) perched ground water located in discontinuous sedimentary units in the Blackhawk formation and in adjacent faults; 3) ground water that has accumulated in existing underground mine workings; and 4) potentially a regional water table.

The ground water movement in the permit and adjacent area is limited by the generally low transmissivity values of the area geology and limited recharge due to the arid conditions of the site as well as limited outcrop exposures coupled with steep terrain.

Three of the four water monitoring wells that were completed within the Hiawatha Coal seam were dry with no ground water encountered. Additionally, one of the two monitoring wells completed below the Hiawatha Coal seam was dry as well. Five wells (CR 06-03 ABV, CR 06-09, CR 06-09 ABV, CR 10-11 and CR 10-12) had water present above the Hiawatha Coal Seam.

CR 06-03 ABV is located within the Eagle Canyon Graben. Due to the faulting in the graben, the coal seam is located below the regional water table. However; mining will not be conducted within the Eagle Canyon Graben (See Map 15, *Mine Plan Layout and Production Schedule*). Monitoring wells CR 06-09 and CR 06-09 ABV (a double completion monitoring well) are located nearly a half a mile north-east of the permit boundary on the ridgeline between Eagle and Long Canyons. In this location, the Hiawatha Seam is lower than the projected regional aquifer (See Map 7A, *W-E X-Section A-A'*). As with monitoring well CR 06-03 ABV, wells CR 10-11 and CR 10-12 are completed well above the Hiawatha Seam which is significantly lower in the area of these wells do to the extensive fault in this area.

Surface Water

The MRP presents water information in Section R645-301-724.200. Figure 7, *Regional Hydrology* depicts the surface water resources within the permit and adjacent area. Map 31, *Surface Water Rights*, depicts the locations of the surface water rights within the permit and adjacent area. Exhibit 13, *Water Rights*, provides the written documentation of the water rights as provided by the Utah Division of Water Rights. Table 10, *Surface and Ground Water Quality Summary,* provides a basic statistical summary of the water quality information obtained during the baseline data collection. The permit and adjacent areas are located within the Upper Price River basin.

Surface water in the permit and adjacent areas is limited to Scofield Reservoir, perennial flows within Mud Creek, Miller and Long Canyon and ephemeral flows from various side drainages and Eagle Canyon. The permit and adjacent area fall within the Upper Price River watershed. Perennial streams within the area adjacent to the mine site are Mud Creek and Miller Canyon. These drainages are tributary to Scofield Reservoir. The perennial streams within the adjacent area include Mud Creek and Long/Miller Canyon. All of the other drainages within the permit and adjacent area are characterized as ephemeral (Monay Draw, Blue seal Draw, Kinney Draw, Columbine Draw, Jones Draw, UP Canyon and Eagle Canyon).

Baseline data was collected at three surface water monitoring points: Miller Outlet, Mud Creek and Res-1. Figure 7, *Regional Hydrology* depicts the location of these surface water monitoring points. Map 10, *Regional Water Quality* provides a depiction of the permit and adjacent area with corresponding water quality diagrams for the baseline water monitoring stations.

Perennial Streams

No perennial streams are located within the permit boundary. Miller Canyon and Mud Creek are the only perennial streams located in the adjacent area of the permit boundary. Significant variation in flow has been recorded within these drainages. The baseline data presented in the application for Miller Canyon has noted variability from zero flow (in winter

months when the stream is frozen) to 1.21 cubic feet per second (cfs) in the spring. Similarly, Mud Creek has produced flow variability's ranging from 11.0 cfs to 131.1 cfs.

The water quality data for these two drainages is presented in Table 10, *Surface and Ground Water Quality Summary, Exhibit* 12, *Surface and Ground Water Quality Data* and Figure 17, *Field Data.*

Intermittent Streams

No intermittent streams were identified within the permit and adjacent area. The Permittee has provided information in Exhibit 20, *Ephemeral Drainage Information* that discusses the drainages (other than the perennial area drainages of Mud Creek and Miller Outlet) located within the permit and adjacent area. Based upon that information as well as monitoring well information, the seven drainages located within or adjacent to the permit area (with the exception of Mud Creek and Miller Outlet) are ephemeral (See Ephemeral Streams discussion below).

Ephemeral Streams

Seven ephemeral drainages have been identified within the permit and adjacent area. Of the seven, four are within or cross a portion of the permit boundary (from North to South): Eagle Canyon, Kinney Draw, Columbine Draw and Jones Draw. The remaining three ephemeral drainages are located outside the permit boundary (from North to South): Monay Draw, Blue Seal Draw and UP Canyon.

In Exhibit 20, the Permittee characterizes the ephemeral nature of these drainages by utilizing photographs, analyses of the drainages 3D geometry, alluvial and vegetative material as well as their position relative to the water table. Monitoring well CR 06-01 BLW is located directly adjacent to the Jones Draw. Measurable ground water was not detected/encountered within this monitoring well. The bottom of the well screen is approximately 120 feet below Jones Draw. As a result, it's unlikely that the drainage receives any recharge from a ground water system thus characterizing it as an ephemeral (as opposed to intermittent) drainage.

Additionally, Exhibit 20 discusses how the 7 drainages outlined above are ephemeral based on the following observations:

- Relatively small drainage basins for these drainages,
- Low sinuosity,
- Absence of a defined channel,
- Minimal amounts of alluvium in the channel
- No noticeable difference between in channel vegetation and surrounding drainage basin vegetation.

- Virtual absence of bank and bed storage material.

Exhibit 10, *Surface and Ground Water Field Measurements* and Figure 17, *Field Data* documents 21 observations of no flow for Eagle Canyon, Kinney Draw, Columbine Draw, Jones Draw, Monay Draw, Blue Seal Draw and the UP Canyon drainage. The field visits were documented by Carbon Resources, LLC representative Benjamin Grimes. The field visits began in May of 2006 and with the exception of 2008 (based upon discussions with the Permittee, lack of funding at this time terminated active field work), extended to October of 2010.

Water Quality

As required by R645-301-724.100, the Permittee provided ground water quality data for total dissolved solids, specific conductance, pH, total iron and total manganese. Additionally, the Permittee provided baseline data for total suspended solids, total dissolved solids (or specific conductance), pH, total iron and total manganese for surface water monitoring stations as required by R645-301-724.200. Table 20, *Hydrologic Water Monitoring Schedule* provides a comprehensive list of additional analytical parameters that were analyzed. The list of additional parameters is derived from State of Utah Tech Directive 004, *Water Monitoring Programs for Coal Mines*. Water quality data obtained during the baseline data collection period is provided in numerous locations within the MRP. Exhibit 10 contains field measurements obtained from both ground and surface water resources in the permit and adjacent area. Exhibit 12 contains the analytical lab reports generated from the baseline data collection. Map 10, *Regional Water Quality*, provides a depiction of the permit and adjacent area with Stiff Diagrams that correspond to the various baseline water monitoring points. Figure 18, *Basic Water Quality*, provides charts of total dissolved solids (TDS), total manganese (T-Mn), sulfate and total iron (T-Fe) for baseline water monitoring stations over time. The figure aids in identifying the presence/absence of water quality trends. Additionally, Figure 19, *Water Quality vs. Flow* provides charts of water quality versus flow for the baseline water monitoring stations. Table 10 provides a water quality summary for both ground and surface water.

Ground water quality data was obtained from three of the eleven wells (CR 06-03ABV, CR 10-11 and CR 10-12). The amount of water quality data obtained from monitoring wells was limited simply because little water was encountered (with the exceptions identified above). Water quality data was also obtained from Angle Spring, Aspen Spring, Eagle Spring and Sulfur Spring. Map 10, *Regional Water Quality*, provides a depiction of the major cations and anions identified during the baseline data collection period.

The data indicate that the general water chemistry of the ground water in the permit and adjacent area is a calcium bicarbonate type with some variations. Water quality from Angle and Sulfur Springs as well as from monitoring well CR 06-03ABV show a strongly calcium bicarbonate type water. Miller Outlet, Mud Creek and Res-1 are composed of slightly lower concentrations indicative of this water type. Mud Creek also contains higher concentrations of

sodium potassium, magnesium and sulfate. An additional anomaly has been identified with Eagle Spring which shows distinctly higher quality sodium-calcium bicarbonate type water. As a result, it appears that there is a distinct difference between the water qualities of Eagle Spring when compared to the water chemistry data obtained from the other ground water monitoring sites.

Surface water quality data was obtained from Miller Outlet, Mud Creek, and Scofield Reservoir. Table 12, *Surface Water Rights* and Map 31, *Surface Water Rights Locations* provides a comprehensive list and location depiction respectively. The basic chemical characteristics of these surface water monitoring sites is displayed on Map 10, *Regional Water Quality*. Based upon the data presented in the MRP, the surface waters within the permit and adjacent areas are of a calcium-bicarbonate type, although Mud Creek shows higher components of sodium, potassium and sulfate than Scofield Reservoir and Miller Outlet. Angle Spring, Sulfur Spring and monitoring well CR 06-03 ABV were also found to be of calcium-bicarbonate type water and to have higher concentrations than that of surface water resources. As discussed, Eagle Spring exhibits different concentrations of basic anions-cations and is of higher water quality. As discussed above, Figure 19 provides charts for pH, conductivity, TDS and sulfate versus flow. A clear pattern showing variation in water quality relative to recorded flows is not readily apparent.

Water Wells

Four water wells have been identified within 1 mile of the permit boundary. Map 30, *Ground Water Rights* depicts the locations of these wells. No water supply wells are located within the permit boundary.

State Appropriated Water Rights

The MRP provides a comprehensive list and depictions of the State Appropriated Water Rights located within the permit and adjacent area. The water right information presented in the MRP was compiled in consultation with the State of Utah Division of Water Rights (DWRi).

Map 30, *Ground Water Rights Locations* and Map 31, *Surface Water Rights Locations* depict the locations of State Appropriated Water Rights within the permit and adjacent area.

Table 11, *Ground Water Rights* and Table 12, *Surface Water Rights* provide a comprehensive listing of the State Appropriated Water Rights located within the permit and adjacent area.

Baseline Cumulative Impact Area Information

The MRP meets the Baseline Cumulative Impact Area Information requirements of the State of Utah R645-Coal Mining Rules.

Information needed to meet the regulatory requirements of R645-301-725 is available from federal, state and a number of other sources. The Permittee is not required to provide data specifically for the CHIA determination, but may gather and submit such information. The Division is not limited to information in the MRP in preparing the CHIA; however, data presented in Chapter's 7 and 9 were utilized in the preparation of the CHIA.

Modeling

The MRP meets the Modeling requirements of the State of Utah R645-Coal Mining Rules.

In Section R645-301-726, the MRP discusses the regional aquifer water modeling that was conducted. The Permittee utilized SERVCAD software with a triangulation interpellator and a 500 ft. grid size. Static water level data obtained from CR 06-09, CR 06-03ABV, CR 10-11 and CR 10-12 were utilized in constructing the model. Additionally, limiting data provided by the screened interval elevation in dry monitoring wells CR 06-01BLW and CR 06-05A was data input for the model. The perennial reaches of Mud Creek and Miller Creek were also utilized in constructing a 3D image of the regional aquifer system.

In order to the design the collection system ditches and culverts, the Permittee utilized Hydrologic Modeling Software (HEC-HMS) 3.1.0 developed by the Army Corps of Engineers using the Soil Conservation Service (SCS) curve number loss method and the SCS unit hydrograph transform method.

Drainage basins were delineated in AutoCAD by utilizing existing and proposed elevation contour data and the location of proposed pads and storm drainage facilities. Drainage basins were modeled in HEC-HMS using the SCS unit hydrograph transform method.

Probable Hydrologic Consequences Determination

The MRP meets the Probable Hydrologic Consequences Determination requirements of the State of Utah R645-Coal Mining Rules.

The MRP discusses the probable hydrologic consequences beginning in Section R645-301-728.

Adverse Impacts to the Hydrologic Balance

Based upon the lack of ground water encountered during the baseline data collection, the potential for impacts to the hydrologic balance relative to ground water is considered minimal. The data obtained from the completion of eleven monitoring wells both within and adjacent to the permit area shows no evidence of a lateral continuous aquifer or ground water system within or above the coal seam to be mined. It's anticipated that small perched ground water systems will be encountered, but the direct impact of that will be minimal. It would be expected (based on the baseline data) that loss of ground water from the perched ground water systems within the permit area would be very localized and characterized by low flow rates and low total flow volumes as these ground water systems are small.

The potential for intercepting the recharge for the springs located within the permit and adjacent area is considered minimal. Based on the data presented for ground water, the limited number of springs located within the permit and adjacent area are recharged by snowmelt and precipitation events at the surface. As mining will be constrained to first mining practices only (i.e. no subsidence) the potential for mining induced fracturing to intercept the recharge to these springs is considered minimal. 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 its proximity to the drainages and the utilization of first mining practices only (i.e. no planned subsidence).

Potential impacts to the hydrologic balance relative to surface water are also considered minimal. The Kinney No. 2 surface facility is confined to a very small area. No perennial or intermittent streams are located within the permit area. Surface water resources within the adjacent area are essentially limited to Mud Creek and Scofield Reservoir. With only first mining to be conducted (i.e. no subsidence) and the lack of any significant surface water resources within the permit area, the potential for hydrologic balance impacts relative to surface water is considered minimal. Mud Creek and Scofield Reservoir are located within the Pleasant Valley Graben approximately a half a mile from the mine works. The potential for the recharge to these surface water resources of being impacted as result of mining activity at the Kinney No. 2 Mine is considered minimal based upon the proximity of these surface water resources to the mine works and the limited ground water encountered during the baseline data collection period. The baseline data indicates that a regional water table may exist within the permit and adjacent area, however, based upon the drill logs of the eleven monitoring wells and the lack of water encountered within the coal seam to be mined, it appears that the regional water table is located below the coal seam, thus the potential for the mining to intercept this ground water resource is considered minimal. As a result, any potential impact to the recharge of Scofield Reservoir and Mud Creek from the regional ground water table is considered minimal.

The ephemeral drainages that are located within the permit area will be effectively routed around the surface disturbance with the construction of the facilities drainage network and sediment control measures.

Based on available data and expected mining conditions, the mining and reclamation operation is not expected to proximately result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit or adjacent area.

Sediment yield from the disturbed area

Sediment control structures will be constructed to minimize impacts as a result of increased sediment yield from the disturbed area. The MRP discusses the sediment control measures in Section R645-301-732. Exhibit 16, *Runoff Control Design Details* provides the calculations and design considerations utilized in designing the sediment control/drainage controls at the mine site.

All diversion ditches (disturbed and undisturbed), associated culverts as well as the sediment pond have been designed to the required performance standards outlined in R645-301-740. All storm water runoff and associated sediment load generated from the disturbed area will report to the primary sediment pond where it will be retained and treated prior to discharge.

Temporary sediment controls and alternative sediment controls will be utilized in smaller areas that do not report to the primary sediment pond.

Flooding or streamflow alteration

The potential for flooding or streamflow alteration impacts is minimal. No perennial or intermittent streams are located within the permit area. Mud Creek is a perennial stream located 0.5 mile west of the permit area in the Pleasant Valley Graben. Mining impacts are not anticipated to affect Mud Creek given its proximity to the mine works. Miller/Long Canyon is a perennial drainage located approximately 1.5 miles north of the permit area. As with Mud Creek, given the proximity of this drainage as well as no anticipated subsidence impacts, the potential for flooding or streamflow alteration of this drainage is considered minimal.

Additionally, the primary sediment pond has been designed and will be built to be geo-technically stable, minimizing the potential for breaches that could cause flooding impacts. Flow routing through the sedimentation pond and other sediment-control devices will reduce peak flows from the disturbed areas, decreasing the potential for flooding in downstream areas. By retaining sediment on site in the sediment-control devices, the ditch elevations directly adjacent to the permit area on the west side (adjacent to SR 96) will be maintained.

Ground Water Impacts

Impacts to ground water resources within the permit and adjacent area are considered to be minimal given the overall lack of ground water encountered during the baseline data collection period (See Baseline Ground Water discussion above).

The following potential impacts to the ground water resources are identified in Section R645-301-728:

- Alterations of local ground water flow patterns
- Drainage of seeps/springs
- Alterations of recharge/storage/discharge relationships
- Localized increases in concentrations of TDS and other individual chemical constituents.

Alterations of local ground water flow patterns

Coal mining operations have the potential to cause ground water to flow into the mine. An alteration of ground water flow towards the mine workings could occur if a perched aquifer was encountered. Encountering these perched ground water systems can alter existing ground water storage as well as flow patterns. The result of such an impact could be the partial or full drainage of the perched system which can affect the discharge of receiving springs and seeps.

However, given the baseline data collected from the extensive monitoring well completions and subsequent data collection from those wells, it would follow that impacts to the hydrologic balance of the ground water resources in the permit and adjacent area are minimal based on the monitoring well completion diagrams (See Exhibit 11, *Monitoring Well Completion Details*) and the lack of ground water encountered. Monitoring well CR 06-01 BLW's screen is completed at a depth of approximately 7,700'. The lowermost spring elevation is Angle Spring at approximately 7,940'. Given that the monitoring wells completed within the permit area did not encounter water and that the monitoring wells were completed well below the springs, it would appear that the limited springs in the region are recharged by annual snowmelt and precipitation events. Additionally, as the mine plan does not call for secondary mining (i.e. no planned subsidence) and that the areas where water was encountered in the coal seam (i.e. within the Eagle Canyon Graben) will not be mined, the potential for impacts to ground water resources appears to be minimal.

Additionally, perched aquifer systems in the permit and adjacent area are believed to be discontinuous due to the faulting in the area. Any water that is encountered within the mine works would flow down dip inside the mine and serve as a possible recharge source. Once operations at the mine have ceased and the site is reclaimed, it would be expected that the underground workings may partially fill with encountered ground water. No significant changes would be expected to the potentiometric surface of the regional aquifer as it appears to be well below the Hiawatha Coal seam.

Impacts to water users within the permit and adjacent area would be expected to be minimal. Map 30, *Ground Water Right Locations*, depicts the locations of the ground water rights within the permit and adjacent area. Beneficial uses of ground water are primarily located on the south-eastern shoreline of Scofield Reservoir. As discussed in Chapter 6 (Geology), the regional dip of the stratigraphic units is to the east (towards the mine works).

Drainage of seeps/springs

Mining activity could result in the draining/dewatering of overlying perched aquifers resulting in the vertical migration of water through mining related fractures. As a result, springs/seeps that discharge from the stratigraphic units containing the encountered perched ground water could be impacted. The potential for such impacts is considered minimal. Mining induced fractures will be minimized by the maintenance of barrier pillars and the limited extraction of the coal seam to first or development mining only (i.e. no planned subsidence/secondary mining). If it's determined that seeps or springs have been impacted as a result of mining activity, the Permittee commits to mitigate these impacts through the purchase of affected water rights, monetary compensation, development of alternative water facilities (such as guzzlers) or other appropriate mitigation measures. Additionally, the overall lack of springs/seeps within the permit and adjacent area (See discussion above) further reduce the potential for such impacts.

Alteration of recharge/storage/discharge relations

Mining activity could produce alterations of the recharge, storage and discharge relations of ground water in the permit and adjacent area. However; as discussed in the Baseline Section above, the recharge of water to the underlying ground water systems occurs primarily as a result of direct precipitation, snowmelt and infiltration. As the mine workings and associated surface disturbance are limited in a real extent and are not located within a major recharge area, the mining operations are not expected to produce significant impacts in this regard. Additionally, as a result of the vertical separation between the mine workings and the elevation of the overlying springs, it's unlikely (given that secondary mining will not occur) that appreciable recharge sources will be encountered.

Once mining operations cease and the site is reclaimed, encountered ground water will accumulate in the mine workings. The result will be an increase in localized ground water storage. The increase in storage could temporarily reduce down gradient ground water flows as the underground mine works fill. However, this would be a temporary development as over time the mine water levels would reach equilibrium.

Localized increases in concentrations of TDS

As ground water resources are encountered and enter the mine workings, it is exposed to subsurface materials in the mine thus potentially producing oxidation and weathering processes that can cause changes to ground water chemistry. The resulting impacts can be increases in total dissolved solids (TDS) and an increase in the concentrations of other individual chemical constituents (e.g. total-iron). However, over time such increases will stabilize and decrease as the finite amount of chemical constituents are depleted. Additionally, in the event that mine-water reached an elevation where discharge to the surface was necessary, the Permittee would need to comply with all applicable State and Federal water quality standards. The Permittee has obtained a Utah Pollutant Discharge Elimination System permit under the Federal Clean Water Act. The site will utilize a sediment pond to treat the storm water runoff generated/ on site prior to discharge.

Surface Water Impacts

The MRP discusses surface water impacts beginning on page 7-89 of the MRP. As with ground water resources, the amount of surface water resources within the permit and adjacent area are limited (See Surface Water Baseline discussion above).

Surface water in the permit and adjacent areas is limited to Scofield Reservoir, perennial flows within Mud Creek, Miller and Long Canyon and ephemeral flows from various side drainages and Eagle Canyon. No perennial or intermittent streams are located within the permit area. Perennial streams within the area adjacent to the mine site are Mud Creek and Long/Miller Canyon. These drainages are tributary to Scofield Reservoir. All of the other drainages within the permit and adjacent area are characterized as ephemeral (Monay Draw, Blue Seal Draw, Kinney Draw, Columbine Draw, Jones Draw, UP Canyon and Eagle Canyon).

Of the seven ephemeral drainages that have been identified within the permit and adjacent area four are within or cross a portion of the permit boundary (from North to South): Eagle Canyon, Kinney Draw, Columbine Draw and Jones Draw. The remaining three ephemeral drainages are located outside the permit boundary (from North to South): Monay Draw, Blue Seal Draw and UP Canyon.

The following potential impacts to surface water resources are identified in Section R645-301-728:

- Temporary increases in runoff from disturbed areas
- Minor reductions in surface flows and alteration of surface flow patterns due to operation of the sedimentation structure.
- Changes in surface water chemistry.
- Increases in the levels of TDS, TSS and certain individual chemical constituents.

Temporary increases in runoff from disturbed areas

Constructing the surface facilities of the mine, will result in disturbing the surface as grading is performed and topsoil and vegetation removed. The disturbance will result in the reduction of infiltration rates and a potential for increases in runoff from the disturbed area. In order to reduce the potential impact of the surface disturbance, the Permittee has designed a surface runoff/drainage plan (See Sediment Control Discussion below). As part of the drainage plan, undisturbed/upgradient drainage will be routed around the surface disturbance to minimize increased runoff from the disturbed area. Disturbed areas will be graded to minimize runoff when possible. Additionally, the Permittee has designed the surface facility to reduce the area of surface disturbance (and thus the potential for greater temporary increases in runoff). Additionally, the drainage control plan utilizes a sediment pond that has been designed to retain the surface runoff volume produced by a 10-year, 24-hour storm event. The retention of storm flow within the sediment pond will decrease the amount of increased runoff from the disturbed area.

Minor reductions in surface flows and alteration of surface flow patterns due to operation of the sedimentation structure.

The storm water runoff/erosion plan utilizes a primary sediment pond to retain and treat the water prior to leaving the disturbed area. The operation of a sediment pond can reduce discharge flow volumes and extend the period of effective flow for runoff from snowmelt and precipitation events. The sediment pond designed for the Kinney No. 2 Mine (See Sediment Pond discussion below for further detail) is designed to gradually release impounded water after the required retention times for sediment control have been achieved.

Changes in Surface Water Chemistry: Increases in Levels of TDS, TSS, Sedimentation and Individual Chemical Constituents

No perennial or intermittent streams are located within the permit area. However, several ephemeral drainages are located within the permit area. Contact between disturbed area runoff and exposed surficial materials could result in increases in TDS and TSS to primarily receiving drainages within the adjacent area (i.e. Scofield Reservoir).

The surface disturbance produced by the construction of the facility could also potentially impact surface water quality in the receiving drainage (i.e. the drainage system adjacent to SR96 that reports to Scofield Reservoir). As disturbed area runoff flows over exposed surficial materials, additional contributions of sodium, sulfate materials could be introduced to adjacent area drainages as the materials are subjected to weathering.

The potential for such impacts is considered minimal. The MRP provides the details of the sediment control measures beginning in Section R645-301-732. The primary sediment control measure for the disturbed area is the sediment pond. All disturbed area storm water

runoff will report to the primary sediment pond. The pond has been adequately sized and designed to safely contain the 10-year, 24-hour event. As a result, the potential for increases in TSS, TDS, sedimentation and other chemical constituents to receiving drainages outside the permit area is minimal. The Permittee's UPDES permit establishes the minimum water quality standards that must be met by any discharge that ultimately leaves the sediment pond and enters the Scofield Reservoir drainage. By effectively maintaining and operating the sediment pond during the construction and operational phase, the amount of sedimentation and resulting increases in TSS, TDS to receiving drainages is minimized. During reclamation, the Permittee has committed to the re-establishment of the pre-mining drainage patterns (See Reclamation Discussion below).

Acid-forming/Toxic-forming materials

In Chapter 6 of the MRP, the Permittee presents the acid/toxic information. Tables 4 and 4A in Section R645-301-624 presents the results of the analyses that were performed on the coal located within the lease area as well as on mine waste buried within the proposed disturbed area boundary. Exhibit 19 in Volume 4 of the MRP provides the details of the core analysis which was performed by SGS Labs, Denver. Exhibit 6 provides the details of the mine waste analysis (also conducted by SGS Labs). The information provided suggests that potentially acid forming material is located in the roof and floor of the mine. Table 4 provides the supporting calculations for Acid Production Potential (APP), Neutralization Potential (NP) and Net Neutralization Potential (NNP). Negative net neutralization potential values are identified in Table 4 indicating that acid/toxic forming materials may be present.

The potential for acid/toxic forming materials to impact surface and ground water resources is considered minimal. The roof and floor material will not be stored for long periods of time at the surface facility. Section 528.320 indicates that the maximum time the temporary waste pile will remain on the site is two years. The MRP indicates that the material will be blended with the coal product, placed temporarily in the Temporary Stockpile (See Map 13, *Surface Facilities*) or temporarily stored in the "off-spec" stacking tube for eventual shipping. The MRP indicates that any unused material stored in the Temporary Stockpile will be taken under contract to a third party processing facility.

The potential for acid/toxic impacts to surface and ground water facilities is further minimized by the utilization of the primary sediment pond. The sediment pond located at the surface facility is designed to contain the 10-year, 24-hour event. In addition, the Permittee has obtained a Utah Pollutant Discharge Elimination System (UPDES Permit) under the Federal Clean Water Act. As all storm water generated on site is routed to the sediment pond for retention/treatment prior to discharge, the potential for acid/toxic impacts to migrate outside the permit area is limited. The UPDES permit establishes water quality standards that must be met prior to any discharge leaving the sediment pond. As a result, the potential for acid/toxic material to impact Scofield Reservoir is minimal.

The potential for ground water to be impacted by acid/toxic materials is also minimal. The ground water baseline information (See Ground Water baseline discussion above) indicates that there is a general lack of ground water that could even come in contact with potentially acid/toxic forming materials. Additionally, the baseline data indicates that the coal seam to be mined is located well above the potential regional water table thus limiting even further the potential for impacts to ground water systems in the permit and adjacent area.

Findings:

The MRP meets the Hydrologic Resource Information requirements of the State of Utah R645-Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

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

Analysis:

Archeological Site Maps

Map 14, *Mine Surface Facilities Area Pre-Mining Topography* depicts the locations of archeology features.

Cultural Resource Maps

Map 2 *Raptor Map*, Map 2A *Black Bear Habitat*, Map 2B *Blue Grouse Habitat*, Map 2C *Moose Habitat*, Map 2D *Mule Deer Habitat*, Map 2E *Rocky Mountain Elk Habitat*, Map 2F *Sage Grouse Habitat* and Map 2G *Snowshoe Hare Habitat* provide the necessary habitat depictions.

Existing Structures and Facilities Maps

The MRP meets the Existing Structures and Facilities Maps requirements of the State of Utah R645-Coal Mining Rules.

Existing structure means a structure or facility used in connection with or to facilitate coal mining and reclamation operations for which construction began January 21, 1981. The MRP met the requirements of depicting the existing structures and facilities by showing:

- Map 13, *Surface Facilities*, depicts the location of the primary sedimentation pond and associated embankment.

Existing structures are included on Map 14, Mine Surface Facilities Area and Pre Mining Topography Map.

Existing Surface Configuration Maps

The MRP provides a cross-sectional view of the permit and adjacent area in Maps 7A, *W-E X-Section A-A'* and Map *7B, N-S X-Section C-C'*.

Pre-mining topography details are included on Map 14, Mine Surface Facilities Area and Pre Mining Topography Map.

Mine Workings Maps

Future and past mine workings details are included on Map 15, Mine Plan Layouts and Production Schedule. Previous mining activity details are included on Map 5, Previous Mining Activities.

Monitoring and Sampling Location Maps

The MRP meets the Monitoring and Sampling Location Map requirements relative to the hydrology section of the State of Utah R645-Coal Mining Rules. Map 28, *Surface and Ground Water Monitoring Sites* depicts the locations of the ground and surface water monitoring sites. Additionally Map 7, *Regional Hydrology* also depicts the locations of the water monitoring sites that were utilized for the baseline data collection as well as the operational water monitoring sites.

Subsidence-monitoring locations are included in the MRP.

Permit Area Boundary Maps

The permit area is depicted on Map 7, Regional Hydrology.

Subsurface Water Resource Maps

Maps 7A, *W-E X-Section A-A'* and Map *7B, N-S X-Section C-C'* provide cross-sectional view of the permit and adjacent area. The cross-sections depict the piezometric surface of the regional water table as it is currently understood.

The MRP meets the Surface Water Resource Map requirements of the State of Utah R645-Coal Mining Rules.

Map 7, *Regional Hydrology* depicts the surface water resources located within the permit and adjacent area.

Surface and Subsurface Manmade Features Maps

Map 14, *Mine Surface Facilities Area Pre-Mining Topography* indicates "None will be used for mining". This map also provides a listing of each archeological feature which may be impacted.

Surface and Subsurface Ownership Maps

Map 11, *Regional Surface Ownership*, depicts the surface ownership within the permit area. Map 12, *Regional Coal Ownership*, depicts the ownership and lease areas.

Surface Water Resource Maps

The MRP meets the Surface Water Resource Map requirements of the State of Utah R645-Coal Mining Rules.

Map 7, *Regional Hydrology* depicts the surface water resources located within the permit and adjacent area.

Vegetation Reference Area Maps

Map 1A, *Facilities Area Vegetation Map*, depicts the location of vegetation. Map 1B, provides an aerial view of the vegetation in the permit area.

Well Maps

The MRP meets the Well Map requirements of the State of Utah R645-Coal Mining Rules.

Map 7, *Regional Hydrology* depicts the locations of all monitoring wells that were constructed during the baseline data collection period. Additionally, the map depicts the locations of the monitoring wells that will be utilized for on-going water monitoring activity.

Map 30, *Ground Water Rights Locations* depicts the locations of the water wells located within the adjacent area. No culinary water wells are located within the permit boundary.

There are no oil and gas wells within the Portal Block Permit Boundary (Section 622.400).

Findings:

The MRP meets the Maps, Plans and Cross-Sections of Resources requirements of the State of Utah R645-Coal Mining Rules.

OPERATION PLAN

Analysis:

Within the MRP are general descriptions of the mining operations to be conducted during the life of the mine within the proposed permit area, including, a narrative description of the type and method of coal mining procedures and proposed engineering techniques, anticipated annual and total production of coal, and the major equipment to be used for all aspects of those operations

Descriptions are included for the construction, modification, use, maintenance, and removal of a sedimentation pond, mine facilities, storage areas and structures; coal removal facilities, top-soil storage facilities, materials handling and storage, and transportation areas and structures

The permit states that the proposed mining and related activities will require limited surface support facilities and that the facilities to be utilized in conjunction with the proposed operations will include new facilities to be constructed in the proposed Kinney No. 2 Mine surface facilities area. Surface facilities will be operated, maintained, and ultimately reclaimed in a manner that prevents or controls erosions and siltation, water pollution, and damage to public or private property; and to the extent possible using the best technology currently available. Required surface facilities are shown and identified on Map 13, Surface Facilities Map.

A number of structures will be required to support the proposed mining and related operations. These facilities will be used to provide storage, maintenance, and support services for mine personnel, equipment, and materials and supplies and will specifically include the following facilities:

- Storage Sheds – 5 each
- Shop – Warehouse
- Fueling Facility
- Mine Office – Bath House
- Water Tank
- Electrical Substation
- Explosives Magazine
- Explosive Cap Magazine

These structures are shown on Map 13, Surface Facilities and are described in details within section R645-301-528 of the MRP, beginning on page 5-52. These descriptions include shop facilities, office, bath house building, maintenance shop, conveyor system, load-out

facilities, and warehouse facilities. Figure 26 depicts the coal handling flow sheet. Figure 27 provides a complete elevation schematic of the conveyor system. Figures 28 and 29 depict the plan views of bath house configuration for the lower and upper levels. Figures 30 and 31 depict section views of the bath house. Figure 32 depicts a plan view of the warehouse & shop configuration. Figure 33 & 34 show different cross section views of the warehouse and shop configuration.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

EXISTING STRUCTURES:

Regulatory Reference: 30 CFR 784.12; R645-301-526.

Analysis:

The only existing structures consist of a small stone, concrete, and railroad tie building that historically housed a mine fan, a small concrete building used as a powder magazine, and several foundation structures. None of these structures will be used by the Kinney No.2 Mine. These structures can be found on Map 14, Mine Surface Facilities, Pre-Mining Topography Map.

Findings:

Since none of these structures will be used by the Kinney No.2 Mine, no further descriptions, information or details are required. Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

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

Analysis:

The Land Use information is included in chapter 4 and map #4 (Regional Land Use) of the application. The proposed disturbed area includes two zoning classifications for the proposed disturbed area, Scofield Commercial and Carbon County Mountain Range. A portion of the area is a reclaimed abandoned mine site and the remaining is an undisturbed grass, shrub aspen community both of which are used primarily for wildlife, grazing and outdoor recreation

according to the text on page 4-9. These current land uses as described by the applicant are clearly components of the Watershed zone by definition. Page 4-3 has been revised to include a narrative and Table 3 that delineates the land uses and zones.

Map #4, the Regional Land Use map includes the current and post mining land uses of wildlife and grazing for the proposed disturbed area in the legend of the legislated zones, (Mountain Range and Commercial).

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

RELOCATION OR USE OF PUBLIC ROADS

Regulatory Reference: 30 CFR 784.18; R645-301-521, -301-526.

Analysis:

On page 5-37, within section 526.116 of the MRP, the permit states that one public road passes through the permit boundary. Utah Highway SR 96 passes through the northwest corner of the permit boundary and is adjacent to the operations area. The highway is within 100 feet of operations.

Public notice was offered during two public notice and comment periods. The permit states that no comments were received regarding the highway and Kinney No.2 Mine operations.

The permit states that the new mine facilities access road will generally follow the alignment of the undeveloped dirt road which begins near the south end of the proposed operations on Highway 96.

On page 5-10, the permit states that required highway modifications will occur prior to mine development and entirely within the existing Highway 96 right of way and will be conducted under approved plans developed in consultation with the Utah Department of Transportation (UDOT).

Discussions with UDOT have been held and a preliminary plan for access to the mine has been presented to UDOT. UDOT requires a standard intersection design that provides turn lanes into the mine site from both directions as well as through lanes and acceleration and deceleration lanes. Final modification plans will be approved by UDOT prior to any work on the intersection.

On page 5-37, within section 526.116 of the MRP, the permit states that one public road passes through the permit boundary. Utah Highway SR 96 passes through the northwest corner of the permit boundary and is adjacent to the operations area. The highway is within 100 feet of operations.

Public notice was offered during two public notice and comment periods. The permit states that no comments were received regarding the highway and Kinney No.2 Mine operations.

The permit states that the new mine facilities access road will generally follow the alignment of the undeveloped dirt road which begins near the south end of the proposed operations on Highway 96.

Discussions with the Utah Department of Transportation (UDOT) were held and a plan for access to the mine was presented to and approved by UDOT. The "Intersection Design Approval" letter was included in Exhibit 4 of the response. The letter from UDOT states that the permit must submit final, P.E. stamped plans along with an access MRP and that an Access Approval Permit will need to be obtained by the permit prior to any construction.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules. The Division expects the permit to include of the UDOT Access Approval Permit for Highway 96 within Exhibit 4 of the MRP when it has been received.

AIR POLLUTION CONTROL PLAN

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-244, -301-420.

Analysis:

The Applicant is required to obtain an Air Quality Approval Order prior to receiving a permit to mine. The first step in acquiring an Air Quality Approval Order is to file a Notice of Intent with the Utah Division of Air Quality (DAQ). The Permit Application Package indicates that Carbon Resources, LLC provided the DAQ with a Notice of Intent (NOI) in February 2008.

A comment was received during the public comment period that adequate information was not available in the application to ensure compliance with SMCRA and the Clean Air Act. Section R645-301-420 of the application describes the Scofield area as an attainment area for the primary pollutant standards as defined by the National Ambient Air Quality Act. As such, federal air emission requirements are not applicable.

Dust control practices are described in more detail in the Notice of Intent. The site will operate 24 hours a day, 7 days a week, producing 3,000,000 tons of coal per year. The surface conveyance system will handle 1,000 tons per hour. There will be two 17,000 ton coal stockpiles (spec and non-spec), a 3,900 ton waste rock storage pile, two 50 ton silos for loading coal trucks. The operation will use enclosed conveyors, fabric filters (bag house and vent filters), water sprays, and a telescoping discharge chute for dust control. Based on these controls, the site will generate 44 tons of fugitive dust and 19 tons of non-fugitive PM_{10} sized particles. (The dust calculations do not include the future 20,000 ton stockpile and rail loading facility.)

Findings:

The application contains an Air Quality Approval Order. See Exhibit 4.

COAL RECOVERY

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

Analysis:

The permit lists as its project objectives: maximize recovery of available coal resource, optimize coal production efficiency and economics, facilitate potential development of nearby coal reserves, provide a safe healthy secure working environment, and minimize potential adverse environmental impacts.

The permit states that after review and evaluation of possible alternative mining scenarios, that final mine plans were selected as the best combination of mine layout, mining method, and mining sequence in order to maximize the utilization and conservation of the coal, while utilizing the best technology currently available to maintain environmental integrity, so that re-affecting the land in the future through coal mining operations is minimized.

On pages 5-16 through 5-29, the permit includes a description of the measures to be used to maximize the use and conservation of the coal resources. This description includes coal recovery, mine development and sequence, use and conservation of coal resource, mining method, mining equipment and activities, projected annual coal production, support activities, pillar dimension details, and approach to old mine workings areas. The permittee will utilize room development mining methods as the primary coal extraction and production technique. The primary production equipment will include continuous miners, shuttle cars, LHD scoops, and roof bolters.

The permit lists as its project objectives: maximize recovery of available coal resource, optimize coal production efficiency and economics, facilitate potential development of nearby coal reserves, provide a safe healthy secure working environment, and minimize potential adverse environmental impacts. The permit states that after its review and evaluation of possible alternative mining scenarios, that final mine plans were selected as the best combination of mine layout, mining method, and mining sequence in order to maximize the utilization and conservation of the coal, while utilizing the best technology currently available to maintain environmental integrity, so that re-affecting the land in the future through coal mining operations is minimized.

On pages 5-16 through 5-29, the permit includes a description of the measures to be used to maximize the use and conservation of the coal resources. This description includes coal recovery, mine development and sequence, use and conservation of coal resource, mining method, mining equipment and activities, projected annual coal production, support activities, pillar dimension details, and approach to old mine workings areas. The permit will utilize room development mining methods as the primary coal extraction and production technique. The primary production equipment will include continuous miners, shuttle cars, LHD scoops, and roof bolters. Map 15 includes the development and production schedule. Details of coal development and production sequence located on pages 5-18 through 5-21 were also updated.

The underground mining operations are planned to recover coal from the Hiawatha Coal Seam, using continuous mining techniques, with no pillar recovery planned at this time. Mining will be restricted to fault-bounded blocks, and numerous faults will need to be crossed during mining operations. The Applicant has designed the mine for annual production rate of 0.18 to tons of coal, with a projected life (within the currently proposed boundary) of approximately two years; there is a potential to extend the mine life significantly through acquisition of coal reserves to the south and east (Sections R645-301-522, -523).

Findings:

The proposed coal development, production, and mining sequence details have been described appropriately. Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

SUBSIDENCE CONTROL PLAN

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

Analysis:

On page 5-31, in section R645-301-525 of the MRP, the permit states that subsidence typically only occurs at the surface where pillars have been extracted, or where longwall mining

methods remove substantial blocks of coal. No second mining, or pillar extraction, or longwall mining that would result in subsidence is planned for the Kinney No. 2 Mine, therefore no subsidence is anticipated.

Renewable Resources Survey

Map 1A, 7, 8, 10, 13, 28 and 31 shows the location and type of structures and renewable resource lands that subsidence may materially damage. The maps are located in Exhibit 3. During the Cultural Resource/Pre-Subsidence survey, no structures were found above planned underground mining areas. There are no aquifers or bodies of water that serve as a significant water source for any public water supply system.

The MRP meets the Renewable Resources Survey requirements relative to hydrology. The MRP provides several maps that identify and depict the locations of renewable resources. Map 7, *Regional Hydrology* depicts the locations of all surface water bodies located within the permit and adjacent area as well as the projected piezometric surface elevation of the regional ground water aquifer. Map 8, *Works-Wells-Springs-Faults* depicts the locations of the springs, surface water bodies, faults and piezometric surface elevation of the regional ground water aquifer. Maps 30, *Ground Water Rights Locations* and Map 31, *Surface Water Rights Locations* depict the locations of State Appropriated Water Rights within the permit and adjacent area. Exhibit 13, Water Rights provides the documentation of each water right located within the permit and adjacent area and depicted on the aforementioned maps.

At this time, the mine plan only provides for first mining practices only. No secondary mining (i.e. planned subsidence) will take place. As a result, the amount of subsidence and subsidence related impacts should be minimal. Although a stand-alone Renewable Resources Survey relative to hydrologic resources was not provided within the MRP, the baseline data collected and the resulting PHC discussion (See Above) adequately addresses the potential for material damage and impacts to hydrologic resources.

Subsidence Control Plan

A subsidence control plan was added in the appropriate section of chapter 5 of the MRP. The permit states that methods used to control subsidence may include backfilling voids, leaving support pillars of coal, and leaving areas where no coal is extracted.

To document whether or not subsidence occurs, the permit commits to conduct a subsidence monitoring program including installation of monitoring points above mining areas. Figure 40 was added to the MRP to depict the Subsidence Monitoring Plan. The permit states that monuments will be installed prior to mining consisting of 3/4 inch rebar driven a minimum of 3 feet into the ground and topped with plastic caps. High precision GPS survey shots will be made on each monument prior to mining, and once each year for the first 5 years. After the first

5 years, the monuments will be surveyed every other year. Control monuments will be established outside the subsidence zone to use as baseline control for the subsidence monuments, Control monuments will be calibrated to the Scofield Cemetery US Geodetic Survey control point to ensure accuracy and consistency. Visual inspections will be conducted with the subsidence surveys. The results of the survey will be provided to DOGM yearly with the annual report.

The MRP includes a narrative indicating whether subsidence, if it occurred could cause material damage or to diminish the value or reasonable foreseeable use of structure or resource or water supplies. The MRP includes a description of monitoring needed to determine the commencement and degree of subsidence so that, when appropriate, other measures can be taken to prevent, reduce, or correct material damage. The MRP includes a detailed description of the subsidence control measures that will be taken to prevent or minimize subsidence and subsidence-related damage in the event that subsidence occurs. The Division recognizes that there are many control methods that are being applied but have not been included in this section, such as backfilling of voids; leaving support pillars of coal; leaving areas in which no coal is removed, including a description of the overlying area to be protected by leaving the coal in place. The mine plan is based on the retention of barrier pillars and first mining only, with no pillar extraction. This design, combined with the mining depth, should minimize fracture propagation at or near the ground surface in areas overlying the underground workings. As a result, the potential for drainage of overlying perched aquifer systems and alteration of surface infiltration characteristics is minimal.

Performance Standards for Subsidence Control

The permit commits to correct any material damage resulting from subsidence cause to surface lands, to the extent technologically and economically feasible by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses. The permitee will either correct material damage resulting from subsidence or compensate parties in the full amount of diminution in values resulting from subsidence.

Notification

The MRP includes a commitment to mail a notification to all owners and occupants of surface property and structures above the underground workings at least 6 months prior to mining. The notification includes, at a minimum, identification of specific areas in which mining will take place, dates that specific areas will be undermined, and the location or locations where the operator's subsidence control plan may be examined.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

SLIDES AND OTHER DAMAGE

Regulatory Reference: 30 CFR Sec. 817.99; R645-301-515.

Analysis:

On page 5-2 of the MRP, the permit states that certain situations involving accident, emergencies, or unforeseen circumstances may require immediate or timely reporting to provide for appropriate coordination of required control and mitigation measures. This includes slides which may have potential adverse effects on public health and safety, property, or the environment. This also includes other damage to excess spoil fills, impoundments, etc.

At any time a slide occurs which may have a potential adverse effect on public, property, health, safety, or the environment, the person who conducts the underground mining activities shall notify the Division by the fastest available means and comply with any remedial measures required by the Division. The MRP includes a description of notification when potential impoundment hazards exist.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

FISH AND WILDLIFE INFORMATION

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

Analysis:

Protection and Enhancement Plan

Chapter 3, Page 3-57 through 3-62, Section R645-301.330; (Operation Plan) includes a list of mitigation measures. "Provisions to minimize Total Disturbance" are included in the list of mitigation measures beginning on page 3-67. Listing them as bullets beginning presents the information more clearly.

Chapter 3, Pages 3-11 through 3-13 Section R645-301.220 include a description of high value or crucial habitats for several species of animals within the permit and disturbed areas.

These habitats are clearly defined on maps 2A through 2G. The maps and associated legends also define the range of these habitats. Pages 3-64 through 3-69 Section R645-301.330 include a description of "some of the conservation and mitigation plans for the wildlife species that have been described as occupying crucial or substantial habitat within and adjacent to the Kinney #2 permit area". They include: Black Bear, Blue Grouse, Moose, Mule Deer, Elk, Sage Grouse and snowshoe Hare. Preliminary site visits, (Dr. Collins 2009), indicate little evidence of long term occupancy. More so along the lines of occasional, passing through or avoidance due to the close proximity to highway 96 and the presence of human activity. During the life of the mine said species of wildlife will be displaced from the 27 acre area of disturbance. The displacement of these species to areas of as good or better habitat will not result in a negative impact to their respective life cycles or populations. Concurrence of this assumption was field verified with Leroy Mead, (DWR), Joe Helfrich, (DOGM), and Patrick Collins, (Mt. Nebo Scientific on June 1st 2011. The application includes a revision to the text that describes the results of the habitat field survey dated 6/1/2011. The assumptions made for each species habitat type were verified during the survey. The information regarding habitat types for the selected species in the Utah Heritage program data base was determined to be accurate and appropriate.

The Raptor Map, map #2, includes the location of the raptor nests and the species and status associated with each nest. According to the information in chapter 3, Section R645-301.330, page 3-57 there is presumably a Red Tailed hawk nest # 1541 approximately 650 feet from the south east corner of the proposed disturbed area. Spatial buffers for this species are ½ mile temporal buffers run from March 15th through August 15th according to information published by The U S Fish and Wildlife Service.

Consultation with representatives from the FWS, (Nathan Darnall), Carbon Resources' consultant, (Dr. Pat Collins) and DOGM, (Joe Helfrich) was initiated on Wednesday, January 5th and Thursday January 6th, 2011 with DWR, (Leroy Mead).

The results of the consultation included the following recommendations for protection measures for nest #1541;

A commitment to conduct 2 raptor surveys, (ground surveys in mid March and mid April of 2011would be adequate), of nest, #1541, prior to the initiation of mining activities to determine occupancy;

A commitment to limit any mining activities to within ½ mile of the nest from March 15th through August 15th if the nest is occupied, and

A commitment to consult with the FWS, DWR and DOGM biologists if the nest is not occupied and the applicant wishes to commence mining activities within the spatial and temporal buffers.

Additional consultation in March of 2011 with the applicant, FWS, DWR and DOGM changed the complexion of the raptor nest protection commitments to a monitoring and mitigation plan with appropriate revisions to the text in chapter three. Paragraph 2 on page 3-41b has been revised to include the Division of Oil, Gas and Mining as a consulting agency and a commitment to obtain approval from DOGM for any mitigation plans that may be required.

The application includes approval from the USFWS as noted in exhibit 4 for the proposed deterrents for nest # 1541.

Page 4.3-5 paragraph two has been deleted as it made reference to the "Barn Canyon air ventilation shaft" The applicant has noted that the paragraph has been deleted. The applicant has referred the reviewer to chapter 3, page 3-1.

The Division, (Joe Helfrich) and DWR, (Leroy Mead), in consultation with Pat Collins from Mt. Nebo Scientific June 1, 2011 have provided the applicant through individual conversations three options for mitigation plans at the Kinney #2 proposed mine location. The applicant has considered these options in developing the raptor mitigation plan. The FWS in consultation with DWR DOGM and the applicant requested that mitigation plans for raptor nest 1541 include site specific raptor mitigation as much as possible. The applicant has submitted a mitigation plan that includes three alternatives for the 3,000 dollars allocated to mitigation. The plan includes include the construction and installation Purple martin nesting boxes, osprey nesting platforms and the distribution of non toxic ammunition. The plan includes a commitment to implement to implement the consensus of the alternatives by October of 2011 or as directed by the consulting agencies.

Endangered and Threatened Species

The results of the vegetation survey, exhibit 3.2, indicate that there are no threatened, endangered or sensitive plant species within the permit or proposed disturbed areas as noted by Dr. Pat Collins. Section R645-301-322.201 of the application includes a current list of the sensitive animal species for Carbon County.

Colorado Fish Recovery Program

The proposed mining activities are located in a watershed that contributes water to the upper Colorado River. Within that section of the river are four endangered fish species, the Colorado pike Minnow, Razorback Sucker, Humpbacked Chub and Bonytail. Page 3-62 of the application has been revised to include the figure of 61.4 acre feet per year based on the water rights allotted to Carbon Resources. The figure will then be used to determine potential adverse effects to the referenced species and to complete the consultation process with the FWS.

Bald and Golden Eagles

According to the information provided from the Utah Natural Heritage program there are records of bald eagles within the proposed permit area. Eagles typically migrate through the area during the winter taking advantage of the food supply at or near the near-by Scofield Reservoir. There are no bald or golden eagle nests within ½ mile of the proposed permit area due in part to a lack of adequate nesting habitat. Protection measures are described on pages 3-52, 3-56, 3-60, 3-62 and 3-63 and include the construction of raptor proof power poles.

Wetlands and Habitats of Unusually High Value for Fish and Wildlife

Chapter 3, Section R645-301.330, Page 3-56, Paragraph 1 needs to include the names of the individual(s) and the data collected during the baseline field surveys used to determine that there were no jurisdictional wetlands located within the proposed disturbed area. The applicant has committed to have Mt. Nebo Scientific conduct the vegetation analyses and wetland evaluations during 2011 as noted in the permit conditions.

Other habitats of high value for fish and wildlife within the proposed disturbed area include Black Bear, Moose, Blue Grouse, Elk, Mule Deer, Sage Grouse and Snowshoe hare. Chapter 3, Pages 3-11 through 3-13 Section R645-301.220 include descriptions of the high value or crucial habitats for these species of animals within the permit and disturbed areas. These habitats are clearly defined on maps 2A through 2G. The maps and associated legends also define the range of these habitats. Pages 3-64 through 3-69 Section R645-301.330 include a description of "some of the conservation and mitigation plans for the wildlife species that have been described as occupying crucial or substantial habitat within and adjacent to the Kinney #2 permit area". These assumptions were field verified on 6/1/2011, see additional text under the sub heading *"Protection and Enhancement"*.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Removal and Storage

The proposed disturbed area is 27.6 acres and includes 0.4 acres across SR 96 from the main facilities. Total potential topsoil and yield is 68,845 yd^3 (Section 232.100 and Map 34).

Most of the soil (40,460 yd^3) will come from 20 acres of previously disturbed lands, and most of the previously disturbed soil (38,859 yd^3) comes from Map Units DA-3, DB-2, DB-4, and DB-5. Based upon the soil survey, the plan calls for soil removal from 1.2 feet up to a depth of three feet (Map 37). Topsoil and subsoil from undisturbed slopes will contribute 27,396 cubic yards from 6.94 acres (Map Units 1B, 2A, and 2B) to the stockpile. However, steep areas will not have topsoil salvaged and approximately 13,879 yd of topsoil from steep areas will be mixed with the fill (Section 232.100). Map 37 demarcates the topsoil salvage boundary along those areas considered too steep (> 30%) for soil salvage. Map 33 illustrates the slopes within the proposed disturbance and itemizes 7.37 acres or 29.47% of the permit area as unavailable for soil salvage due to slope.

Section 232.100 describes salvage of soil from avoidance of buried coal and separation of coal fines from salvaged soil, if the buried coal is greater than six inches deep. Map 45 provides information on the location and volume of the estimated 12,000 yd^3 of coal fines buried in within the disturbed area.

A qualified reclamation specialist/soil scientist will be on site to direct the soil salvage, which is complicated by areas of previously disturbed and pockets of buried coal. The applicant commits to reporting final salvage volumes in an annual report (R645-301-232.100).

The salvaged soil will be stored in three locations as described on Map 38, Topsoil Storage. Topsoil storage locations are also shown on Map 13, Surface Facilities. Two stockpiles west of the SR 96 will hold approximately 2,000 yd^3. East of SR 96, the largest stockpile will be layered against the bathhouse parking lot fill. The soil will be protected by a ditch, a berm and by a six foot excavated material base that will raise the level of the topsoil pile above the expected level of road salt accumulation. Pile construction is illustrated on Plate 38. This stockpile has the capacity for approximately 20,000 topsoil storage that will be constructed in a trapezoidal shape against the existing slope and against a fill slope. The topsoil stockpile will be approximately 20 ft. in depth with an outslope of approximately 4h:1v (as shown in cross Section A-A' on Map 16). Berms and ditches will protect the large stockpile from water erosion, described in Section 234.220 and 234.230. The topsoil stockpile sediment control plan is illustrated on Map 24. Surface roughening and a temporary seed mixture of wheatgrasses, bluegrass and Utah Sweetvetch (Table 21) will also provide erosion protection on the stockpile outslope.

Findings:

The information provided in the application meets the requirements of the R645 Coal Rules for Soils Handling Operation Plan.

VEGETATION

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

Analysis:

Exhibit 3 includes a description of the vegetative communities within the disturbed, permit and reference areas. The disturbed area will affect the rabbitbrush/grass community that has been impacted by previous mining activities and a native sagebrush/grass community and a small portion the aspen community that extends into the pre disturbed and proposed disturbed north east end of the disturbed area . The vegetation survey references the compilation of a list of threatened, endangered and sensitive plant species for the area. They are included in chapter three pages 3-7 through 3-10.

The vegetation survey results indicate that there are no threatened, endangered or sensitive plant species within the permit or proposed disturbed areas.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

Analysis:

In conjunction with the proposed mining and related operations, the permittee will construct, operate, and maintain a number of new roads and will operate and maintain several existing roads. Roads will be used as transportation facilities for personnel, equipment, and supplies.

Road Classification System

All roads are classified as primary roads. This classification includes any roads used for transporting coal or spoil, roads which are used frequently for periods exceeding 6 months, and roads which will be retained to support the post-mining land use. The permit states that all roads will be utilized on a frequent, long term basis to support the proposed mining and related operations.

Plans and Drawings

The proposed primary roads are depicted on Map 13, Surface Facilities Map. Profiles for all seven roads (PR-1 through PR-7) are provided on Maps 20 through 22, Mine Road Profiles. Typical road construction practices, road configuration and dimensions for roads are illustrated in Figure 25 within the text.

The MRP discusses the road drainage plans in Section R645-301-724.400. Maps 20, 21 and 22 provide profile view for the proposed roads to be utilized during the operational phase of mining.

Map 13, *Surface Facilities*, depicts the locations of all roads to be utilized. The locations for all associated drainage ditches are provided on Map 24, *Drainage and Sediment Control Plan Disturbed Drainage Areas.* Map 27, *Runoff Control Details* provides detailed design and installation information for the components of the road drainage system. Table 18, *Ditch Design Details*, provides a table of the dimensions and design criteria for all diversion ditches. Table 19, *Culvert Design Details* provides the design information/criteria for all disturbed and undisturbed drainage culverts to be constructed on the site. Exhibit 16, *Runoff Control Design Details*, provides the hydrologic and hydraulic calculations that were utilized in designing and sizing the surface runoff control plan and associated components. Figure 25, *Typical Primary Road Configuration*, provides a cross-sectional view of the road design to be implemented for all roads (PR1-PR-7) with the exception of PMLU Road 8 and PMLU Road 9. Figure 25A, *Primary Roads P8 & P9 Configuration*, provides cross-sectional views for primary roads P8 and P9. Map 22, Mine Surface Facilities Road Profiles provides the profiles for roads P8 and P9.

No road will be constructed within a perennial or intermittent stream. However, a road crossing will be constructed across an irrigation ditch. The road crossing of this drainage will require the installation of a culvert (UDC-1, See Map 24). The irrigation ditch has not been utilized for several decades as evidenced by the amount of vegetation overgrowth in the channel as well the overall lack of maintenance.

Performance Standards

The permit states that all roads have been or will be design and constructed to the extent operationally feasible in the most stable areas available and outside of the channel of intermittent or perennial streams. The permit states that design and construction of all primary roads will be

certified by a certified by a qualified Registered Professional Engineer. Road PR-1 will be a paved asphalt road with all-weather travel surface from Highway 96 to the Shop-warehouse building. PR-2 will also be paved to the mine office building. The mine office pad will also be paved. All other primary roads will be constructed using compacted road base and durable granular surfacing.

Road construction will involve cut and fill earthwork operations. No potential acid or toxic forming materials will be utilized in road construction or as surfacing material. Cut and fill slopes will be establish at maximum grades up to 0.8H: 1V. Typical road construction practices, road configuration and dimensions for roads are illustrated in Figure 25. Road gradients will vary from flat to a maximum of approximately 14.5% for the majority of the roads. Road embankments will be constructed and compacted in a controlled manner to provide a minimum static safety factor of 1.3. Only road PR-6 had a gradient about 14.5&, at 18.8%.

Adequately sized ditches and culverts will be installed and maintained to effectively carry road and other disturbed area drainage. The locations of all proposed ditches are shown on Map 24, Drainage and Sediment Control Plan Map. The permit states that all roads and ditches will be operated and maintained according to the requirement of Utah Coal Mining Rules.

The MRP meets the Performance Standards requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

As required by R645-301-742.423.1, all of the roads (which have been classified as 'primary') have been designed to safely pass the peak flow generated from a 10-year, 6-hour storm event. Exhibit 16, *Runoff Control Design Details*, provides the hydrologic and hydraulic calculations that were utilized in designing and sizing the surface runoff control plan and associated components. Table 18, *Ditch Design Details* provides the design considerations for each of the diversions to be utilized at the mine-site. Table 19, *Culvert Design Details* provides the design considerations for the culvert sizing calculations that were performed.

All roads will be reclaimed following mining activity, with the exception of PMLU Road P8 and PMLU Road P9. Roads P8 and P9 are to be retained permanently following the termination of mining activity and post-reclamation. The two roads are to be retained permanently per an access agreement with an adjacent land-owner. The roads are required to access private property east of the mine-site. Access roads to the private property east of the mine site were in existence prior to mining. As a result, the retention of PMLU Road P8 and PMLU Road P9 following reclamation is in line with the post-mining land use and pre-mining land use of the property. Figure 25A, *Primary Roads P8 & P9 Configuration*, provides cross-sectional views for primary roads P8 and P9. Drainage control from the two roads will be achieved by utilizing two diversion ditches and a culvert (UDD-1, UDD-2 and UDC-2 respectively). The diversions do not route a perennial or intermittent stream. As such, the design standard for a diversion of miscellaneous flows (R645-301-742.330) applies. The design standard for a permanent diversion of a miscellaneous flow is to safely pass the peak runoff

generated from a 10-year, 6-hour event. The design information provided in Exhibit 16 and Table 18 show that diversions UDD-1 and UDD-2 have been over designed to safely pass a 100-year, 6-hour event.

In order to the design the collection system ditches and culverts, the Permittee utilized Hydrologic Modeling Software (HEC-HMS) 3.1.0 developed by the Army Corps of Engineers using the Soil Conservation Service (SCS) curve number loss method and the SCS unit hydrograph transform method. Drainage basins were delineated in AutoCAD by utilizing existing and proposed elevation contour data and the location of proposed pads and storm drainage facilities. Drainage basins were modeled in HEC-HMS using the SCS unit hydrograph transform method. The sub-basins peak flows were then calculated in order to properly size the culverts and diversion ditches.

Primary Road Certification

Typical Primary Road configurations for sloping and level terrain were included in Figure 25 within the text. Within Figure 25, the permit provides the details of the thickness of asphalt and sub-base. Also, the proposed primary roads are depicted on Map 13, Surface Facilities Map. Profiles for all seven roads (PR-1 through PR-7) are provided on Maps 20 through 22, Mine Road Profiles. Map 13 is correctly certified. Maps 20 through 22 also have proper certification. Figure 25 has a copy of a professional engineer's certification.

Other Transportation Facilities

The mine's coal handling system will consist of both the underground coal haulage system and the surface coal handling components which will transport coal from the mine portal to the truck load-out. Components of the surface portion of the coal handling system are shown on Map 13, Surface Facilities Map and include:

- Conveyor SB-1
- Conveyor Transfer Tower
- Conveyor SB-2
- Non-spec Coal Pile & Stacking Tube
- Conveyor SB-3
- Spec Coal Pile & Stacking Tube
- Conveyor SB-4
- Screening & Crushing Building
- Truck Load-out Building

The permit states that the coal handing system had been designed using the best current technology and accepted engineering practices to provide adequate transportation for mined material.

The MRP includes a detailed description of the conveyor system that will be used for mine material transportation. The description includes details of conveyor transfer & details, conveyor components, vibrating aprons, pan feeders, and coal stockpiles. The description includes construction, operation, and maintenance of the conveyor system and load-out facilities

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Disposal of Noncoal Mine Wastes

The MRP meets the Disposal of Noncoal Mine Wastes requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

In Section R645-301-727 of the MRP, the Permittee discusses the generation and disposal of noncoal waste. The application discusses that used oil and lubricants, garbage, paper waste, machinery parts, tires, cable, wood waste and other miscellaneous debris will be generated by the proposed mining activity. Smaller sized noncoal solid wastes will be stored in dumpsters. Larger solid waste materials (i.e. used equipment, machinery parts, tires etc.) will be temporarily stored in designated storage yards as located on Map 13, *Surface Facilities*.

A contract disposal service will regularly collect and haul the smaller noncoal solid wastes from the dumpsters to the permitted Carbon County municipal landfill, or to the East Carbon Development Corporation facility.

Depending on market conditions for used machinery, scarp, metal etc., the larger noncoal solid waste will be collected periodically either by a salvage contractor or by a contract disposal firm which will haul these materials off-site to a permitted disposal site.

Any waste other than used oil/lubricants that don't meet applicable EPA requirements will be collected and stored in either closed drums or in the waste oil storage tank located in the maintenance shop building. The temporary storage areas for this waste will provide for full containment in order to prevent an accidental release of petroleum products to flow into the sites.

Non-coal mine wastes generated in conjunction with mining and related activities include but are not limited to used oil and lubricants, garbage, paper waste, machinery parts, tires, cable, wood waste, and other miscellaneous debris. All non-coal solid wastes will be collected and stored in dumpsters or similar closed containers. Larger solid waste materials including such items as equipment, machinery parts, tires, and cables will be temporarily stored in designated sap yards located in areas as shown on Map 13, Surface Facilities Map. Non-coal wastes will be regularly collected and disposed of by a contract disposal service and hauled to a State-approved waste disposal site. The permit will adhere to the disposal requirements of the State of Utah and the EPA.

Coal Mine Waste

The MRP meets the Coal Mine Waste requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

In Chapter 5 of the MRP, the Permitee discusses three potential classes or categories of generated material that could be classified as coal mine waste:

1) Rock with no coal.
2) A mixture of coal and rock.
3) Dirty coal (high ash or high sulfur content)

Items 2 and 3 above are considered coal processing waste. The material that is generated in this category will be placed on a 'non-spec coal pile' (See Map 13, *Surface Facilities*, Item 7 and 41). The Permittee discusses how the material that is placed on this pile will either be blended into the saleable coal product, or if the volume of this coal processing waste becomes too great, it will be moved to a temporary coal processing waste storage pile (See map 13, *Surface Facilities*, Item 38 and Figure 41). The Permittee indicates that "*When sufficient volume of coal processing waste is accumulated on this temporary pad, it will then be sold, as "distressed coal", to the Arch Coal Washing Facility on Ridge Road south of Price, UT.*" In each instance, the coal processing waste will be sold and removed from the property. The Permittee has committed to providing a copy of the contract with the Arch Coal Washing Facility. Additionally, the Permittee has indicated that the Covol Facility in Wellington would receive the coal processing waste.

The underground development waste (Item 3 above) is also discussed. The application discusses how the material will returned to designated areas of the underground mine workings. As the underground development waste is generated, it will be temporarily stock-piled on the off-spec coal pile (See Map 13, *Surface Facilities*, Item 7 and Figure 41) until it's possible to return the material underground. Map 15, *Mine Plan Layout & Production Schedule Map* depicts the areas where this material will be permanently stored.

Each of the generated wastes (i.e. coal processing waste and underground development waste) will be temporarily stored on the surface facility. As a result, the materials are not considered refuse and the performance standards required for a refuse pile are not applicable at this time. However, if the either of these wastes is stored at the site for a period longer than 2 years, the Division could deem the material to be refuse. If that occurs, then all applicable performance standards and design criteria relative to refuse piles would need to be addressed and complied with.

The sediment control/drainage control network that has been designed for the surface facility will serve to effectively minimize the potential for any of the aforementioned wastes to migrate off the disturbed/permit area. All storm water runoff generated on the disturbed area will report to the primary sediment pond. The Permittee has obtained a Utah Pollutant Discharge Elimination System (UPDES) Permit under the Federal Clean Water Act. The UPDES permit establishes water quality standards that must be met prior to the discharge of any water from the sediment pond. As a result, the MRP has identified a controlled manner that will minimize adverse effects of leachate and surface water runoff on surface and ground water quality and quantity.

Section 538.320 of the MRP includes a description of three classes or categories of waste that will be brought out of the mine. The permit changed references refer to any "underground development rock" or "mine development rock" as either coal mine waste, underground development waste, or coal processing waste. Language was changed to indicate that no washing plant is planned for the mine. A Coal waste handling schematic, Figure 41, page 5-74, was included to depict and define how waste will be handled. Coal processing waste will not be returned to underground areas. Only underground development will be returned to underground areas. Waste stored on site will be allowed to stay in place for a maximum of two years before being returned to underground areas or being re-evaluated by Division staff. Coal processing waste will be sold to Arch coal. The permit commits to include a copy of the agreement letter with Arch Coal in Exhibit 3, Confidential Information.

The permit states that any underground development waste that is hauled back underground will be placed into designated panel areas inside the mine and will serve to encapsulate pillars. The permit states that this will passively stabilize pillars in those areas with some confinement. The permit states that these backfill areas will be ventilated until they are filled and have been monitored for products of combustion for a period of 1 year after backfill operations are complete. If no significant products of combustion have been found the area will be sealed and monitored according to an approved ventilation plan.

The waste rock will be rock, carbonaceous shale, floor clay, and parting material. The source of the material will be general mine development, slope/raise development, overcast development, etc. The material will be conveyed out of the mine with/ or in the same manner as coal is conveyed. Continuous miners, electric shuttle cars, and LHD scoops will be used to load

and haul waste rock to the mine conveyor system. The rock will then be conveyed to the surface, separated from the coal, and temporarily stockpiled. The surface coal haulage system has been designed to facilitate mine rock handling through the stacking tube and a dumping flop gate. The rock will then be hauled back underground and stored in the areas designated as disposal areas and depicted on Map 15, Mine Plan Layout & Production Schedule Map.

Refuse Piles

The MRP meets the Refuse Pile requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

As discussed above (See Coal Mine Waste Discussion), the coal processing waste and underground development waste that may be generated as a result of mining activity is not considered refuse. Each of the generated wastes (i.e. coal processing waste and underground development waste) will be temporarily stored on the surface facility. As a result, the materials are not considered refuse and the performance standards required for a refuse pile are not applicable at this time. However, if the either of these wastes is stored at the site for a period longer than 2 years, the Division could deem the material to be refuse. If that occurs, then all applicable performance standards and design criteria relative to refuse piles would need to be addressed and complied with.

Burning and Burned Waste Utilization

No burned waste is expected to be encountered and there are no plans to burn or utilize burned waste in the MRP.

Return of Coal Processing Waste to Abandoned Underground Workings

The MRP describes states that no coal processing waste will be returned to underground workings.

Impounding Structures

The MRP meets the Impounding Structures requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

No impounding structures are proposed for either impounding coal mine waste nor are there are plans for impounding coal mine waste. The potential coal-mine waste will be stored at the surface facility temporarily and will occupy a small area. As such, the Impounding Structures requirements relative to coal mine waste are not applicable.

Excess Spoil

The MRP meets the Excess Spoil requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

As discussed previously, there is the potential for the mining operation to produce coal processing waste and underground development waste. Spoil is defined by the State of Utah R645-Coal Mining Rules as '*overburden that has been removed during coal mining and reclamation operations*'. The mining operation is strictly underground. No surface mining is proposed. As such, the excess spoil requirements are not applicable to this project. The Permittee does not anticipate the generation of excess spoil.

There will be no spoil for the Kinney No. 2 Mine since there will no overburden removed during coal mining and reclamation operations.

Page 5-70 was revised to reference no.38 instead of no.7. Map 13 was revised to make it clear that item no.18 points to the Solid Construction Debris Disposal Areas (multiple), and that no.38 points to the Coal Processing Waste - Temporary Stockpile. Revised copies of page 5-70 and Ma 13 were included in the submittal.

Also included with the MRP is a Letter of Intent to Buy "Distressed Coal" supplied jointly by Arch Coal and Carbon Resources, LLC.

Findings:

The MRP meets the Spoil and Waste Materials requirements of the State of Utah R645-Coal Mining Rules.

HYDROLOGIC INFORMATION

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

Analysis:

General

The MRP meets the General Hydrologic Information requirements of the State of Utah R645-Coal Mining Rules. Chapter 7 of the application provides an extensive discussion and presentation of ground and surface water resources within the permit and adjacent area.

The underground mining and reclamation activities have been designed to minimize disturbance of the hydrologic balance within the permit and adjacent areas, to prevent material damage to the hydrologic balance outside the permit area and to support approved postmining land uses.

The Permittee met those requirements by submitting baseline information for ground and surface water in sections R645-301-724.100 and R645-301-724.200. The baseline data was utilized to identify the probable hydrologic consequences from the proposed mining activity (see Section R6445-301-728). Based on the identified probable hydrologic consequences, the Permittee developed a ground and surface water monitoring program (See Section R645-301-731.200).

Groundwater Monitoring

The MRP meets the General Hydrologic Information requirements of the State of Utah R645-Coal Mining Rules.

In order to protect the hydrologic balance, the Permittee has developed a Ground Water Monitoring Plan. The plan is described in Section R645-301-731.200 of the MRP. Table 6, *Kinney Mine Baseline Monitoring Stations* and Table 7, *Kinney Mine Operational Monitoring Stations* provides a list of the baseline and operational ground water monitoring stations respectively. Table 20, *Hydrologic Monitoring Schedule* provides a list of the water quality parameters that will be analyzed for during the operational and post-mining phases of the project. Map 28, *Surface and Ground Water Monitoring Sites* depicts the locations of the ground water monitoring sites.

The Permittee commits to obtaining water quality samples on a quarterly basis. The data will be submitted to the Division within 90 days of the end of the quarter. On an annual basis, the Permittee commits to providing the Division with a hydrologic review and summary of data that will be submitted on or before June 1st.

The operational and reclamation phase ground water monitoring program consists of monitoring 9 monitoring wells (CR 06-01, CR 06-01 BLW, CR 06-02, CR 06-02 ABV, CR 06-05A, CR 06-09 ABV, CR 06-09 BLW, CR 10-11 and CR 10-12) and 7 spring sites (Aspen Spring/Pond, Eagle Spring 2 and Pond 2, Eagle Seep 1, Eagle Seep 1A, Eagle Seep 3, Eagle

Spring and Sulfur Spring). The sites will be monitored for water level/flow as well as field and laboratory analytical parameters.

The Permittee will monitor Eagle Seep 1, Eagle Seep 1A, Eagle Seep 3, Eagle Spring 2, Eagle Pond 2 and Aspen Spring (aka Eagle Pond 1) on a monthly basis for a minimum of 12 months (with the exception during months when access is not possible due to snow).

As mining progresses, it is the intent of the Permittee to expand eastward beyond the Eagle Canyon Graben. In Section R645-301-731.200, the Permittee commits to collecting water quality data for any water sources where sufficient flow is available on a quarterly basis for 12 months.

Surface Water Monitoring

The MRP meets the General Hydrologic Information requirements of the State of Utah R645-Coal Mining Rules.

In order to protect the hydrologic balance, the Permittee has developed a Surface Water Monitoring Plan. The plan is described in Section R645-301-731.200 of the MRP. Table 6, *Kinney Mine Baseline Monitoring Stations* and Table 7, *Kinney Mine Operational Monitoring Stations* provides a list of the baseline and operational ground water monitoring stations respectively. Table 20, *Hydrologic Monitoring Schedule* provides a list of the water quality parameters that will be analyzed for during the operational and post-mining phases of the project. Map 28, *Surface and Ground Water Monitoring Sites* depicts the locations of the ground water monitoring sites.

The Permittee commits to obtaining water quality samples on a quarterly basis. The data will be submitted to the Division within 90 days of the end of the quarter. On an annual basis, the Permittee commits to providing the Division with a hydrologic review and summary of data that will be submitted on or before June 1st.

The operational and reclamation phase surface water monitoring program consists of monitoring 6 surface water monitoring sites (Miller Outlet, Mud Creek, Scofield Reservoir, Jones Draw, Kinney Draw and Columbine Draw). The sites will be monitored for flow as well as field and laboratory analytical parameters.

Acid- and Toxic-Forming Materials and Underground Development Waste

The MRP meets the Acid- and Toxic-Forming Materials and Underground Development Waste requirements of the State of Utah R645-Coal Mining Rules.

In Chapter 6 of the MRP, the Permittee presents the acid/toxic information. Tables 4 and 4A in Section R645-301-624 presents the results of the analyses that were performed on the coal located within the lease area as well as on mine waste buried within the proposed disturbed area boundary. Exhibit 19 in Volume 4 of the MRP provides the details of the core analysis which was performed by SGS Labs, Denver. Exhibit 6 provides the details of the mine waste analysis (also conducted by SGS Labs). The information provided suggests that potentially acid forming material is located in the roof and floor of the mine. Table 4 provides the supporting calculations for Acid Production Potential (APP), Neutralization Potential (NP) and Net Neutralization Potential (NNP). Negative net neutralization potential values are identified in Table 4 indicating that acid/toxic forming materials may be present.

In Chapter 5 of the MRP, the Permittee discusses three potential classes or categories of generated material that could be classified as coal mine waste:

1) Rock with no coal.
2) A mixture of coal and rock.
3) Dirty coal (high ash or high sulfur content)

Items 2 and 3 above are considered coal processing waste. The material that is generated in this category will be placed on a 'non-spec coal pile' (See Map 13, Surface Facilities, Item 7 and 41). The Permittee discusses how the material that is placed on this pile will either be blended into the saleable coal product, or if the volume of this coal processing waste becomes too great, it will be moved to a temporary coal processing waste storage pile (See map 13, *Surface Facilities*, Item 38 and Figure 41). The Permittee indicates that "*When sufficient volume of coal processing waste is accumulated on this temporary pad, it will then be sold, as "distressed coal", to the Arch Coal Washing Facility on Ridge Road south of Price, UT.*" In each instance, the coal processing waste will be sold and removed from the property. The Permittee has committed to providing a copy of the contract with the Arch Coal Washing Facility. Additionally, the Permittee has indicated that the Covol Facility in Wellington would receive the coal processing waste.

The underground development waste (Item 3 above) is also discussed. The application discusses how the material will returned to designated areas of the underground mine workings. As the underground development waste is generated, it will be temporarily stock-piled on the off-spec coal pile (See Map 13, *Surface Facilities*, Item 7 and Figure 41) until it's possible to return the material underground. Map 15, *Mine Plan Layout & Production Schedule Map* depicts the areas where this material will be permanently stored.

Each of the generated wastes (i.e. coal processing waste and underground development waste) will be temporarily stored on the surface facility. As a result, the materials are not considered refuse and the performance standards required for a refuse pile are not applicable at this time. However, if the either of these wastes is stored at the site for a period longer than 2

years, the Division could deem the material to be refuse. If that occurs, then all applicable performance standards and design criteria relative to refuse piles would need to be addressed and complied with.

The potential for acid/toxic forming materials to impact surface and ground water resources is considered minimal. The roof and floor material will not be stored for long periods of time at the surface facility. Section 528.320 indicates that the maximum time the temporary waste pile will remain on the site is two years. The MRP indicates that the material will be blended with the coal product, placed temporarily in the Temporary Stockpile (See Map 13, Surface Facilities) or temporarily stored in the "off-spec" stacking tube for eventual shipping. The MRP indicates that any unused material stored in the Temporary Stockpile will be taken under contract to a third party processing facility.

The potential for acid/toxic impacts to surface and ground water facilities is further minimized by the utilization of the sediment control/drainage control network. The disturbed area/surface facilities primary water treatment/retention component is the primary sediment pond. The sediment pond located at the surface facility is designed to contain the 10-year, 24-hour event. In addition, the Permittee has obtained a Utah Pollutant Discharge Elimination System (UPDES Permit) under the Federal Clean Water Act. As all storm water generated on site is routed to the sediment pond for retention/treatment prior to discharge, the potential for acid/toxic impacts to migrate outside the permit area is limited. The UPDES permit establishes water quality standards that must be met prior to any discharge leaving the sediment pond. As a result, the potential for acid/toxic material to impact Scofield Reservoir is minimal. Additionally, the ground water baseline information (See Ground Water baseline discussion above) indicates that there is a general lack of ground water that could even come in contact with potentially acid/toxic forming materials. Additionally, the baseline data indicates that the coal seam to be mined is located well above the potential regional water table thus limiting even further the potential for impacts to ground water systems in the permit and adjacent area.

Tables 4 and 4A in Section R645-301-624 present the results of acid/toxic analysis on six cores within the proposed lease area and on mine waste buried within the proposed disturbed area boundary. Exhibit 19 in Volume 4 presents the details of the core analysis which was performed by SGS Labs, Denver. Exhibit 6 presents the details of the mine waste analysis, also performed by SGS Labs.

The information provided suggests that the roof and floor is potentially acid forming. The roof and floor may be blended with the coal product, or it may be placed temporarily in the Temporary Stockpile shown on Map 13, Surface Facilities, or it may be temporarily stored in the "off-spec" stacking tube for eventual shipping. The MRP states that any unused material stored in the Temporary stockpile will be taken under contract with a third party to a processing facility. The plan states that confirmation of such a contract will be provided as soon as it is finalized. Receipt of this confirmation should be a condition of permit issuance. (See also engineering review deficiency R645-301-536.510.)

Section 528.320 states that the maximum time the temporary waste pile will remain on the surface is two years. Section 515.300 of the MRP states that during periods of temporary cessation lasting 30 days or more, one composite waste sample will be drawn for every 5,000 Tons in the pile to be analyzed according to Tables 3 & 7 of the 2008 Division Topsoil and Over burden guidelines.

Section 542.200 Backfilling and Grading to Establish Final Configuration states that the all coal seams and any coal mine materials or coaly materials will be covered with four feet of suitable soil (Priority #1). Section 553.250 Refuse Pile & 553.260 Disposal of Coal Processing Waste states that coal mine waste encountered during reclamation will be covered with four feet of suitable material and Section 553.300 provides a commitment to backfill the coal seam with four feet of cover.

Transfer of Wells

The MRP meets the Transfer of Wells requirements of the State of Utah R645-Coal Mining Rules.

In Section R645-301-748 of the application, the casing and sealing of wells is discussed. The Permittee commits to plugging and sealing all exploration boreholes and any boreholes which have been converted to monitoring wells during mining reclamation.

In Section R645-301-755, the Permittee outlines the methods to be utilized in plugging any water monitoring wells/boreholes. The boreholes or casing will be sealed with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or water bearing rock strata. The remainder of the hole will be filled with concrete to within 20 feet of the ground surface and then filling the remainder of the hole to the ground surface with cement to form a surface plug. In addition, the Permittee commits to placing a steel fence post in the center of the surface plug before the cement sets up in order to provide a permanent marker of the hole location.

Discharges Into an Underground Mine

The MRP meets the Discharges into Underground Mine requirements of the State of Utah R645-Coal Mining Rules.

In Chapter 5 of the MRP, the Permittee discusses the mine portal area where surface water could potentially enter into the mine. Map 17, *Mine Surface Facilities Area Pre-Mining, Mining & Post Mining Cross Sections*, shows a typical cross Section of the portals. The portal pad will be graded to prevent surface runoff water from entering the mine.

In light of the absence of any form of surface water present in the disturbed area, the elevation difference between the mine entries and the disturbed area and the primary and emergency spillways of the primary sediment pond reporting to Scofield Reservoir, there is minimal potential for any significant water discharge to enter the underground mine works.

Gravity Discharges from Underground Mines

The MRP meets the Gravity Discharges From Underground Mine requirements of the State of Utah R645-Coal Mining Rules.

In Chapter 5 of the application, the Permittee states, "*potential mine inflows are expected to be minimal and there will be sufficient storage capacity in both the existing abandoned underground mine workings and in inactive working areas*".

Gravity discharges from the mine are not expected based on the minimal amounts of ground water encountered during the baseline data collection period. Additionally, based on the data submitted for the MRP, the potentiometric surface of the regional water table is well below the Hiawatha Coal seam.

Water Replacement

The MRP meets the Water Replacement requirements of the State of Utah R645-Coal Mining Rules.

In Section R645-301-731.800, the MRP discusses water rights and replacement. The Permittee commits to mitigate any water right impacts through the development of a cooperative agreement with any effected water rights holder. The MRP identifies possible mitigation options as replacement or augmentation of effected water rights, monetary compensation or the development of alternative watering facilities.

Additionally, the Permittee owns two shares of Scofield Reservoir water and has indicated that these shares will be preserved as a potential mitigation option for any claim against the Permittee relative to the depletion of a state appropriated water right.

The Permittee further commits that until verification of actual spring flow volumes within the Eagle Canyon Graben can be achieved, the Permittee commits to replace the estimate of Aspen Spring and the total of the flow measurements for the other springs in the graben area. Based on the maximum estimate of flow for Aspen Spring (5.0 gpm), the total for the five seeps and springs in the upper Eagle Canyon is 25 gpm.

Water-Quality Standards and Effluent Limitations

The MRP meets the Water Quality Standards and Effluent Limitation requirements of the State of Utah R645-Coal Mining Rules.

The Permittee has obtained a Utah Pollutant Discharge Elimination System (UPDES) permit. The Utah Division of Water Quality issued the Permittee a UPDES permit on June 15th, 2010. Exhibit 4 contains the UPDES permit.

The UPDES permit authorizes the Permittee to discharge from Outfall 001 (lone sedimentation pond) to Mud Creek and Scofield Reservoir. The permit expires on April 30th, 2013. The Permittee will be required to sample for flow, oil and grease, total iron, total suspended solids and pH every month.

Diversions: General

The MRP meets the Diversions: General requirements of the State of Utah R645-Coal Mining Rules.

The Permittee discusses the diversions to be utilized at the site in Section R645-301-742.300. Map 23, *Drainage and Sediment Control Plan* depicts the undisturbed drainage areas. Map 24, *Drainage and Sediment Control Plan Disturbed Drainage Areas* depicts the disturbed drainage areas and all temporary diversions. Map 25, *Sedimentation Pond 1 Sections and Details*, depicts the diversions from the primary detention pond. Map 26, *Drainage and Sediment Control Plan Disturbed Drainage Sub-Basins* depicts the sub-watersheds utilized to calculate the peak storm flow and sizing of the disturbed area diversions. Map 29, *Mine Surface Facilities Area Post Mining Topography and Interim Drainage Control* depicts the diversions to be utilized following reclamation. MAP 29A, Mine Surface Facilities Area Post Mining Topography depicts the final surface configuration/topography of the surface facility. Design calculations for temporary and permanent diversions are provided in Exhibit 16, *Runoff Control Design Details*. The surface facilities will be constructed to intercept and divert surface runoff flows from undisturbed up gradient areas around the mine surface facilities areas.

Diverting the undisturbed drainage around the mine-site will greatly minimize the potential for erosion and sedimentation impacts and also significantly reduce the requirements for retention and treatment of surface runoff from the disturbed area. The MRP discusses how the diversion structures to be utilized will include both temporary diversions (used to control undisturbed runoff during the operational phase of mining and reclamation) as well as permanent diversions (used to restore effective surface drainage following the completion of mining activity).

All diversions have been designed to appropriate design standards. With the exception of undisturbed drainage ditches UDD-1 and UDD-2 and undisturbed culvert UDC-2 all diversions

will be utilized on a temporary basis (i.e. removed following reclamation). Only the aforementioned diversions will be retained permanently and they have been designed accordingly per R645-301-742.300.

Diversions: Perennial and Intermittent Streams

The MRP meets the Diversions: Perennial and Intermittent Stream requirements of the State of Utah R645-Coal Mining Rules.

Map 24, *Drainage and Sediment Control Plan Disturbed Drainage* areas depicts the drainage control plan for the surface facility. Undisturbed drainage will be routed around the site with culvers (UDC-1 and UDC-2 respectively). The drainages reporting to these culverts have been characterized as ephemeral.

No perennial or intermittent streams are located within the area of the proposed surface facility.

Exhibit 20 identifies several ephemeral drainages that cross the disturbed area. The drainage and sediment control plan will effectively route these drainages around the disturbed area with the utilization of diversions UDD-1 and UDD-2 and culvert UDC-2. Each of these three diversions will be permanent and have been designed to meet the performance standard of safely passing a 10-year, 6-hour event.

Stream Buffer Zones

The MRP meets the Stream Buffer Zone requirements of the State of Utah R645-Coal Mining Rules.

A stream buffer zone will not be required with the proposed mining operation. No intermittent or perennial streams are located within the proposed disturbed area.

Sediment Control Measures

The MRP meets the Sediment Control Measure requirements of the State of Utah R645-Coal Mining Rules.

Erosion and sediment control measures are discussed in Section R645-301-732. Runoff generated on the site during mining operations will be contained and controlled by utilizing a network of ditches, culverts, a sedimentation pond and alternate sediment control methods. The network will be comprised of diversion ditches which route undisturbed runoff around or through the disturbed area, collection ditches which intercept disturbed area runoff and route it to the sedimentation pond and the sediment pond.

The Permittee commits to utilizing various drainage control measures to prevent or mitigate excessive erosion and sediment transport. These measures include: the placement of straw bales, sediment fence, erosion netting, mulch berms, stilling basins, sumps and other small structures to control and surface runoff and limit erosion.

Map 27, *Runoff Control Details*, provides the design drawings for various components of the sediment control measures to be implemented at the site. The drawings include typical silt fence and straw bale installations, headwall protection measures, channel designs and drainage berm details. Map 24, *Drainage and Sediment Control P lan Disturbed Drainage Areas* depicts a plan view of the surface facilities and locations of the various components of the sediment control plan.

The permit states that drainage and sediment control structures, which will be constructed and utilized in conjunction with the proposed mining and related activities, will effectively route natural drainage through the mine surface disturbance area, intercept and route undisturbed drainage from upslope areas around disturbance areas, and collect and route disturbed area drainage to sedimentation structures to allow settlement of suspended solids prior to discharge to natural drainages. The permit states that drainage and settlement control structures required under the proposed MRP will include Sedimentation Pond 1, a number of undisturbed drainage diversion ditches, disturbed area collection ditches, drainage culverts, containment berms, and various alternative drainage and sediment control measures as appropriate. Sediment control measures include practices carried out within and adjacent to the disturbed area.

Siltation Structures: Sedimentation Ponds

The MRP meets the Siltation Structures: Sedimentation Pond requirements of the State of Utah R645-Coal Mining Rules.

The primary sediment control measure to be implemented at the mine site is a sole sediment pond. Map 25, *Sedimentation Pond 1 Section & Details*, provides the design drawings for Sediment Pond 1. Map 24, *Drainage And Sediment Control Plan Disturbed Drainage Areas* depicts the location of the sediment pond relative to the undisturbed drainage areas east of the mine site.

Exhibit16, *Runoff Control Design Details*, provide the design calculations and methodology utilized in designing the sediment pond. As required by R645-301-742.221.33, the sediment pond has been designed to retain the surface runoff volume produced a 10-year, 24-hour storm event. The runoff generated from the adjacent undisturbed areas is to be diverted around the mine site and as such, were not considered in the sediment pond design.

The Permittee commits to installing a staff gage in the sediment pond that will be clearly marked so it can be visually monitored. Marks will be established at an elevation of 7,683.80 (5.3 year sediment level) and at each 0.5' level below that. This will allow the mine and Division inspectors to clearly identify when the sediment needs to be removed.

In Section 526.300, the application discusses the sediment pond maintenance procedures. The sediment pond maintenance procedures include: ongoing sampling and discharge monitoring under applicable provisions of the UPDES permit, quarterly inspections of pond embankments, impoundment areas, discharge structures and inlet/outlet structures as well as reporting any hazardous conditions, maintenance and repair of any problems noted during the inspections as well as the periodic removal of accumulated sediment. Control of potential water quality impacts from pond discharge will be monitored through the compliance with the UPDES permit. During the quarterly inspections, the depth and elevation of any impounded water will be measured and based on those measurements; the storage capacity will be estimated as well. If the inspections identify any potential public hazard, the Permittee will promptly notify the Division.

Siltation Structures: Other Treatment Facilities

Not applicable. Sediment control will be performed using standard sediment ponds and drainage ditches. No other treatment facilities proposed.

Siltation Structures: Exemptions

No exemptions proposed.

Discharge Structures

The MRP meets the Siltation Structures: Sedimentation Pond requirements of the State of Utah R645-Coal Mining Rules.

The pond has been designed with vertical risers for both the primary and emergency spillways. The primary spillway is set at an elevation of 7,683.80 feet. The primary spillway will be used to dewater the pond and discharge stormwater inflows. The invert of the emergency spillway will be set at an elevation of 7,686.9 feet. The spillways have been over-designed to safely pass the 100-year, 6-hour event (as opposed to the 25-year, 6-hour event as required by rule). The principal and emergency spillways were over designed to provide additional safety due to the proximity of the sediment pond to SR 96.

Impoundments

Included below.

Ponds, Impoundments, Banks, Dams, and Embankments

The permit states that Sedimentation Pond 1 has been designed and will be constructed to meet the following regulatory design criteria:

- Located as close as possible to the disturbed area and out of perennial streams unless approved by the Division.
- Provide adequate storage drainage
- Provide adequate detention time to meet applicable effluent standards
- Provide a non-clogging dewatering device
- Minimize short circuiting
- Facilitate periodic sediment removal
- Foundation structures will be stable under all conditions of construction and operation

The permit states that in addition, Sedimentation Pond 1 design has been prepared by or under the direction of a certified by a qualified Registered Professional Engineer in accordance with Rules R645-301-512.200 and 240.

The permit states that the sedimentation pond will be inspected quarterly by a qualified person for any indication on structural weakness or other hazardous condition, instability, erosion, or other problems. Impounded water depth will be measured, and any required structural monitoring will be performed. The qualified registered professional engineer, or qualified registered professional land surveyor as applicable, shall promptly after each inspection provide to the Division a certified report that the impoundment has been constructed and/or maintained as designed and in accordance with the approved plan and this section. The report shall include discussion of any appearance of instability, structural weakness or other hazardous condition, depth and elevation of any impounded waters, existing storage capacity, any existing or required monitoring procedures and instrumentation, and any other aspects of the structure affecting stability. A copy of the report shall be retained at or near the mine-site. If any examination or inspection discloses that a potential hazard exists, the person who examined the impoundment shall promptly inform the Division of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the Division shall be notified immediately. The Division shall then notify the appropriate agencies that other emergency procedures are required to protect the public.

Sedimentation Pond 1 will be located at the northern end of the mine site, as shown on Maps 24 and 13. It is the only sedimentation pond that is proposed to be used for mining operations. The total contributing drainage area for pond 1 is approximately 28 acres. The pond has been designed to provide adequate total retention capacity of 3.15 acre feet.

The permit states that Sediment Pond has been designed to meet a minimum 1.3 static safety factor and all other provisions of the required regulations. The pond does not meet the

NRCS Class B or C criteria for dams in TR-60 or the size or other criteria of 30 CFR Section 77.216.

Stability analyses were performed for the proposed pond and sudden drawdown conditions. For the sudden drawdown condition, the phreatic surface was modeled to be within one foot of the slope surface 10 feet down-slope of the crest, existing at the toe of the slope after full drawdown. A factor of safety of 3.37 was obtained for the steady state condition. For sudden drawdown, the factor of safety reduces to 2.3. Both are able the required 1.3. Map 25, Sediment Pond No. 1, Sections and Details has been certified by a Registered Professional EngineerPonds, Impoundments, Banks, Dams, and Embankments

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

Analysis:

The mining and related operations will utilize new utility installations including electrical distribution, telephone, potable and raw water, and sewer systems. All existing and proposed utility installations are shown on Map 13, Surface Facilities Map.

Descriptions were provided for electrical power systems that will service the mining operation. Electrical power will be provided through an existing power line running north-south immediately east of the portal area. The power line is shown on Map 11, Regional Surface Ownership Map. Electrical voltage will be reduced from the existing power source at a substation located at the portal pad. The substation location is depicted on Map 13.

All electrical components will be designed, constructed, and operated in accordance with regulatory requirements. Any new power lines will be constructed with "raptor proof" power poles. Design specification for these poles in located on Figure 22 on page 3-62 within the biology section of the MRP. All substations, electrical transformers, switchgear, and electrical control components will either be located so that it is not readily accessible to wildlife and the public or appropriate fences with locked gates or other enclosures will be utilized to limit access to authorized personnel.

Buried or overhead telephone lines will be extended by US West from Highway 96 to provide telephone service for mine facilities.

The permit states that potable water, raw water, and sewer connections are expected to be provided by the town of Scofield. Water requirements for the mine are calculated to be a maximum of 4.7 acre feet per year potable water and 61 acre feet per year non-potable water for mining operations.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

SIGNS AND MARKERS

Regulatory Reference: 30 CFR Sec. 817.11; R645-301-521.

Analysis:

The permit commits to posting and maintaining all required signs and markers in compliance with the applicable regulatory provisions of R645-301-521.200. Sign and markers will be constructed of durable materials and will be posted so as to be clearly visible. Mine identification signs listing the name, business address, and telephone number of the permitee and the permit number will be clearly posted. Perimeter markers will be posted for topsoil stockpile, blasting areas, buffer zones, etc.

All required signs and markers will be maintained or replaced during the period of active operations, site reclamation, and until final bond release is approved for all areas within the permit boundaries.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

USE OF EXPLOSIVES

Regulatory Reference: 30 CFR Sec. 817.61, 817.62, 817.64, 817.66, 817.67, 817.68; R645-301-524.

Analysis:

General Requirements

The MRP committed to submit specific blast design information to the Division prior to any blast. Language was included to indicate that the blast plan included with the plan is an example of the general blast plan and not a specific blast design.

The MRP states that any surface blasting will be conducted by or under the direction of a certified blaster. Certificates of blaster certification will be carried by blasters or shall be on file at the permit area during blasting operations. A blaster and at least one other person shall be present at the firing of a blast. Any blaster who is responsible for conducting blasting operations at a blasting site shall be familiar with the site-specific performance standards and give direction and on-the-job training to persons who are not certified and who are assigned to the blasting crew or assist in the use of explosives.

A blast design was included with the MRP (Exhibit 15, Kinney No. 2 Mine Blasting Plan). Blasting operations will be conducted within 1,000 feet of State Highway 96 and within 500 feet of abandoned underground mines.

The blast design contains sketches of the drill patterns, delay periods, and decking and shall indicate the type and amount of explosives to be used, critical dimensions, and the location and general description of structures to be protected, as well as a discussion of design factors to be used, which protect the public and meet the applicable air-blast, fly-rock, and ground-vibration standards. The blast design does not have indication that it was prepared and signed by a certified blaster.

Pre-blasting Survey

Within the MRP, the permittee makes a commitment that at least 30 days before initiation of blasting, the operator shall notify, in writing, all residents or owners of dwellings or other structures located within 1/2 mile of the permit area how to request a pre-blasting survey. A resident or owner of a dwelling or structure within 1/2 mile of any part of the permit area may request a pre-blasting survey. This request shall be made, in writing, directly to the operator or to the Division, who shall promptly notify the operator. The operator shall promptly conduct a pre-blasting survey of the dwelling or structure and promptly prepare a written report of the survey. An updated survey of any additions, modifications, or renovations shall be performed by the operator if requested by the resident or owner.

General Performance Standards

The permit commits to notify, in writing, residents within 1/2 mile of the blasting site and local governments of the proposed times and locations of blasting operations. Such notice of times that blasting is to be conducted may be announced weekly, but in no case less than 24

hours before blasting will occur. Unscheduled blasts may be conducted only where public or operator health and safety so require and for emergency blasting actions.

Blasting Signs, Warnings and Access Control

The operator states that conspicuously place signs reading "Blasting Area" along the edge of any blasting area that comes within 100 feet of any public-road right-of-way, and at the point where any other road provides access to the blasting area and at all entrances to the permit area from public roads or highways, place conspicuous signs which state "Warning! Explosives in Use," which clearly list and describe the meaning of the audible blast warning and all-clear signals that are in use, and which explain the marking of blasting areas and charged holes awaiting firing within the permit area.

Warning and all-clear signals of different character or pattern that are audible within a range of 1/2 mile from the point of the blast shall be given. Each person within the permit area and each person who resides or regularly works within 1/2 mile of the permit area shall be notified of the meaning of the signals in the blasting notification.

Access within the blasting areas shall be controlled to prevent presence of livestock or unauthorized persons during blasting and until an authorized representative of the operator has reasonably determined that no unusual hazards, such as imminent slides or un-detonated charges, exist and access to and travel within the blasting area can be safely resumed.

Control of Adverse Effects

The permit states that blasting shall be conducted to prevent injury to persons, damage to public or private property outside the permit area, adverse impacts on any underground mine, and change in the course, channel, or availability of surface or ground water outside the permit area. UDOT will be notified if Highway 96 needs to be temporarily closed for blasting activities.

Records of Blasting Operations

The permit states that it will retain a record of all blasts for at least 3 years. Upon request, copies of these records shall be made available to the Division and to the public for inspection.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

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

Analysis:

The MRP includes maps depicting affected areas, mine facilities, mine workings, and monitoring and sampling locations. The maps depict Location of each facility used in conjunction with mining operations such as buildings, roads, and facilities to be used in mining and reclamation operations or by others within the permit area; each coal storage, cleaning, and loading area; each topsoil, spoil, coal preparation waste, underground development waste, each water diversion, collection, conveyance, treatment, storage and discharge facility; each source of waste and each waste disposal facility. Also included are the locations and extent of known workings of proposed, active, inactive, or abandoned underground mines, including mine openings to the surface within the proposed permit and adjacent areas.

Affected Area Maps

Maps with the following information were included in the MRP: affected area (permit boundary), bonded area, final reclamation contours, final surface configuration, and reclamation surface features. Map 29 and (new) Map 29A were certified by a Registered Professional Land Surveyor.

Mining Facilities Maps

Maps 16 thru 19 depict the Mine Surface Facilities Area, Pre-Mining, Mining and Post Mining Cross Sections.

Mine Workings Maps

Future and past mine workings details are included on Map 15, Mine Plan Layouts and Production Schedule. Previous mining activity details are included on Map 5, Previous Mining Activities.

Monitoring and Sampling Location Maps

The MRP meets the Monitoring and Sampling Location Map requirements of the State of Utah R645-Coal Mining Rules.

Map 28, *Surface & Ground Water Monitoring Sites*, depicts the locations of the ground and surface water monitoring sites.

Findings:

Contents and information including the certification requirements provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

RECLAMATION PLAN

GENERAL REQUIREMENTS

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

Analysis:

The reclamation plan outlines the removal of all diversions and the primary sediment pond. Two roads (P8 and P9) will be left as permanent access roads to adjacent private property to the east of the surface facility. Access roads to the property were located at the site prior to mining activity. As such, the permanent access roads are part of the approved post-mining land use and required per an agreement with the land owner.

The MRP discusses the re-establishment of the pre-mining topography and the re-establishment of pre-mining drainage patterns. The exception to this is undisturbed drainage ditches UDD-1, UDD-2 and UDC-2. The diversions do not route a perennial or intermittent stream. As such, the design standard for a diversion of miscellaneous flows (R645-301-742.330) applies. The design standard for a permanent diversion of a miscellaneous flow is to safely pass the peak runoff generated from a 10-year, 6-hour event. The design information provided in Exhibit 16 and Table 18 show that diversions UDD-1 and UDD-2 have been over designed to safely pass a 100-year, 6-hour event. UDD-1 and UDD-2 will be utilized as runoff control for the post-mining land use access roads. UDC-2 will route runoff into the adjacent irrigation ditch that ultimately reports to Scofield Reservoir.

Beginning on page 5-82 of Chapter 5 of the MRP, the permit includes details of the reclamation plan. This section provides a plan for the reclamation of the lands within the proposed permit area, showing how the permit will comply with the regulatory program and the environmental protection performance standards. It also includes practices to be used to restore disturbed areas resulting from mining and related activities to productive self sustaining use. The general steps for reclamation include:

- Facility Demolition & Removal
- Stabilization and Sealing of Mine Openings

- Disposal of Non-Coal Wastes, and Mine Waste Materials
- Backfilling and Grading to Establish Final Design Configuration
- Drainage Re-establishment
- Road Removal
- Removal and Reclamation of Sedimentation Ponds and Associated Structures
- Soil/Substitute Replacement
- Revegetation
- Soil and Seed Stabilization
- Post-Reclamation Management, Maintenance, & Monitoring

The plan contains a detailed timetable for the completion of each major step in the reclamation plan. Details are provided for initial, interim, and final reclamation. Final reclamation include a plan for backfilling, soil stabilization, compacting, and grading,

A post mining contour map (Map 29) is provided. This provides the details for the anticipated final surface configuration of the proposed permit area; a plan for redistribution of topsoil, subsoil, and other material

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

POSTMINING LAND USES

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

Analysis:

Chapter 4, Section R645-301-412.100, Page 4-18, Paragraph 3 has been revised to include wildlife, grazing and recreation and Mountain Range, Watershed and Commercial as zoning classifications established by Carbon County and the Scofield Town for zoning purposes described in chapter 4 on page 4-4.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

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

This review of the information required by this section of the regulations is covered in detail in the operation plan section of this document.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

The disturbed area for the Kinney No. 2 Mine will be reclaimed to the approximate original contour as it exists as of December, 2007, the state it was left in by the Utah AML reclamation project, including the highwall remnant.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

FILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

Following completion of mining and related operations and subsequent facility removal and sealing of mine openings, the associated disturbances will be backfilled and re-graded to achieve the approximate original contour; eliminate steep cuts and highwall exposure, spoil piles, and depressions; achieve a postmining slope that does not exceed either the angle of repose or such lesser slope as is necessary to achieve a minimum long term static safety factor of 1.3 and to prevent slides; minimize erosion and water pollution both on and off the site; and, support the approved postmining land use. Final backfilling and grading will require the movement of approximately 221,877 cubic yards of material.

The permit states that slope limitations for final cut and fill slopes will result in slope configurations having a static factor of safety of at least 1.4. The designed factor of safety for any benched slope is 1.5

The postmining slope is not expected to vary greatly from the approximate original contour. Small depressions will be constructed to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation. The topsoil on the area shall be removed, segregated, stored, and redistributed in accordance with regulatory requirements; the spoil shall be backfilled and graded on the area in accordance with the general requirements for backfilling and grading. Preparation of final-graded surfaces shall be conducted in a manner that minimizes erosion and provides a surface for replacement of topsoil that will minimize slippage.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

The permit states that five main portals will be constructed. These openings will be permanently sealed upon completion of mining. The plan states that portals will be sealed and stabilized by constructing a concrete block wall, at a minimum of 25 feet in-by the portal opening. Further casing and sealing details are located on page 5-92 of the MRP.

Map 17 depicts 25 feet of backfill from the portal seals to the portal face-up. The corresponding text, on page 5-80 includes a commitment to backfill the portals for a minimum of 25 feet from the portal seal to the portal face-up.

In Section R645-301-551 of the application, the Permittee discusses the sealing all mine openings. On completion of mining and related activities, all mine openings including portals, shafts, raises, boreholes and wells will be stabilized and sealed unless they are utilized for ongoing monitoring. The portals will be sealed by constructing a concrete block wall a minimum of 25' in-by the portal openings (See Figure 37).

In Section R645-301-765, the Permittee discusses the casing and sealing of wells. The Permittee commits to sealing and backfilling the monitoring wells once the Division has made a

finding that they are no longer needed for monitoring. The application discusses how the monitoring wells will be sealed. The boreholes or well casings will be sealed by filling them with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or water-bearing zone. The remainder of the hole will be filled with cement to within 20 feet of the ground surface and then the remainder of the hole will be filled with cement to the ground surface to form a surface plug. A steel fence post will be placed in the center of the surface plug in order to provide a permanent marker of the hole location.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

Operational contours are shown on Surface Facilities Map 13. Cuts made into competent sandstone may approach 0.8h:1v (Exhibit 14). Reclamation slopes will vary from 5h:1v to 0.5h:1v (Section 542.200, Backfilling and Grading to Establish Final Configuration). Exhibit 14, RB&G Engineering November 2007 Report, discusses the stability of reclamation fill slopes ranging from 1.4H:1V to 2H:1V. RB&G specifies that clayey fill slopes (Sections A-A, B-B, and F-F) constructed at 1.5h:1v will have a safety factor of 1.3 and that the silty sand fill (Sections C-C, D-D, and E-E) could achieve a safety factor of 1.3 at slopes of 1.8h:1v. Map 29 shows reclamation contours. Map 33 identifies the locations of steep slope reclamation areas and will be used to determine reclamation treatment as discussed in Section 542.200 Soil/Substitute Replacement.

The final reclamation contours are shown on Map 29, Post Mining Topography. Cross sections of the post mining topography are shown on Maps 16 through 19; cross-section locations are shown on Map 13, Surface Facilities.

Tractor scrapers or wheel loaders and trucks will be used to recover material stored in the stockpile and transport the material to the graded slopes. A uniform thickness of 14.8 inches will be replaced on the graded surface. Soil replacement thickness will be monitored (Section R645-301-242). After soil placement, soils will be sampled and analyzed, with 1 sample taken

per four acres (Section R645-301-243). Samples will be analyzed for suitability parameters described in the Utah Guidelines for Topsoil and Overburden.

Regraded slopes of less than 30% will be deep ripped. Slopes of greater than 30% will be roughened with a track hoe. Refer to Map 33 for slope steepness. All regraded slopes will be amended with 3 Tons/ac chopped hay (Section R645-301-243). Further fertility amendments will be dependent upon the results of the laboratory analysis. Seeding will occur immediately after topsoil placement (Section R645-301-244.200, Soil Stabilization).

Sections R645-301-244.200 and R635-301-340 Soil Replacement and R645-301-355 describe the application of an additional 2.0 tons/acre straw or hay after seeding, followed by crimping.

Findings:

The information provided in the application meets the requirements of the R645 Coal Rules for Soils Redistribution Plan.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Analysis:

Reclamation

The MRP meets the Roads Systems and Other Transportation Facilities requirements of the State of Utah R645-Coal Mining Rules.

In Section R645-301-762 of the application, the Permittee states, "*Roads that will not be retained for use under an approved postmining land use will be reclaimed immediately after they are no longer needed for coal mining and reclamation activities*". The reclamation of the roads will be accomplished by reshaping all cut and fill slopes to be compatible with the post-mining land use and to compliment the drainage pattern of the surrounding topography and the removal of all associated culverts/diversions.

Map 29, *Mine Surface Facilities Area Post Mining Topography & Interim Drainage Control* and Map 29A, *Mine Surface Facilities Area Post Mining Topography* depict the mine site post-mining and reclamation. As depicted on Maps 29 and 29A Sections of road will remain on the site permanently after reclamation efforts. As directed by the landowners, the post-mining

land use roads will provide access to private property in the mining area and the area east of the mining area as well as to private property north of the mine area.

With the exception of roads to be used for post-mining land use, roads will be reclaimed in accordance with the approved reclamation plan as soon as practicable after it is no longer needed for mining and reclamation operations. This reclamation shall include: closing the road to traffic; removing all bridges and culverts unless approved as part of the postmining land use; removing or otherwise disposing of road-surfacing materials that are incompatible with the postmining land use and revegetation requirements

Retention

The MRP meets the Roads Systems and Other Transportation Facilities requirements of the State of Utah R645-Coal Mining Rules.

All roads will be reclaimed following mining activity, with the exception of PMLU Road P8 and PMLU Road P9. Roads P8 and P9 are to be retained permanently following the termination of mining activity and post-reclamation. The two roads are to be retained permanently per an access agreement with an adjacent land-owner. The roads are required to access private property east of the mine-site. Access roads to the private property east of the mine site were in existence prior to mining. As a result, the retention of PMLU Road P8 and PMLU Road P9 following reclamation is in line with the post-mining land use and pre-mining land use of the property. Figure 25A, *Primary Roads P8 & P9 Configuration*, provides cross-sectional views for primary roads P8 and P9. Drainage control from the two roads will be achieved by utilizing two diversion ditches and a culvert (UDD-1, UDD-2 and UDC-2 respectively). The diversions do not route a perennial or intermittent stream. As such, the design standard for a diversion of miscellaneous flows (R645-301-742.330) applies. The design standard for a permanent diversion of a miscellaneous flow is to safely pass the peak runoff generated from a 10-year, 6-hour event. The design information provided in Exhibit 16 and Table 18 show that diversions UDD-1 and UDD-2 have been over designed to safely pass a 100-year, 6-hour event.

In order to the design the collection system ditches and culverts, the Permittee utilized Hydrologic Modeling Software (HEC-HMS) 3.1.0 developed by the Army Corps of Engineers using the Soil Conservation Service (SCS) curve number loss method and the SCS unit hydrograph transform method. Drainage basins were delineated in AutoCAD by utilizing existing and proposed elevation contour data and the location of proposed pads and storm drainage facilities. Drainage basins were modeled in HEC-HMS using the SCS unit hydrograph transform method. The sub-basins peak flows were then calculated in order to properly size the culverts and diversion ditches.

The permit states that certain roads within the mine facilities area will continue to provide access to areas during reclamation and extended liability periods. Roads to be retained for an approved postmining land are classified as primary roads and designed constructed and maintained in accordance with the requirements for primary roads and in consideration of the approved postmining land use.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

The application meets the General Reclamation Plan requirements of the State of Utah R645-Coal Mining Rules.

In Section R645-301-760 the application discusses the hydrologic restoration plans to be implemented during the reclamation phase of the mining operation. The MRP states, "*CR has incorporated specific control and mitigation measures in mining, processing and reclamation plans in order to prevent any significant impacts on surface or ground water quality.*"

The reclamation plan involves backfilling and regarding disturbed areas, replacement of soil, re-establishment of pre-mining drainage patterns and establishing a vegetative community. A component of the reclamation plan includes the removal of some temporary operational drainage structures, establish designed permanent post-mining drainage structures, and modify some of the existing temporary drainage structures to provide for effective drainage and sediment control.

As part of the reclamation activities, the Permittee will implement an interim runoff control plan. During this phase, the majority of temporary operational drainage structures will be removed. The primary sediment pond will remain throughout the re-vegetation effort on the mine site. Once vegetation is established, the sediment pond will be removed and the site re-vegetated. The interim drainage control plan is depicted on Map 29, *Mine Surface Facilities Area- Post Mining Topography & Interim Drainage.*

Once reclaimed slopes have been stabilized, vegetation established and when no longer needed for sediment control, all temporary diversions and associated structures will be removed. The exceptions to this are permanent diversion ditches UDD-1, UDD-2, UDC-2 and culvert CP-2 and the associated energy dissipation riprap depicted on Map 29. The irrigation ditch shown at the southern end of Map 29 will be re-established. Post mining land use roads P8 and P9 will be retained permanently to facilitate access to private property following mining activity. Reclamation will consist of filling of the diversion ditches, grading to blend ditch areas with adjacent terrain and reseeding of the affected areas. Map 29 and 29A; depict diversion ditches UDD-1 and UDD-2 as permanent diversions. The ditches have been designed to handle the 100-year, 6-hour event. Undisturbed drainage culvert UDC-2 will also be retained permanently following final reclamation. The culvert will divert storm water generated from the undisturbed area above post-mining land use road PMLU P9. Culvert UDC-2 will be tied into the existing UDOT culvert that routes storm water under SR 96 (CP-2). UDC-2 will also serve as runoff control for the post-mining land use road.

Sediment pond reclamation will include the removal of the man-made discharge structures, removal and disposal of any riprap, concrete and bedding materials which will not be utilized in conjunction with the reestablishment of post-mining drainages. The application states, "*CR will continue to operate and maintain sedimentation ponds and associated drainage structures until contributing drainage areas are effectively restored through application of the reclamation activities.*" Effective restoration will be established once re-vegetation success has been accomplished and the surface drainage has been restored such that contributions of suspended solids from untreated disturbed area runoff are within applicable water quality standards.

The Permittee proposes to control erosion and sediment transport during reclamation of the interim drainage and sediment control structures with a combination of silt fences, hay bales and other appropriate alternative sediment control measures. The Permittee commits to installing these temporary controls prior to "*any reclamation activities*." The alternative sediment controls are to remain in place during backfill/regarding operations, placement of soil material, reseeding and re-establishment of vegetation. The structures will be removed once vegetation has been reestablished on the site.

The Permittee discusses the restoration of drainage patterns at the mine site. The application states, "*In conjunction with final backfilling and regarding activities, permanent drainage features, designed to pass the peak flows from the 100-year, 6-hour event, will be established to effectively pass natural drainage through the reclaimed areas and provide for effective control of runoff from reclaimed areas while minimizing the potential for any significant erosion.*" The application continues that "*some temporary drainage structures may be retained and modified as necessary to carry disturbed area drainage flows from permanent drainages to the sedimentation pond which will also be retained to provide ongoing sediment control through the extended liability period.*"

Interim Drainage Control

As part of the reclamation activities, the Permittee will implement an interim runoff control plan. During this phase, the majority of temporary operational drainage structures will be removed. The primary sediment pond will remain throughout the re-vegetation effort on the mine site. Once vegetation is established, the sediment pond will be removed and the site re-vegetated. The interim drainage control plan is depicted on Map 29, *Mine Surface Facilities Area- Post Mining Topography & Interim Drainage.*

When no longer needed for sediment control, all temporary diversions and associated structures will be removed. The exceptions to this are permanent diversion ditches UDD-1, UDD-2, UDC-2 and culvert CP-2 and the associated energy dissipation riprap depicted on Map 29. The irrigation ditch shown at the southern end of Map 29 will be re-established. Post mining land use roads P8 and P9 will be retained permanently to facilitate access to private property following mining activity. Reclamation will consist of filling of the diversion ditches, grading to blend ditch areas with adjacent terrain and reseeding of the affected areas.

In order to demonstrate that pre-mining drainage patterns have been restored, the Permittee will provide documentation to the Division with one of two methods or by a combination of: 1) Comparing pre- and post-mining water monitoring data as well as analyzing applicable effluent standards and 2) Providing runoff and sedimentation modeling results by utilizing measured reclamation vegetation cover values and calculated sediment contributions with that of modeling results developed using baseline pre-mining vegetative cover values.

Permanent Casing and Sealing of Wells

All exploration drill holes within the permit and adjacent area will either be completed as monitoring wells or sealed following completion of drilling, sampling and logging. If the hole is to be utilized as a monitoring well, it will be cased, completed and developed as a monitoring well consistent with Figure 21, *Typical Well Completion Diagram.* If the hole will not be utilized as a monitoring well, or when an existing well is no longer needed for on-going water monitoring, it will be sealed by filling the casing with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or water bearing zone; filling the remainder of the hole to within 20 feet of the ground surface with bentonite; and filling the remainder of the hole to the ground surface with cement to form a surface plug.

The Permittee does not intend to transfer title of any monitoring wells to a second party following the cessation of mining and reclamation activities.

Findings:

The application meets the Hydrologic Reclamation Plan requirements of the State of Utah R645-Coal Mining Rules.

CONTEMPORANEOUS RECLAMATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.100; R645-301-352, -301-553, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

General

Section R645-301-352 describes contemporaneous reclamation practices for exploration activity including timing of revegetation activities for revegetation of areas that could be reclaimed during the active life of the mine. This would be either in the fall or as needed to promote seed germination as soon after the seed bed is prepared to prevent soil crusting.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

REVEGETATION

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

Analysis:

Revegetation: General Requirements

Revegetation is described in section R645-301-353 of the application. Implementation includes seedbed preparation, seeding, woody species transplanting, mulching and monitoring.

Revegetation: Timing

Page 3-88, Section R645-301-354 includes timing of revegetation activities for revegetation of areas that could be reclaimed during the active life of the mine and post mining. This would be either in the fall or as needed to promote seed germination as soon after the seed bed is prepared to prevent soil crusting.

Revegetation: Mulching and Other Soil Stabilizing Practices

Page 3-81, Section R645-301-341.230 describes the mulching techniques to be used during reclamation, including rates, crimping, plowing and or disking. Additionally tackifier will be incorporated on slopes steeper than 3:1.

Revegetation: Standards for Success

Section R645-301-356 includes a commitment to sample the revegetated areas during years 4, 8, 9 and 10 in accordance with the DOGM vegetation guidelines.

Findings:

The information in the application is adequate to meet the requirements of this section of the regulations.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Stockpiled topsoil and subsoil will be bermed and seeded. The stockpile will cover 2.1 acres (Section 231.400).

Section R645-301-331 describes interim reclamation of roadcuts, ditches, sedimentation pond embankments, soil stockpiles to control erosion. Section R645-201[sic]-527 emphasizes all road cut and fill slopes and excavated slopes will be stabilized with an interim vegetation mix.

Road PR-1 will be paved from Hwy 96 to the shop/warehouse (Section R645-201[sic]-527). Other roads will be watered or be treated with dust suppressants and a 15 mph speed limit will be imposed in accordance with the air quality permit dated December 11, 2008 (Exhibit 4).

Final reclaimed areas will be ripped or gouged, seeded and top dressed with 2 tons/acre straw crimped into the soil (Section R645-301-340 Soil Replacement and Seedbed Preparation and Section R645-301-355). Section 412.100 states the post mining land use is wildlife, watershed, and commercial. A commitment for the treatment of rills and gullies is found in Section 244.300.

Findings:

The information provided in the application meets the requirements of the R645 Coal Rules for Soil Stabilization.

CESSATION OF OPERATIONS

Regulatory Reference: 30 CFR Sec. 817.131, 817.132; R645-301-515, -301-541.

Analysis:

Section R645-301-515.300 describes procedures to be taken in the event that Cessation of Operations takes place. Carbon Resources, LLC will submit a notice of intention to UDOGM. The notice will include a statement of the exact number of acres which have been disturbed prior to cessation, the nature and extent of any reclamation completed, and any reclamation, environmental monitoring, water treatment, or other activities which will continue during the period of cessation.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

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

Analysis:

Final Surface Configuration Maps

The MRP meets the Final Surface Configuration Map requirements of the State of Utah R645-Coal Mining Rules relative to hydrology.

Map 29, *Mine Surface Facilities Area Post Mining Topography and Interim Drainage Control* depicts the surface configuration and drainage controls that will be in place during the interim reclamation phase. Map 29A, *Mine Surface Facilities Area Post Mining Topography* depicts the final surface configuration/topography of the surface facility.

Reclamation Monitoring and Sampling Location Maps

The MRP meets the Reclamation Monitoring and Sampling Location Map requirements of the State of Utah R645-Coal Mining Rules.

Table 20, *Hydrologic Monitoring Schedule* provides the parameters to be analyzed for during post-mining. Map 28, *Surface and Ground Water Monitoring Sites* depicts the water monitoring sites that will be monitored during the reclamation liability period.

Findings:

Contents and information provided in the MRP are sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:

Bond calculation spreadsheets were submitted within the MRP. The bonding calculations include details for all direct and indirect costs. The permittee provided updated unit cost estimates for reclamation aspects. Direct costs include subtotals for removal (demolition), backfilling and grading (earthwork), and revegetation. Indirect costs include mobilization/demobilization, contingencies, engineering redesign, office expenses, and project management fees. Direct & Indirect costs were adequately calculated and summarized as follows:

Bonding Calculations		
Direct Costs		
Subtotal Demolition & Removal	$954,000	
Subtotal Earthwork - Backfill and Grading	$545,685	
Subtotal Revegetation	$102,606	
Subtotal Direct Costs	**$1,602,291**	
Indirect Costs		
Mobilization /Demobilization	$160,229	10%
Contingencies	$80,115	5.00%
Engineering Redesign	$40,057	2.50%

Main Office Expense	$108,956	6.80%
Project Management Fee	$40,057	2.50%
Subtotal Indirect Costs	**$429,414**	26.80%
Total Costs	$2,031,705	

The bond summary spreadsheet include the following details: The escalation factor used was 1.7%. The total 5 year escalation cost was $178,667. The total reclamation cost + escalation (2016 dollars) was $2,210,372. The total required bond to be posted (in 2016 dollars) will be **$2,210,000** (cost + escalation, rounded to nearest $1000). This is a number that was agreed upon by the Division and the permittee.

Findings:

Contents and information provided in the MRP are considered sufficient enough to meet the minimum requirements of this section of the Utah Coal Mining Rules. This finding is contingent upon the permittee successfully posting the bond and demonstrating adequate bonding insurance.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

OPERATIONS IN ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR Sec. 822; R645-302-324.

Analysis:

Essential Hydrologic Functions

The MRP meets the Essential Hydrologic Function requirements of the State of Utah R645-Coal Mining Rules.

The MRP provides information that examines the presence of an Alluvial Valley Floor in Chapter 9, Section R645-302-320. As required by R645-302-321.300, the Division will determine that an alluvial valley floor (AVF) exists if it finds that:

1) Unconsolidated stream laid deposits holding streams are present; and,
2) There is sufficient water to support agricultural activities as evidenced by:
3) The existence of flood irrigation in the area in question or its historical use;
4) The capability of an area to be flood irrigated, based on stream flow water yield, soils, water quality and topography; or,
5) Subirrigation of the lands in question derived from the ground water system of the valley floor.

Beginning on page 9-3, the MRP discusses AVF's within the permit and adjacent area. Based upon the aforementioned criteria, an AVF is located within the adjacent area (west of SR 96) of the permit area. Map 32, *AVF Evaluation Map* depicts the AVF location. Map 6, *Regional Surface Geology Map*, depicts alluvial material directly adjacent to Mud Creek on either side of the stream channel. The areal extent of the alluvial material adjacent to Mud Creek is relatively small (limited to within less than 500 feet of the Mud Creek stream channel). However, an irrigation network has been identified; evidence to the existence of flood irrigation in the adjacent area. The source of the irrigation water for the AVF area is Mud Creek. The water from Mud Creek has been historically utilized for irrigation purposes in this area with an irrigation network originating well upstream from the permit area. The permit describes the Scofield Ditch System as the source of irrigation water for the adjacent land outside the permit area. The East Branch Ditch divides as shown on Map 32. One irrigation ditch flows through the southwestern corner of the permit area. Based upon research conducted by the Permittee, the irrigation ditch has not been utilized for approximately 25 years. The ditch will be routed into a

culvert that will be maintained throughout the life of the mine. During reclamation, the pre-existing drainage characteristics of the ditch will be restored. Potential impacts to the function of the AVF are discussed in Section R645-302-322.100. The potential for the AVF to be impacted by the mining operations are considered negligible for the following reasons:

1) Mining will occur well above the regional water table (as presented in Chapter 7 of the MRP). As a result, the potential for ground water interception of the regional water table is considered negligible. Additional ground water investigations will be conducted as mining progresses eastward. However; based upon the baseline information provided by the Permittee, it appears that any ground water component that may contribute recharge to the AVF area adjacent to the permit area will not be affected by mining activity. Surface runoff will be controlled via the storm water drainage system (See Chapter 7). All surface runoff generated during snowmelt and precipitation events will be routed to Sediment Pond No. 1. A Utah Pollutant Discharge Elimination System has been obtained by the Permittee and establishes water quality/effluent standards for any discharge that could potentially enter the AVF area.

2) The source of irrigation water for the AVF area comes from Mud Creek at a diversion point located upstream of the mine site. As can be seen from Map 32, irrigation ditches supplying water to the AVF area are part of the Scofield Ditch system. The diversion point for this system is located approximately ¾ of a mile south of the most southern point of the permit area.

3) The only ditch that supplies water to the AVF that is located in close proximity to the mine site has not been utilized for a long time as evidenced by the vegetation present in the channel and general state of disrepair.

4) With the exception of the snow and rainfall that is captured within the disturbed area of the mine, all adjacent undisturbed drainage will be routed around the mine during operations and interim reclamation and thus still report to the adjacent AVF area.

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 its proximity to the drainages and the utilization of first mining practices only (i.e. no planned subsidence).

The MRP identifies a "Quasi AVF" area that is much closer to permit area on Map 32. The existence of historic flood irrigation and the capability of the mine-site to be irrigated have been documented. However, the unconsolidated streamlaid deposits required for an AVF are not present within this area and as such do not meet the criteria of an AVF. The MRP discusses the

geology of the permit area relative to AVF's beginning on page 9-6. Pleasant Valley (located directly west of the permit area) is a graben produced by faulting. Based upon the extent of the valley floor relative to the size of the Mud Creek drainage and resulting flows, it seems apparent that the valley floor of Pleasant Valley was primarily the result of faulting and not by fluvial processes solely. The result of this explains the minimal amount of stream laid deposits located directly adjacent to the Mud Creek stream channel (i.e. the identified AVF).

In summary, the coal seam to be mined is located well above the regional water table. As a result, the possibility that mining activity could interrupt or impact recharge to the identified AVF is minimal. In addition, the irrigation water that supplies the 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).

Monitoring

The MRP meets the Monitoring requirements for hydrologic function of Alluvial Valley Floors.

In order to protect the hydrologic balance, the Permittee has developed a Ground Water Monitoring Plan. The plan is described in Section R645-301-731.200 of the MRP. Table 6, *Kinney Mine Baseline Monitoring Stations* and Table 7, *Kinney Mine Operational Monitoring Stations* provides a list of the baseline and operational ground water monitoring stations respectively. Table 20, *Hydrologic Monitoring Schedule* provides a list of the water quality parameters that will be analyzed for during the operational and post-mining phases of the project. Map 28, *Surface and Ground Water Monitoring Sites* depicts the locations of the ground water monitoring sites.

The Permittee commits to obtaining water quality samples on a quarterly basis. The data will be submitted to the Division within 90 days of the end of the quarter. On an annual basis, the Permittee commits to providing the Division with a hydrologic review and summary of data that will be submitted on or before June 1st.

The operational and reclamation phase ground water monitoring program consists of monitoring 9 monitoring wells (CR 06-01, CR 06-01 BLW, CR 06-02, CR 06-02 ABV, CR 06-05A, CR 06-09 ABV, CR 06-09 BLW, CR 10-11 and CR 10-12) and 7 spring sites (Aspen Spring/Pond, Eagle Spring 2 and Pond 2, Eagle Seep 1, Eagle Seep 1A, Eagle Seep 3, Eagle Spring and Sulfur Spring). The sites will be monitored for water level/flow as well as field and laboratory analytical parameters.

The Permittee will monitor Eagle Seep 1, Eagle Seep 1A, Eagle Seep 3, Eagle Spring 2, Eagle Pond 2 and Aspen Spring (aka Eagle Pond 1) on a monthly basis for a minimum of 12 months (with the exception during months when access is not possible due to snow).

The water monitoring program will allow the Permittee to determine if mining activity is producing impacts to the hydrologic balance as well as the effectiveness of future reclamation efforts. The obtained data will be used to identify problems/issues and if necessary, develop necessary mitigation measures as needed.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The application meets the Cumulative Hydrologic Impact Assessment requirements of the State of Utah R645-Coal Mining Rules. The Permittee has provided the hydrologic and geologic information and baseline data necessary to demonstrate the proposed mine plan has been designed to prevent material damage to the hydrologic balance outside the permit area.

Findings:

The application meets the Cumulative Hydrologic Impact Assessment requirements of the State of Utah R645-Coal Mining Rules.

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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

June 27, 2011

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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.

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 448 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.

The CIA boundary was last 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 and 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 also 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.

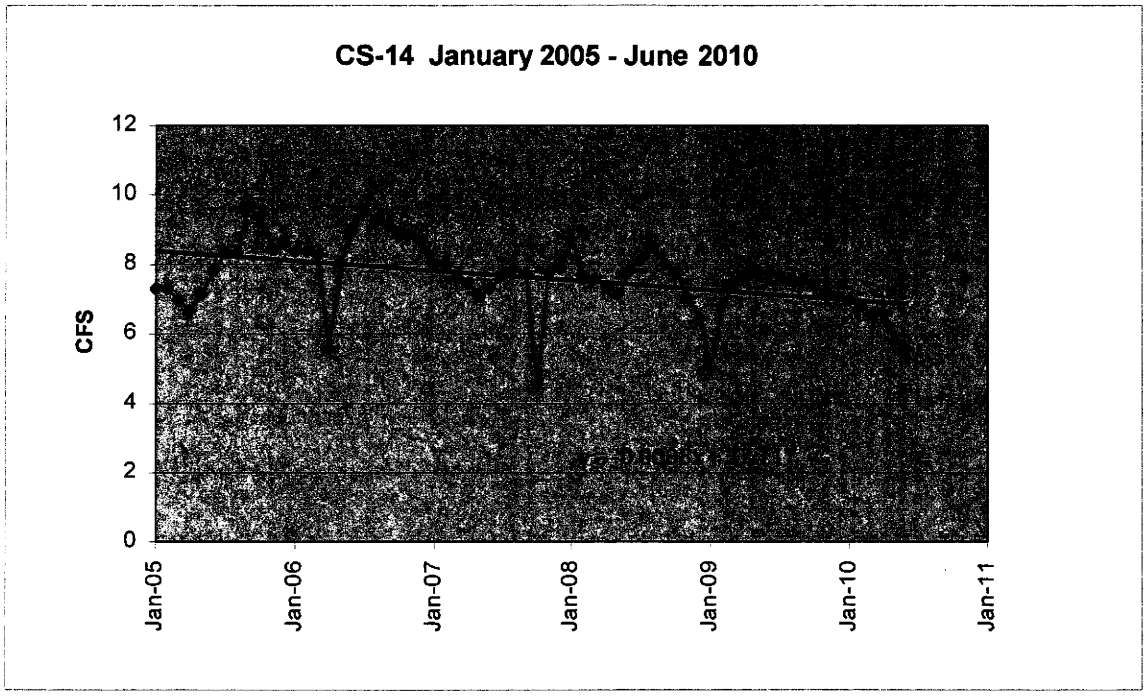


Exhibit 1 – The discharge from the mine, measured at CS-14, has been declining since 2005.

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.

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 25 springs, 18 ground water wells, 38 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

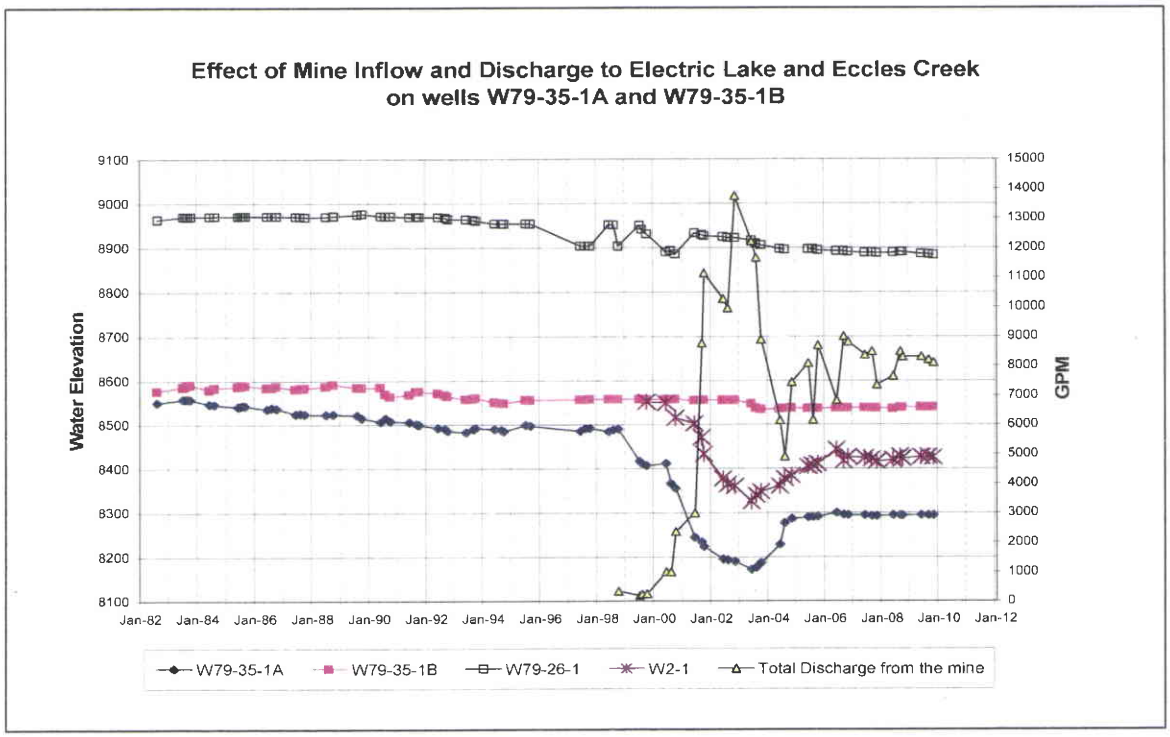


Exhibit 2 – Response of water levels in wells W2-1, W79-26-1, W79-35-1A, and W79-35-1B to mine water discharge (as an indicator of mine inflow).

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 6×10^{-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 2010)

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.

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

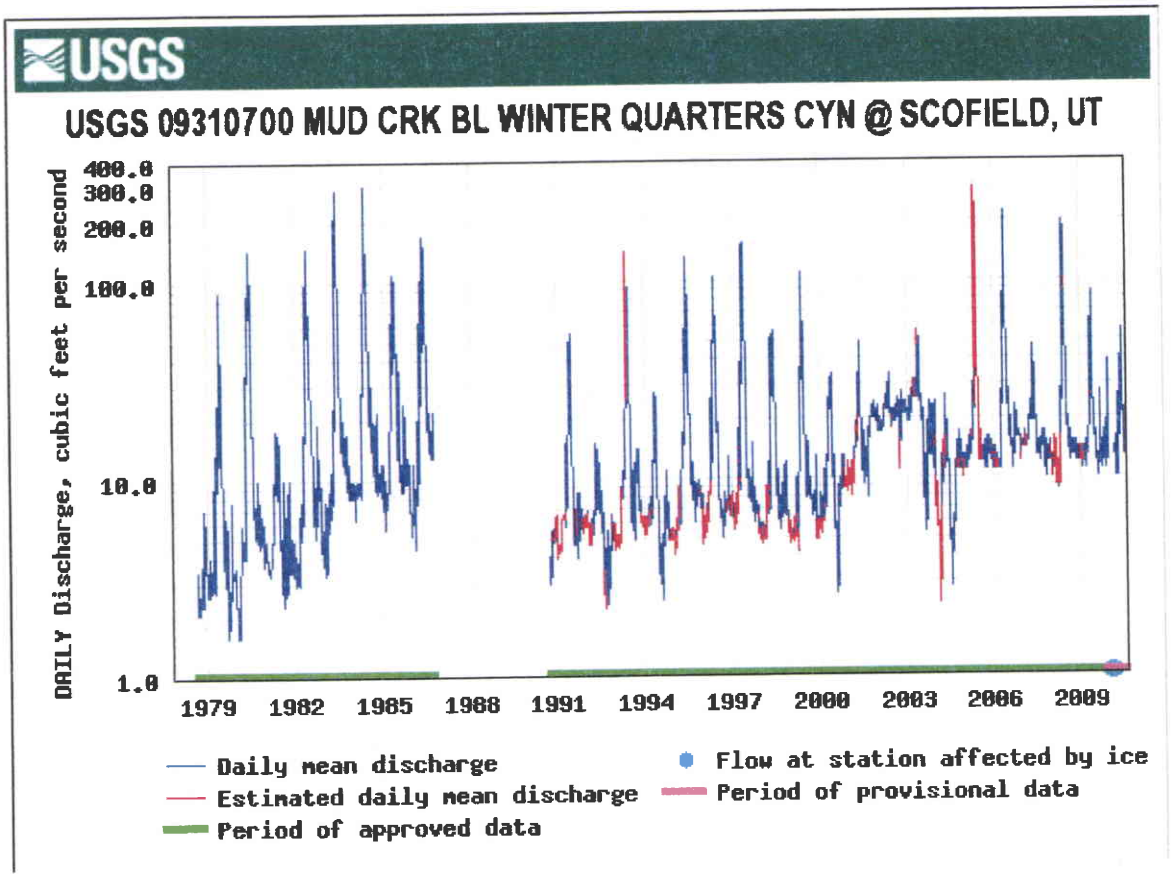


Exhibit 3 – Daily Mean Discharge of Mud Creek measured at USGS flow monitoring station 09310700 at Scofield, Utah.

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.

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

Gauging Station	Date	Average	Maximum	Minimum
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 10 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	5/31/89	12/14/88	3/29/89	4/18/89	5/31/89
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

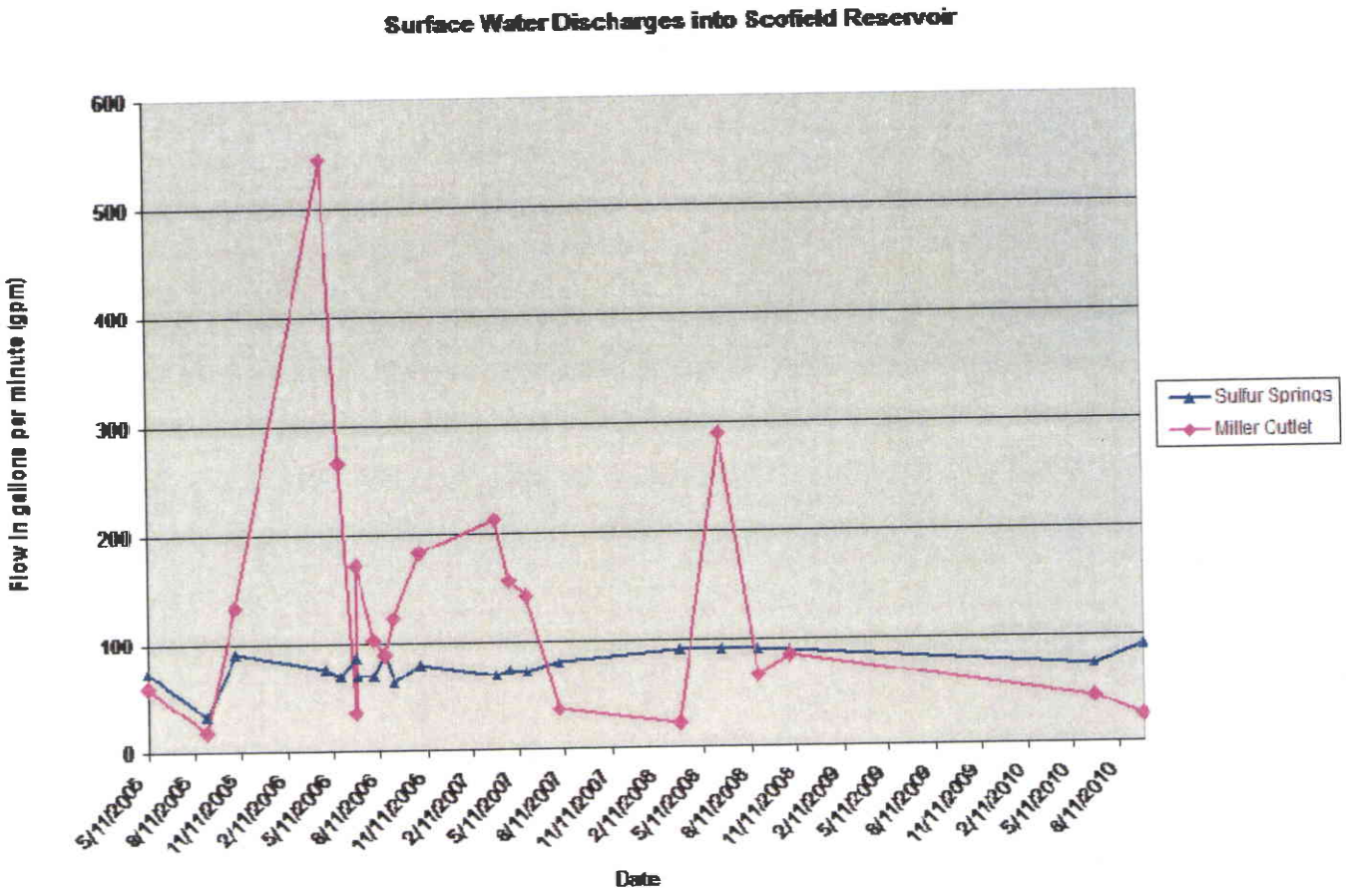
Increased Streamflow

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 δ^{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.

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Appendix A

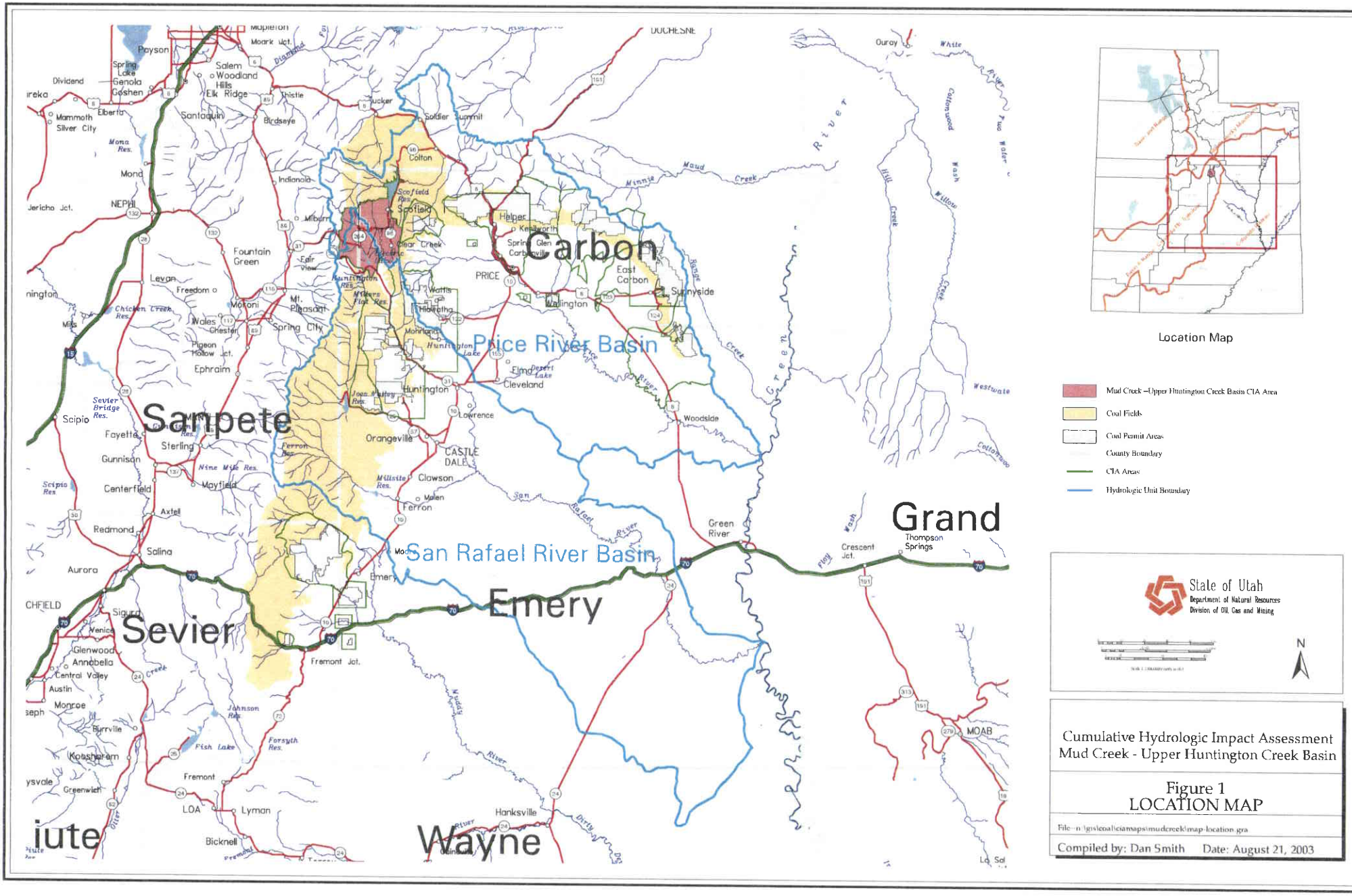

Carbon
Sanpete
Grand
Emery
Sevier
Wayne
Price River Basin
San Rafael River Basin
Location Map
Mud Creek –Upper Huntington Creek Basin CIA Area
Coal Fields
Coal Permit Areas
County Boundary
CIA Areas
Hydrologic Unit Boundary
State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
N
Cumulative Hydrologic Impact Assessment
Mud Creek - Upper Huntington Creek Basin
Figure 1
LOCATION MAP
File: n:\gis\coal\cia\maps\mudcreek\map-location.gra
Compiled by: Dan Smith Date: August 21, 2003

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

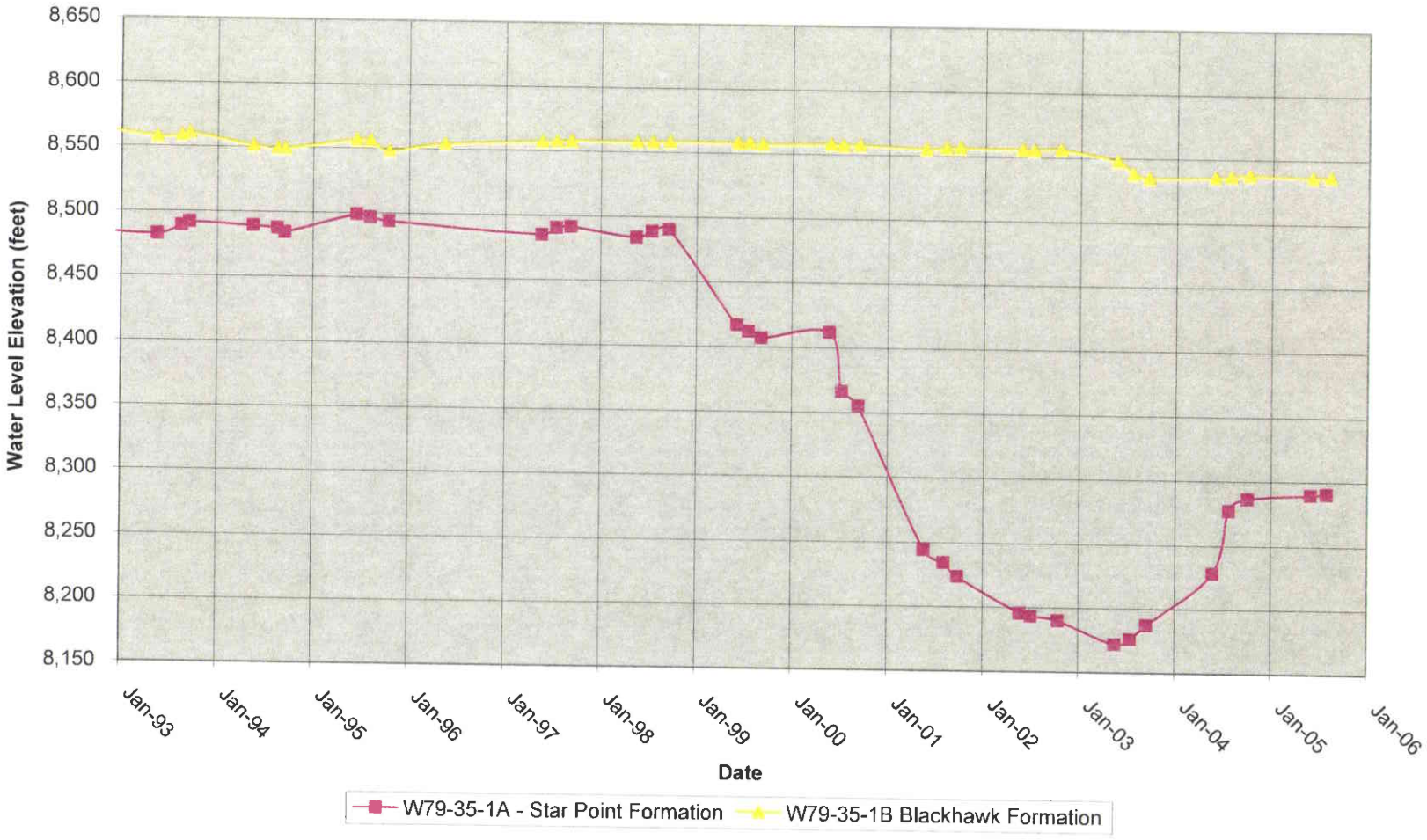


Figure 5a - Springs vs. SWSI

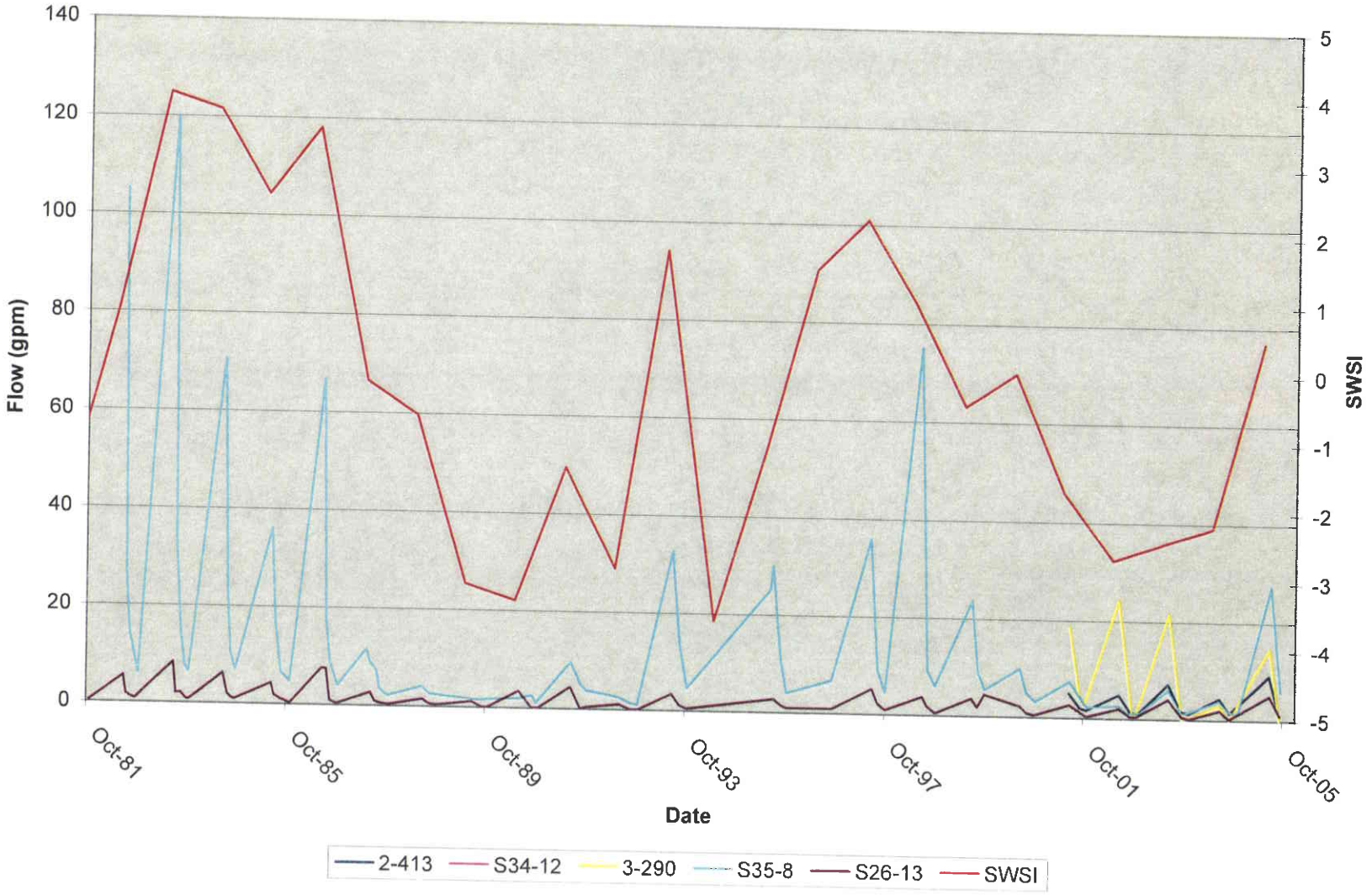


Figure 5b - Streams vs. SWSI

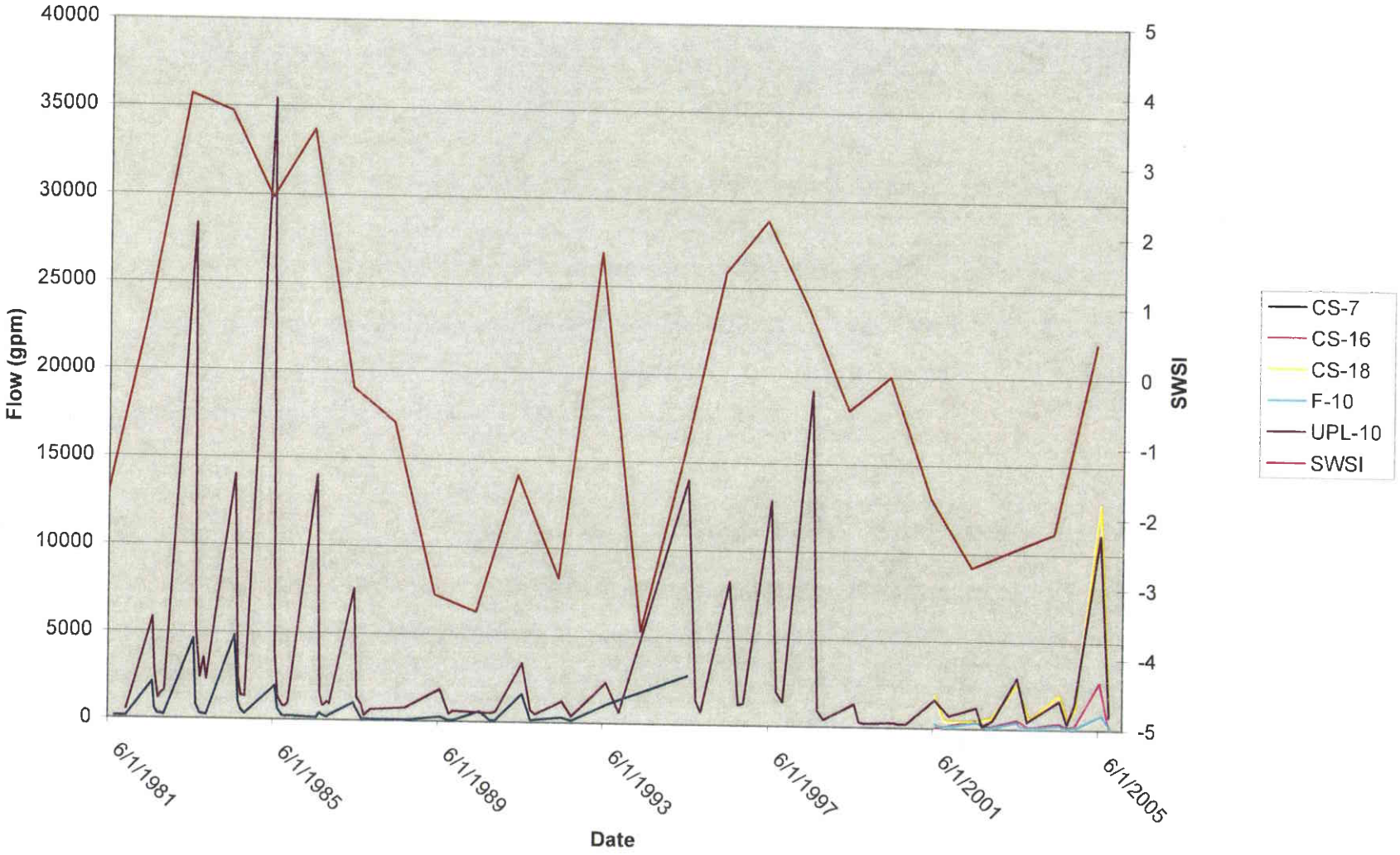


FIGURE 6A

TDS in Lower Eccles Creek

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

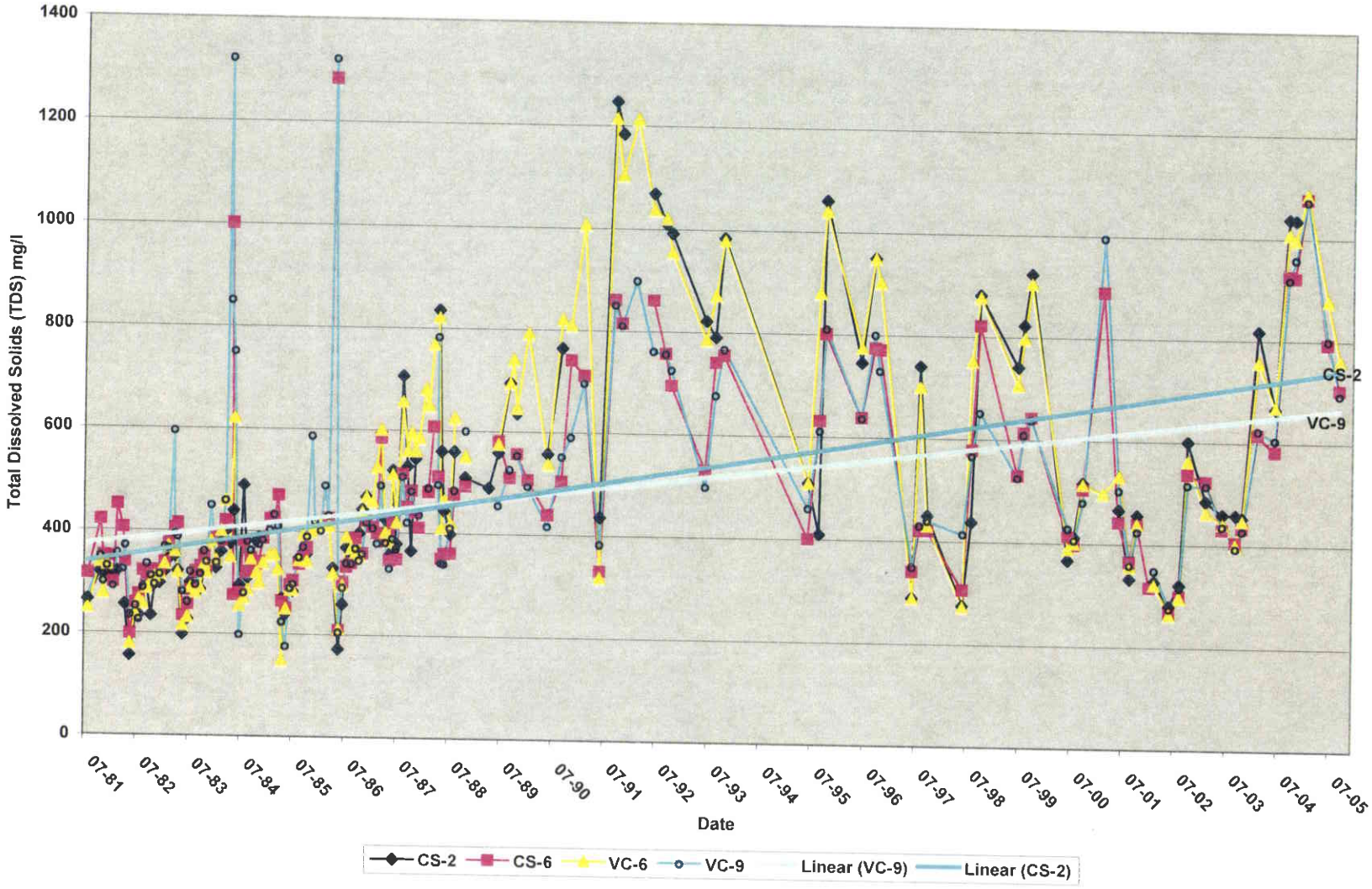


FIGURE 6B
TDS in Upper Eccles Creek
CS-3, CS-4, CS-9, &CS-11 1978-2002

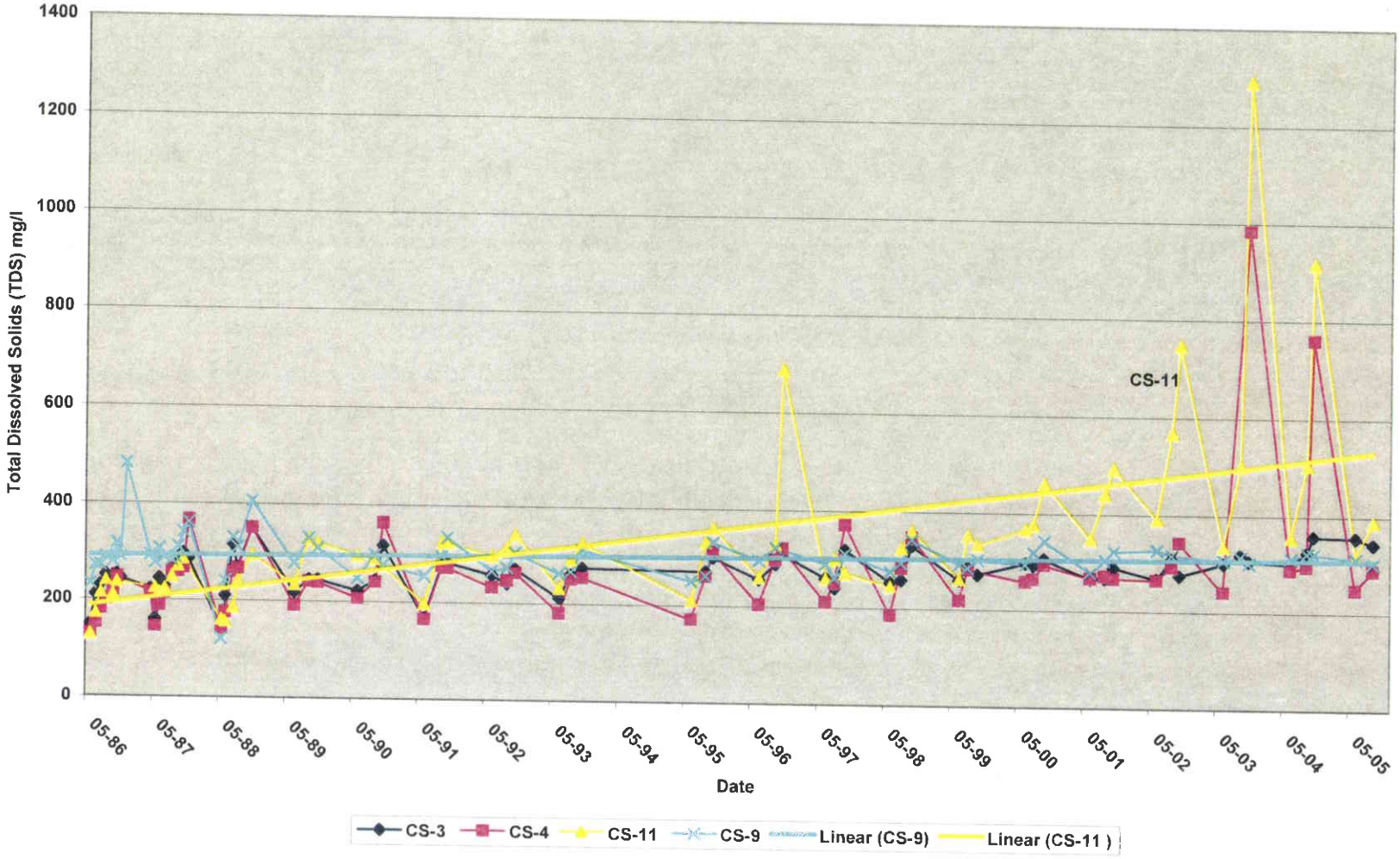


FIGURE 6C

TDS in South Fork of Eccles Creek

CS-1 & VC-10 1978-2002

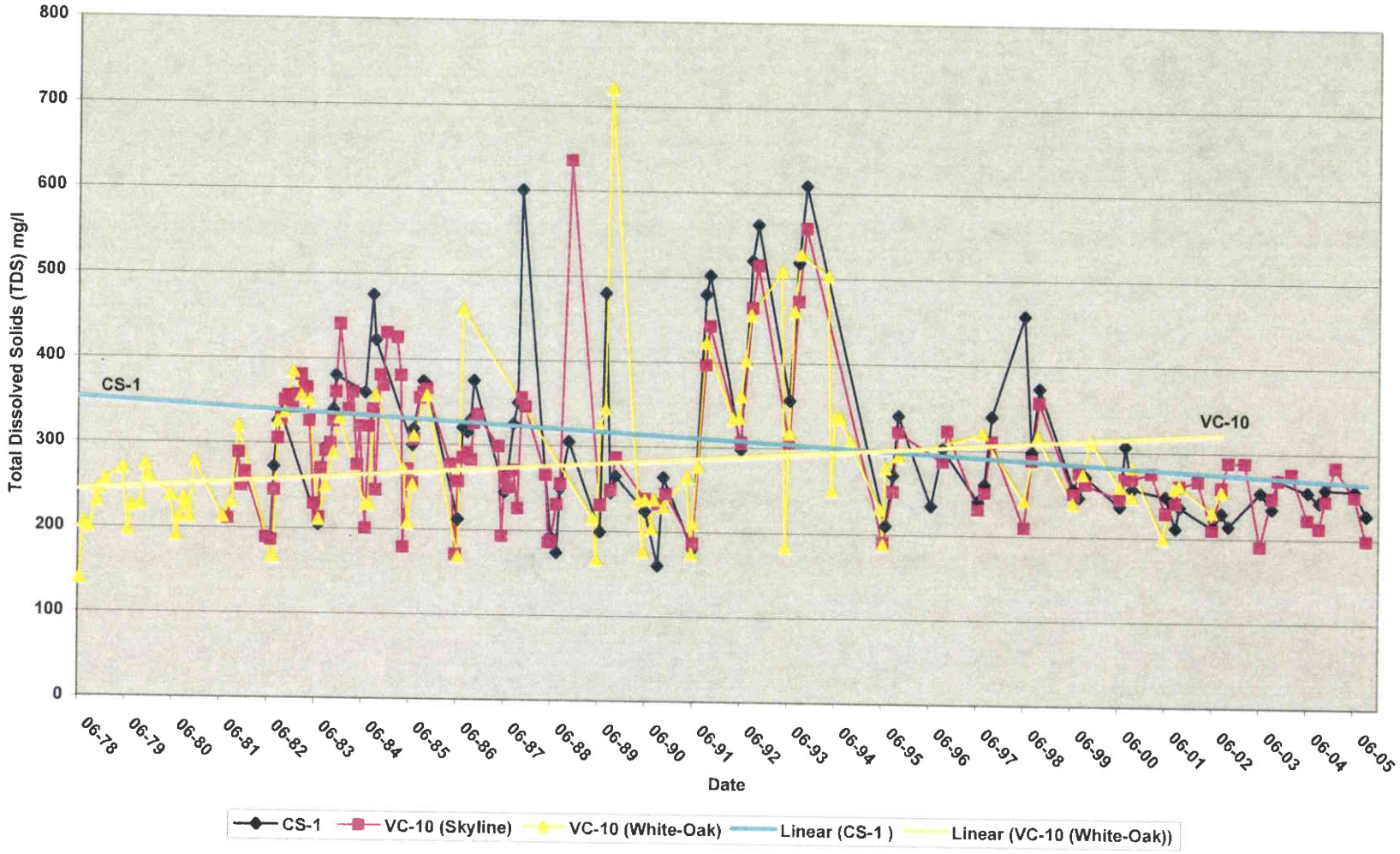


FIG .E 6D
TDS in Whiskey Creek
VC-4 & VC-5 1977-2001

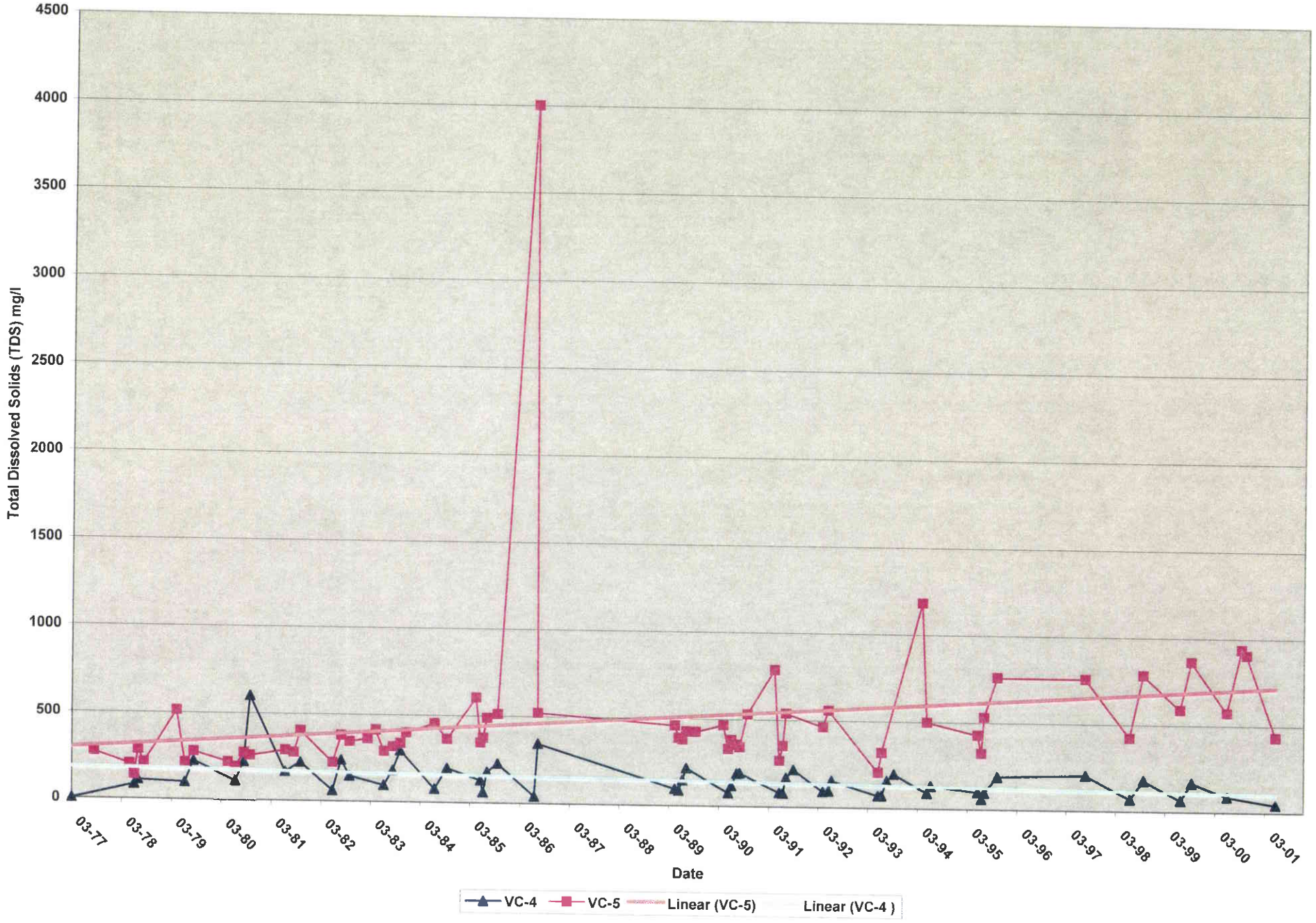


FIGURE 7A

TDS in Mud Creek Below Eccles

VC-1 &VC-2 1977-2002

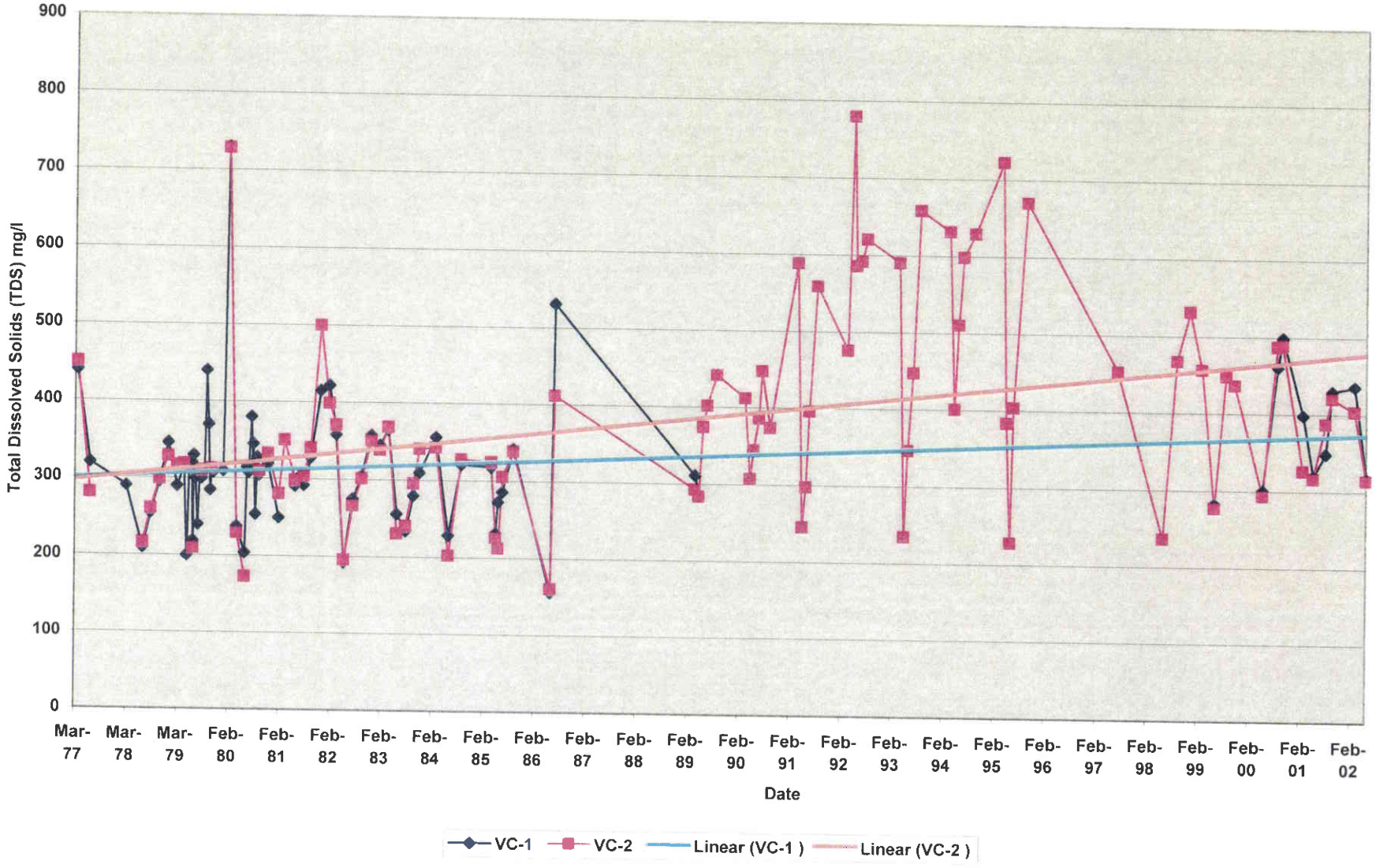


Figure 7B
TDS Baseline Monitoring In Mud Creek - Kinney #2 Mine

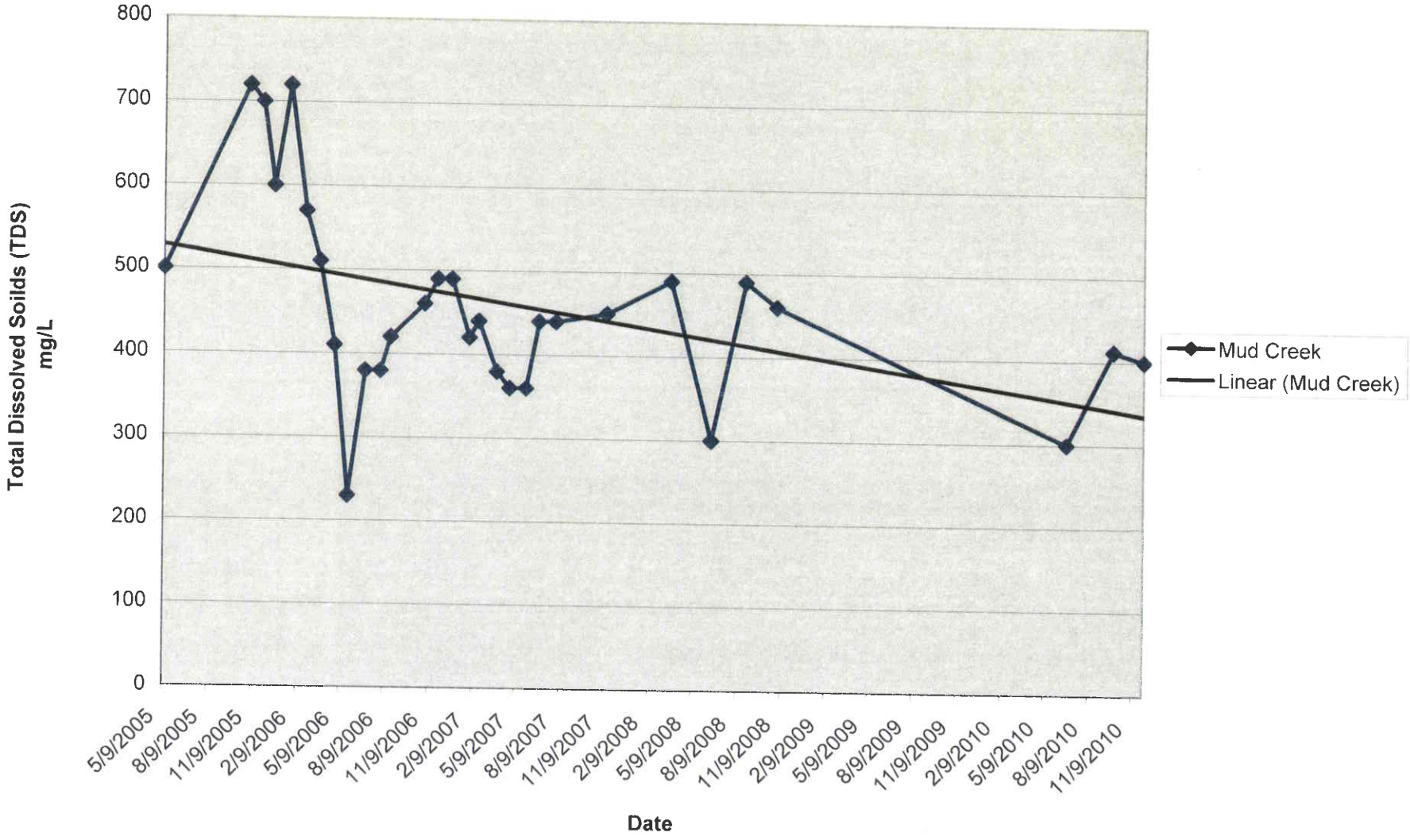


FIGURE 8
TDS in Upper Huntington Creek
CS-7, CS-8, CS-10 & UPL-10 1981-2002

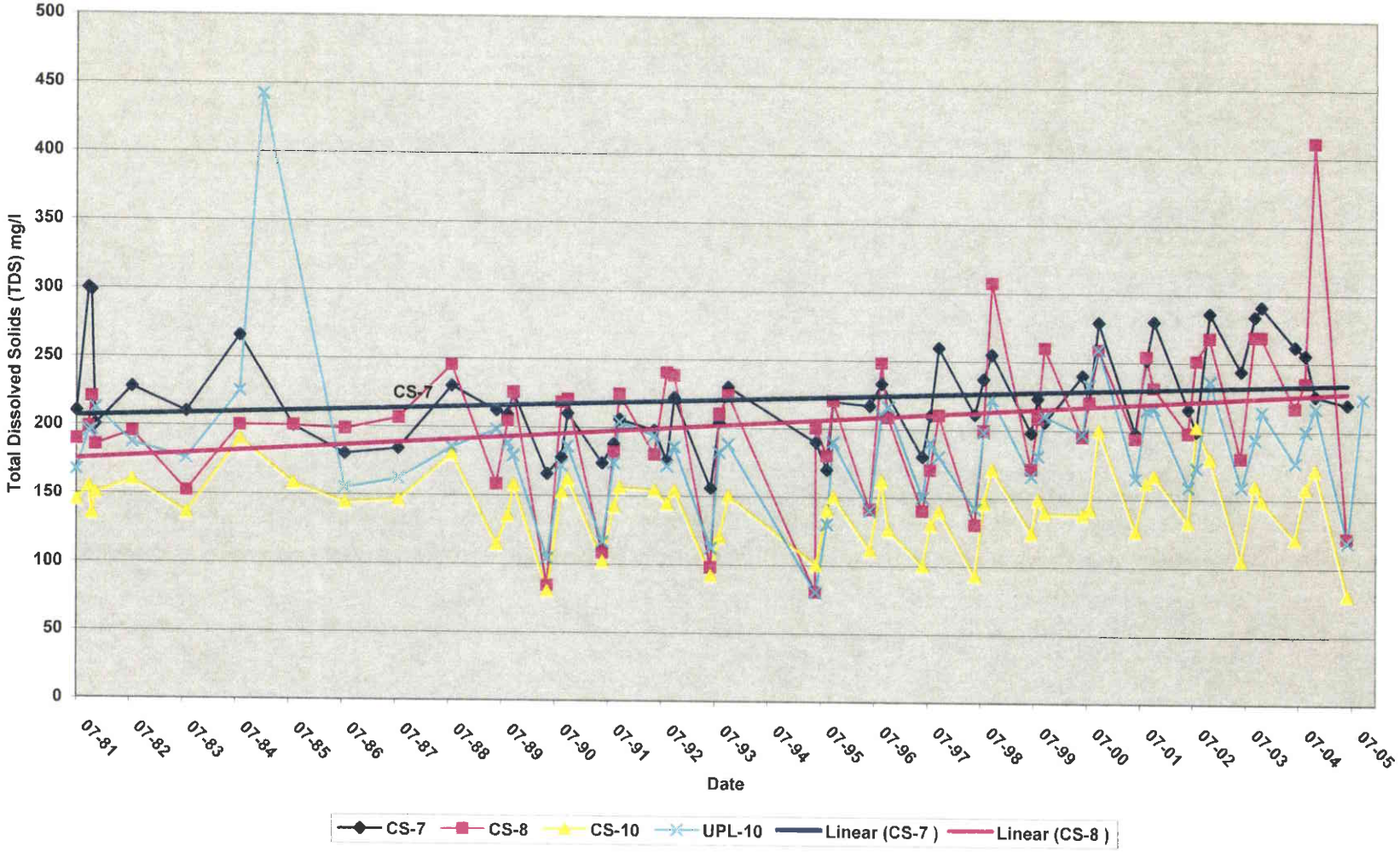


Figure 9 - Tritium Analysis

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

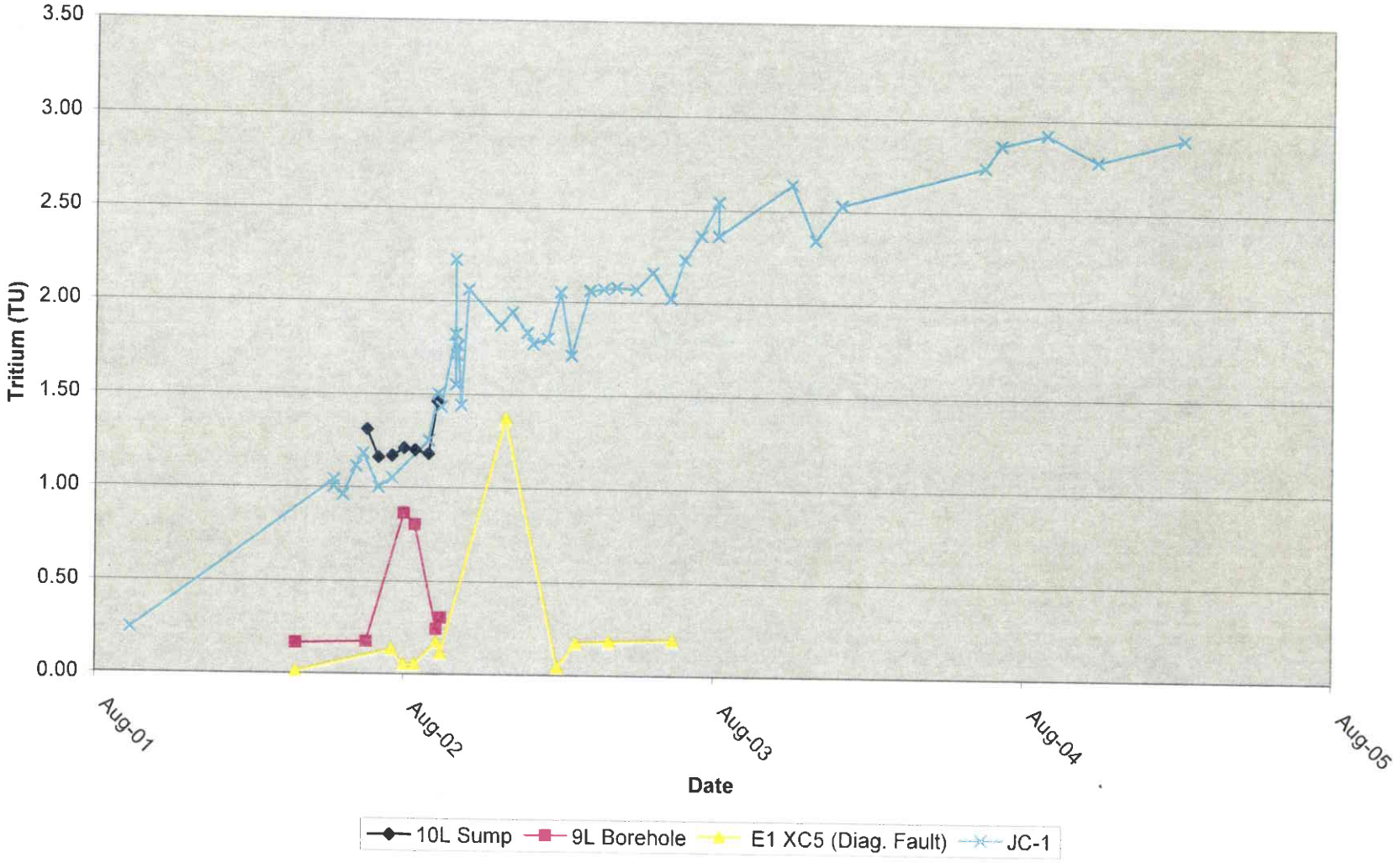


Figure 10 - Skyline Discharge to Eccles Creek

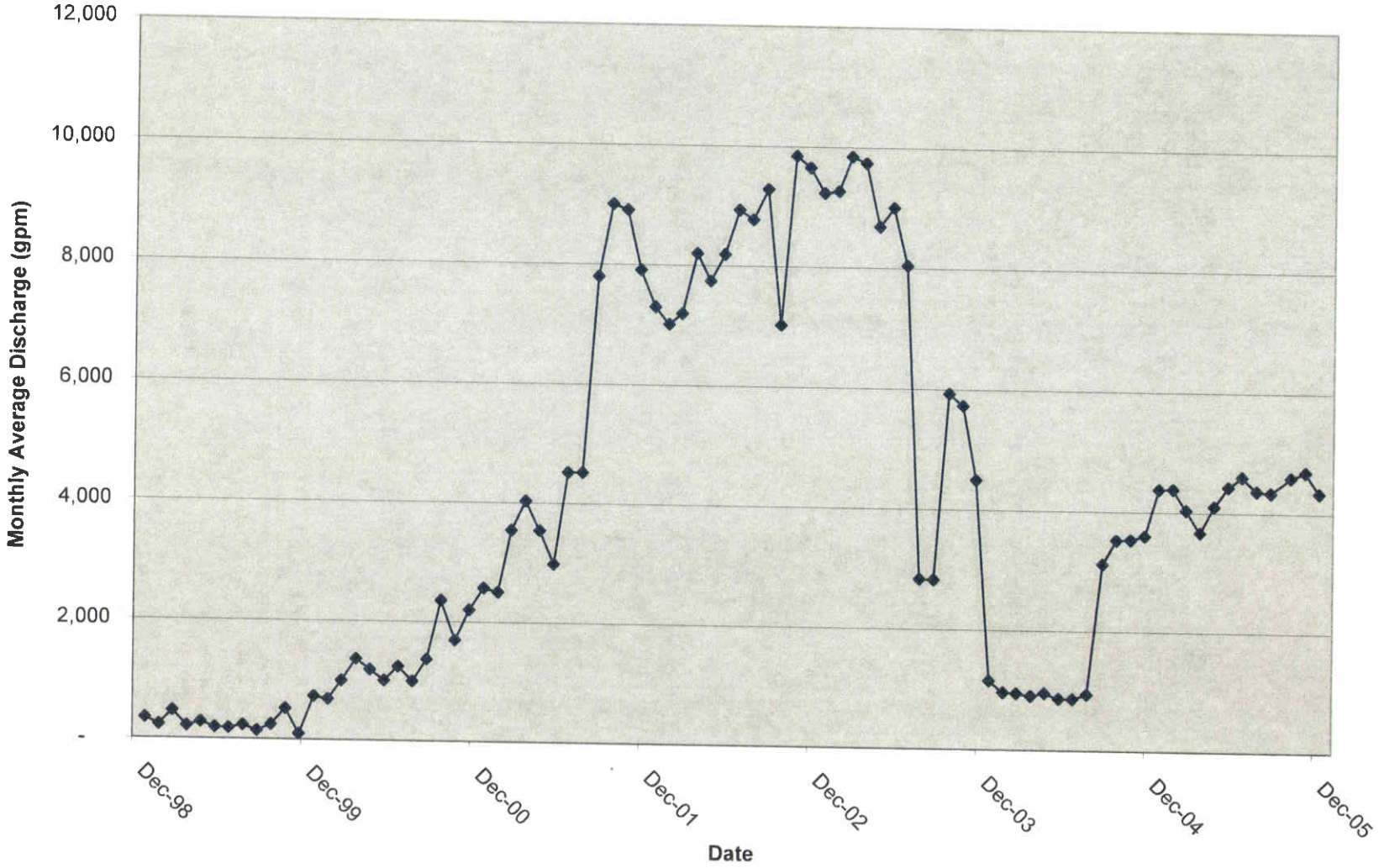


Figure 10a - Eccles Flow vs. "Normal"

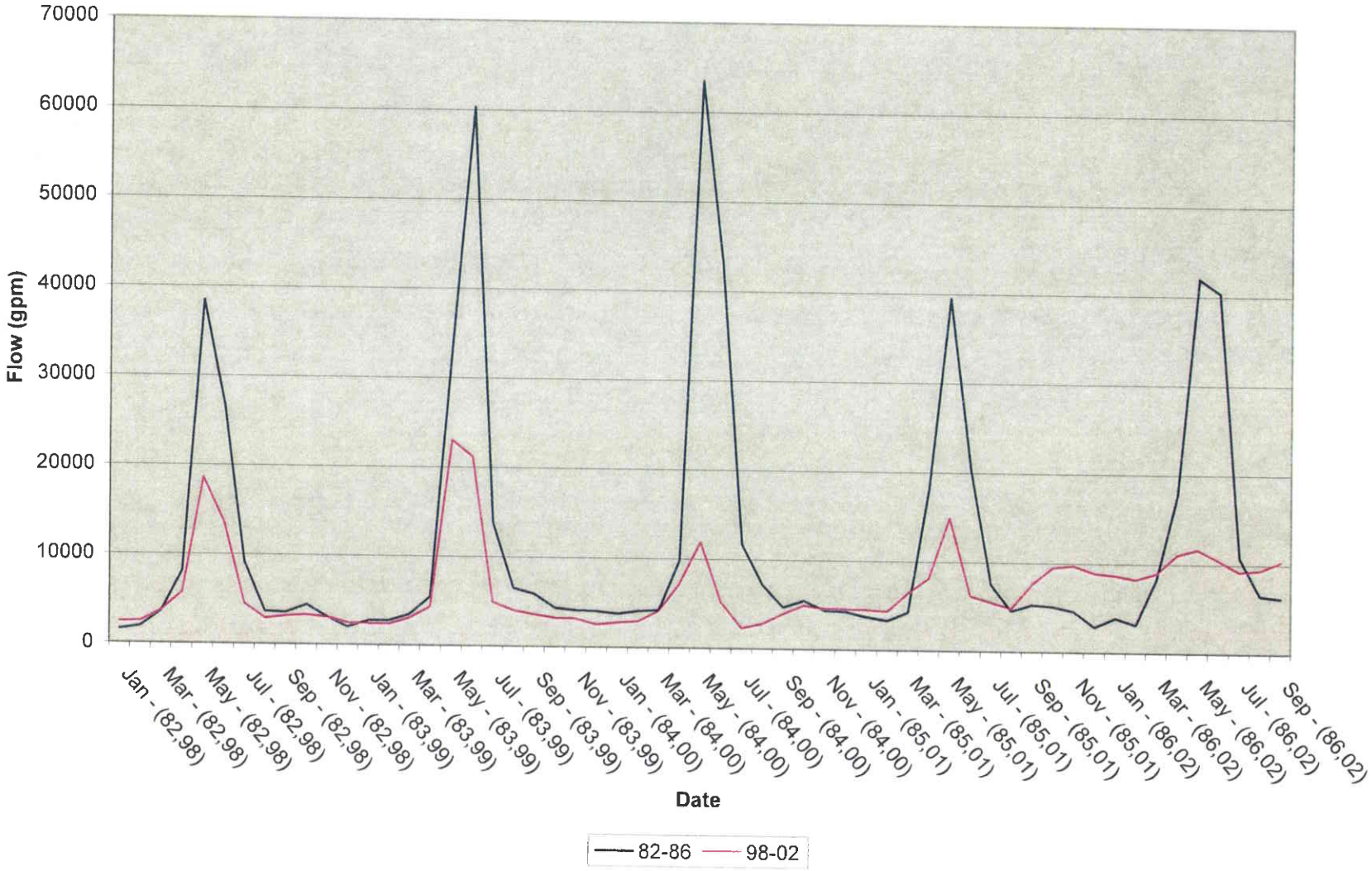


Figure 11 - Skyline Actual and Projected Cumulative Discharge by Drainage

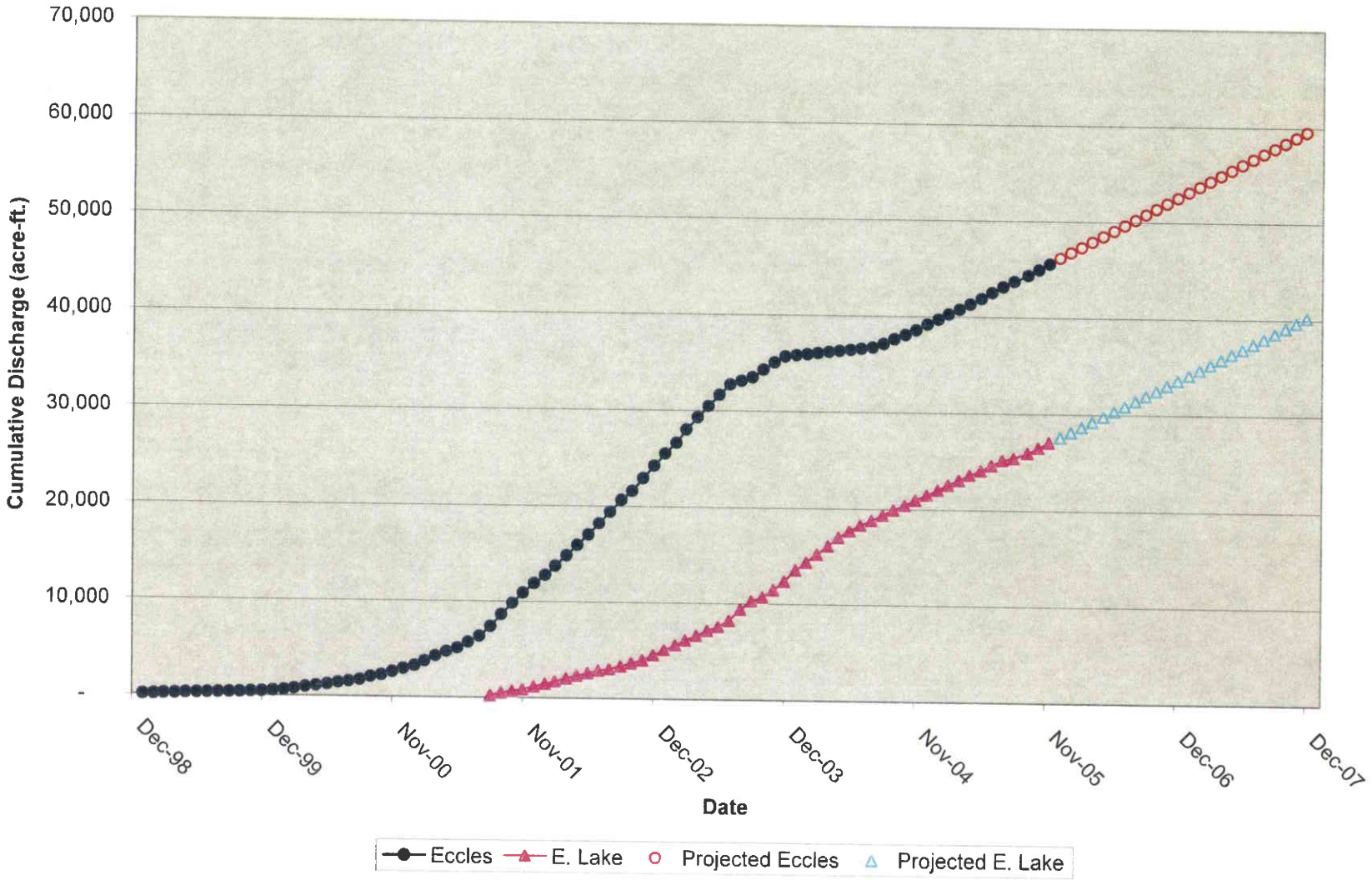


Figure 12 - Total Phosphorous in Mud Creek

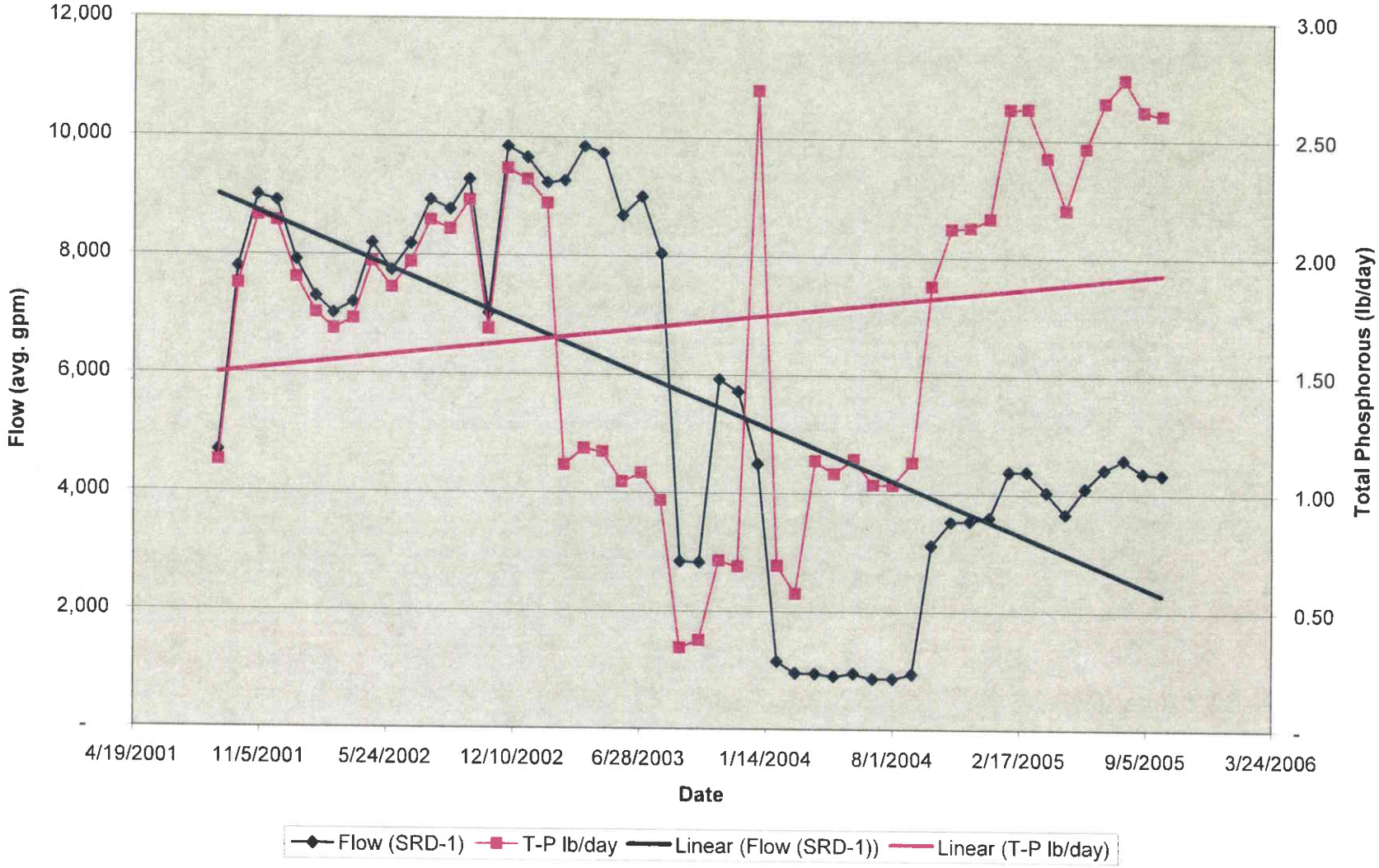


Figure 13 - Electric Lake Storage vs. Discharge

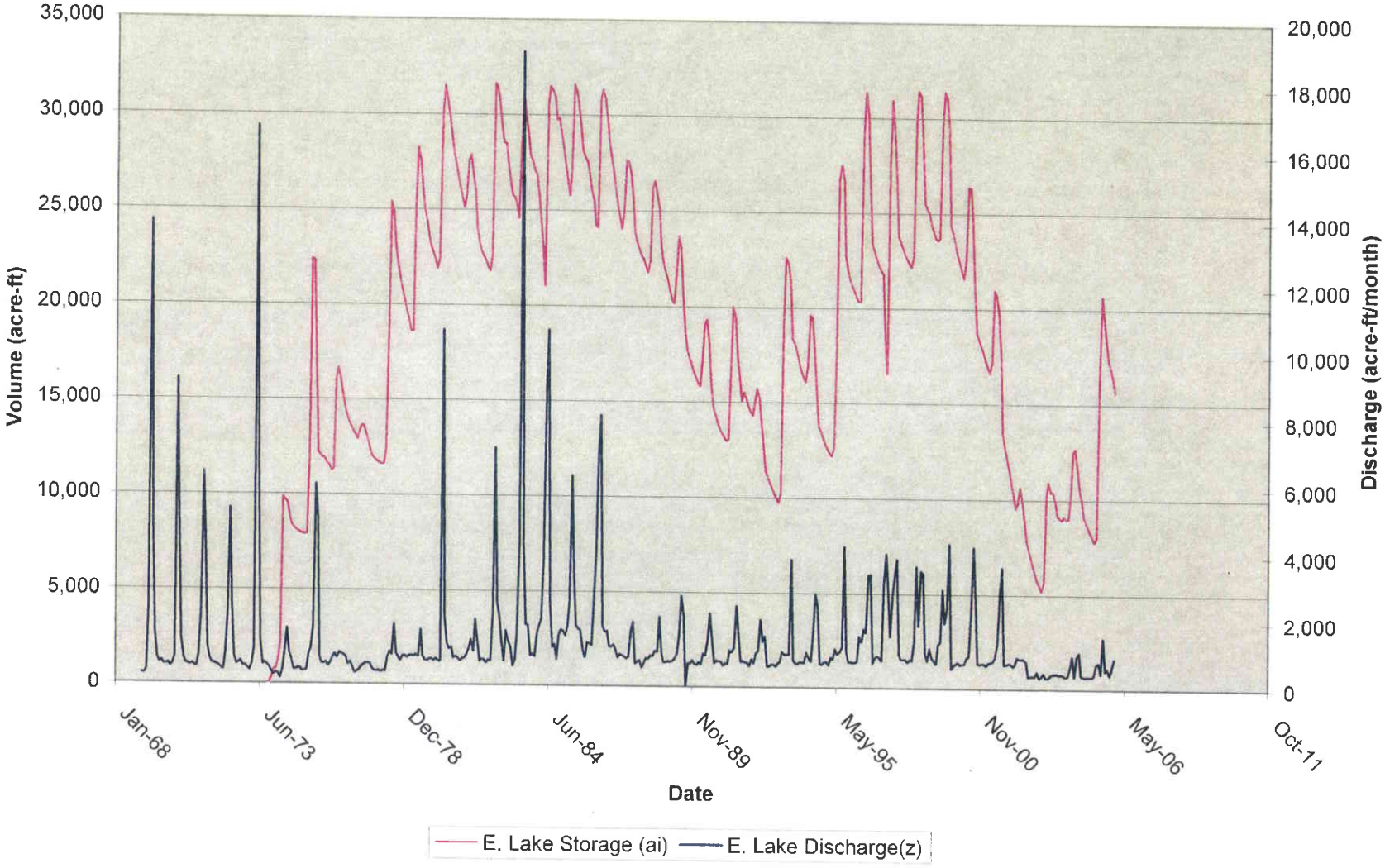


Figure 14 - Electric Lake, Calculated vs. Measured Inflows

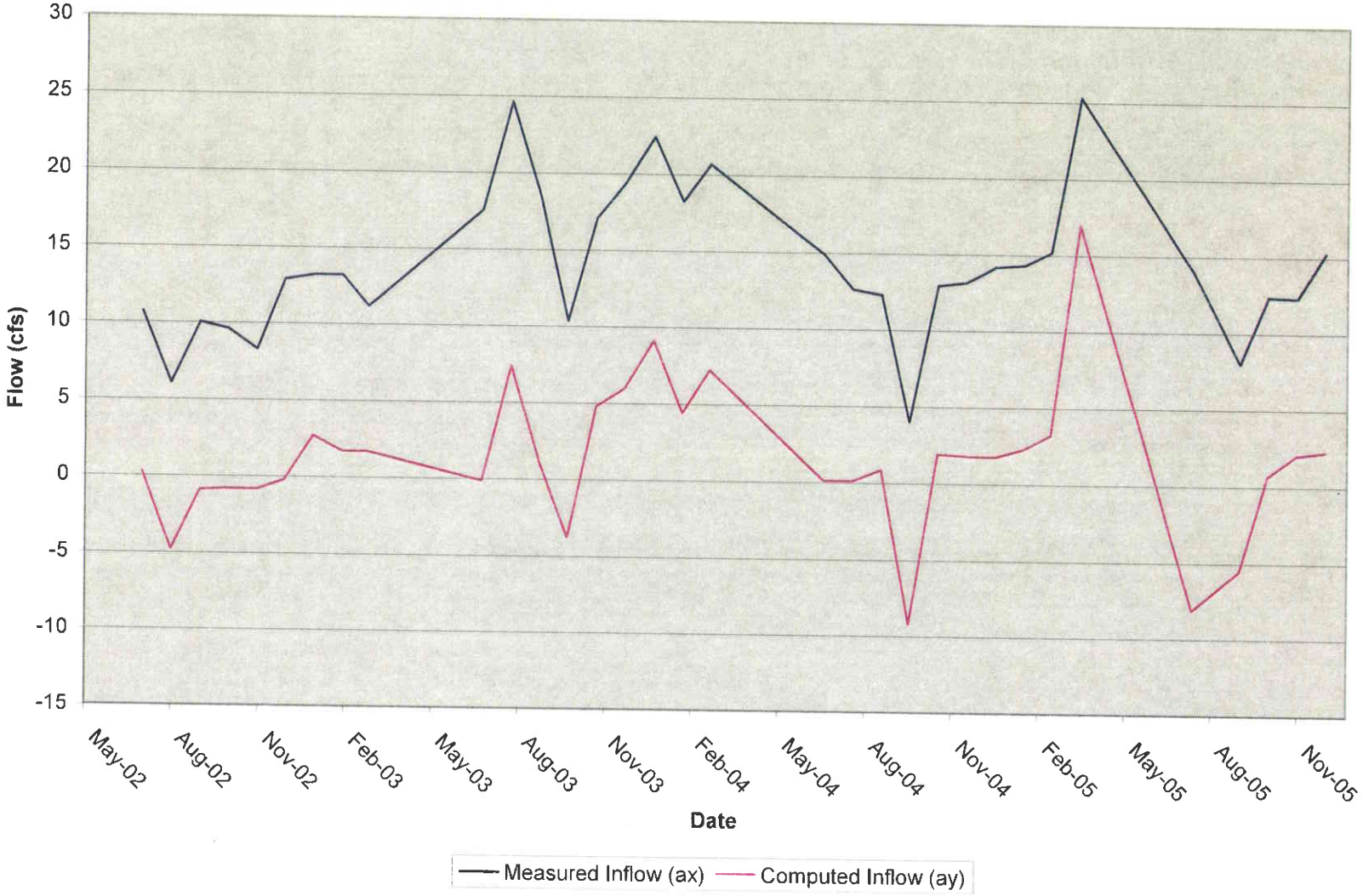
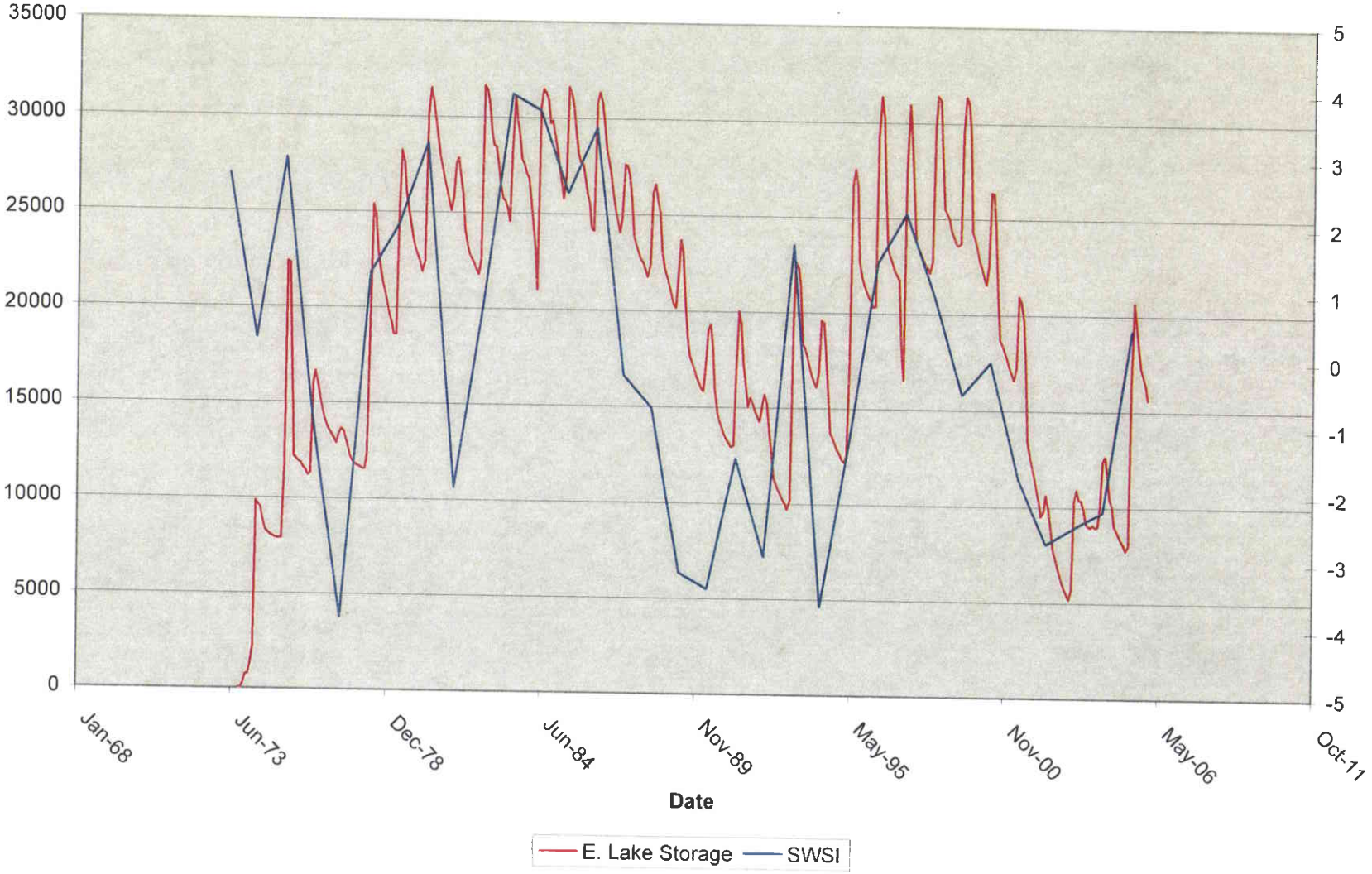
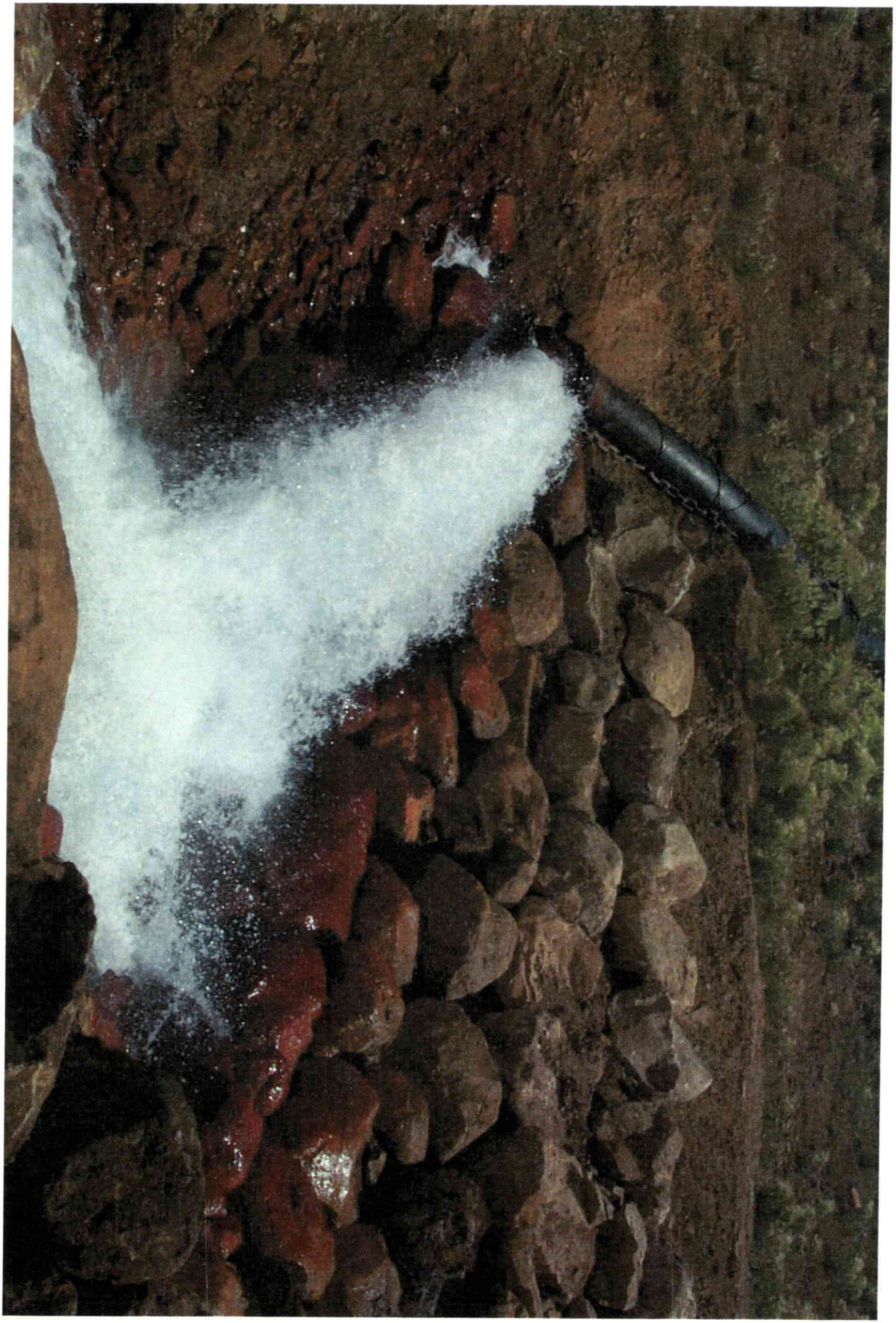


Figure 15 - Electric Lake vs. Surface Water Supply Index (SWSI)





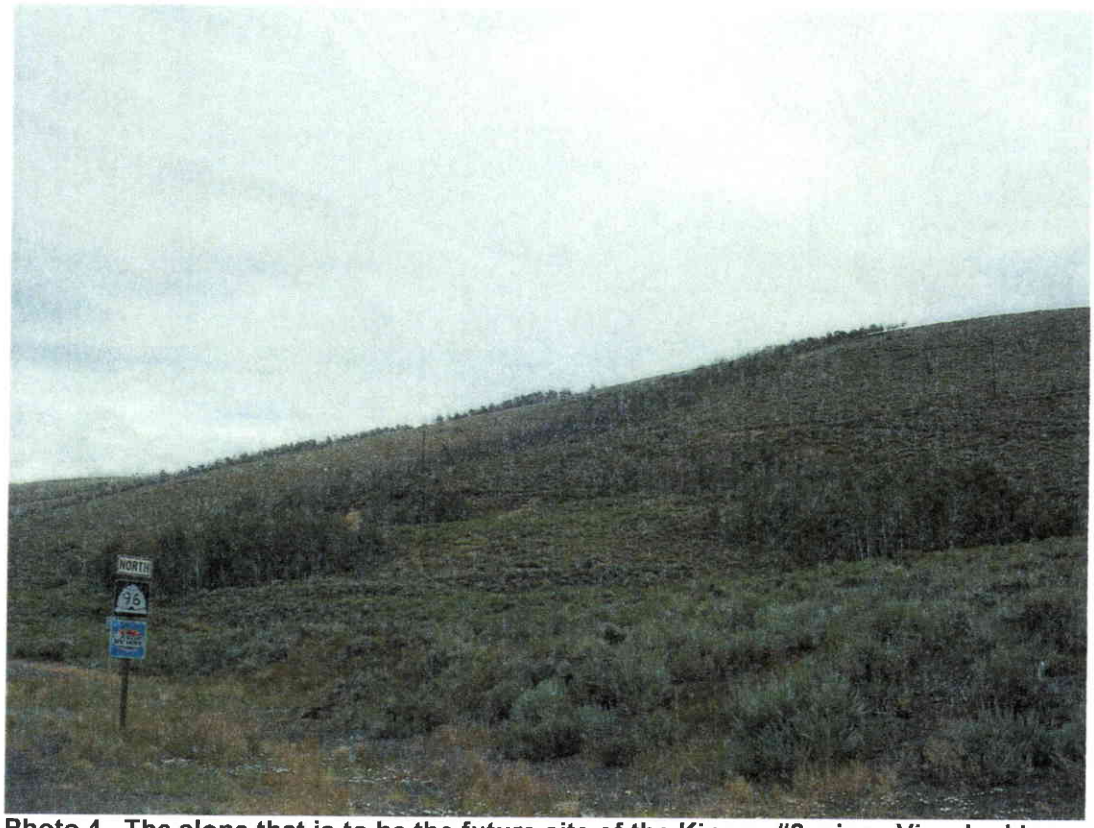


Photo 4. The slope that is to be the future site of the Kinney #2 mine. View looking northeast and due east of Scofield Reservoir

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

GARY R. HERBERT
Governor
GREGORY S. 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

June 29, 2011

TO: Internal File

FROM: Daron R. Haddock, Permit Supervisor

RE: Compliance Review for Section 510 (c) Findings – Kinney #2 Mine, Carbon Resources, LLC, C/007/0047, Task ID #3860

As of the writing of this memo, there are no NOVS or COs which are not corrected or in the process of being corrected. There are no finalized Civil Penalties, which are outstanding and overdue in the name of Carbon Resources, LLC. Carbon Resources, LLC does not demonstrate a pattern of willful violations, nor have they been subject to any bond forfeitures for any operation in the state of Utah.

The recommendation from the Applicant Violator System (AVS) denotes that all connected entities either do not have any civil penalties or are under a settlement agreement (attached).

O:\007047.KN2\PERMIT\510C.DOC

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114 -5801
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HOME > ENTITY EVALUATE

Evaluation on Entity Number: 249309
0 Violations

Print Report

Entity Evaluation

Entity Number	249309
Entity Name	Carbon Resources LLC
Date of Request	6/29/2011 12:48:14 PM
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: 4

249309 Carbon Resources LLC - ()
---249310 William J H Reeves - (Chief Executive Officer)
---249311 Clay Wisdom - (Chief Financial Officer)
---249312 Gregory L Hunt - (Manager)

Narrative

Request Narrative

was published in the full issue of such newspaper for 4 (Four) consecutive issues, and the first publication was on the 10th day of June, 2010, and that the last publication of such notice was in the issue of such newspaper dated the 1st day of July 2010.

Richard Shaw – Publisher

Subscribed and sworn to before me this 1st day of July, 2010.

Notary Public My commission expires January 10, 2011 Residing at Price, Utah

Publication fee, $ 798.72

LINDA THAYN
NOTARY PUBLIC - STATE OF UTAH
845 EAST MAIN
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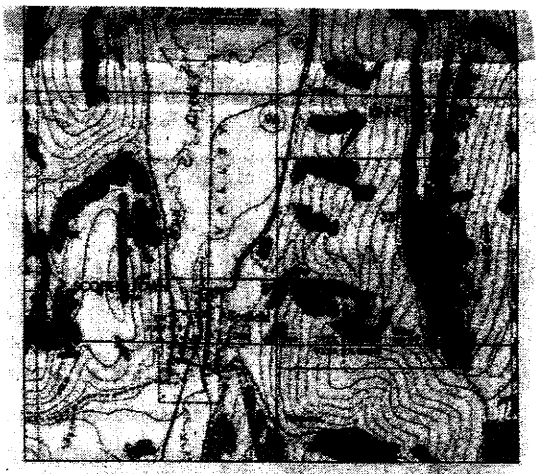

The permit area affected is located in Carbon County, Utah as follows:

Township 12 South, Range 7 East, Salt Lake Base & Meridian

Section 32
E2SE4

Section 33
S2, S2N2

Township 13 South, Range 7 East,
Salt Lake Base & Meridian

Section 4
N2N2

Copies of the application can be reviewed at the following locations:

Carbon County Recorder's Office
120 East Main Street
Price, Utah 84501

Utah Department of Natural Resources
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84116

Mining operations will be conducted within 100 feet of Utah Highway 96.

Written comments, objections, or requests for informal conferences on the application may be submitted to the Division of Oil, Gas and Mining at the address above.

Closing date for submission of such comments, objections and requests for an informal conference on this proposal must be submitted by August 1, 2010.

Published in the Sun Advocate June 10, 17, 24 and July 1, 2010

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 a true copy of which is hereto attached, was published in the full issue of such newspaper for 4 (Four) consecutive issues, and the first publication was on the 10th day of June, 2010, and that the last publication of such notice was in the issue of such newspaper dated the 1st day of July 2010.

Richard Shaw – Publisher

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LINDA THAYN
NOTARY PUBLIC - STATE OF UTAH
645 EAST MAIN
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COMM. EXP. 01-10-2011

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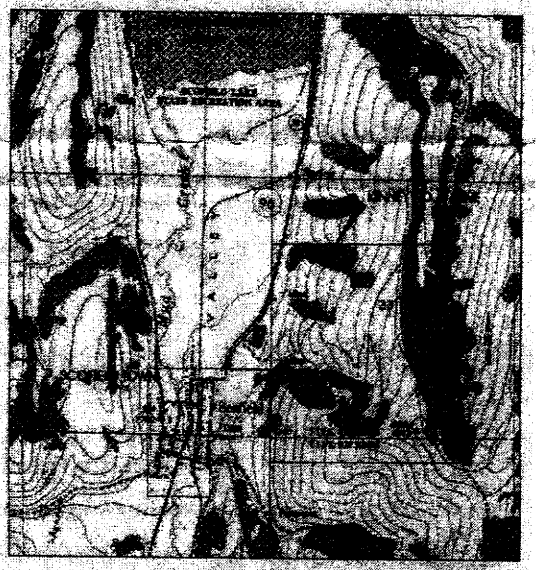
PUBLIC NOTICE

APPLICATION FOR PERMIT TO MINE COAL UNDER UTAH COAL MINING REGULATIONS R645 CARBON RESOURCES, LLC CARBON COUNTY, UTAH

Notice is hereby given that Carbon Resources, LLC., PO. Box 954, Sandia Park, New Mexico 87047 with Ronald C. Barker as Resident Agent, 2870 S. State Street, Salt Lake City, Utah 84225-3624, has filed an application with the Utah Department of National Resources, Division of Oil, Gas and Mining for a Permit to mine coal pursuant to R645 of the Utah Coal Program Regulations. The permit area is shown on the Scofield U.S. Geologic Survey 7.5-minute Quadrangle map.



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Section 4
N2N2

Copies of the application can be reviewed at the following locations:

Carbon County Recorder's Office
120 East Main Street
Price, Utah 84501

Utah Department of Natural Resources
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84116

Mining operations will be conducted within 100 feet of Utah Highway 96.

Written comments, objections, or requests for informal conferences on the application may be submitted to the Division of Oil, Gas and Mining at the address above.

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 a true copy of which is hereto attached, was published in the full issue of such newspaper for 4 (Four) consecutive issues, and the first publication was on the 24th day of June, 2008, and that the last publication of such notice was in the issue of such newspaper dated the 15th day of July, 2008.

Richard Shaw - Publisher

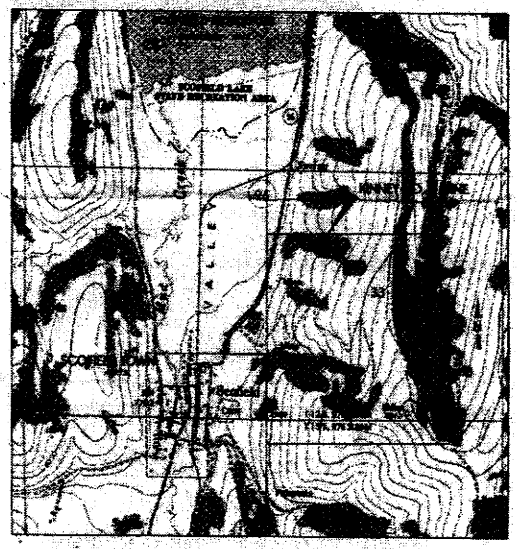
Subscribed and sworn to before me this 15th day of July, 2008.

Notary Public My commission expires January 10, 2007 Residing at Price, Utah

PUBLIC NOTICE

APPLICATION FOR PERMIT TO MINE COAL UNDER UTAH COAL MINING REGULATIONS R645 CARBON RESOURCES, LLC CARBON COUNTY, UTAH

Notice is hereby given that Carbon Resources, LLC., PO. Box 11789, Albuquerque, New Mexico 87192, with Ronald C. Barker as Resident Agent, 2870 S. State Street, Salt Lake City, Utah 84225-3624, has filed an application with the Utah Department of National Resources, Division of Oil, Gas and Mining for a Permit to mine coal pursuant to R645 of the Utah Coal Program Regulations. The permit area is shown on the Scofield U.S. Geologic Survey 7.5-minute Quadrangle map.



The permit area affected is located in Carbon County, Utah as follows:

Township 12 South, Range 7 East, Salt Lake Base & Meridian

Section 32
E2SE4

Section 33
S2, S2N2

Township 13 South, Range 7 East,
Salt Lake Base & Meridian

Section 4
N2N2

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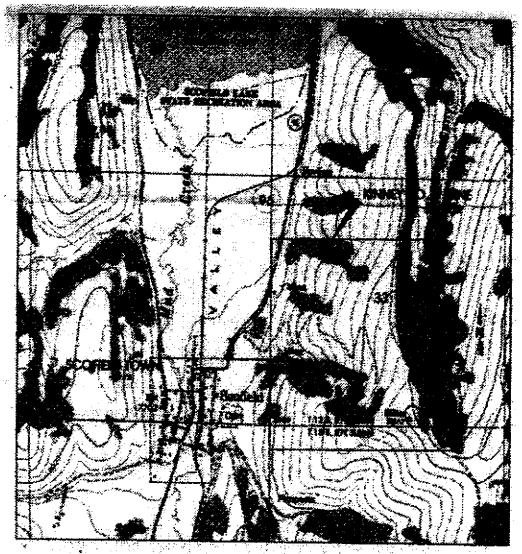
Publication fee, $ 798.72

LINDA THAYN
NOTARY PUBLIC-STATE OF UTAH
845 EAST MAIN
PRICE, UTAH 84501
COMM. EXP. 01-10-2011



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S2, S2N2

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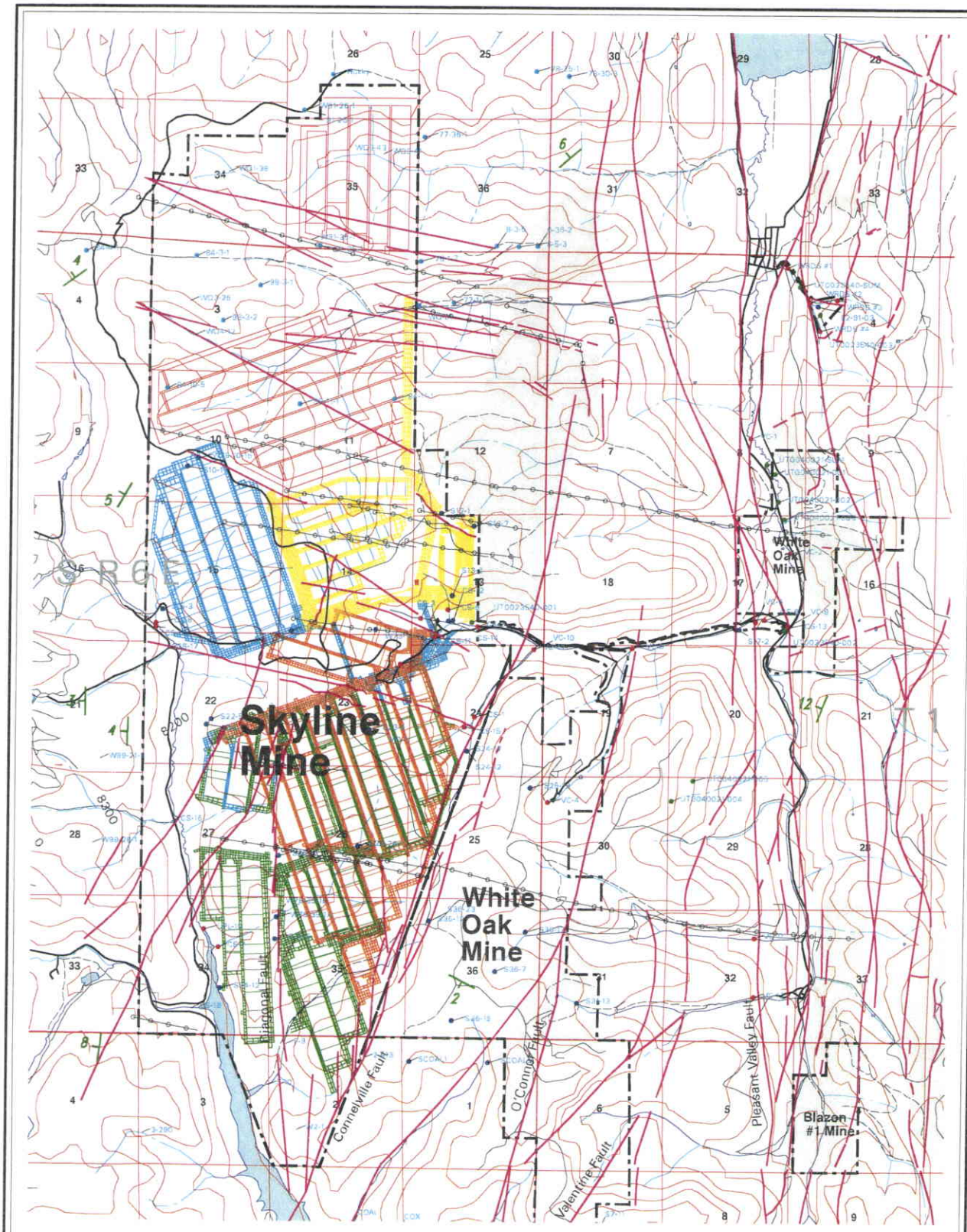
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84116

Mining operations will be conducted within 100 feet of Utah Highway 96.

Written comments, objections, or requests for informal conferences on the application may be submitted to the Division of Oil, Gas and Mining at the address above.

Closing date for submission of such comments, objections and requests for an informal conference on this proposal must be submitted by August 14, 2008.

Published in the Sun Advocate June 24, July 1, 8 and 15, 2008.



Pre-SMCRA, Pre-1977 Mining
Streams
Major Faults
Piezometric Surface Oct 2001
Piezometric Surface Inferred 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

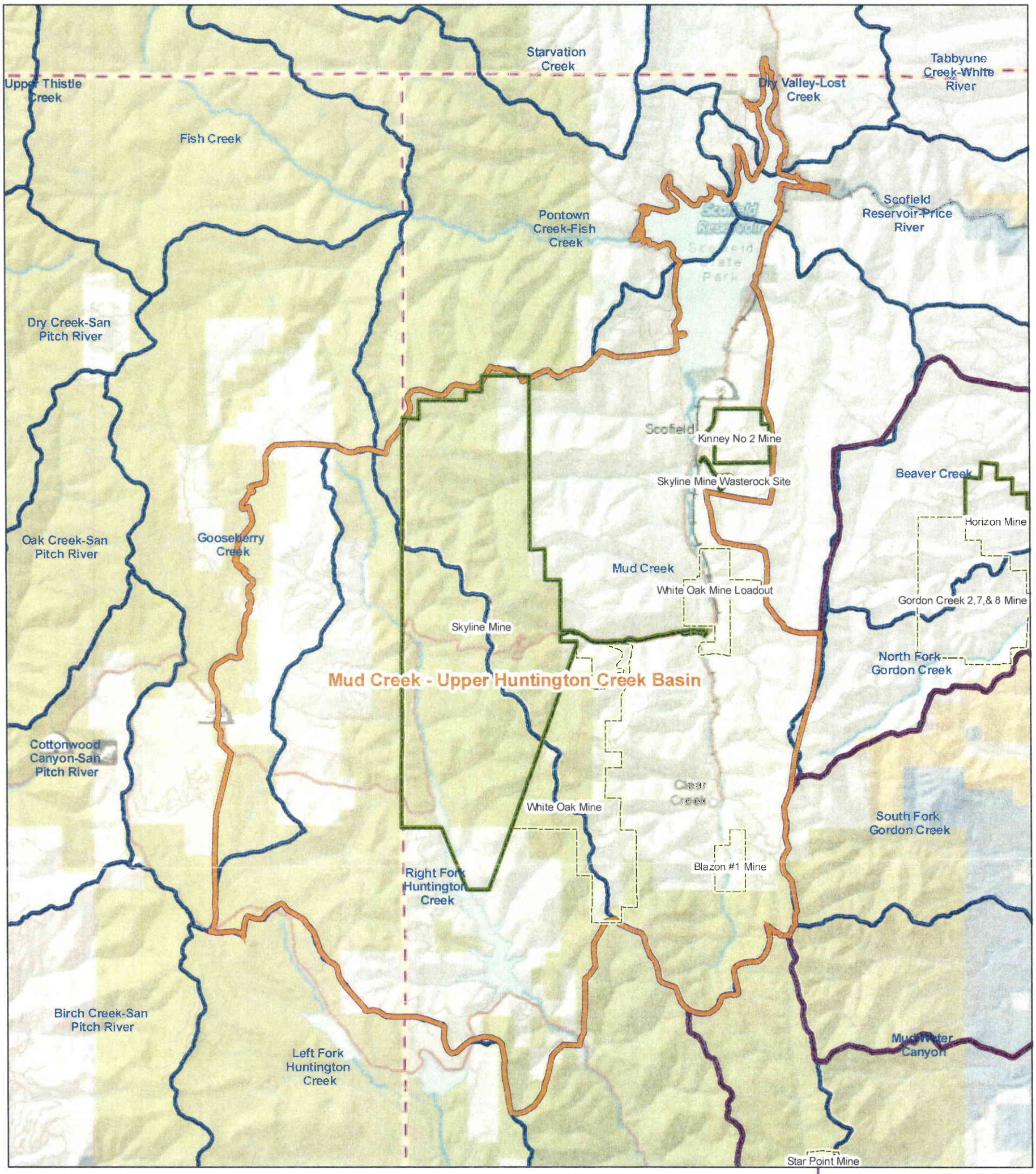
File=n:\gis\cal\cumaps\mudcreek\map-mining1.gra

Compiled by: Dan Smith Date: October 24, 2005

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

N

Location Map



Cumulative Impact Area Mud Creek - Upper Huntington Creek Basin

Figure 2

Location Map

May 2011

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

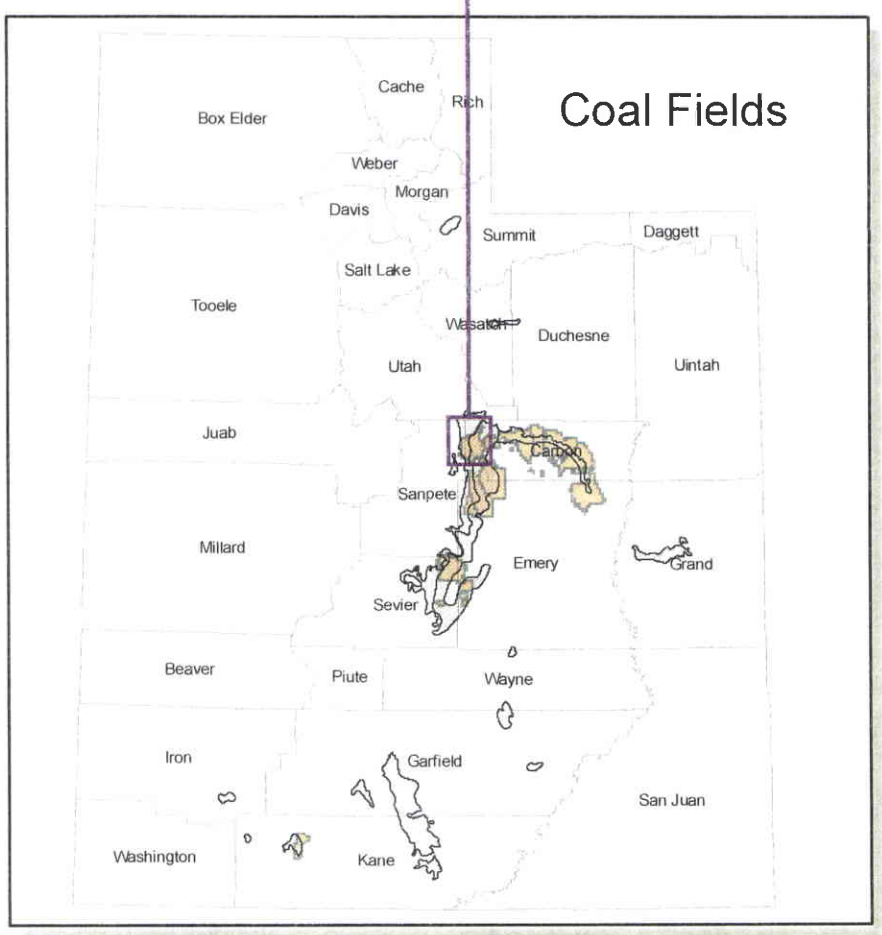
Mine Area

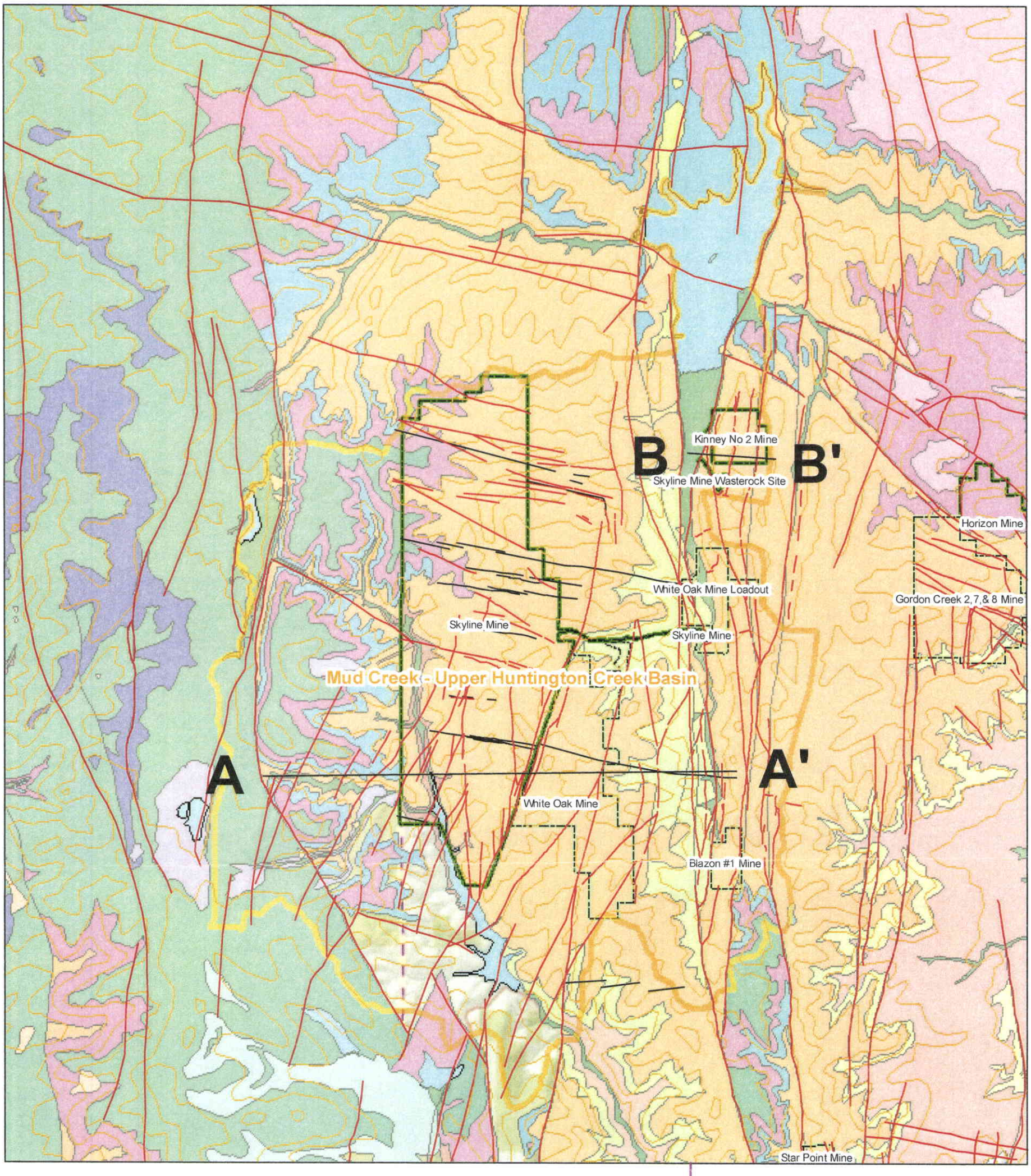
STATUS

- 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

1:110,000





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 Formation
Indianola Group, undivided
Landslide deposits
Landslide blocks of the Green River Formation
Mass-wasting deposits
Moraine deposits
North Horn Formation
Pediment mantle
Price River Formation
Star Point Sandstone
Terrace deposits
Upper part of the Blue Gate Member of the Mancos Shale
water

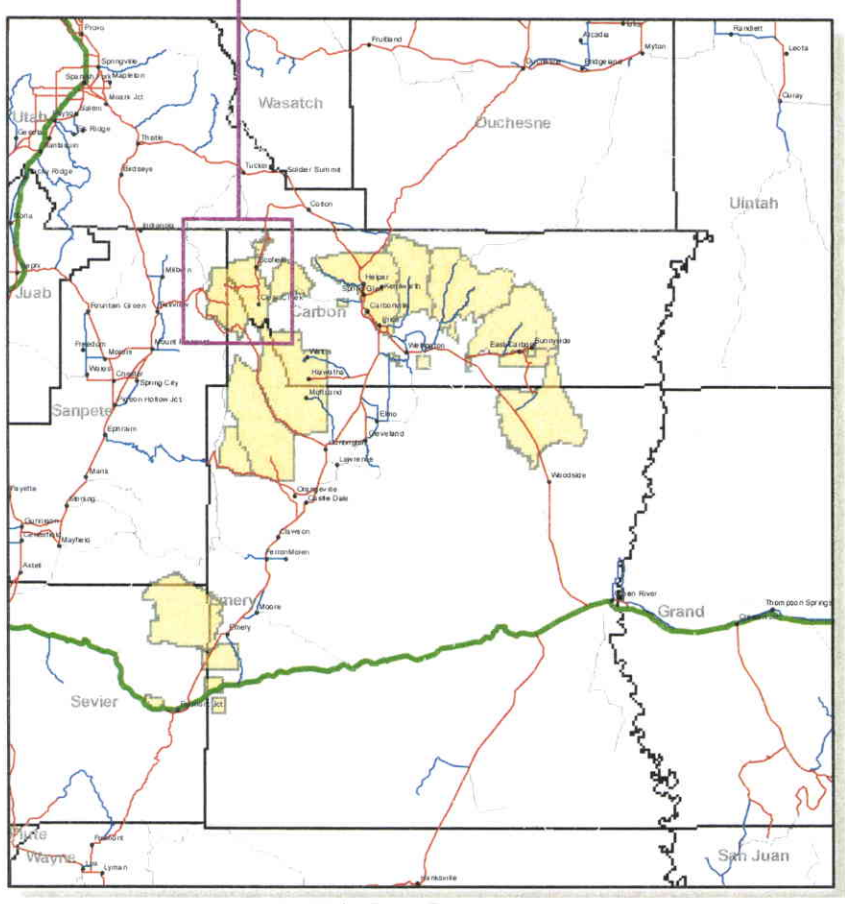
A-A' Location approximate

UTAH DNR OIL, GAS & MINING

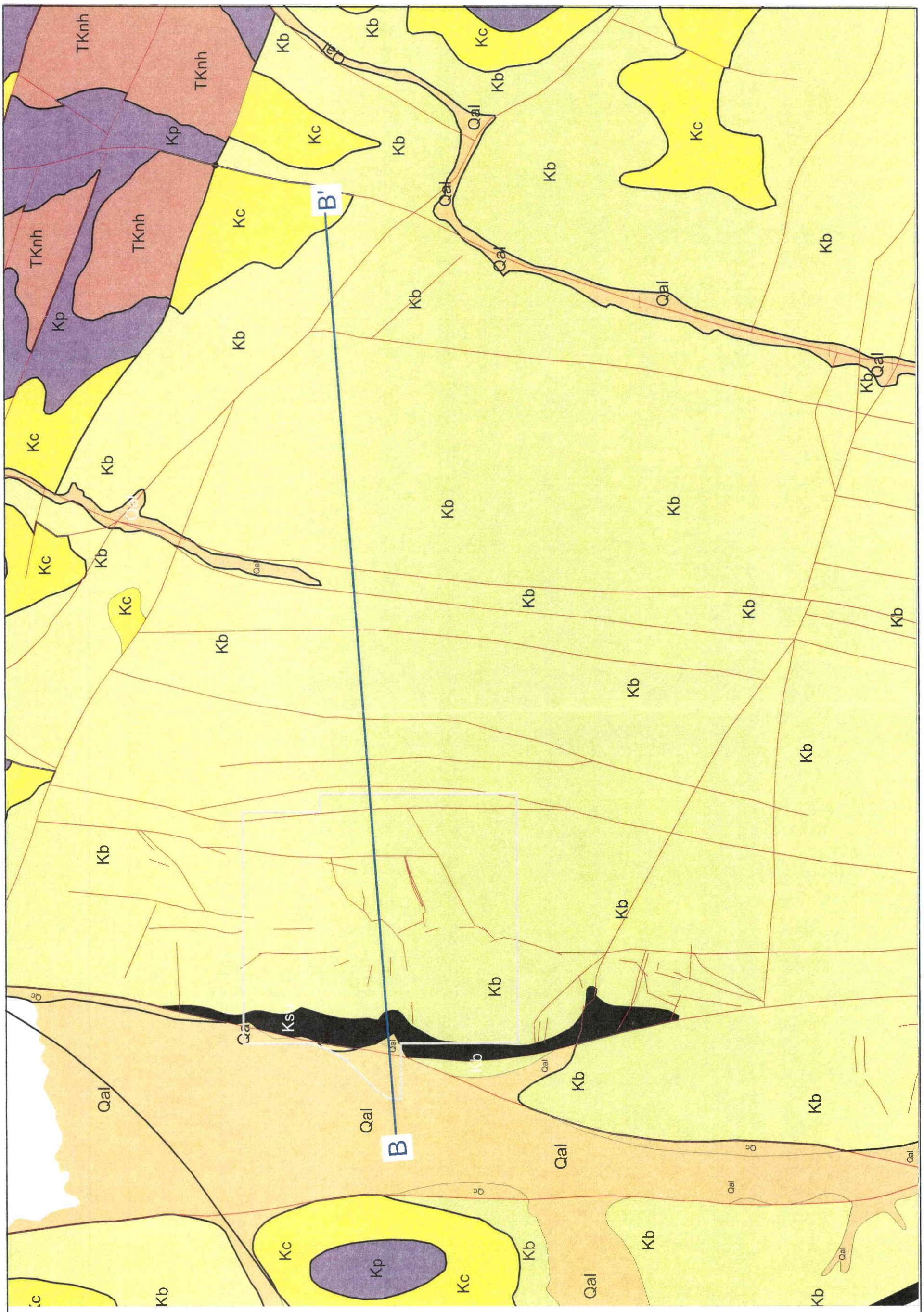
N

0 0.250.5 1 1.5 2 Miles

1:110,000

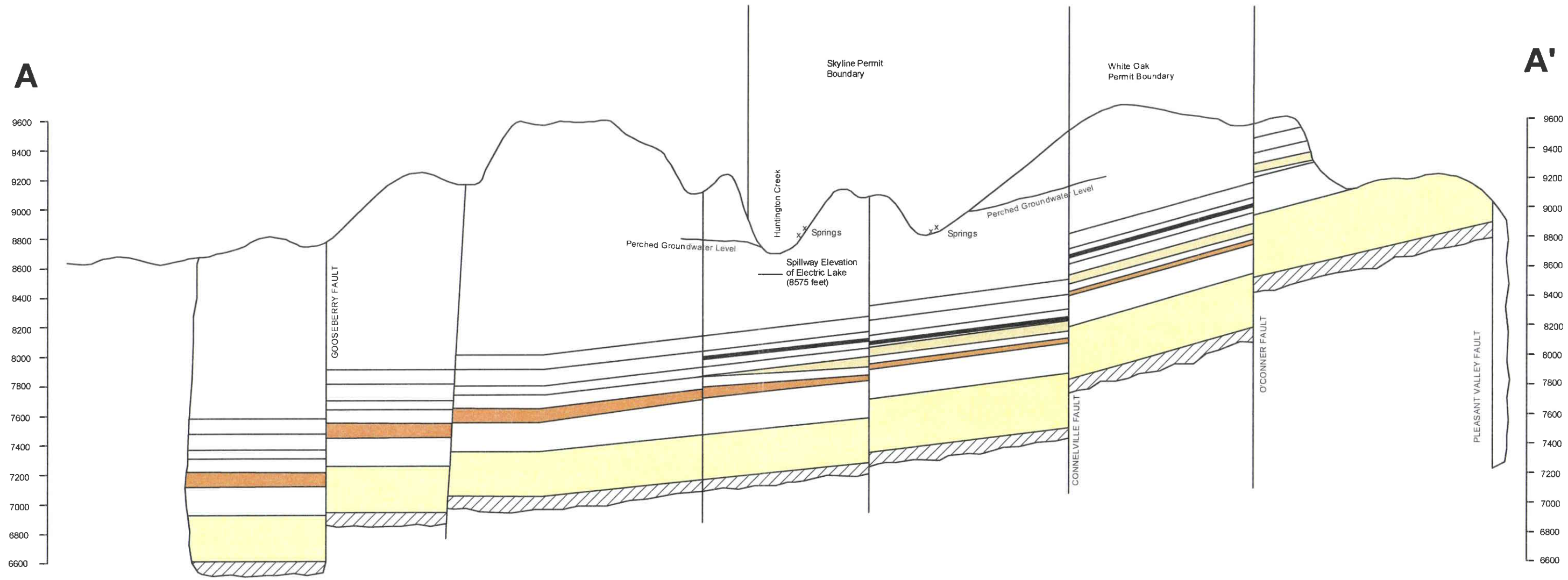


CIA Areas


B
B'
Kb
Kc
Kp
TKnh
Qal
Ksu
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
CROSS SECTION LOCATIONS
A
A'
SCALE. 1:15,000 or 1" = 1,250'
0
2,000 ft
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
P.O. Box 954
Sandia Park, NM 87047
File: CHIA Figure 3B Regional Geology

A

A'



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-06-01 BLW

CR-06-06 A

76-25

G-13

76-2

G-3

CR-06-03

G-4

CR-10-12

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 7510

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

Starvation Creek
Tabbyune Creek-White River
Upper Thistle Creek
Dry Valley-Lost Creek
Fish Creek
Scofield Reservoir-Price River
Pontown Creek-Fish Creek
Dry Creek-San Pitch River
Kinney No 2 Mine
Skyline Mine Wasterock Site
Beaver Creek
Horizon M
Gooseberry Creek
Oak Creek-San Pitch River
Mud Creek
Gordon Creek 2,7,& 8 Mi
White Oak Mine Loadout
Skyline Mine
North Fork Gordon Creek
Mud Creek - Upper Huntington Creek Basin
Cottonwood Canyon-San Pitch River
South Fork Gordon Creek
Blazon #1 Mine
Right Fork Huntington Creek
Birch Creek-San Pitch River
Mud Water Canyon
Left Fork Huntington Creek

Cumulative Impact Area Mud Creek - Upper Huntington Creek Basin

Figure 5

Hydrology Map

May 2011

File: N:/gis/coal/ciamaps/QuitchupahMuddyCk/Hydrology.pdf

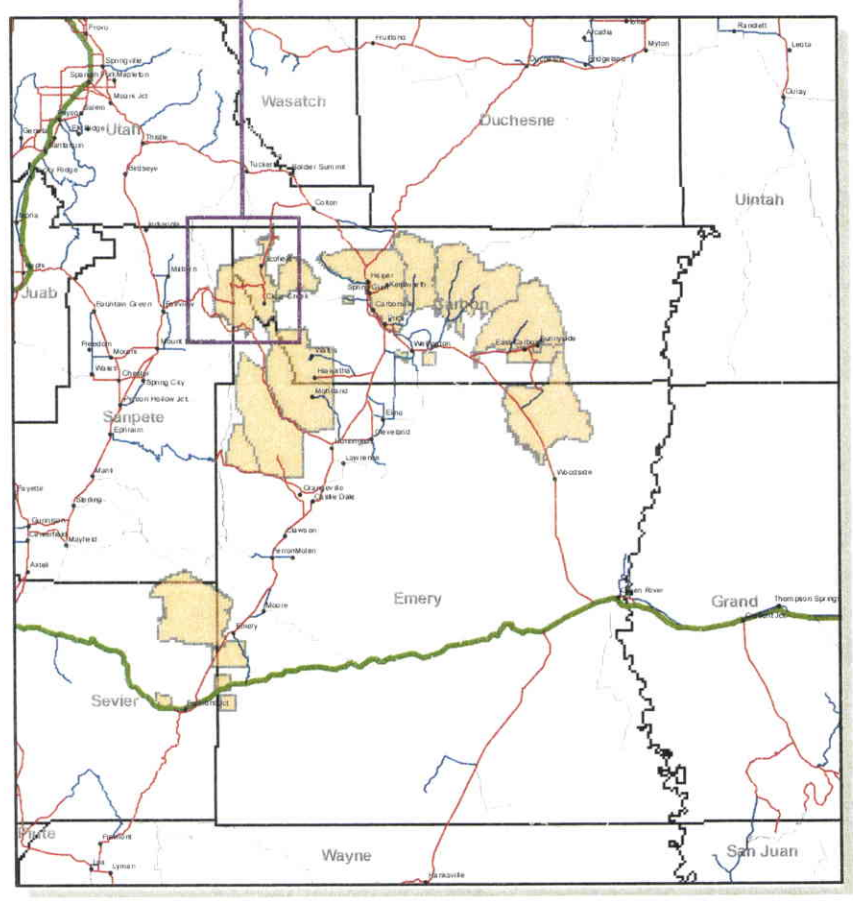
Water Monitoring Sites
- Spring
- Well
- Stream
- UPDES

Drainage
Mud Creek - Upper Huntington Creek Basin
Subwatersheds
Water Body

UTAH DNR OIL, GAS & MINING

0 0.250.5 1 1.5 2 Miles

1:110,000



CIA Areas