0025

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 & Mining

JOHN R. BAZA
Division Director

April 5, 2007

Allen Klein, Regional Director
Office of Surface Mining Reclamation and Enforcement
P.O. Box 46667
Denver, Colorado 80201-6667

Subject: Decision Document/Conditionally Approved Permit for the Bear Canyon Mine Lease Expansion, Co-Op Mining Company, Bear Canyon Mine, C/015/0025

Dear Mr. Klein:

Enclosed please find the Decision Document/Conditionally Approved Permit for the expansion of the Bear Canyon Mine. Mining may not proceed into this area until the Assistant Secretary of Lands and Minerals in the Department of Interior has signed the mining plan approval.

This package is conditionally approved because it does not include the consent of the US Forest Service to the Mining Plan Modification as needed under 30 CFR 740.4(c)(2). Utah hereby requests OSMRE to assist us under the terms of the Utah Cooperative Agreement, 30CFR944, by securing the required consent of the FS. Utah has worked closely with the USFS, and has requested consultation and consent with respect to the post mining land use and requirements to protect non-coal resources. On March 13, 2007, Utah believed it had obtained USFS consent, however, on March 20, 2007, this consent was rescinded, as shown on the Notices included with this package.

Utah also notes the need for an administrative correction to the R2P2 lease description to be submitted directly to OSMRE by the Bureau of Land Management. Therefore, Utah is sending this permit package forward to you to complete by the addition of these two items from USFS and the BLM. We greatly appreciate OSMRE's assistance with this permitting action.

Sincerely,

John R. Baza
Director

Enclosures
cc: Pete Rutledge, OSM-WRCC (w/o)
Charles Reynolds, Co-Op Mining Company (w/o)
Alice Carlton, Forest Service (w/o)
Kent Hoffman, BLM (w/o)
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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*

File in:
C/015/0025, 2007, Outgoing
Refer to:
☐ Confidential
☒ Expandable
Date 4/05/07 **For additional information**

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

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Governor

GARY R. HERBERT
Lieutenant Governor

April 5, 2007

Charles Reynolds, Resident Agent
Co-Op Mining Company
P.O. Box 1245
Huntington, Utah 84528

Subject: State Permit and Decision Document, Bear Canyon Mine Lease Expansion (Federal Leases UTU-46484, UTU-61048, UTU-61849, UTU-24316 and Private Coal), Co-Op Mining Company, Bear Canyon Mine, C/015/0025, Task #2734, Outgoing File

Dear Mr. Reynolds:

Enclosed please find the Decision Document and State Permit for the proposed Bear Canyon Mine Lease Expansion. This permitting action involves the addition of federal leases UTU-46484, UTU-61048, UTU-61849, UTU-24316 and certain private land and coal reserves totaling approximately 7591 acres.

This Decision Document has been forwarded to the Office of Surface Mining (OSM). Also, please be advised that this permit is conditionally approved until a letter of consent is received from the U.S. Forest Service and an administrative correction is made by the BLM to the R2P2 approval recommendation to include mining within federal lease UTU-24316. Mining may not proceed into the expansion area until the Assistant Secretary of Lands and Minerals in the Department of Interior has signed the mining plan approval.

Please have the authorized officer for Co-Op Mining Company sign both permits and return one to the Division. If you have any questions, please call me, or Mary Ann Wright, Associate Director of Mining.

Sincerely,

John R. Baza
Director

an
Enclosures
cc: Pete Rutledge, OSM-WRCC (w/attachments)
Emery County Planning (certified) (w/o)
Marc Stilson, Water Right (w/o)
Kent Hoffman, BLM (w/o)
Jim Kohler, BLM (w/o)
Dave Ariotti, DEQ (w/o)
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UTAH DIVISION OF OIL, GAS AND MINING
STATE DECISION DOCUMENT
CO-OP MINING COMPANY
(AKA C.W. MINING COMPANY)
LEASE EXPANSION – MOHRLAND AREA
PRIVATE COAL AND FEDERAL LEASE ADDITIONS

Emery County, Utah
C/015/0025

April 5, 2007

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  NEPA for BLM Leases: (UTU-46484 [Forest Service Exclusion, dated October 3, 1997], UTU-61048 [Forest Service Letter dated July 16, 2002 requiring update of stipulation for clarification of intent consistent with post-Forest Plan agreement with local water user, the lessees and BLM]], UTU-61049 [Forest Service Decision Memo dated July 31, 2001 and Forest Service decision in 1989], and UTU-24316 [Forest Service Categorical Exclusion dated October 3, 1997 and Decision Notice signed August 6, 1987])

File in:
☐ Confidential
☒ Expandable
Refer to Record No 0025 **Date** 04/05/07
In C/015/0025, 2007, Outgoing
For additional information

Forest Service Decision Notice/Finding of No Significant Impact, published March 13, 2007, Rescinded March 20, 2007 in the Sun Advocate for mining plan modification to expand the Bear Canyon Mine permit area.

* Letters

  SHPO, Letter dated February 21, 2007
  SHPO, Letter dated March 30, 2007
  USFWS, Letters dated December 1, 2006 and January 22, 2007
  OGM/USFWS Section 7 Informal Consultation, internal memo dated April 4, 2007
  USFS, ***Letter forthcoming after the Environmental Assessment is completed***
  BLM, Resource Recovery and Protection Plan (R2P2) for UTU-61048, 61049 & 46484, dated September 22, 2006
  BLM, ***Letter forthcoming,*** R2P2 approval for UTU-24316
  OSM Mining Plan Modification Decision, September 2, 2005

* AVS Memo - Section 510(c) finding, dated March 23, 2007

ADMINISTRATIVE OVERVIEW

CO-OP MINING COMPANY
(AKA C.W. MINING COMPANY)
BEAR CANYON MINE
LEASE EXPANSION – MOHRLAND AREA
PRIVATE COAL AND FEDERAL LEASE ADDITIONS

Emery County, Utah
C/015/0025

April 5, 2007

PROPOSAL

On July 22, 2005, the Division received the proposed Mohrland Area permit modification to the Bear Canyon Mine MRP. The previous approved permit area included approximately 3376.18 acres. CO-OP Mining Company proposes to add approximately 7591.29 acres to their existing permit area. The new permit acreage will total 10,967.39 acres. The new lease areas as well as the existing permit area are shown on the enclosed locator map. This proposal does not include any new surface facilities or surface disturbances. All mining operations will be conducted underground.

The new project area is a combination of federal and private surface and coal reserves. The following federal coal leases are being added or expanded: UTU-61048 (1108 acres), UTU-61049 (2196 acres), UTU-46484 (1400 acres) and UTU-24316 (80 acres). Approximately 2740 acres of private coal and 3754.16 acres of private surface are also being added to the permit to allow uninterrupted mining and maximum recovery of the coal reserves in the Bear Canyon Mine. It is important to note that portions of the private property overlies federal coal and federal surface overlies some private coal. Due to the fact that the proposal will add approximately 7591.29 additional acres to the approved permit area, this permitting action is categorized as a significant revision according to Utah Coal Mining Rules (R645-303-224).

The proposed project expansion was categorized as a federal mining plan modification by the Office of Surface Mining (OSM) on September 2, 2005 because it meets the requirements of 30 CFR 746.18 (d)(3) and 30 CFR 746.18 (d)(4).

The Bureau of Land Management concurred with the latest proposal and issued a recommendation for approval of the R2P2 plan on September 22, 2006. Therefore, this permit does not authorize mining in the federal leases until the R2P2 is approved and the Secretary of the Interior authorizes the mining plan approval.

BACKGROUND

The Bear Canyon Coal Mine is owned by Co-Op Mining Company (aka C. W. Mining Company) and is located in Emery County approximately 20 miles southwest of Price, Utah in the Huntington Canyon area. The original permit for the Bear Canyon Mine was issued on November 1, 1985, with subsequent permit renewals on May 29, 1991, November 2, 1995, November 2, 2000 and November 2, 2005. Mining began in the Blind Canyon Seam, and in 1994, the Division approved mining the Tank seam. The Division received the proposal to mine on the east side of the Bear Canyon Fault (Wild Horse Ridge) on December 18, 1998, this mine expansion received mining plan approval on February 1, 2002. On September 28, 2004, the Division received a minor amendment to add a 40-acre Incidental Boundary Change (IBC) to federal lease U-38727. The Division approved the IBC on September 26, 2005.

Room and pillar mining occurs in the Bear Canyon seam (middle seam), the Hiawatha seam (lower seam) and the Tank Seam (upper seam). The permit area currently encompasses 3376.18 acres and the disturbed area is 40.46 acres.

ANALYSIS

No additional surface disturbance is proposed in relation to this permit modification to add the following federal coal leases: UTU-61048 (1108 acres), UTU-61049 (2196 acres), UTU-46484 (1400 acres) and UTU-24316 (80 acres) and approximately 2740 acres of private coal and 3754.16 acres of private surface are also being added to the permit to allow uninterrupted mining and maximum recovery of the coal reserves in the Bear Canyon Mine. It is important to note that portions of the private property overlies federal coal and federal surface overlies some private coal. Mining practices will include room and pillar for development or first mining and longwall for second or full extraction.

All of the federal leases were readjusted:

UTU-46484 [Readjusted March 20, 1998]
UTU-61048 [Readjusted February 21, 2003]
UTU-61049 [Readjusted June 19, 2002]
UTU-24316 [Readjusted March 20, 1998]

NEPA was also part of the BLM Lease Adjustment process:

UTU-46484 [Forest Service Exclusion, dated October 3, 1997]
UTU-61048 [Forest Service Letter dated July 16, 2002 requiring update of stipulation for clarification of intent consistent with post-Forest Plan agreement with local water user, the lessees and BLM]
UTU-61049 [Forest Service Decision Memo dated July 31, 2001]
UTU-24316 [Forest Service Categorical Exclusion dated October 3, 1997, Decision Notice Signed August 8, 1987]

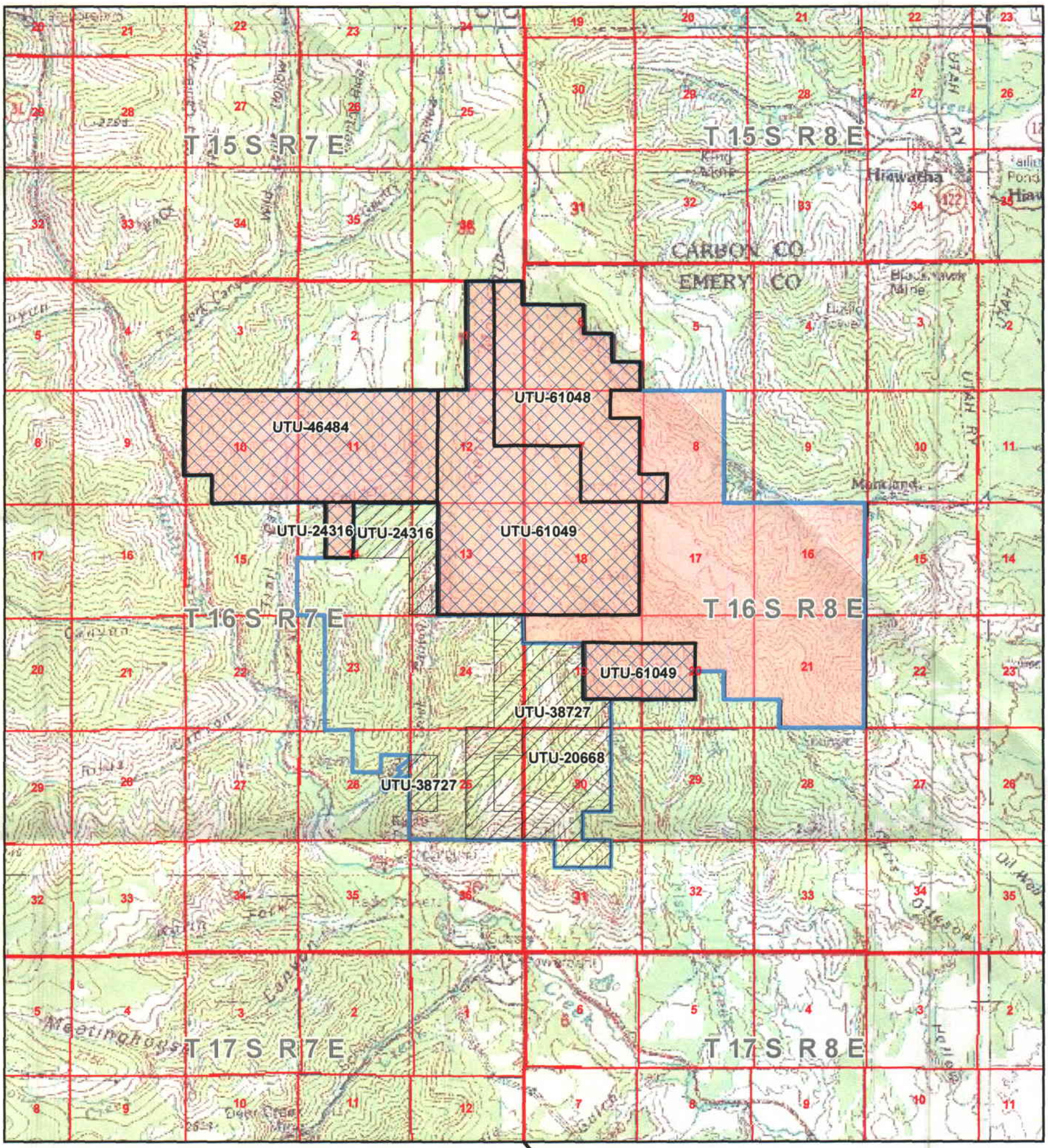
For this mining plan modification, the Forest Service required additional NEPA analysis. The Forest Service (FS) Decision Notice/Finding of No Significant Impact (FONSI) was published March 13, 2007 in the Sun Advocate and Emery County Progress. This decision was rescinded March 20, 2007 in the Sun Advocate for mining plan modification to expand the Bear Canyon Mine

permit area. A republication of the Forest Service FONSI decision is pending finalization of the supplemental NEPA analysis.

RECOMMENDATION

Co Op Mining Company has demonstrated that mining as part of acquisition of these federal leases and private coal can be done in conformance with the Surface Mining Control and Reclamation Act, and the corresponding Utah Act and performance standards. The Bureau of Land Management approved these federal leases and concurs with the decision to allow mining at this time, see recommendation for approval of the Resource Recovery and Protection Plan, dated September 22, 2006.

It is, therefore, recommended that approval be given for the addition of 7591.29 acres to the Bear Canyon Mine permit area. The total permit acreage would be 10,967.39 acres.



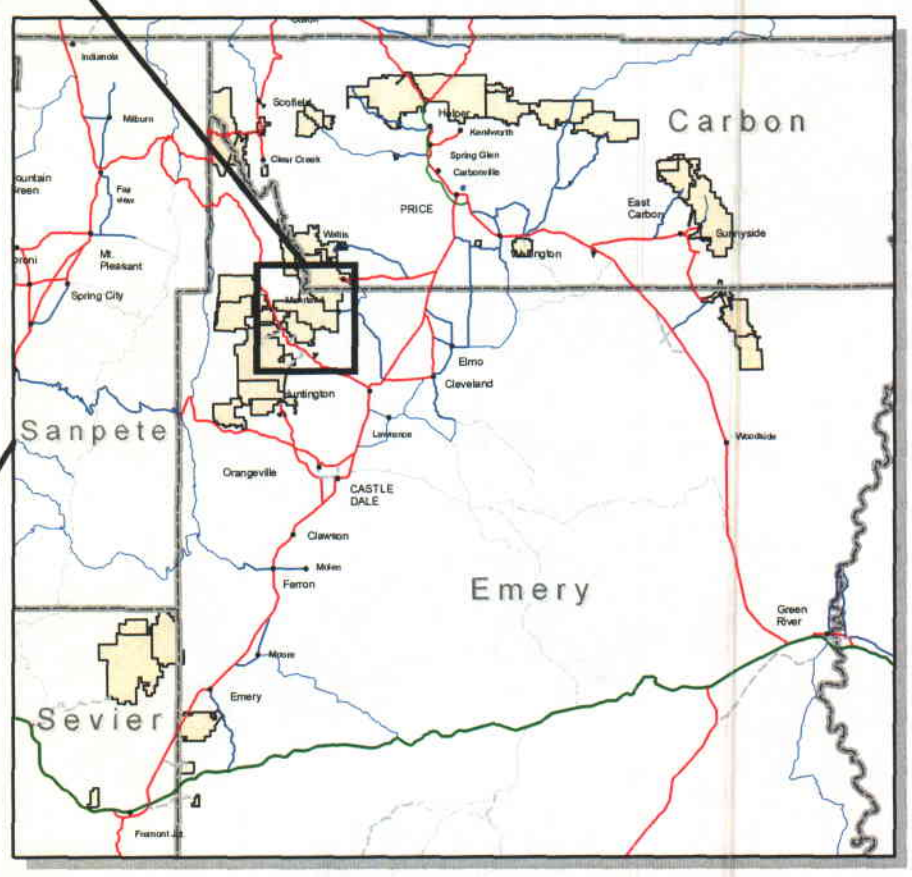
Proposed Mine Plan Modification
Bear Canyon Mine

C0150025
Carbon County, Utah
Feburary 2007

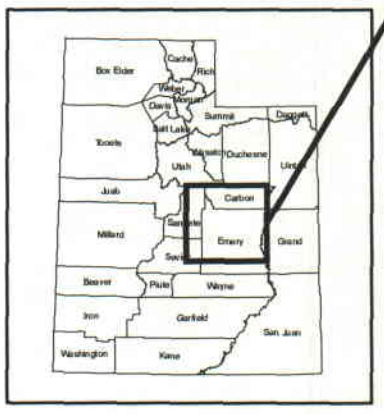
Township 16 South Range 7 & 8 East

Lease Areas

- Previous Federal Mining Plan Approval
- Proposed Federal Mining Plan Modification
- Permit Area
- Proposed State Permit Modification



Locator Map



File: N:/gis/coal/coalareamaps/C0150025-MiningPlan.pdf

MINING PLAN AND MINING PLAN MODIFICATION INFORMATION
BACKGROUND INFORMATION

USGS 7.5 minute Quadrangle location map(s): Hiawatha Quadrangle Map

Year mine began production: 1981

Current permit acreage: 3,376.18
Current surface disturbed acres: 40.46
Total acres of Federal coal within the current permit: 1,520
Total acres of Federal surface land within the current permit: 1,520
Recoverable tons of Federal coal remaining in the current permit: 5,855,669

Average annual production rate: 550,000
Maximum production rate: 1,200,000 Tons/year (This was in the old #1 Mine)
Coal seam(s) mined: Blind Canyon, Tank Seam
Average annual employment: 75 people
Life-of-Mine in current permit: 2020

Current Post mining land use: Wildlife, Grazing, and Recreation

PROPOSED ACTION INFORMATION

Total change in permit acreage: increase of 7,591.29
Change in surface disturbed acres: none
Change in acres of Federal coal: increase of 4,784.36
Change in Federal surface land acres: increase of 3,837.13
Change in recoverable tons of Federal coal: increase of 22,785,202 Tons

Change in average annual production: 2,500,000
Coal seam(s) to be mined: Tank, Blind, and Hiawatha seams
Change in annual employment: 200 people
Change in Life-of-Mine: 2018-2019

Reclamation bond amount: $1,825,000

Change in post mining land use: none

PERMITTING CHRONOLOGY

CO OP MINING COMPANY
(AKA C.W. MINING COMPANY)
BEAR CANYON MINE
LEASE EXPANSION – MOHRLAND AREA
PRIVATE COAL AND FEDERAL LEASE ADDITIONS

Emery County, Utah
C/015/0025

April 5, 2007

July 22, 2005	Bear Canyon Lease Addition application received to add additional federal and private coal to the current permit area.
September 2, 2005	OSM determined that this application is a mining plan modification.
October 13, 2005	Bear Canyon Lease Addition application determined Administratively complete.
October 18, 2005	Publication commences in the Emery County Progress for the Bear Canyon Mine Expansion. The notice was published for four consecutive weekly issues ending on November 8, 2005.
December 8, 2005	End of public comment period. No comments received.
February 1, 2006	First round of review completed for the Bear Canyon Lease Addition application Task ID #2292.
May 16, 2006	Bear Canyon Lease Addition NEPA adequacy meeting with OSM, FS, Division - Decisions: • Decision by the FS, Alice Carlton - to do some type of supplemental analysis: keeping this as minimal as possible to address all issues of concern to the FS; • Wayne Hedberg to work with Dale Harber in keeping FS current technically with all needed permit information and maps; • Joe Helfrich and other Division technical review team to sit down and review with Karl Boyer and others at FS, as designated, to review Cultural & 106 process, Threatened and Endangered Species review and consultation, all biological components of concern, areas of proposed subsidence in relation to any potential impact to springs and other hydrology resources; and any cumulative impacts of the proposed mining; • Division to receive an update today from the permittee/operator and

will set the continuing review schedule to be followed and will keep USFS in close contact with that schedule and coordinated review;

- Alice Carlton to discuss appeal issues with FS counsel;
- All to stay in close contact and work on increasing communication and coordination in reviewing the impacts of the mining proposal to non-coal resources.

May 22, 2006	Co-Op Mining Company's first response to the Division's technical analysis of the lease addition application, Task ID #2292 is received at the Division office.
June 13, 2006	Second round of review completed for the Bear Canyon Lease Addition application Task ID #2526.
August 10, 2006	Co-Op Mining Company's second response to the Division's deficiencies for the lease addition application, Task ID #2526 is received at the Division's Salt Lake office.
September 12, 2006	Third round of review completed for the Bear Canyon Lease Addition application Task ID #2597.
September 22, 2006	The Resource Recovery and Protection Plan (R2P2) completed, signed and a copy sent to DOGM.
October 30, 2006	Mark Reynolds hand delivers four hard copies and two digital copies of Co-Op Mining Company's third response to Task ID #2597one of which was a confidential binder and two CD's to the Salt lake office.
December 8, 2006	Fourth round of FS review comments and Division deficiencies, Task ID #2680, sent to Mark Reynolds, Co-Op Mining Company.
January 16, 2007	Division receives Co-Op Mining Company's fourth response to the Division's deficiency list for the lease addition application, Task ID #2680.
January 22,2007	Division receives Co-Op Mining Company's fourth response to the Division's deficiency list for Task ID #2680. The response received on January 16, 2007 was returned, resubmitted on January 19, 2007 and returned again for clarifications and corrections.
January 22, 2007	Formal Section 7 concurrence letter received from the USFWS.
February 12, 2007	Division receives one hard copy and four digital copies of the changes to the Probably Hydrologic Consequence (PHC) maps and text for Task ID #2680.
February 21, 2007	Copy of SHPO concurrence letter received (addressed NFS lands), no programmatic agreement needed, but stipulations will be added to permit.

March 13, 2007	USFS FONSI decision notice published in Sun Advocate & Emery County Progress.
March 20, 2007	USFS publishes rescinded notice of FONSI decision in Sun Advocate.
March 30, 2007	Division consultation letter to SHPO seeking concurrence with Division's determination of No Adverse Effect for entire project area (federal and private lands).
March 30, 2007	SHPO concurrence letter received to Division's determination of No Adverse Effect.
March 30, 2007	Cumulative Hydrologic Impact Assessment (CHIA) updated.
April 3, 2007	Technical Analysis (TA) updated to include analysis and findings for the Bear Canyon Lease Addition.
April 4, 2007	OGM/USFWS Informal Section 7 Consultation Memo finalized.
April 5, 2007	Division sends Decision Document to OSM (excluding the Forest Service EA, and the Forest Service consent letter).
Future Date	BLM will make administrative correction - listing of leases in R2P2 (lease UTU-24316 was inadvertently not listed)
Future Date	Forest Service EA completed. FONSI notice published, appeal period begins.
Future Date	Forest Service consent letter.

FINDINGS

CO OP MINING COMPANY
(AKA C.W. MINING COMPANY)
BEAR CANYON MINE
LEASE EXPANSION – MOHRLAND AREA
PRIVATE COAL AND FEDERAL LEASE ADDITIONS

Emery County, Utah
C/015/0025

April 5, 2007

1. The revised plan and the permit application are accurate and complete and all requirements of the Surface Mining Control and Reclamation Act, and the approved Utah State Program (the "Act") have been complied with (R645-300-133.100). See attached Technical Analysis dated April 3, 2007.

2. No additional surface reclamation is required since the additional permit area will be mined as an underground extension of the existing mine. There will be no new surface facilities (R645-300-133.710).

3. The 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 regulatory authority and no significant impacts or material damage findings were identified. The Mining and Reclamation Plan (MRP) proposed under the application has been designed to prevent damage to the hydrologic balance in the permit area and in associated off-site areas (R645-300-133.400 and UCA 40-10-11 {2}{c}) (See Cumulative Hydrologic Impact Analysis [CHIA], updated March 30, 2007).

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

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

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

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

    d. not within 100 feet of the outside right-of-way of a public road (R645-300-133.220);

e. not within 300 feet of any occupied dwelling (R645-300-133-220).

5. The regulatory authority's issuance of a permit is in compliance with the National Historic Preservation Act and implementing regulations (36 CFR 800) (R645-300-133.600). See attached letters from State Historic Preservation Officer (SHPO) dated February 21,2007 and March 30, 2007. The acreage proposed in this incidental boundary change is not located within areas where cultural resources will be found.

6. The applicant has the legal right to enter and complete mining activities through a federal coal lease issued by the Bureau of Land Management (Leases UTU-46484, UTU-61048, UTU-61049, UTU-24316) (R645-300-133.300).

7. A 510(c) report has been run on the Applicant Violator System (AVS), which shows that: prior violations of applicable laws and regulations have been corrected; neither Co Op Mining Company or 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 a 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 (R645-300-133.730). (See attached memo dated March 23, 2007).

8. Underground mining operations to be performed under the permit will not be inconsistent with other operations anticipated to be performed in areas adjacent to the proposed permit area. There are not permits adjacent to the Bear Canyon Mine. The Crandall Canyon Mine is in the vicinity.

9. The applicant has posted financial assurance for the Bear Canyon Mine Complex in the amount of $1,825,000.00. (Bond #L06-01-C-015-025 issued by Lyndon Property Insurance Company). No additional surety will be required, since there is no additional surface disturbance proposed (R645-300-134).

10. No lands designated as prime farmlands or alluvial valley floors occur within the permit area (R645-302-313.100) (R645-302-321.100).

11. The proposed postmining land-use of the permit area is the same as the pre-mining land use and has been approved by the regulatory authority. (See R645-301- 400)

12. The regulatory authority has **not** made all specific approvals required by the Act, the Cooperative Agreement, and the Federal Lands Program. The Forest Service EA and Forest Service consent letter are not finalized to date. The September 22, 2006, BLM R2P2 approval letter did not include federal lease UTU-24316. OSM will coordinate with the Forest Service to complete the Environmental Assessment and obtain the requisite Forest Service consent letter. OSM will also consult with and obtain the BLM's requisite consent for UTU-24316. (See cover letter to Allen Klein from John Baza, dated April 5, 2007)

13. The proposed operation will not affect the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats (R645-300-133.500). (See letter from US Fish and Wildlife Service, dated January 22, 2007).

14. All procedures for public participation required by the Act, and the approved Utah State Program have been complied with. This permitting action was published for four consecutive weeks with a 30-day public comment period. No comments were received. (R645-300-120).

15. No existing structures will be used in conjunction with mining of the underground lease addition other than those constructed in compliance with the performance standards of R645-301 and R645-302 (R645-300-133.720).

D. Wayne Hedberg
Permit Supervisor

Permit Supervisor

Associate Director, Mining

John R. Baza
Director

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AFFIDAVIT OF PUBLICATION

STATE OF UTAH)

ss.

County of Emery,)

I, Richard Shaw, on oath, say that I am the General Manager of the Emery County Progress, a weekly newspaper of general circulation, published at Castle Dale, State and County aforesaid, and that a certain notice, a true copy of which is hereto attached. was published in the full issue of such newspaper for 4 (Four) consecutive issues, and that the first publication was on the 18th day of October, 2005 and that the last publication of such notice was in the issue of such newspaper dated the 8th day of November, 2005.

Richard Shaw - General Manager

Subscribed and sworn to before me this 8th day of November, 2005.

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

Publication fee, $238.40

LINDA THAYN
NOTARY PUBLIC • STATE of UTAH
845 EAST MAIN
PRICE, UTAH 84501
COMM. EXPIRES 1-10-2007

NOTICE

Co-Op Mining Company, P. O. Box 1245, Huntington, Utah, 84528 hereby announces its intent to expand underground coal mining activities at the Bear Canyon Mine, Permit No. C/015/025, issued Nov. 1, 1985. The Bear Canyon Mine is located in Bear Canyon, approximately 12 road miles west of Huntington, Utah. The permit area addition will consist of 2,740.00 private acres and 4,764.36 federal acres within Federal Coal Leases U-024316, U-46484, U-61048, and U-61049. The explanation area can be found on the USGS Hiawatha Quadrangle map and is described as follows:

T16S R7E	Section 01:	E1/2
	Section 10:	All except the SW1/4SW1/4
	Section 11:	All
	Section 12:	All
	Section 13:	E1/2, E1/2W1/2
	Section 14:	E1/2NW1/4
T16S R8E	Section 06:	S1/2NW1/4, SW1/4, S1/2SE1/4, W1/2N1/2SE1/4
	Section 07:	All
	Section 08:	W1/2, W1/2E1/2
	Section 16:	All
	Section 17:	All
	Section 18:	All
	Section 19:	N1/2NW1/4, NE1/4, N1/2SE1/4
	Section 20:	N1/2, N1/2 SW1/4, NE1/4SE1/4
	Section 21:	All except the SW1/4SW1/4

The area is shown on Plate 1-1 of the Mining and Reclamation Plan. Written comments, objections, or requests for informal conference should be directed to the Utah Division of Oil, Gas, & Mining. 1594 West, North Temple, Suite 1210, Salt Lake City, Utah, 84114-5801. Copies of the of the application and the current mining plan are available for public inspection at the office of the Utah Division of Oil, Gas & Mining, Salt Lake City, and at the Emery Count Recorder's office, Emery County Courthouse, Castle Dale, Utah, 84513.

Published in the Emery County Progress October 18, 25, November 1 and 8, 2005.

FEDERAL **PERMIT** **April 3, 2007**
C/015/0025

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

This permit, C/015/0025, is issued for the State of Utah by the Utah Division of Oil, Gas and Mining (Division) to:

Co-Op Mining Company
(aka CW Mining)
P. O. Box 1245
Huntington, Utah 84528
(435) 687-2450

for the Bear Canyon Mines. A performance bond is filed with the Division in the amount of $1,825,000 payable to the State of Utah, Division of Oil, Gas and Mining and the United States Department of Interior, Office of Surface Mining Reclamation and Enforcement. The Division 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 coal mining and reclamation operations on the following described lands within the permit area of the Bear Canyon Mines, situated in the State of Utah, Emery County, and located as follows:

Township 16 South, Range 7 East, SLBM

Sec. 1: Lots 1 and 2, S1/2 NE1/4, SE1/4;
Sec. 10: N1/2, N1/2 S1/2, SE1/4 SW1/4, S1/2 SE1/4;
Sec. 11: All;
Sec. 12: All;
Sec. 13: All;
Sec. 14: NE1/4, E1/2 NW1/4, S1/2;
Sec. 23: E1/2, E1/2 W1/2;
Sec. 24: All;
Sec. 25: All;

Sec. 26: NE1/4 NE1/4, NW1/4 NE1/4, N1/2 SW1/4, NE1/4 and the access/haul road and topsoil storage area as shown on Plate 2-1.

Township 16 South, Range 8 East, SLBM

Sec. 6: Lots 11-14, E1/2 SW1/4, W1/2 SE1/4, SE1/4SE1/4;
Sec. 7: All;
Sec. 8: NW1/4, W1/2 E1/2, N1/2 SW ¼, SE1/4 SW1/4, SW1/4 SW1/4;
Sec. 16: All;
Sec. 17: All;
Sec. 18: All;
Sec. 19: S1/2 NW1/4, SW1/4, SW1/4 SE1/4, N1/2SE1/4, S1/2 NE1/4, Lot 1, NE1/4 NW1/4, N1/2 NE1/4;
Sec. 20: S1/2 NW1/4, N1/2 SW1/4, N1/2 NW1/4, NE1/4, NE1/4 SE1/4;
Sec. 21: E1/2 NW1/4, NE1/4, N1/2 SE1/4,W1/2 NW1/4, N1/2 SW1/4,SE1/4SW1/4,S1/2SE1/4;
Sec. 30: W1/2, W1/2 NE1/4, NW1/4 SE1/4; and
Sec. 31: NE1/4 NW1/4, NW1/4 NE1/4;

This legal description is for the permit area of the Bear Canyon Mines. The Permittee is authorized to conduct coal mining and reclamation operations connected with mining on the foregoing described property subject to the terms and conditions of this permit.

Sec. 3 COMPLIANCE - The Permittee will comply with all applicable terms and conditions required by the lease issued pursuant to the Mineral Leasing Act and conditions imposed by the Federal land management agency relating to postmining land use, and those of other affected agencies, and compliance with the requirements of the Federal land management agency with jurisdiction, and performance standards and requirements of the State Program.

Sec. 4 PERMIT TERM - This permit expires on November 2, 2010.

Sec. 5 ASSIGNMENT OF PERMIT RIGHTS - The permit rights may not be transferred, assigned or sold without the approval of the Division Director. 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 Division, including but not limited to inspectors, and representatives of the 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;

(b) Be accompanied by private persons for the purpose of conducting an inspection in accordance with R645-400-210 and 30 CFR 842, when the inspection is in response to an alleged violation reported to the Division by the private person.

Sec. 7 SCOPE OF OPERATIONS - The Permittee shall conduct underground coal mining activities only on those lands specifically designated as within the permit area on the maps submitted in the approved plan 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) Any 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 and the Federal Lands 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 the Division in approving alternative methods of compliance with the performance standards of the Act, the approved Utah State Program and the Federal Lands Program.

ATTACHMENT A
Special Conditions

1. Co-Op Mining Company will submit surface and ground water quality data for the Bear Canyon Mine on a quarterly basis for the Bear Canyon Mine in an electronic format through the Electronic Data Input web site, http://hlunix.hl.state.ut.us/cgi-bin/appx-ogm.cgi. throughout the life of the permit.

2. Co-Op Mining Company will not initiate coal mining and reclamation operations on federal leases UTU-61048, UTU-61049, UTU-46484, and UTU-24316 until federal mining plan approval is signed by the Assistant Secretary of Land and Minerals for this mining plan modification.

3. This permit is conditioned upon the issuance of the Forest Service letter of consent.

4. Co-Op Mining Company must submit the amended air quality approval to the Division for inclusion in the MRP within 30 days of the approval that allows for the increase in throughput to 2.5 million tons per year prior to Co-Op Mining exceeding the approved 1.95 millions tons per year.

5. Co-Op Mining Company must develop a raptor mitigation plan and submit it to the Division for inclusion in the MRP by July 1, 2007 in consultation with the Division, Manti-La Sal National Forest, the BLM, and Division of Wildlife Resources.

6. Co-Op Mining Company will comply with the Special Forest Service Stipulations regarding compliance with the National Historic Preservation Act.

   The following stipulations will apply to both NFS and private lands associated with the Bear Canyon Lease Expansion project area. The subsidence monitoring and reporting requirements for the NFS lands will also include appropriate notification to the Division.

   For private lands that involve subsidence related impacts to cultural and historic resources, the Division will be the appropriate agency for initial contact and coordination, in place of the Forest Service as outlined below for subsidence related impacts to cultural and historic resources on NFS lands:

Forest Service NHPA Stipulations

1. **Monitoring of Subsidence.** CO-OP will conduct annual subsidence monitoring of National Forest System Lands (NFS) throughout the life of the mine. Should subsidence occur, CO-OP will provide an accurate map of the entire subsidence area. CO-OP will ensure that a qualified archaeologist will then examine the location of the subsidence area relative to previous inventories and known sites within fifteen (15) working days of the identification of the subsidence. Depending on the location of subsidence in relation to previous inventories

and known sites, the following stipulations will apply (to each subsidence event):

a. **Previously Inventoried and No Sites.** If subsidence occurs on NFS lands within an area that has undergone previous archaeological inventory, and no sites are present within the area of subsidence, or no sites eligible to the National Register of Historic Places are present in the area of subsidence, no further work will need to be done. CO-OP or their consulting archaeologist will notify the U.S. Forest Service (USFS) regarding this determination within fifteen (15) working days of making the determination. The USFS will provide the information to SHPO.

b. **Previously Inventoried and Known Sites.** If subsidence occurs on NFS lands within an area that has undergone previous archaeological inventory, and known archaeological sites, previously determined eligible to the National Register of Historic Places are present in the subsidence area, CO-OP will have a qualified archaeologist examine the effects of subsidence upon the site(s) in question within fifteen (15) working days of making this determination. The archaeologist will provide a report, for review by the USFS in a timely manner that makes recommendations regarding whether or not the effects of subsidence are adverse. The USFS will make a final determination of the effects of subsidence. The USFS will then consult with the SHPO regarding the effects determination. If the effect is determined to be adverse, procedures following 36CFR800.6 and the stipulations below regarding evaluation and archaeological treatment will be followed.

c. **Not Previously Inventoried.** If subsidence occurs on NFS lands within an area that has not undergone previous archaeological inventory, CO-OP will have a qualified archaeologist conduct a field examination of the subsidence area within fifteen (15) working days of making this determination (in consultation with the USFS and SHPO). Depending on the presence or absence of sites in the subsidence area, the following stipulations will apply (to each subsidence event):

   i. **No Sites.** If no sites are present within the area of subsidence, the archaeologist will make a recommendation of No Historic Properties Affected to the USFS in a timely manner. The USFS will make a final determination of the effects of subsidence. The USFS will then consult with the SHPO regarding the effects determination per 36CFR800.4(c).

   ii. **Newly Discovered Sites.** If a site or sites are found within the area of subsidence, the archaeologist will provide a report and make recommendations of eligibility and effect to the USFS (per 36CFR800.4(c)(2) and 36CFR800.5) regarding the site(s) and subsidence effects on the site(s) in a timely manner. The USFS will make a final determination of eligibility of the site(s) and the effects of subsidence on the site(s). The USFS will then consult with the SHPO regarding the effects determination. If the effect to any site eligible to the National Register of Historic Places is determined to be adverse, procedures following 36CFR800.6 and the stipulations below regarding evaluation and archaeological treatment will be followed.

d. **Time Lines.** In all cases SHPO and the Tribes will be afforded thirty (30) calendar days following receipt of reports/consultation requests to respond.

e. **Conducting Consultation.** The USFS will consult with tribes, SHPO, and the Utah Division of Oil, Gas and Mining (UDOGM) during this process at a level appropriate to the nature of the resources (if any) and effects to the resources (if any) taking into account comments and concerns received previously from the tribes and consulting parties.

2. **Discoveries in Area of Potential Effect (APE).** Should unanticipated cultural or historic resources be observed within the APE during, but not limited to, CO-OP's quarterly ground-water monitoring, annual subsidence monitoring, OGM's field visits, construction of any mine-related structures or features, future archeological surveys conducted within the permit area, or otherwise brought to USFS attention, CO-OP will halt any work within the vicinity of the discovery that could harm the discovery and notify the USFS within 24 hours of the discovery. CO-OP will also protect the site. The USFS will notify SHPO of said resources within seven (7) days of resource discovery. If determined appropriate, the USFS will require CO-OP to

record the discovery, conduct additional evaluations as necessary, and provide correlating reports. The USFS will make determinations of eligibility and effect regarding the discovery.

a. **No Historic Properties Affected or No Adverse Effects.** If a determination of No Historic Properties Affected or No Adverse Effects is made, the USFS will consult with the SHPO regarding the determination following 36CFR800.4-5.

b. **Adverse Or Potentially Adverse**. If effects to a site that is determined via this process to be eligible to the National Register of Historic Places are determined adverse or potentially adverse, the USFS, CO-OP and SHPO will reconvene to recommend and draft appropriate measures to avoid, minimize, or mitigate adverse effects.

c. **Time Lines.** In all cases SHPO and the Tribes will be afforded thirty (30) calendar days following receipt of reports/consultation requests to respond.

d. **Conducting Consultation.** The USFS will consult with tribes, SHPO, and UDOGM during this process at a level appropriate to the nature of the resources (if any) and effects to the resources (if any) taking into account comments and concerns received previously from the tribes and consulting parties.

3. **Funding of Work.** CO-OP will fund and implement any future and all cultural or historic resources fieldwork, analysis, and monitoring, required under these stipulations.

GENTRY MOUNTAIN
CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

For

STAR POINT MINE
C/007/0006

SUNNYSIDE COGENERATION ASSOCIATES
C007/0042

HIAWATHA MINES COMPLEX
C/007/0011

DEER CREEK MINE WASTE ROCK STORAGE FACILITY
C/015/0018

TRAIL CANYON MINE
C/015/0021

BEAR CANYON MINE
C/015/0025

in

CARBON AND EMERY COUNTIES, UTAH

March 30, 2007

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I. INTRODUCTION

This CHIA (Cumulative Hydrologic Impact Assessment) predicts potential cumulative impacts to the hydrologic balance, associated with past, present and anticipated coal-mining operations within the Cumulative Impact Area (CIA). The CHIA determines whether material damage effects outside the individual permit boundaries will result from mining activities.

The CHIA document will:

1.	Identify the Cumulative Impact Area.	**(Part II)**
2	Describe the hydrologic system and its water resources.	**(Part III)**
3.	Predict hydrologic impacts.	**(Part IV)**
4.	Assess material damage.	**(Part V)**
5.	Make a statement of findings.	**(Part VI)**

This CHIA has been prepared by the Utah Division of Oil, Gas, and Mining (UDOGM or the Division) and complies with Federal and Utah coal regulations 30 CFR 784.14(f) and R645-301-729, respectively. A major revision of the CHIA was completed June 21, 2001: this was for the Bear Canyon Mine-Wildhorse Ridge permit extension. A minor update to the CHIA was completed on September 4, 2003 to define the area and features controlled by Sunnyside Cogeneration Associates (SCA) for the Star Point Refuse operation, and another update was completed on September 24, 2004. This March 2007 update is because of the addition of leases U-46484, U-61048, and U-61049; the remainder of U-024316; and adjacent fee coal lands to the Bear Canyon Mine permit area. These tracts were already included in the CIA boundary..

In addition to the references cited, hydrologic and geological information was obtained from the Mining and Reclamation Plans (MRP) of the Bear Canyon Mine, Star Point Mine, Hiawatha Mine, Trail Canyon Mine and the Deer Creek Mine waste rock storage facility. Previous versions of this CHIA included references to a pre-1966 Star Point Mine Plan: the Star Point Mine Plan was revised in September 1996, and much detailed information from the previous plan was not included in the current mine plan. A copy of this pre-1966 plan is not available for quick reference, although it could be requested from state archives if needed. Information taken from this earlier plan is considered valid, but because the source cannot be checked directly, sections that refer to information from this earlier plan are enclosed in brackets [ ] in this CHIA.

II. CUMULATIVE IMPACT AREA (CIA)

The Gentry Mountain Cumulative Impact Area (CIA) is located near Price, Utah, within the Transition Province between the Great Basin and Colorado Plateau. The CIA surrounds Gentry Mountain Ridge, which lies south of the town of Scofield in Carbon County and north of Huntington City in Emery County (Map 1). The area of interest can be found on the Hiawatha, Wattis, Candland Mountain, and Huntington U. S. Geological Survey (USGS) 7.5 minute quadrangles.

The CIA is shown in detail on Map 2. This CIA is the region where past, present, and anticipated or foreseeable future coal mining activities may interact to affect surface and ground water. The CIA boundary incorporates mined areas and proposed mine-lease areas at the Star Point, Hiawatha, Trail Canyon, and Bear Canyon Mines and at the Deer Creek refuse pile and the SCA Star Point Refuse operation. The CIA is defined based on the potential for the hydrologic resources to be impacted by mining activities. Potential surface and ground-water impact areas are within the CIA outlined in Map 2.

Surface waters from the CIA flow from the eastern divide of the Wasatch Plateau to either the Price River or the San Rafael River. These rivers then discharge to the Green River before its confluence with the Colorado River.

Ground water from the CIA includes all ground water known to flow through or originate within the CIA boundary and includes all known ground-water[1] discharge points that have the potential to be in hydrologic connection with the mines. Determination of the ground-water CIA boundary has been based on the major geologic features that control flow. Ground waters issue from alluvial and colluvial aquifers, perched aquifers, channel sandstones and other water bearing lithologies, and fault and fracture systems within the CIA.

MINING HISTORY

MINING ACTIVITIES IN THE CIA.

Mining in the CIA predates the Surface Mining Coal Reclamation Act (SMCRA). Areas

1 The term "regional aquifer" is frequently used in mine plans in the Wasatch and Book Cliffs Coal Fields in reference to the Blackhawk Formation and adjacent strata. The use of this term in these areas likely originated from hydrologic studies conducted by the U.S. Geological Survey. Although some of these formations contain large volumes of ground water, labeling them regional aquifers is not necessarily congruent with the SMCRA definition of an aquifer, "...a zone, stratum, or group of strata that can store and transmit water in sufficient quantities for a specific use." Many of these saturated strata cannot supply water in sufficient quantities for specific uses. Furthermore, most ground-water sources in these coal fields are internally discontinuous, and although they may be saturated over great areas, they do not effectively transport water on a regional scale. Unless information indicates it is appropriate to identify these saturated strata as aquifers, the Division refers to them simply as saturated strata or ground-water zones.

that have been mined within the permitted sites in the CIA are shown on Maps 2, 3 and 4.

Star Point Mine (Plateau Mining Corporation - Permit C/007/006)

The Wattis, Third (Middle), and Hiawatha Seams have been mined within the Star Point Mine permit area. Early development occurred on the east side of the Bear Canyon Fault (Map 3). Subsequent access to mining in the Gentry Ridge Horst, west of the Bear Canyon Graben, was by a 3-main-entry rock tunnel constructed through the graben in 1989. Coal was removed through the Lion Deck Portal Area.

Operations began in 1916 when the Wattis brothers and Mr. Browning bought 160 acres from the United States and developed the property for coal production. The Lion Coal Company operated the Wattis No.1 and No. 2 Mines until the end of 1963: the Wattis mines have also been known as the Plateau and Star Point mines. Mining was idled from 1964 through 1967 (Doelling, 1972).

United Nuclear Corporation (UNC) acquired the mines in 1971. UNC modernized the mines and expanded the Lions Deck facilities.

After mining operations resumed in 1971, the mines changed names and ownership several times. UNC operated the mines under the name Plateau Mining Company from October 21, 1971 until April 2, 1979, as UNC Plateau Mining Company from April 2, 1979 to July 23, 1980, and again as Plateau Mining Company from July 23, 1980 until August 26, 1982. Plateau Mining Company became Plateau Company, and a new Plateau Mining Company was formed August 26, 1982 to operate the mines. The company name subsequently changed to Cyprus Plateau Mining Company, then Cyprus Plateau Mining Corporation (CPMC). On June 30, 1999, the stock of Cyprus Amax Coal Company was sold to RAG American Coal Company, and CPMC was no longer affiliated with Amax Mineral Company or Amax Energy, Inc. Subsequently, CPMC was merged into RAG American Coal Company. Also on June 30, 1999, the name of the mine operator was changed to Plateau Mining Corporation (PMC), and PMC is the current operator (Star Point Mine Plan, p. 100-2). Because PMC is the current operator of the Star Point Mine and the successor of all previous operators, PMC is identified as the operator throughout this CHIA, no matter what time period is involved.

Table II-1. Star Point Mine Coal Production

Company	Time Period	Coal Mined (tons)
Lion Coal Company	1917 – 1964	Approximately 7,750,000 *
	1965 - 1966	Idle
Plateau Mining Company	1967 - 1971	750,000
UNC Plateau Mining Company	1971 - 1980	5,000,000
Plateau Mining Company, also	1980 - 1990	12,000,000

d/b/a. Cyprus Plateau Mining Company and Cyprus Plateau Mining Corporation	1991	No information
	1992	2,100,000
	1993	3,000,000
	1994	No information
	1995	No information
	1996	2,900,000 **
	1997	1,350,000 **
	1998	92,000 **
Plateau Mining Corporation	1999	1,055,000 **
	2000	89,000 ** Halted production in March and started reclamation.
	2001	In reclamation
	2002	In reclamation
	2003	In reclamation
	2004	In reclamation
	2005	In reclamation
	2006	In reclamation

* Doelling 1972; **Jahan Bani, 1997, 1998, 1999, 2000, 2001

PMC began mining from the Star Point No. 1 and No. 2 Mines. They mined in the Hiawatha Third and Wattis seams using room and pillar and longwall methods until the spring of 2000 when they began reclamation operations. Three additional portals were approved for Little Park Canyon but were never built. The Star Point No. 2 Mine's maximum annual coal recovery was approximately 3.5 million raw tons. Currently, PMC has no leasehold interest, options, or pending bids on lands contiguous to the permit area.

The mines were developed through six *portal units*, a unit being an area containing several portals. The Star Point No. 1 and the South Wattis units have been sealed and reclaimed. The two breakouts of the sixth unit, located in a side drainage north and west of the Mudwater Canyon fan unit, were sealed and reclaimed in 1994. A third portal unit at the Star Point No. 2 Mine, located on the Lion Deck, was sealed in January 2001 and reclaimed during 2002. The Corner Canyon fan area, the fourth unit, has three portal entries. The Mudwater Canyon fan unit, the fifth unit, has five portal entries, all of which were sealed and reclaimed in 2000- 2001.

Star Point Refuse (Sunnyside Cogeneration Associates - Permit C007/0042)

Sunnyside Cogeneration Associates (SCA) will mine the coal refuse pile remaining at the Star Point Mine. SCA acquired the coal refuse and associated subsoil cover material from PMC in January 2002. The State issued the mine permit for surface mining of this material on November 14, 2003. SCA uses the coal refuse as a fuel source in its fluidized-bed combustion boiler at the cogeneration power plant at Sunnyside, Utah.

Construction of the refuse pile began in 1970 with wet processing of "run of mine" coal from the Wattis, Third, and Hiawatha coal seams via the Star Point Mine operations. Refuse was continually added to the pile until mine closure in 2000. The quality of the refuse from the mine changed over time as processing improvements were made. The most deeply buried refuse has greater BTU/lb and is finer than the material above. Approximately 192,000 yd^3 of waste from the Price River Coal AML project (Panther Mine) was transferred to this refuse pile in 1988 (personal communication with MaryAnn Wright, Louis Amodt, and Chris Rohrer of UDOGM, May 15, 2003).

Subsoil salvaged from the expansion of the refuse pile in 1982 will be redistributed over the refuse pile at reclamation. The entire 235,000 yd^3 of salvaged subsoil will be returned to the disturbed area. At final reclamation, 2.7 acres of the refuse pile will receive 4 feet of substitute topsoil cover and 59 acres of the former refuse pile will receive the remainder of the subsoil pile with a minimum coverage of 12 inches, for a total of up to 235,000 yd^3 of substitute topsoil removed from the subsoil stock pile.

Unusable refuse will be permanently placed in the former slurry ponds north of the refuse pile. The discarded refuse will be compacted in lifts of 4 feet into a 4h:1v slope. The refuse samples taken in 1987 had acid-forming potential. The refuse was sampled again in 2001, but not for acid/toxic characteristics. SCA will monitor the refuse placed in the settling basins for acid and toxic characteristics just prior to final reclamation. Accordingly, any toxic waste or waste with the potential for acid-formation or with elevated boron or selenium can be covered with 4 feet of substitute topsoil from the subsoil pile.

Bear Canyon Mine (C.W. Mining Company, d/b/a Co-Op Mining Company - Permit C015025)

C.O.P Coal Development Company is the owner or leaseholder of the mineral estate in the Bear Canyon Mine permit area and in a large share of the adjacent area. C.O.P. and the USFS are the main surface estate holders. C.O.P. has subleased all its fee and federal coal rights to C.W. Mining Company, operator of the Bear Canyon Mine.

Mining in Bear Canyon dates back to 1885. Mine operators and owners changed often. C.O.P. acquired fee coal lands and federal coal leases in the Bear Canyon area from Peabody Coal Company in 1980, and mining operations began in 1982. C.O.P. obtained federal coal leases U-020668 and U-38727 from Nevada Electric Investment Company in 1992. C.O.P. obtained federal coal leases U-024316 (issued 05/01/1958), U-61049 (issued 11/01/1949), U-46484 (issued 05/01/1958), and U-61048 (issued 02/08/1923) from IPA in 1996. The Wild Horse Ridge extension to the mine was permitted in 2002. . In 2007, approximately 3,800 acres from the four IPA leases and 3,800 acres of C.O.P. fee coal lands were added to the Bear Canyon Mine permit. Altogether, the Bear Canyon Mine permit area covers approximately 11,000 acres.

There are four coal seams at the Bear Canyon Mine; from highest to lowest - the Tank, Upper Bear, Blind Canyon, and Hiawatha Seams. No mining has occurred in the Upper Bear Seam, and none is planned.

Co-Op started mining the Blind Canyon Seam in Bear Canyon in 1983. Mining was conducted by room and pillar mining methods. Construction of two new portals in the summer of 1986 provided access to the underlying Hiawatha Seam, but with time a rock tunnel from the Blind Canyon Seam became the main access to the Hiawatha Seam, and the Hiawatha working were considered part of the #1 Mine. Production began in the Hiawatha Seam in 1987 but was limited because the coal was scoured by channel-sand formations.

First mining from the Blind Canyon seam occurred from 1983 through 1996. A large channel sandstone that traverses east and west across the Blind Canyon Seam stopped the operator from advancing the mine working to the north after 1993. Further mining in the Blind Canyon Seam is still a possibility in the McCadden Hollow area, on the north side of the channel sandstone. The Bear Canyon Mine Plan indicates this McCadden coal will be accessed by rock slope tunnels from Hiawatha Seam workings, east of the Bear Canyon Fault. Possible advantages of accessing this coal from currently unleased federal coal lands directly to the north have been discussed. Further exploration drilling may indicate faulting and fracturing preclude mining in this McCadden Hollow area, part of which lies in the "Shattered Zone" mapped by Brown (1987).

Co-Op constructed an access road to the Tank Seam, located above the Blind Canyon seam, in 1994. The #2 Mine in the Tank Seam began operations in 1995. By 2001, Co-Op was retreat mining the Blind Canyon and Tank Seams in the #1 and #2 Mines. In 2003 - 2004 the portals were sealed, but not all were backfilled and reclaimed at that time. The #2 Mine pad and access road have been reclaimed, but the #1 pad and access road remain as part of the tipple and loadout operations area.

The Bear Canyon Fault separates the #1 and #2 Mines from the #3 and #4 Mines. The portals for the #3 and #4 Mines, which access the Blind Canyon and Tank Seams respectively, are located in an unnamed side canyon that joins Bear Canyon from the east. Up to six portals are anticipated for these mines, including a portal in Cedar Creek Canyon, near the old King #2 (Mohrland) Mine portal but on the opposite side of the canyon.

The Tank Seam does not crop out in the Wild Horse Ridge area, and initial access to the Tank Seam in the #4 Mine was through a rock tunnel from the #3 Mine. Portals for the #4 Mine were constructed by breakout once a location with suitable conditions was identified near the head of the canyon. A longwall system was purchased in 2006 for use in Mine #4.

Co-Op plans to mine the Blind Canyon Seam under Wild Horse Ridge, but this seam splits and becomes too thin to mine to the north. The Hiawatha Seam is not thick enough to mine under Wild Horse Ridge; however, the Hiawatha will be mined to the north, where it is thicker because one of the splits of the Blind Canyon Seam merges with it. The Hiawatha Seam will be accessed by the proposed portal in Cedar Creek Canyon and possibly through rock

tunnels from the #3 Mine. Room-and-pillar mining is planned in the Blind Canyon Seam, but longwall mining will be used in the Tank and Hiawatha Seams.

Annual production from Co-Op prior to 1996 was 400,000 to 500,000 tons per year. The #3 Mine produced 304,000 tons and the #4 Mine produced 151,000 tons of coal in 2005. Co-Op controls more than 30 million tons of coal reserves (Jahan Bani 2003), and recoverable Reserves are estimated at 15.8 million tons (Bear Canyon Mine Plan, Table 5-1). With the addition of longwall mining and the proposed expansion of the existing loadout in Bear Canyon, production could reach 2.5 million tons/year.

Table II-2. Bear Canyon Mine Coal Production

Mines	Time Period	Coal Mined (tons)
Blind Canyon Seam workings	1938 - 1957	150,000 total (Section 411.200, Bear Canyon Mine Plan)
#1 and #2	1982 –1996	400,000 to 500,000 annually*
	1996	581,000*
	1997	570,000*
	1998	660,000*
	1999	881,000*
	2000	1,040,000*
	2001	1,254,000**
#1 and #3	2002	957,000**
	2003	713,000**
#3 and #4	2004	339,000**
	2005	455,000**
	2006	800,000 est.**

* Jahan Bani, 1997, 1998, 1999, 2000, and 2003
** UGS

Hiawatha Mine (Hiawatha Coal Company, Inc. - Permit C/007/011)

The Hiawatha permit area spans a total of 12,707 acres with 290 acres of disturbed area. The Hiawatha Mines Complex is a consolidation of the King, Hiawatha, Blackhawk, and Mohrland Coal mines that began operating in the early 1900's. United States Fuel Company (U. S. Fuel) began coal-mining operations in 1916 when it took over the properties of the Consolidation Fuel Company: all these properties are within the current permit boundary. U.S. Fuel ceased production in April 1993. Total production thru 1993 was greater than 50 million tons from more than 80 years of mining. The portals are sealed and the refuse pile is being reclaimed.

U.S. Fuel was a subsidiary of Arava Natural Resource Company, Inc. (ANR), which still

owns the fee lands and holds the federal coal leases in the Hiawatha permit area. ANR has leased the coal rights to C.W. Mining Company for inclusion in the Bear Canyon LMU. All U.S. Fuel permits for the Hiawatha Mines Complex were assigned to the Hiawatha Coal Company, Inc. (HCCI) effective December 12, 1997, and HCCI holds the rights to mine all fee and federal coal under the direction of C.W. Mining Company (Section 112.300, Hiawatha Mine Plan).

Portals were constructed for the Hiawatha #1 Mine in 1903. Use of many mining related surface facilities continued post SMCRA within areas identified in Table II-2 (refer to Maps 3 and 6 for general locations). Several portals were associated with pre-SMCRA mining. From 1948 to 1975 the portals at the South Fork Mine yard supported the King No. 1 and King No. 3 Mines, which are interconnected underground. Three prospect portals were developed in the B seam during that time. The three portals of the King No. 5 Mine and the four portals of the adjacent King No. 4 Mine were on the south side of the Middle Fork Mine Yard.

The King No. 6 Mine, located in South Fork Canyon, was developed following the enactment of SMCRA. In 1981, the old portals from the King No. 3 Mine were updated and the King No. 6 haulage portal was developed. One intake airway portal was developed in the North Fork Drainage in 1979. Production from the Hiawatha Complex during the final years of operation, as reported to MSHA, was 584,000 tons in 1990, 197,000 tons in 1991, 108,000 tons in 1992, and 13,500 tons in 1993. The portals of the King No. 4 and King No. 5 Mines were backfilled in the first half of 1993. Plate 3c shows the areas U.S. Fuel Company mined during the last period of mine development. U.S. Fuel Company had plans to mine both the A and B coal seams. They were mining in the B coal seam until 1992, then began a small amount of mining and exploration in the Hiawatha coal seam.

Table II-3

Coal Seams at Mines on Gentry Mountain (possible correlation)

Bear Canyon Mine		Hiawatha Mine Complex		Star Point Mine	
Tank	Mined	Upper seam	Unmined		
Upper Bear	Unmined	B seam (Bear Canyon)	Mined	Wattis	Mined
Blind Canyon	Mined	A seam (split from Hiawatha)	Mined	Third	Mined
Hiawatha	Mined	Hiawatha	Mined	Hiawatha	Mined

Table II-4

Mine status at Hiawatha Mine Complex

Mines	Seam	Location of Portal	Working status	Other openings	Reference in Hiawatha Mine Plan
King #1Mine	Hiawatha	Canyon south of	Abandon 1975		Plate 5-2C

(Blackhawk Mine)		Hiawatha			
King #2 Mine (Mohrland Mine),	Hiawatha	Cedar Canyon	Abandon 1953		Exhibit V-1
King #3 Mine	Hiawatha	Middle Fork of Miller Canyon	Abandon 1948		Plate 5-2C
King #4 Mine	B Seam/ Bear Canyon	Middle Fork of Miller Creek (north side)	Inactive since 1993, considered for future mining	(Vent Portal in Right Fork of Miller Creek)	Plate 5-2A
King #5 Mine	B Seam/ Bear Canyon	Middle Fork of Miller Creek (south side)(	Inactive since 1993, considered for future mining	Break out in left fork of Miller Creek, south side	Plate 5-2A
King #6 Mine	Hiawatha Seam, Bear Canyon/B Seam, Blind/A Seam	Left Fork of Miller Canyon	Inactive since 1993, considered for future mining		Plates 5-2A, B and C.
Hiawatha #1 Mine	Hiawatha Seam	Middle Fork of Miller Creek (south side),	Abandon 1926		Plate 5-2C
Hiawatha #2 Mine	Hiawatha Seam	Middle Fork of Miller Creek (north side)	Abandon 1926	(Vent portal in Right Fork of Miller Creek	Plate 5-2C

Also, see Exhibit IV-5 of the Hiawatha Mine Plan

Trail Canyon Mine (Co-Op Mining Company – C/015/021)

The Trail Canyon Mine is a reclaimed underground mine located in Trail Canyon, a tributary to Huntington Creek (Map 3). This mine operated intermittently beginning in 1921, and was operated by Co-Op Mining Company through 1981. The permit area was approximately 270 acres with 10 acres of disturbed area. Reclamation activities began in June 1987. Most of the site grading and seeding was done in 1988 and 1989, but additional seeding was done as late as 1997. The Trail Canyon Mine obtained Phase I Bond release in July 18, 1994 and Phase II Bond release in January 31, 1996. Phase III Bond release was obtained in January 2001.

Deer Creek Waste Rock Storage Facility (PacifiCorp – C/015/018)

The Deer Creek Waste Rock Storage Facility encompasses 46.22 acres and is located approximately 2 miles northeast of the Deer Creek Mine (Map 6). It is included in the Deer Creek Mine permit. The expected life of the facility is 40 years. This site was predicted to receive 31,200 $yd^3$of waste material annually. Rocky Mountain Power, formerly known as Utah Power and Light Company, is the landowner of the Waste Rock Facility area.

III. HYDROLOGIC SYSTEM

The climate and geology, which affect the hydrologic characteristics, are described under specific headings and are followed by sections that discuss the ground water and surface-water resources.

CLIMATE

Precipitation stations surrounding the CIA include the Bear Canyon Mine, East Mountain, Skyline Mine, and the town of Hiawatha. Climatic variations at these sites are influenced by elevation and aspect. The Bear Canyon Mine lies at an elevation of approximately 7,400 feet, while the town of Hiawatha lies at an elevation of 7,200 feet. The elevation across the CIA ranges from 6,300 feet at Huntington Creek to 9,850 feet on Gentry Mountain.

The climate of the CIA is semiarid, but precipitation increases with altitude. The average annual precipitation, snow and rain, in the CIA may vary between 10 inches in the valley to over 30 inches on the ridges. In the Wasatch Plateau, about 70 percent of the precipitation falls during October through April, mostly as snow. The direction from which storms approach and characteristics of individual storms strongly influence local climate. Summer thunderstorms and rain showers occur in the mountains and high valleys, but the towns and cities in the valleys may remain dry. Summer thunderstorms are generally localized, high-intensity, short-duration events. The 100-yr 24-hour precipitation event, with a probability of occurrence in any year of 0.01, would vary from 2.8 to 3.4 inches for May through October within the CIA (Miller, 1973).

To illustrate the variation in recorded precipitation, selected data from the Bear Canyon and Trail Canyon Mine rain gauges are presented in Table III-1. The difference in the maximum annual and minimum annual precipitation is considerable for the Bear Canyon and Trail Canyon drainages, which are slightly over a mile apart. The National Resource Conservation Service (NRCS) has two precipitation stations at higher elevations west of the Bear Canyon Mine: from 1961 to 1990 (NRCS, 1994), average annual precipitation was 29 inches at the Mammoth-Cottonwood station (elevation 8,800 feet) and 33 inches at Red Pine Ridge (elevation 9,200 feet).

The evaporation and infiltration rates in the CIA vary according to vegetation, soil type, and time of year. The potential evaporation for Bear Canyon Mine is about 40 inches/year while transpiration is less than 18 inches/year. The relative humidity ranges from 45 percent in the summer to 85 percent in the winter (Bear Canyon Mine Plan).

Weather conditions found in the CIA can be gauged by the Palmer Hydrologic Drought Index (PHDI). This index characterizes dry and moist climate periods for a region. It indicates the severity of a wet or dry spell, with negative values denoting a dry spell, and positive values denoting a wet spell. The CIA borders the southern portion of Region 5 and northern portions of Regions 4 and 7 (Map 1a). Figure 14 illustrates the PHDI in those three regions from 1978 to 2006.

Table III-1	Recorded Precipitation Data				
Mine	Monthly Precipitation (inches)		Annual Precipitation (inches)		
	Max	Min	Max	Min	Avg
Bear Canyon (1993-1996) B	3.87 (8/95)	0.07 (6/94)	14.37 (1995)	7.9 (1994)	10.0
Bear Canyon (1999–2002)	3.92 (10/00)	0 (Several months each year)	13.04 (2000)	6.09 (2001)	8.55
Trail Canyon (1993-1996)	5.01 (8/95)	0.15 (6/93)	22.54 (1995)	11.23 (1993)	14.8

Temperatures are seasonally variable and generally cooler at higher elevations. January mean temperatures vary from a mean minimum of 8 to 12°F to a mean maximum of 28 to 32°F. July temperatures vary from a mean minimum of 40 to 52°F to a mean maximum of 72 to 84 °F. The average annual temperature is 45°F (Jeppson and others, 1968).

GEOLOGY

GENERAL

Geology described in this section focuses on elements needed to understand the hydrogeology: stratigraphy, general lithology, structure, and other geologic factors determining occurrence of water.

The principal geologic controls that affect the presence of ground water in the Gentry Mountain area are:

- Stratigraphy and lithology,
- Aquitards,
- Channel sandstones,
- Extensional or boundary faults and grabens,
- Local faults and fissures, and
- Structural dip..

STRATIGRAPHY AND GENERAL LITHOLOGY

Lithology of the Wasatch Plateau consists of Upper Cretaceous and Tertiary strata. Transgressive and regressive phases deposited a number of broad delta and prodelta sheet sandstones along a north-south trending interior seaway. The major coal deposits in Utah were formed along seaway shorelines and are planar and continuous. Landward influences such as small channel splays and levee deposits have created splits in the coal. Tidal inlet deltas, lagoonal muds, and washover fans produced rolls or undulations in the coal formation, fluvial

channel scour, and discontinuous lenticular geology.

In ascending order by age, the strata found in the CIA are the Masuk Shale Member of the Mancos Shale, the Star Point Sandstone, the coal bearing Blackhawk Formation, the Castlegate Sandstone, the Price River Formation, the North Horn Formation, the Flagstaff Formation and Quaternary Alluvium (Map 5), and the combined Price River/North Horn Formation. Additional information for these formations can be found in the mine plans and standard geologic references. The Blackhawk Formation and Star Point Sandstone are described in more detail because of their importance to coal mining and hydrology in the CIA.

Blackhawk Formation and Star Point Sandstone

The Star Point Sandstone consists of several sheet sandstones that were deposited along the shores and deltas of a north-south trending interior seaway. In the vicinity of the CIA, the Star Point Sandstone is comprised of, in ascending order, the Panther, Storrs, and Spring Canyon Sandstone Members. These members inter-tongue with marine shale layers of the Mancos Shale. The sandstones are usually gradational and sorted; medium-grained; and cross-bedded at the top and fine-grained to silty at their base. They thicken westward and in places, such as near the central part of Huntington Canyon where they are more than 600 feet thick (Spieker, 1931), they merge into one massive sandstone unit. Farther west they grade into the back-barrier, coastal plain, and deltaic deposits of the Blackhawk Formation.

The Blackhawk Formation, the primary coal-bearing formation in the Book Cliffs and Wasatch Plateau Coal Fields, overlies the Star Point Sandstone. The Blackhawk is roughly 900 to 1,400 feet thick, with mineable coal seams in the lower 400 feet (Doelling, 1972).It

The Aberdeen, Kenilworth, and Sunnyside are sandstone members of the lower Blackhawk Formation and are similar to the sandstone members of the Star Point Sandstone. They are interbedded with coals, shales, and siltstones in the Blackhawk Formation and inter-tongue with the Mancos Shale on the seaway side.

Sandstones in the lower Blackhawk are dominantly sheet deposits, but there are also lenticular channel sandstones that were deposited by fluvial systems. In the upper Blackhawk Formation, sheet sandstones are thinner and less common, but channel deposits are more abundant and are the dominant sandstone bodies. The fluvial channel sandstones are generally fine grained and well cemented. Localized zones of high clay content occur within the channel sandstones. These sinuous channel deposits may be interconnected, but in cross-section or outcrop they appear laterally discontinuous, and hydrologically they act as local, perched aquifers rather than as large saturated zones 1.

The Hiawatha Seam is the lowest mineable coal seam of the Blackhawk Formation. It lies just above, and in places directly on, the Spring Canyon Sandstone. The names and general thicknesses of the mined coal horizons at the various mines are shown below.

Star Point Mine (Star Point Mine Plan)

Wattis	2 - 12 ft thick; 20 to 90 ft above Third.
Third	3 - 13 ft thick; 30 to 80 ft above Hiawatha.
Hiawatha	1 - 11 ft thick.
Tank	0 - 7 ft thick; uneconomical for development.

Hiawatha Mine (Hiawatha Mine Plan Information Sheet)

Upper Seam	< 6 ft thick; 300 ft above the B Seam.
B seam	4- 12 ft thick; 0 -70 ft above A seam.
A seam	0-12 ft thick; lies 0-60 ft above the Hiawatha.
Hiawatha	up to 24 ft thick.

Trail Canyon Mine (Limited information in the Trail Canyon Mine Plan)

Upper Seam	No information
Hiawatha	Mined by Community Mine and other predecessors of Trail Canyon Mine in Trail Canyon - no information.

Bear Canyon Mine (Bear Canyon Mine Plan)

Tank	0 to 9 ft thick; up to 1,600 ft of overburden; 230 to 340 ft above the Blind Canyon.
Bear Canyon	0 to 7 ft thick; up to 1,700 ft of overburden; 0 to 100 ft above the Blind Canyon; merges with Blind Canyon.
Blind Canyon	0 to 18 ft thick; up to 1,800 ft of over burden; up to 110 feet above the Hiawatha; splits to the northeast and merges with the Bear Canyon and Hiawatha.
Hiawatha	0 to 21 ft thick; interrupted by large sandstone channels; up to 1,900 ft of overburden.

Aquitards

The presence of numerous springs in the headwaters of the CIA (Map 6) is a result of impermeable layers within the Blackhawk and overlying formations. Except where fractures are actually opened by tension, shales and siltstones in the formations hinder the vertical movement of ground water. These aquitards contribute to the formation of perched aquifer systems and also limit vertical migration between the sandstone tongues of the Star Point Sandstone (Bear Canyon Mine Plan).

Channel Sandstones

Channel sandstones may be isolated and localized, or they may be interconnected. They are commonly enveloped in finer grained sediments in strata overlying the coal seams, but also are found in the roof of the coal seams or even within the coal seams, as at the Bear Canyon Mine. They are a common source of water in the mines. Typically, when water is entering a mine from the surrounding rock, drilling roof-bolt holes into overlying channel sandstones will increase the inflow. Such roof-bolt holes flow until the overlying sandstones are de-watered, usually only a short period of time.

A large channel sandstone in the Blind Canyon Seam has been the major source of water at the Bear Canyon Mine. This channel sandstone traverses east and west across the north end of the Blind Canyon Seam in the No. 1 Mine. Drips from the roof of the mine increased as mining approached this channel-sandstone unit. Initial flows from this channel sandstone were 120 gpm (Figure 6). Flow rose to over 400 gpm in 1992, then decreased to less than 100 gpm by the time the nearest monitoring point, SBC-9, was abandoned in 1999. Flow monitored at SBC-13 is believed to have originated from the Blind Canyon channel sandstone and flowed through gob to the monitoring point. Drainage in the mine is toward the Hiawatha portals; the water piped through the seals and monitored at SBC-9A.

Farther north, a channel sandstone system traverses the Hiawatha Mine (Plates 5-2a, -2b, and -2c, Hiawatha Mine Plan). Water from these sandstones drains to the Mohrland portal.

STRUCTURE

[The following discussion includes information from the Star Point Mine Plan as it was prior to the major revision done in 1996. Although there is no reason to consider this information invalid, a copy of that older plan was not available to UDOGM to allow confirmation of the information and UDOGM did not find similar information in the current Star Point Mine Plan. This pre-1966 information is set off with brackets.]

Spieker's 1931 geologic report portrays the major faults, grabens and stratigraphy on Gentry Mountain. Five significant fault zones trend north and south within the CIA; 1) the Pleasant Valley Fault, 2) the Trail Canyon Fault (East Fault of the Pleasant Valley Graben), 3) the Dry Canyon Fault, 4) the Blind Canyon Fault, and 5) the Bear Canyon Fault (Maps 4 and 5). Normal faults trend almost exclusively north-south, forming a series of horsts and grabens that influence the local and regional hydrology. Fault displacements range from several feet to approximately 800 feet. Regional dip is modified locally by the tilt and rotation of individual fault blocks and by broad, gently undulating folds, but large amplitude folds do not occur on the Wasatch Plateau. Faults have also been mapped east of the Bear Canyon Fault in the Star Point Mine area (Maps 3 and 5).

Extensional or Boundary Faults and Grabens

Boundary faults and interior faults of grabens generally form hydrologic boundaries that impede movement of ground water across the faults. A boundary fault is commonly associated with gouge (pulverized clay-like material formed by the grinding of rock as the fault develops) and a highly fractured breccia zone (angular fragments from the fault movement): the amount of gouge and breccia is generally proportional to the amount of movement of the fault. Gouge can impede flow across or along the fault zone and cement the breccia. Fault gouge along the Blind Canyon Fault within the Bear Canyon Mine, in the southeastern zone of the Bear Canyon Graben, was observed to be dry. (Transcripts of Informal Conference, February 28, 1997).

Significant ground water was intercepted in the Star Point Mine at two locations along

the east side of the Bear Canyon Fault, the eastern boundary fault of the Bear Canyon Graben. At the 2nd Left location in the Star Point Mine, flow at the face from the roof was approximately 6 gpm when mining initially intercepted the fault zone. Within three weeks, liquefied gouge had flowed 10 to 15 ft into two entries. Drill holes at the face penetrated 40 to 60 feet of gouge and fractured rock before tapping a "significant ground water conduit". Flow from the drill holes peaked at 150 gpm, dropped to 50 gpm after two weeks, to 10 gpm after 10 weeks, and finally to no discharge. In the 2nd West mains of the Star Point Mine, initial inflow from roof strata was about 20 gpm and decreased to 10 gpm after 4 weeks. Little water flowed from the face. The rapid drops in flow indicate a regional source or aquifer was not intercepted on either side of the fault (Star Point Mine Plan, p. 700-11).

At the Hiawatha Mine, a sustained 900- to 1,000-gpm inflow occurred through the floor where the workings contacted the Bear Canyon Fault in the 10th West Section of the U.S. Fuels King IV Mine. The mine did not penetrate the fault or the gouge zone, so the water most likely originates on the east side of the fault. This flow, encountered in the 1970's, diminished significantly within a short time and was flowing approximately 100 gpm when the area was last accessible (Hiawatha Mine Plan, p. 7-10; Star Point Mine Plan, p. 700-11 and -12). The sustained flow from this location indicates the 10th West Section breached a larger ground-water system; the mine was probably below the potentiometric surface of the Star Point Sandstone at this location and the water was welling up from underlying Spring Canyon Member.

[Most faults from the extensional system encountered in the Star Point No. 2 Mine had accompanying inflows of ground water where ground water was trapped against a gouge zone and was conducted along the breccia zone of the fault

Water may be conveyed along a fault until, 1) water discharges as a spring, 2) water discharges to a lower perched aquifer system, or 3) water discharges to a more extensive aquifer or ground-water system. . Most springs on Gentry Mountain that have flows in excess of 10 gpm lie either: 1) directly along a fault, 2) in close proximity to a fault, or 3) appear to fall in line with the projection of an identified fault. Higher yielding springs appear to be associated with the north-south extensional fault or joint systems found in the area, and no major springs are associated with east-west oriented compressive fractures (Star Point Mine Plan, p. 700-3).

Pleasant Valley Graben

The Pleasant Valley Graben extends from Scofield Reservoir south to Huntington Canyon and displaces strata as much as 400 feet near the Star Point Mine. The Pleasant Valley Fault appears continuous from Scofield Reservoir to Meetinghouse Canyon (Map 5). The Trail Canyon Fault, the eastern boundary of the Pleasant Valley Graben, lies along the western edge of the Star Point Mine, where several small faults have been mapped in the boundary fault complex.

The small faults of the east boundary fault complex are en-echelon, to the west, and extend generally south, from the NE/4, Section 15 to the NW/4 of Section 26, T. 15 S., R. 7 E. (Map 5; Star Point Mine Plan, Map 624.110a).

Bear Canyon Graben

The Bear Canyon Graben forms an irregularly inclined and irregularly bounded trough that extends from south of Huntington Canyon, where it has merged with the Pleasant Valley Graben, northward to First Water Canyon. This graben trends N 4° W, and ranges in width from 1,600 feet to 2,400 feet between the Bear Canyon Fault on the east and the Blind Canyon and Dry Canyon Faults on the west. The Gentry Ridge Horst lies between the Bear Canyon and Pleasant Valley Grabens in the area north of Tie Fork Canyon (Map 3). The Blind Canyon and Dry Canyon Faults have not been mapped north of the area where the Pleasant Valley and Bear Canyon Grabens merge, south of the Gentry Ridge Horst. This merger zone is also where Brown (1987) mapped a "Shattered Zone" between the Bear Canyon and Dry Canyon Faults.

A great deal of information was collected on the Bear Canyon Graben when developing the Graben Tunnels in the Star Point Mine (Map 3a). These rock tunnels cross the Bear Canyon Graben and connect the Wattis Seam east of the Bear Canyon Fault to the Wattis Seam in the Gentry Ridge Horst. Displacements across the eastern and western most faults averaged 250 feet. Fault gouge zones on the east side of the boundary faults were about 10-20 feet wide and appeared impermeable.

Joints and Non-normal Faults

Joint densities increase near some fault planes, both as part of and in addition to the breccia zone. Joint densities within the Bear Canyon Graben are approximately 50 percent greater than on either side of the graben. Every fault examined at the Star Point Mine contained a gouge zone, but not all had associated zones of breccia or increased joint density (Star Point Mine Plan, p. 700-7 and -8).

According to the pre-1996 Star Point Mine Plan, two types of regional stress occurred in the CIA, resulting in several joint sets. One stress was compressional and the other was extensional. Three orientations of joint sets resulted from each regional stress.

The joints formed during compressional stress are oriented N 58° E, N 58° W, and N 85° W. The N 58° E and N 58° W orientations are vertical, generally planar, and closed with a tendency to terminate over short distances or at lithologic boundaries. Carbonate and pyritic mineralization is common along these joint faces. The N 85° W joints are parallel to the maximum compressive stress.

The joints formed during extensional stress orient N 5° W, N 6° E, and N 14° E. The N 6° E joints are more prominent and open. Due to the open nature of this joint set, ground- and surface-water migration and concentration is common along fracture systems having this orientation.

Two non- normal N 80° W trending faults were encountered in the Star Point No. 2 Mine. Both were filled with biotite-rich intrusive rock at several locations. Displacements along the faults were from 0 to 5 ft within the Star Point Mine.]

A system of joint and fracture sets oriented N 15° E to N 17° E and a second set of minor joints with orientations N 60° E are found in the southern end of the Bear Canyon Graben, near the Bear Canyon Mine (Transcripts of Informal Conference, February 28, 1997).

UDOGM personnel did field work at Birch Spring in October 1998. The goal was: examine the 3-dimensional orientation, continuity, and interconnectivity of fractures associated with Birch Spring; examine the relationship of the Blind Canyon Fault to Birch Spring and associated fractures; and examine possible relationships between Birch Spring and the geology and geography of the terrain immediately surrounding the spring. Birch Spring is located in an alcove eroded into the Panther Member of the Star Point Sandstone. Birch Spring is not a single source but several sources flowing from fractures and a fault, mainly on the west side of the alcove. The alcove is centered on a highly fractured zone about 20 feet wide. Previous geologic work has identified a broad fracture zone associated with the Blind Canyon Fault: Birch Spring is on a small fault in this zone, and the fault may connect with Blind Canyon Fault (Map 4).

The Blind Canyon fault is evident on aerial photos and on the ground: the fault in the alcove is not the Blind Canyon fault. Most of the area is jointed, the distance between joints ranging from 2 or 3 feet to 35 feet; one section between the Blind Canyon fault and Birch Spring is not visibly jointed across an exposure approximately 50 feet wide. Joints and faults appear to strike consistently N-S $\pm$ 5$^{\epsilon}$, but a few joints strike approximately N 20$^{\epsilon}$W. Joints and faults appear to be vertical and planar, but on large vertical exposures, the joints are often seen to be gently curved or even sinuous. Observed faults are characterized by zones, several feet wide, of large, blocky rubble or breccia: fracturing in the zone is dominantly vertical to near vertical. Faults and large joints seen in the Panther Sandstone can be projected across the overlying shales (even though the fractures are often not evident in the shales) and into the Storrs Sandstone. Some large, adjacent joints are connected by sets of steeply dipping fractures, similar to the zones at the faults only not vertically extensive and not as brecciated. Large fractures can be followed or projected for hundreds of feet along strike. The fractures appear to be gradually converging to the north, and may actually converge northward or upwards, or both. The Division concluded (UDOGM, October 20, 1998 Field Visit Form) that:

- Joints and faults have good continuity vertically and along strike, which is roughly N-S. Ground-water flow from north to south would be facilitated along these fractures.
- There are thick unfractured sections between fractures, and lateral interconnectivity between joints and faults is not as well developed: east-west flow would be impeded relative to north-south flow.

Although the terrain is steep, the extensive jointing could allow local recharge from precipitation and snowmelt. However, flow at Birch Spring does not vary seasonally. Tritium is absent from the water, and mean residence time of the water is 9,000 years. Together, these indicate the fractures around Birch Spring do not provide significant recharge to the Birch Spring ground-water system.

Local Faults and Fissures

Local faults and fissures also influence ground-water movement. Fault zones associated with boundary and interior faults may conduct ground water parallel to the faults. The Star Point Mine Plan (pages 700-6 and 700-7) states the following:

1. "...The secondary permeability resulting from open fractures created along faults and joints provides the primary conduit system for movement within the Wasatch Plateau..."

2. "...The extension joints and faults which strike in a north-south direction are generally open, and as such increase the secondary permeability. .... The open nature of these joints and faults and the attendant secondary permeability may be primarily limited to the sandstone units within these formations..."

3. "...Secondary permeability within the grabens is expected to be greater than secondary permeability outside of the grabens. Joint densities within the Bear Canyon Graben are approximately 50 percent greater than joint densities on either side of the graben..."

It has been hypothesized that at least part of the recharge for Big Bear Spring is conveyed from Big Bear Creek by way of local fractures. This is supported by isotopic data that indicate the water discharging from Big Bear Spring has a modern component (water in Birch Spring has no modern component; Bear Canyon Mine Plan, Appendix 7-J, Table 4). However, the large difference in stable isotopic ratios between Bear Creek and Big Bear Spring indicates that the creek does not contribute a significant quantity of water to Big Bear Spring (Bear Canyon Mine Plan, Appendix 7-J, p. 97).

[Parallel to the major boundary faults - the Bear Canyon Fault and the Trail Mountain Fault (East Fault of the Pleasant Valley Graben) - and extending inward are two fault zones approximately 200 to 250 feet in width. Spring flows in these zones appear to respond quickly to snowmelt and rainfall, indicating the vertical permeability from fractures in the region is relatively significant. Water seepage of from 1 - 20 gpm was observed to travel along these fractures, depending on the gouge or breaking character of the fault (Pre-1996 Star Point Mine Plan).]

Dip of the Strata

In the Gentry Mountain CIA there is a structural high in the area around Nuck Woodward Canyon and the head of Corner Canyon that results in dip of 1 to 3 degrees to the south in most of the CIA. Dip angles increase near faults to about 20 degrees (Bear Canyon Mine Plan). Although dip is neither a necessary condition for ground-water flow nor a sufficient condition for ground-water flow, the dip of the strata is a major factor governing local and regional flow directions in the CIA.

In the Gentry Ridge Horst between the Bear Canyon and Pleasant Valley Grabens, the coal seams in the Star Point Mine dip approximately 3 degrees to the south-southwest, and the

dip and general direction of ground-water movement is to the southwest in the perched aquifer system of the Price River - North Horn Formations north of Tie Fork Canyon. The structural high is at the head of the North Fork of Corner Canyon (Plate 31 in Spieker, 1931); it is north of the topographic high, which lies between the heads of South Fork of Corner Canyon and Gentry Hollow, above the Star Point Mine (Maps 5 and 6). A structural low has been mapped near the head of the Left Fork of Fish Creek (Spieker, 1931; Brown and others, 1987). Piezometers indicate a possible recharge mound under Gentry Mountain, and Gentry Ridge Horst and Bear Canyon Graben probably receive some recharge vertically from the overlying surface, mainly through fractures. However, the regional potentiometric surface matches geologic structure and dips from north to south through the mine area (Map 722.100c, Star Point Mine Plan), indicating recharge comes from the north. Water not discharged from this system at Upper Tie Fork Spring continues to the south. South of Tie Fork Canyon, dip in the Bear Canyon Graben is southeast, directing flow toward the Bear Canyon Fault.

East of the Bear Canyon Fault, within the previously mined areas, the dip and direction of ground-water movement are to the east and southeast. Localized variations within the coal seams may determine the ultimate direction of water flow following mining. Structural contour maps supplied in the Hiawatha Mine plan (plates 6-6, 6-9, 6-12) indicate the dip within the Hiawatha Mine workings is southwest toward the Bear Canyon Fault in the western half of the workings and south in the eastern half of the workings.

The August 1988 Earthquake

According to PMC personnel and the University of Utah Seismology Department (Nava and others, 1990), the area experienced several earthquakes during the fall of 1988. Information including dates and earthquake magnitude for the four largest earthquakes identified during this period (centered approximately 15 miles east of Ferron, Utah and 29 miles southeast of the Tie Fork Springs) as provided by the University of Utah include:

Date	Time	Magnitude
August 14, 1988	1:07 p.m.	3.8
August 14, 1988	2:03 p.m.	5.3
August 15, 1988	8:50 a.m.	3.0
August 18, 1988	6:57 p.m.	4.4

A flow increase recorded at Upper Tie Fork Spring in August 1988 correlates with the August 14, 1988 earthquake. The changes that occurred at Birch Spring at this time might also have been due, at least in part, to this seismic activity (Figure 2). This is discussed further in several sections of this CHIA.

HYDROLOGIC RESOURCES

Surface- and ground water resources within the CIA are described. Water rights associated with some of the more important resources are presented, along with descriptions of their hydrology and geology.

Watersheds in the CIA

The CIA is contained within two major river basins, the San Rafael River Basin and the Price River Basin. Sub-basins, surface-water monitoring sites, and UPDES water monitoring sites are shown on Map 6. The sub-basins in the Price River Basin on Map 6 are Sand Wash (1), Miller Creek (2), Serviceberry Creek (3), Mud Water Canyon (4), and Corner Canyon (5). The sub-basins in the San Rafael River Basin are Nuck Woodward (6 and 7), Tie Fork (9, 10, and 11), Trail Canyon – McCadden Hollow (13), Bear Creek (15), Fish Creek (16), Cedar Creek (18), and Miscellaneous Huntington Creek tributaries (8, 12, and 17).

GROUND WATER

Water Rights

Ground water within and adjacent to the CIA is used for wildlife, stock watering, domestic, industrial, and municipal purposes. Development of coal mines and power plants in Emery County and associated population growth, beginning in the 1970s, resulted in the transfer of more than one-third of the region's water from agricultural to industrial and municipal uses. Utah Power, now Rocky Mountain Power, acquired large blocs of stock in Huntington-Cleveland Irrigation Company (HCIC) along with stock in Cottonwood Creek Consolidated Irrigation Company and a long-term lease for water from Mill Site Reservoir. This shift in water use required retirement of some agricultural lands from cultivation and a reduced water supply to additional lands. Enlarged storage facilities and improvements in water distribution and irrigation practices have somewhat mollified the impacts to agriculture.

HCIC, a Utah mutual nonprofit irrigation company, has provided water to the Huntington, Cleveland, and Elmo areas since 1875. It serves 660 stockholders (154,694 shares of Class A stock at 0.5 acre-feet/share, and 14,474 shares of Class B stock at 1.0 acre-feet/share). Over the years, HCIC irrigated farmland has varied between about 16,000 and 24,000 acres, depending on water supply. HCIC holds water rights to 392.5 cfs (284,000 acre-feet/year) from various spring and surface-water resources in Huntington Canyon, but water resources in the canyon are over-appropriated and cannot match that volume.

Castle Valley Special Service District (CVSSD), a shareholder in HCIC, was organized in 1976 in order to fund water, sewer, and road projects. CVSSD delivers, by contract, up to 681 acre-feet of culinary water to the cities of Huntington, Cleveland, and Elmo. CVSSD does not provide irrigation water.

North Emery Water Users Special Service District (NEWUSSD, formerly North Emery Water Users Association, NEWUA) is a shareholder in HCIC. NEWUSSD provides culinary water to Lawrence, Huntington Canyon, Huntington Airport, and areas outside city limits in

northern Emery County. The District does not provide irrigation water.

Water Rights Associated with Wells

Wells developed as a water source are scarce in the CIA. The Bear Canyon Mine Plan identifies Water Right E1621, owned by Utah Power and Light, as a well. Table 724.100a of the Star Point Mine Plan lists one water right for an in-mine well: water right 91-3555 was used to supply domestic and mining water for the Star Point Mine. Upper and Lower Tie Fork Springs are sometimes referred to as wells, but they are discussed in the following section.

Water Rights Associated with Springs

The USFS has filed for water rights on many springs on Gentry Mountain. Stock watering is the predominant water-right use associated with these springs, but they are also used by wildlife.

Ground-water rights on 90 springs are listed in Table 724.100a of the Star Point Mine Plan, plus the Star Point Mine in-mine well discussed in the previous section. Stockwatering is the use listed for 83 of these water rights.

Domestic water rights 91-59 and 91-57 (PMC) are associated with springs in Sections 9 and 16, T. 15 S., R. 8 E., in Sagebrush Canyon, where the Star Point Mine portals were located. Water right 91-61 (PMC) is for springs at the south end of Long Point (Section 17, T. 15 S., R. 8 E.). Water rights 91-103 and 91-104 are held by U. S. Fuel Company on several springs in the headwaters of the Middle and Left Fork of Miller Creek. Getty Oil Co. holds water right 91-4295, for coal exploration-drilling, on a spring fed stock pond on Gentry Ridge (Section 13, T. 15 S., R. 7 E.). HCIC holds water right 93-219 on Upper Tie Fork Spring and Lower Tie Fork Springs (Table III-2): use is irrigation, domestic, stockwatering, and power.

Star Point Table 724.100a does not include all water rights in the CIA. The Hiawatha Mine Plan Tables 7-3 and 7-4 list 41 additional ground-water rights in and near the Hiawatha Mine permit area: 3 domestic (individuals), 4 industrial (AMR), 12 irrigation (HCIC), and 22 stockwatering (13 USFS, 2 State of Utah, and 7 individuals). The Bear Canyon Mine Plan does not list water rights but instead gives the URL for the Division of Water Rights Web Page.

CVSSD has developed Upper and Lower Tie Fork Springs for domestic use. Three boreholes encountered a pressurized aquifer at the confluence of Wild Cattle and Gentry Hollows, near existing springs. Two of the boreholes (identified by PMC as 86-35-2 and 86-35-3 and jointly labeled 86-35-2-3 on Maps 3, 5, and 6) were originally drilled as seismic exploration shot holes. CVSSD developed them as Upper Tie Fork Spring and hooked them into the water system in 1982. The third borehole (identified in the Star Point Mine Plan as 85-35-1) was a CPM coal exploratory hole that was deeded to Huntington City to supplement flow from Upper Tie Fork Spring. It was developed and hooked into the system in 1988. Because of down-hole problems, the flow from 85-35-1 was disconnected from the Upper Tie Fork system about a year later (Personal communication, Darrel Leamaster, Manager for CVSSD, February

13, 2007). In October 1993, Upper Tie Fork Spring was removed from the drinking water system, under an agreement with PMC, because a potential for mining impacts was identified at the Star Point Mine. Lower Tie Fork Spring was developed and put into the CVSSD system at this time to replace the diverted Upper Tie Fork Spring flow.

Birch and Big Bear Springs have a number of associated water rights. These rights are summarized and presented in Table III-2. One water right associated with Birch Spring, owned by Nevada Electric Corporation, has a designated stockwatering use for 30 head of cattle at the spring source. This use is incompatible with the domestic use; however, the area around the spring is fenced and has not been grazed for many years. Big Bear Spring, also called Bear Canyon Spring, is referenced as Big Bear Spring in this document because it is the name associated with this water right. **Table III-2 Selected Water Rights Information** [1]

Table III-2 Selected Water Rights Information [1]

Source	Water Right Number	Quantity	Priority	Owner
Birch Spring	93-304	150 cfs	1875	HCIC
	93-2198	80 cfs	1875	HCIC.
	93-2197	77.25 cfs	1884	HCIC
	93-2196	45 cfs	1879	HCIC
	E2504 93 3703	0.00 cfs (see the following paragraph)	1887	Castle Valley Special Service District (CVSSD)
	93-143	0.011 cfs	1875	Nevada Electric
Big Bear Spring	93-2201	80 cfs	1888	HCIC
	93-2200	77.25 cfs	1884	HCIC
	93-2199	45.0 cfs	1879	HCIC
	93-253	150 cfs	1875	HCIC
Upper and Lower Tie Fork Springs (wells)	93-219	150 cfs 162 acre-ft	1875	HCIC
	93-2220	45 cfs	1879	HCIC
	93-2221	77.25 cfs	1884	HCIC
	93-2222	80 cfs	1888	HCIC

1 - Information was obtained through the State of Utah Water Rights Internet site., which makes no claims as to the accuracy of the information.

Water Rights Associated with the Mines and Mine Water

Star Point Mine

Water right 91-3555 (already mentioned in the discussion on wells) is held by PMC for an in-mine well. When in operation, water was pumped to the surface to provide a domestic water supply for the office facilities.

Hiawatha Coal Mine

The main water resources associated with the Hiawatha Mine are the mine-water discharge points (Table III-3). Co-Op has rights to some springs in the area south of Hiawatha, and ANR holds water right 91-174 (application a4656) that allocates a diversion of 3.3 cfs from the Left Fork of Miller Creek for domestic and mining uses.

Table III-3: Hiawatha Mine Water Rights

Source	Right Number	Quantity	Priority	Owner/Use
King #1 Tunnel	91-251 a29532	0.942 cfs	1875	ANR /Industrial and Municipal
	91-316 a6963	0.058 cfs	1989	ANR /Industrial and Municipal
Mohrland Mine Seeps and Drains	93-1089	0.446 cfs	1884	U. S. Fuel/ Irrigation

Bear Canyon and Trail Canyon Mine

Water right 93-3657 is controlled by the Co-Op Mining Company. Use is irrigation (19 acre-ft), domestic (19 families), and mining (2.45 acre-ft). Diversion is from a number of sources controlled by HCIC, but change a15965, 15 acre-ft, is for the points of diversion associated with the old Community Mine in Trail Canyon and the Bear Canyon Mine Portal (Sections 22 and 24 of T. 16 S., R. 7 E.).

C. O. P. Coal Development Company holds water right 93-1067, including change a13694, for water diverted from the Bear Canyon Tunnel. Permitted rate is 0.25 cfs, and the water is used to fill the two 10,000 gallon tanks near the mine. This right is for multiple uses: irrigation, domestic, mine shower facilities, and coal mining. Overflow from the tanks is discharged to Bear Creek at UPDES discharge point UTG04006-004.

General Ground-water Quantity

Recharge

Recharge is controlled by climate and the physical factors that allow the underground transport of water. Water must be available in excess of soil, plant uptake and evaporation losses in order to contribute to ground-water recharge. Moist climatic periods allow the rate of ground-water transport to reach its potential. Snowmelt at higher elevations provides the majority of the recharge to ground water in this region. Streams and reservoirs may also contribute to recharge, but the extent of this recharge is unknown. Figure 14 illustrates the climate conditions

experienced over the last 25 years based on the PHDI.

Recharge in the Wasatch Plateau and Book Cliffs Coal Fields has been estimated to be three to eight percent (Danielson and Sylla, 1983) and nine percent (Waddell and others, 1986) of the average annual precipitation. Snowmelt provides most of the ground-water recharge. Star Point Mine personnel estimated that four percent of the total annual precipitation recharges the local systems, based on the assumption that long - term recharge equals long-term discharge (Aquifer Recharge Characteristics, Star Point Mine Plan). The normal annual precipitation for the higher elevations is 16 to 30 inches, of which 10 to 25 inches normally falls during October through April. Snowpack at these higher elevations commonly accumulate to depths of ten feet or more (Jeppson and others, 1968).

Recharge to the perched aquifer systems of the Price River and North Horn Formations is primarily from snowmelt along the flatter ridge top areas and in local basins. Gentler slopes in these areas allow snowpack accumulation and slower runoff, which provide opportunity for water infiltration.

Some springs, such as Lower Tie Fork, respond to seasonal precipitation and recharge, while others, such as Birch Spring and Upper Tie Fork, show little seasonal variation. Flows at Little Bear and Big Bear Springs have a seasonal component imposed on a more consistent baseflow (Figures 2 and 14a), although the extreme seasonal variation seen at Big Bear Spring from 1980 to 1986 is absent

Once recharge enters the ground, the rate and direction of flow is governed mainly by gravity and geology. Lateral flow dominates in the gently dipping Tertiary and Cretaceous strata of the Wasatch Plateau, where layers of low-permeability rock that impede downward movement and plastic or swelling clays that can seal faults and fractures are common. Typically, ground water infiltrates at higher elevations in the Wasatch Plateau and flows both laterally and downward until it reaches the surface and is discharged as a spring or seep, enters a stream as baseflow, is transpired by vegetation, or simply evaporates from the unsaturated zone.

Ground water tends to flow more readily through shallower systems because the hydraulic conductivities are generally larger than those of deeper systems, but some ground water reaches deeper flow-paths. The flow path of ground water along joints, fractures, and faults to deeper strata can be complex and the volume or rate of recharge difficult to quantify. Recharge will more readily move to deeper zones where there are fractured and coarsely brecciated fault zones, where fractures are open due to tension, and where clays and fine-grained gouge are absent. Flow will be impeded where compression has closed fractures, where movement on fault planes has produced fine-grained gouge, and where faulted strata are rich in clays.

Map 5 illustrates the distribution of springs in the area in relation to the various geologic strata. The North Horn Formation (TKn) supports the greatest number of springs (Table III-4). These springs generally have small flows, but the total flow is large (Bear Canyon Mine Plan, Appendix 7-J, Section 4.1). Recharge to these shallow ground-water systems is by direct

infiltration from the surface through fractures and solution cavities in the Flagstaff Limestone and permeable layers and fractures in the North Horn. Seeps and springs typically occur along downdip exposures of these strata, the result of ground-water flow along sandstone –shale contacts. However, many of these springs are fracture related, and springs associated with fractures and faults may have a recharge area that extends beyond the immediate watershed. Discharge from fractures in the shallower strata indicates shale or mudstone has sealed or blocked the fracture, directing flow to the surface and limiting downward recharge to deeper strata.

Table III-4

Summary of Spring Inventory Data
By Geologic Formation
(From Hiawatha Mine Plan, Table 7-2 and Exhibit 7-2; Star Point Mine Plan, p. 700-19;
some springs were undoubtedly counted by both operators
Figure 6 of Appendix 7-J in the Bear Canyon Mine Plan presents similar information)

Formation	Number of Springs Found		Percent of Total		Predominant Flow Rate (gpm)	
	Hiawatha	Star Point	Hiawatha	Star Point	Hiawatha	Star Point
North Horn Formation	82	154	52	75	2-8	
Price River Formation	23		14		2-8	
Castlegate Sandstone	16	25	10	12	2-5	
Blackhawk Formation	28	10	18	5	Seep	>3
Star Point Sandstone	9	8	6	4	10-100	
Mancos Shale	1	7	<1	3	Seep	
Total	159	204				

The fractured and brecciated zones associated with the major faults appear to be important recharge paths, especially for larger, deeper systems. Ground-water contours around the Star Point Mine indicate a source of ground-water recharge to the north, from the direction of Nuck Woodward Canyon (Star Point Mine Plan, Map 722.100c). The Trail Canyon Fault runs along or near the streambed in Nuck Woodward Canyon and into the western parts of the Star Point Mine. A stream survey completed for the Star Point Mine in 1992 identified losing stream sections in Nuck Woodward canyon. The stream survey included the entire reach of Nuck Woodward canyon adjacent to the Star Point Mine. Information found in Table 728f in the Star Point Mine Plan indicates a majority of the stream appears to be losing water. Reach decreases were as much as 33 gpm (Star Point Mine Plan, pp. 700-68 and -69).

The Mancos Shale is a thick aquitard that effectively blocks further downward infiltration of ground water. The largest natural springs in the Gentry Mountain CIA, Big Bear and Birch, flow near the Mancos - Panther Sandstone contact.

Aquifers

In the Gentry Mountain area, ground water issues from all exposed strata, from Mancos to North Horn (Table III-4). The two major water-bearing units in the CIA are the Star Point

Sandstone and the combined North Horn - Price River Formations. These units are modified by north-south normal fault systems that can act as either boundaries or conduits to ground-water flow, and sometimes act simultaneously as barriers to flow across the fracture but as conduits for flow parallel to the fracture. North-south trending normal faults control the hydrologic regimen on the west side of the CIA, and provide local influence throughout the CIA. Structural dip also imposes some control on ground-water flow direction: west of the Bear Canyon Graben, strata dip generally to the south-southeast, and east of the Bear Canyon Graben, to the south or southwest.

The largest number of springs is in the North Horn - Price River Formations, and these strata probably yield the greatest volume of water (Table III-4; Bear Canyon Mine Plan, Appendix 7-J, Section 4.1). Data from a variety of sources indicate hydraulic conductivities in the Star Point Sandstone and Blackhawk Formation are too low for these strata to be an effective regional aquifer (Appendix D). The largest springs, Upper and Lower Tie Fork, Birch, and Big Bear Springs, issue from fractures in the Star Point Sandstone. Big Bear and Birch Springs issue from fractures in the Panther Sandstone Member, which is the lowest unit of the Blackhawk Formation and lies just above the thick, main body of the nearly impermeable Mancos Shale.

The North Horn - Price River Formations

In the CIA area, the most significant perched aquifer systems are in the Price River and North Horn Formations. These seeps and springs typically have small flows and occur along downdip exposures, the result of dip-controlled ground-water flow along sandstone – shale contacts; however, many are fracture related. The majority of high elevation springs are located near Gentry Mountain Ridge above the Star Point Mine and along the south side of Gentry Mountain (Map 6). Discharge from the Price River and North Horn Formation perched aquifer systems drops off significantly from early summer to late fall, indicating limited storage (Star Point Mine Plan, p. 700-19).

In borehole 84-23-1 on Gentry Ridge, wet strata were identified at depths of 130 feet to 190 feet (elevations of 9,698 and 9,638 ft, respectively), and the 190-foot depth correlates with a sandstone-shale interface and numerous springs. Monitoring well 86-26-4 at the south end of Gentry Ridge located a water table in a perched system at an approximate elevation of 9,550 feet. This is 50 ft higher than the exposure of the sandstone-shale contact nearby, to the west and south, but the Star Point Mine Plan does not mention springs along this exposed contact (Star Point Mine Plan, p. 700-9).

The general direction of movement is to the southwest in the perched aquifer systems of the Price River and North Horn Formations within the Gentry Ridge Horst, between Bear Canyon and Pleasant Valley Grabens. Few springs issue from these formations south of McCadden Hollow (Map 5).

The Star Point-Blackhawk Formations

The Blackhawk Formation overlies the Star Point Sandstone, and, based on local

characteristics, the Blackhawk and the Star Point may be in hydrologic connection. The Star Point Sandstone consists of, from highest to lowest, the Spring Canyon, Storrs, and Panther Sandstone Members. The sandstone members are composed of fluvial shales, siltstones, and channel sandstones.

Channel sandstones are inter-woven throughout the Blackhawk Formation and may appear somewhat discontinuous, but are associated with a large, ancient stream system. These channel sandstones may be linearly extensive except where they are dissected by faults. Saturated, fluvial-channel sandstones and other laterally discontinuous sandstone bodies in the Blackhawk Formation yield water when encountered by mine operations. Clay is abundant throughout the Blackhawk Formation, producing localized perched aquifers

In the Hiawatha Mines, inflows have produced a continuous discharge from the Mohrland portal of approximately 400 gpm since at least 1983 (Figure 1), and most of this flow is from numerous, small inflows from channel sandstones. Based on Hiawatha Coal Company information, it appears that all the major inflows encountered to date have been in the B Seam, stratigraphically the highest coal seam mined at Hiawatha. Water discharging from the abandoned mine workings contains 5.5 TU and has a radiocarbon age of 9,000 years, indicating that the water is a mixture of modem waters with waters in excess of 9,000 years old (Mayo, 2001).

Hydraulic conductivity and transmissivity data for the Wasatch Plateau Coal Field are summarized in Appendix D. Primary permeability within the Star Point Sandstone and overlying Blackhawk Formation is quite low, but varies laterally and vertically. Star Point Sandstone transmissivities measured by slug tests in bore holes at the Bear Canyon Mine (Appendix 7-N, Section 4) ranged from 0.07 to over 50 ft^2 /day ($1.1x10^{-3}$ to over 0.5 cm^2/sec, indicating hydraulic conductivities of approximately $2.8x10^{-6}$ to $2.6x10^{-4}$ cm/sec). Price and Arnow (1974) characterize the sedimentary rocks in this region as having low permeability and specific yields of only 0.2 to 2 percent.

The saturated zone extends up into the Blackhawk Formation within the southern portions of the Star Point Mine in the Gentry Ridge Horst, between the Bear Canyon and Pleasant Valley Grabens. Mining conducted in 1991 verified that water was present both within and above the Star Point Sandstone. East of the Bear Canyon Graben, the Blackhawk Formation is not saturated (Star Point Mine Plan, Exhibit 7-28h).

Spieker (1931) identified the three Star Point Sandstone tongues at outcrop exposures both north and south of the CIA, but in exposures in upper Huntington Canyon to the west and in Pleasant Valley to the northwest, the Star Point is a massive sandstone with no shale. None of the boreholes in the Star Point Mine area penetrated the entire Star Point Sandstone, so it is not certain that three distinct sandstone tongues are present there. At the Bear Canyon Mine to the south, down gradient and down dip, the Star Point Sandstone tongues are distinct, separated from each other by tongues of Mancos Shale, and they have separate potentiometric surfaces (Bear Canyon Mine Plan, Plates 7J-1 and J-2).

Information from mines and boreholes in the CIA indicates water movement is lateral within the three Star Point Sandstone tongues and that vertical movement is minimal, therefore recharge to the Star Point must occur primarily at fractures and outcrops. Recharge may be slow where fractures are due to compression or have been closed or sealed by gouge and clays or other sediments. Where fractures are more numerous or have been opened by tension, and in brecciated zones adjacent to faults, recharge rates may be rapid. Secondary permeability resulting from open fractures was identified as the primary conduit system for movement within the Star Point Mine.

Water that was encountered within the Hiawatha Mine predominantly originated while mining in the B Seam, the highest seam, especially the large flow through the floor where the 10th West Section of the King 4 Mine intercepted the Bear Canyon Fault (Hiawatha Mine Plan, Plate 7-22). Mining of the Hiawatha Seam, which lies closest to the Spring Canyon Member of the Star Point Formation, was relatively dry and produced minimal water. The majority of mining in the Hiawatha Seam (Hiawatha 1 and 2 and King 1, 2, 3, and 4 Mines) was down-dip of mining in the overlying B and A Seams (King 4, 5, and 6 Mines). These observations indicate that the Hiawatha Seam in the Hiawatha Mine complex is not saturated and that fractures do not readily conduct water up from the Star Point Sandstone when the overlying coal is mined.

The Star Point Mine conducted a seep and spring survey in 1986 and did a follow-up in 1991. Of the ten springs found issuing from the Blackhawk Formation, five were in Little Park Canyon, west of the Bear Canyon Fault; three were along or near Trail Canyon Fault in Wild Cattle Hollow, near its junction with Gentry Hollow; one was in Mud Water Canyon; and one was in Seeley Canyon. One spring flow rate was 11 gpm, while all other Blackhawk spring flow rates were 3 gpm or less (Star Point Mine Plan, p. 700-19. Unfortunately, the Star Point Mine Plan does not identify these springs. The springs shown on Maps 5 and 6 undoubtedly include some of them).

Other than Big Bear, Birch, and the Tie Fork Springs, few springs in the CIA flow from the Blackhawk Formation and Star Point Sandstone (Map 5). SBC-14 flows from the Spring Canyon Sandstone in the right fork of Bear Canyon, just below the #3 Mine portal. Springs 16-7-24-3 and SBC-17 discharge from the Blackhawk Formation immediately east of the Bear Canyon Fault in Bear Canyon. FBC-11 flows from the upper Blackhawk, west of the Pleasant Valley Fault. Star Point Mine personnel measured a substantial gain in flow where the North Fork of the Right Fork of Miller Creek crossed the Storrs and Panther Members of the Star Point Sandstone (Star Point Mine Plan, p. 700-23), and other streams may gain flow where they pass over these strata.

The Star Point Mine identified seven springs that issue from the Mancos Shale. The two largest, in Seeley Canyon, issue from faults. Although a fault could not be associated with the other five Mancos Shale related springs, it is likely that these springs receive water from the overlying Star Point Sandstone through faults or fractures (Star Point Mine Plan, p. 700-19)).

General Ground-water Quality

The quality of the upper Cretaceous sediments in the Wasatch Plateau is characterized by total dissolved solids (TDS) concentrations less than 1,000 mg/L. The TDS measured in springs, wells, and mines issuing from or completed in the formations are reported for the Wasatch Plateau and Book Cliffs areas by Waddell and others (1981) as:

- Price River Formation 122-792 mg/L
- Castlegate Formation 315-806 mg/L
- Blackhawk Formation 63-796 mg/L
- Star Point Sandstone 355-391 mg/L

The local characteristics are summarized below for each formation. The Mancos shale is also included because some springs were found issuing at the top of the formation.

Isotopic analysis is becoming increasingly important for determining ground water mean residence time, which is often simply called the age of the water. Tritium and radiocarbon analyses are the primary isotopic methods used in age-dating water. Sometimes a unique isotopic identifier can help establish the water's origin.

Table 4 in Appendix 7-21 of the Hiawatha Mine Plan outlines a study of ground-water age. Tritium in 10 springs that discharge from the Flagstaff Limestone, North Horn Formation, Price River Formation, and the Blackhawk Formation ranged from 12 to 32 TU. This indicates modern recharge to these springs, the water being held in the formation for only a short time before being discharged. This conclusion is supported by radiocarbon (^{14}C) analyses, which indicate the number of years since the ground water became isolated from soil-zone gases and near-surface waters.

Price River-North Horn Formations

These formations are entirely above all mine workings. Springs from these formations respond quickly to seasonal precipitation. Water is locally recharged and discharged at nearby springs. Water quality from these formations is adequately described through spring water-quality analyses. The Price River and North Horn Formation ground waters are similar, having the primary chemical constituents of calcium and bicarbonate. At certain locations, particularly along Gentry Ridge where the Flagstaff Formation also is present, magnesium becomes a more dominant cation than at the other locations, probably due to the solution of dolomite. TDS concentration is generally less than 300 mg/L. The mean concentration of TDS for springs monitored by PMC from 1979 to 1990 from the Price River and North Horn perched system varied from a low of 124 mg/L to a high of 298 mg/L. In general, TDS concentrations are higher in the fall than in the early summer due to localized snowmelt and short residence time (Star Point Mine Plan).

Blackhawk Formation

Ground water from the Blackhawk Formation is a mixed type with no single dominant cation or anion. Springs from the Blackhawk Formation tend to be a calcium bicarbonate type,

but waters from the Blackhawk can contain significant concentrations of magnesium and sulfate, and pH is generally somewhat alkaline. TDS concentrations tend to vary inversely with flow. Water quality can be better where springs issue from fractures and are recharged locally. Within the mines, some waters from the Blackhawk may be old and may have higher concentrations of TDS, magnesium, and sulfate.

Star Point Sandstone

Ground water from the Star Point Sandstone is a mixed type with no single dominant cation or anion. Water quality can be better where springs issue from fractures and are recharged locally.

Mancos Shale

Sulfate concentrations may increase because of contact with shales having a high sulfide concentration.

SURFACE WATER

Surface waters from within the CHIA flow to both the Price River and San Rafael River Basins. These basins discharge to the Green River, which joins the Colorado River (Map 1).

The Price River Basin is located primarily within Carbon and Emery Counties and has an area of approximately 1,800 square miles. The Price River originates in the Wasatch Plateau, at the outlet of Scofield Reservoir. The river flows east-northeast from Scofield Reservoir and then turns and flows to the south-southeast. The Price River drainage basin is bounded by the Book Cliffs to the north- northeast and the Wasatch Plateau to the northwest, with the divide that extends from Gentry Ridge to Cedar Mountain forming the southern boundary within the Wasatch Plateau. Flow from the CIA enters the Price River south of Wellington, Utah (Map 1).

The San Rafael River Basin is located primarily in Emery County and lies south of the Price River Basin. This drainage basin covers approximately 2,300 square miles. The San Rafael River Basin drains sections of the Wasatch Plateau and the San Rafael Swell north of San Rafael Nob. Three major tributaries - Huntington, Cottonwood and Ferron Creeks - converge to form the San Rafael River. Huntington Creek is the primary surface-water resource in the San Rafael River Basin, draining the southeast portion of the CIA. The San Rafael River flows into the Green River (Map 1).

Surface-water Rights

Local water development in the region is primarily focused in the Huntington drainage, which flows to the San Rafael River. Water reservoirs were constructed in the Huntington Creek headwaters adjacent to the CIA, and the west and southwest regions of the CIA drain to Huntington Creek. The primary water users are NEWUSSD and HCIC, which hold rights for

domestic and municipal uses. CVSSD delivers water to the cities of Huntington (500 acre-ft), Cleveland (114 acre-ft) and Elmo (67 acre-ft). The total quantity of use granted to the HCIC is 392.5 cfs from the various spring and surface-water resources in Huntington Canyon. Other water rights associated with springs of the CIA may contribute to down stream surface-water rights.

Drainages on the east side of the CIA report to the Price River by way of Miller Creek, Gordon Creek, and several washes. There are numerous water rights, mostly for stockwatering, on the springs and streams in these drainages.

Surface-water Quantity and Quality

Watersheds in the CIA

The CIA is contained within two major river basins, the San Rafael River Basin and the Price River Basin. Sub-basins, surface-water monitoring sites, and UPDES water monitoring sites are shown on Map 6. The sub-basins in the Price River Basin are Sand Wash (1), Miller Creek (2), Serviceberry Creek (3), Mud Water Canyon (4), and Corner Canyon (5). The sub-basins in the San Rafael River Basin are Nuck Woodward (6 and 7), Tie Fork (9, 10, and 11), Trail Canyon – McCadden Hollow (13), Bear Creek (15), Fish Creek (16), Cedar Creek (18), and Miscellaneous Huntington Creek tributaries (8, 12, and 17).

Price River Basin

Sand Wash Drainage (1) and Miller Creek Drainage (2)

Miller Creek (11,892 acres) and Sand Wash (6,082 acres) drain the southwest portion of areas associated with the Hiawatha and Star Point Mines. Miller Creek has an average gradient of 15 percent and Sand Wash has an average gradient of 17 percent. Flow in the North Fork of the Right Fork of Miller Creek is intermittent to perennial.

Approximately 350 disturbed acres from the Hiawatha Mine lie within the upper reaches of Sand Wash and the Right and Left Forks of Miller Creek. Miller Creek was permanently diverted along a reach adjacent to the coal processing waste pile. Hiawatha and Star Point Mines mined under Miller Creek. Cypress Plateau mined under the North Fork of the Right Fork of Miller Creek.

Of the 36 springs identified within the North Fork of the Right Fork of Miller Creek, 21 springs issue from the Price River - North Horn Formation, 14 springs issue from the Castlegate Sandstone, and 1 spring issues from the Star Point Sandstone. Total flow from these springs during a spring inventory conducted for the Star Point Mine was 99 gpm (0.22 cfs). This represented 86 percent of the 0.26 cfs flow from the North Fork of the Right Fork of Miller Creek.

Serviceberry Creek Drainage (3)

Serviceberry Creek drains 6,321 acres within the CIA and has a 21 percent gradient, on average. East of the CIA, Serviceberry Creek is ephemeral and is tributary to Miller Creek,. The Star Point Mine disturbed area (approximately 330 acres) lies primarily within the Serviceberry Creek drainage, and mining has occurred under the upper reaches of this watershed.

Mud Water - Los Angles Canyons Drainage (4) and Corner Canyon Drainage (5)

Mud Water and Los Angeles Canyons (3,040 acres) have a 19 percent gradient on average. The Corner Canyon drainage (6,951 acres) includes Seely and First Water Canyons. Mud Water and Corner Canyon drainages converge to form Gordon Creek. The Gentry Mountain CHIA prepared in 1989 stated that Mud Water, Seeley, and the South Fork of Corner Canyon were perennial in their lower reaches due to high-elevation spring flows and mine-water discharge. Mines no longer discharge water to these drainages. These drainages are not monitored by any mine operator, and whether their lower reaches are still perennial is not certain. Mining occurred in the headwaters and ridges separating these drainages.

San Rafael River Basin - Huntington Drainage

Flow in Huntington Creek is controlled by three reservoirs upstream of and outside of the CIA: Electric Lake, Huntington, and Cleveland Reservoirs. Typically, a rapid increase in streamflow results from snowmelt between April and June. Climatic influences and water releases from the reservoirs control year-to-year variations.

PacifiCorp measures the flow in lower Huntington Creek monthly at two locations near the Deer Creek Mine: HC001 is just upstream and HC002 just downstream of the Deer Creek confluence. The PacifiCorp data show that from 01/28/1991 to 06/22/2006, flow in Huntington Creek at HCC01 averaged 27,400 gpm (61 cfs), with a maximum flow of of 219,900 gpm (490 cfs) on 06/30/1995 and a minimum of 0 gpm (no flow) on 12/01/1993. Maximum and minimum values at HCC02 are the same, but average flow is slightly higher, 29,800 gpm (65 cfs), indicating the influence of Deer Creek and the Deer Creek Mine discharge on Huntington Creek.

The USGS monitored Huntington Creek at station 09318000 almost daily from 05/03/1909 to 10/04/1979 (U. S. Geological Survey NWIS, 2006). Mean daily discharge averaged 105 cfs, with a maximum of 1,310 cfs on 06/06/1952 and a minimum of 1.2 cfs on 12/17/1977 (Exhibit III-1). Extreme flows were 2,500 cfs on 08/02/30, and 0.87 cfs, which occurred twice - both during November - on 11/26/76 and 11/28/78 (Price and Plantz, 1987). 09318000 was approximately at the same location as Deer Creek Mine monitoring point HCC03 (Map 6).

On 04/25/1979, the USGS began monitoring Huntington Creek at 09317997, approximately 2 miles upstream of 09318000 and upstream of the Deer Creek confluence (Exhibit III-2). HCC01 is at approximately the same location (Map 6). Monitoring at 09317997was done six out of the next ten years, until 09/30/1989 (U. S. Geological Survey

NWIS, 2006). Mean daily discharge averaged 89 cfs, with a maximum and a minimum of 847 cfs (06/03/1986) and 8.1 cfs (12/08/1980), respectively. It is important to note that according to the Palmer Hydrologic Drought Index (Figure 14), 1981 through 1986 was a particularly wet period, and that flows from the Upper Huntington drainage are influenced by discharges from Electric Lake reservoir.

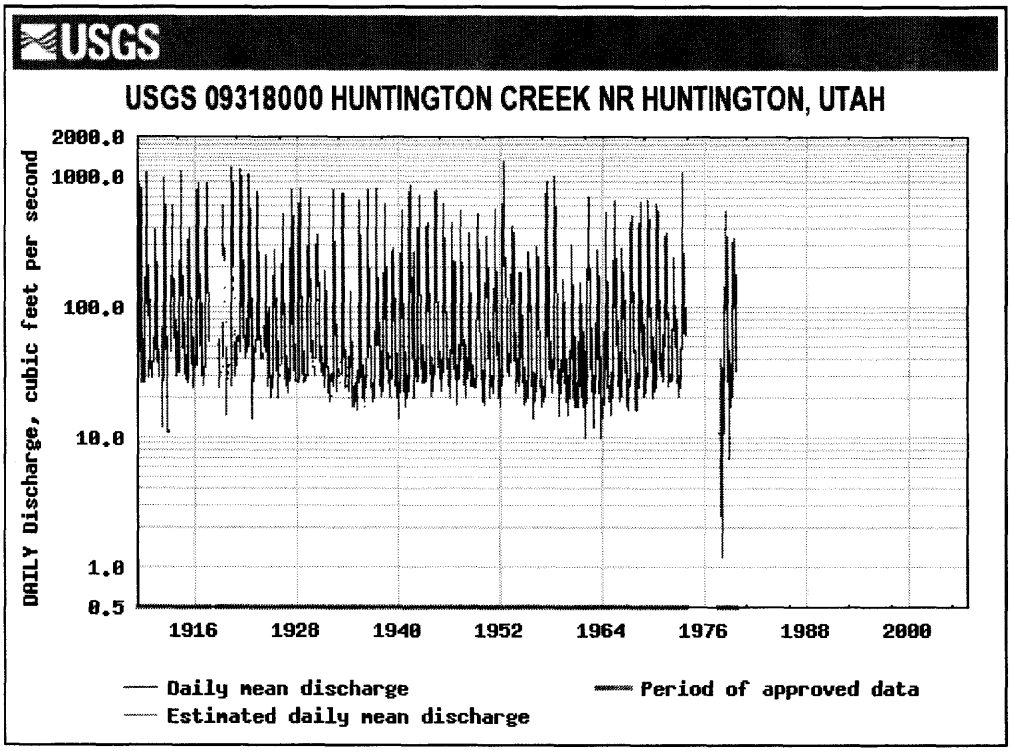

Exhibit III-1

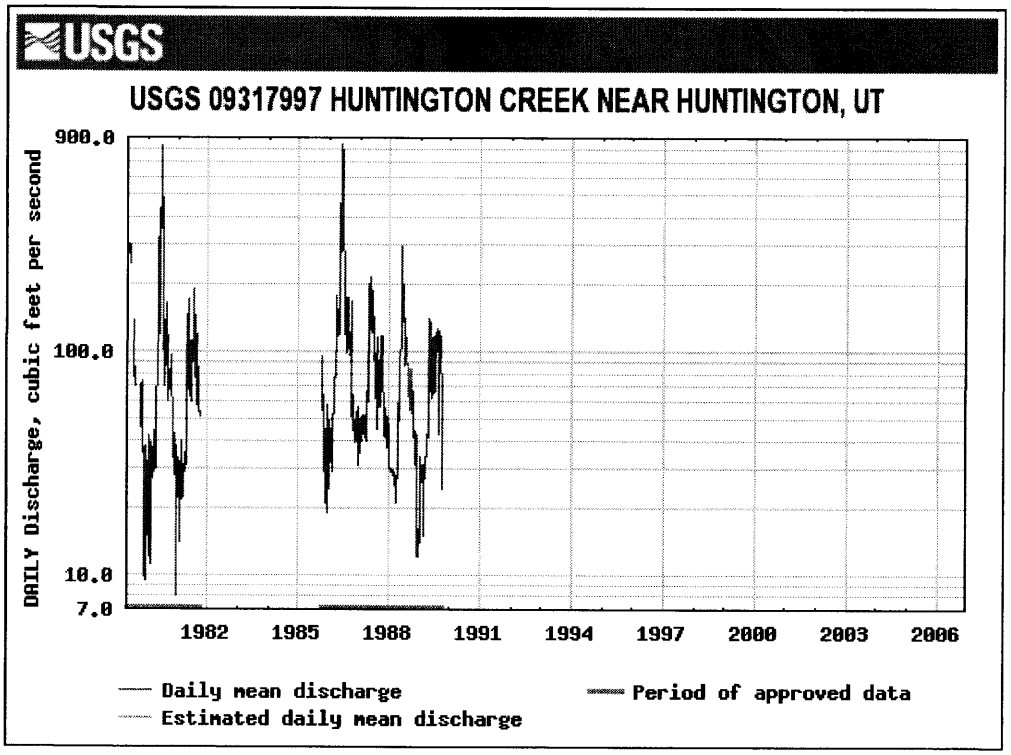

Exhibit III-2

Nuck Woodward (6) and (7)

Nuck Woodward Canyon drains approximately 6,738 acres and is directly tributary to Huntington Creek. This drainage abuts the northwestern mined region of the Star Point Mine. The upper end of the canyon parallels the Trail Canyon Fault (East Fault of the Pleasant Valley Graben), and it is evident faulting determined the orientation of the upper canyon.

Ground-water contours around the Star Point Mine indicate recharge is from the north, from the direction of Nuck Woodward Canyon (Star Point Mine Plan, Map 722.100c). Extensive local faulting runs through the streambed in Nuck Woodward Canyon and into the western parts of the Star Point Mine. A stream survey completed for the Star Point Mine in 1992 identified losing stream reaches in Nuck Woodward Canyon. The stream survey included the entire reach of Nuck Woodward Canyon adjacent to the Star Point Mine: inflow from side drainage was only partially accounted for. Information found in Table 728f in the Star Point Mine Plan indicates the majority of stream reaches appear to be losing water. Significant reach decreases were as much as 33 gpm (Star Point Mine Plan, pp. 700-68 and -69).

Surface water in Nuck Woodward Canyon is thought to be connected to ground water in the Star Point Mine. The Star Point Mine Plan states, "Water flowing down Nuck Woodward Canyon is believed to be partially lost to this [Eastern Boundary] fault system whereafter it joins with deeper water moving within the fault. Water is then directed underground towards and

through the permit area." (Star Point Mine Plan, Ground Water Source, p. 700-68).

Recharge from Nuck Woodward probably contributes to the flow in the Tie Fork Springs and may reach as far as Birch and Big Bear Springs in Huntington Canyon (Map 3). "It may also be possible for water to enter the fault in Nuck Woodward Canyon, move southward along the East Fault of the Pleasant Valley Graben, south-southeastward across Gentry Ridge toward the Western Boundary Fault of the Bear Canyon Graben [Trail Canyon Fault], then southward towards Birch and Big Bear Springs. The complexity and additional length of the water flow path greatly reduces the potential for impact on both Birch and Big Bear Springs by mining" (Star Point Mine Plan, Impact to Culinary Water Supplies, p. 700-83).

Tie Fork Drainage (11, 9, 10)

Wild Cattle Hollow (2,759 acres) and Gentry Hollow (3,830 acres) join Lower Tie Fork Canyon (1,199 acres) to form the Tie Fork Drainage. The average gradient for Gentry and Wild Cattle Hollow is 13 percent and the Lower Tie Fork Canyon gradient is 44 percent. Location and orientation of Wild Cattle Hollow and upper Gentry Hollow were controlled by the Trail Canyon and Bear Canyon Faults, respectively.

The east side of Wild Cattle Hollow was undermined by the Star Point Mine Gentry Ridge workings, and east side of upper Gentry Hollow was undermined by both the Hiawatha and Star Point Mines. The Star Point Mine longwall panels abut Wild Cattle Hollow's main channel.

Both Gentry Hollow and Wild Cattle Hollow are designated perennial creeks on the USGS Hiawatha quadrangle map. Star Point Mine's monitoring of both streams just above their confluence (stations 34-01 and 34-2) from 1980 through 2001 indicates perennial flow, although there was one report of zero flow. Discharge rates for Tie Fork Canyon are available for USGS station 09317920 (Figure III-3) from 10/20/1977 to 10/07/1981 (U. S. Geological Survey NWIS, 2006). Measured mean daily discharge averaged 2.2 cfs. It ranged from 0 cfs (15 days between November 1977 and February 1978) to 29 cfs (five days in late May and early June 1980).

Springs were monitored within the Star Point Mine area and adjacent area in June/July of 1986 and were monitored again in August 1991. All 51 springs found within the Gentry Hollow surface-water drainage basin issue from the North Horn Formation. Total discharge from these springs in 1990 was 418 gpm (0.93 cfs). If it were assumed that there are no stream losses between the springs and the junction of Gentry and Wild Cattle Hollows, total spring flow would represent 71 percent of the 1.3 cfs total streamflow (Star Point Mine Plan).

From the 60 springs found within the surface-water drainage basin of Wild Cattle Hollow, 57 of the springs issue from the Price River - North Horn Formations. The three remaining minor springs issue from the Blackhawk Formation near the junction of Wild Cattle and Gentry Hollows. Total discharge from these 60 springs was 393 gpm (0.88 cfs), which represents 86 percent of the 1.02 cfs total streamflow measured in Wild Cattle Hollow (Star Point Mine Plan).

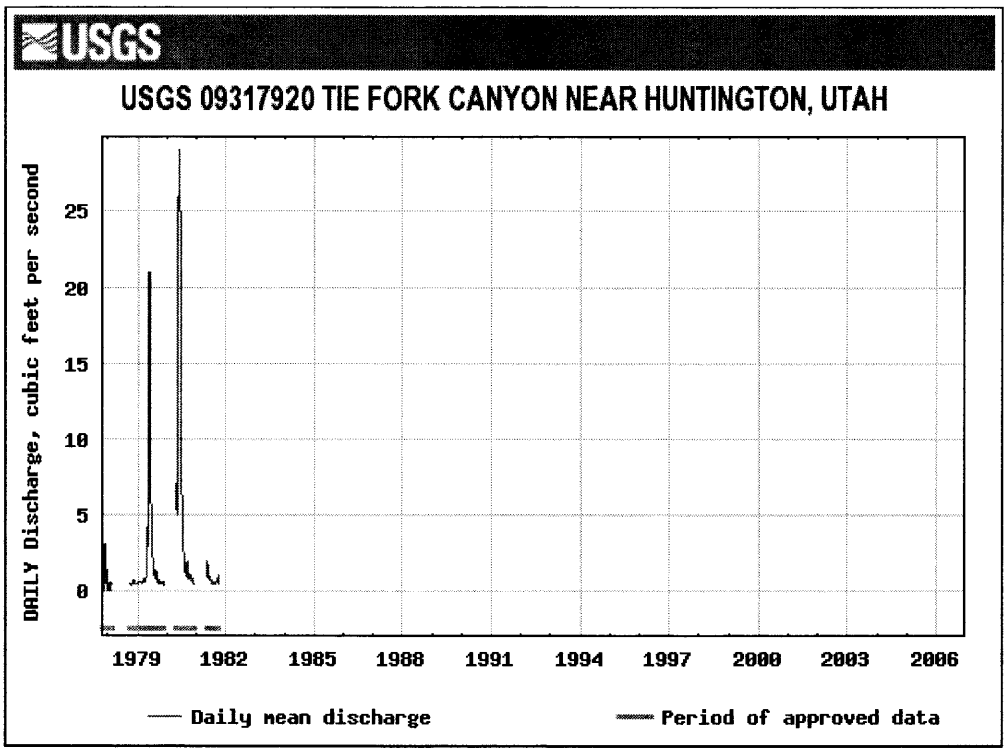

Exhibit III-3

Huntington Creek Tributaries (8, 12, 14, and 17)

Miscellaneous tributaries to Huntington Creek that originate within the CIA include: Pole Canyon, McElprang Canyon, Vicks Canyon, Grange Hole, Biddlecome Hollow (8), Blind or Dry Canyon - which includes Birch Spring (14), and two miscellaneous side drainages (12) and (17). The 46.22 permitted acres associated with the Deer Creek Waste Rock site lie within Watershed Area 17 (Map 6). The average gradients of the tributaries range from 40 to 70 percent.

Trail Canyon – McCadden Hollow (13) and Bear Creek (15) Drainages.

Trail Canyon drainage encompasses approximately 2,954 acres, including McCadden Hollow. Bear Canyon drainage includes approximately 2,029 acres. The average gradient of Trail and Bear Canyons is 20 to 25 percent. Location and orientation of Trail and Bear Canyons indicate they were eroded along the Trail Canyon and Bear Canyon Faults, and upper McCadden Hollow was eroded either along the Bear Canyon Fault or a nearby parallel fault.

Bear Creek lies below Gentry Ridge in steep, narrow canyons. It carries large sediment loads: Total Suspended Sediment (TSS) of 28, 092 mg/L was measured during a major storm event. Sediment sources are the exposed bedrock along the boundary of the Gentry Ridge escarpments and the springs that issue along the Bear Canyon Fault where erosive lithologic

units are exposed. Trail Creek (9) is characterized by a steep gradient, narrow canyons, and good water quality.

Approximately 10 surface acres have been disturbed in both the Bear Canyon and Trail Canyon drainages. Trail Canyon includes a residential area of about 14 acres that is not associated with the Trail Canyon Mine. The disturbed area associated with the Trail Canyon Mine is reclaimed and was released from the reclamation bond in January 2001.

Projected workings at the Bear Canyon Mine will undermine portions of upper McCadden Hollow and Bear Canyon.

Fish Creek Drainage (16) and Cedar Creek Drainage (18).

Fish Creek drainage encompasses approximately 5,288 acres, and the average gradient is 19 percent. Fish Creek is identified as a perennial stream in the Bear Canyon Mine PHC, but monitoring has been very sparse. These drainages have gone dry during periods of prolonged drought. From 1991 to 1994 flow ranged from 0 gpm to 65 gpm in the Left Fork; during 1996 and 1997 low flow was 15 gpm in both the Left and Right Forks. When the leases between Wild Horse Ridge and Cedar Creek were added to the Bear Canyon Mine in 2006, perennial reaches of both forks of Fish Creek were identified. Additional monitoring points were established along Fish Creek and at the springs that feed the streams. One concern was that subsidence would fracture the surface and divert flow from these streams directly into the mine workings, but overburden thicknesses appear sufficient to prevent this.

Cedar Creek drainage covers approximately 17,023 acres. The average gradient is 13 percent. The Right Fork is ephemeral and the Left Fork exhibits perennial characteristics in certain reaches due to mine-water discharge. Portions of the Hiawatha and Bear Canyon Mines lie within the Left Fork of Cedar Creek, and the Hiawatha Mine extends into the Right Fork. The Mohrland Mine surface facilities and disturbed area (approximately 25 acres) are adjacent to Cedar Creek. Mine water discharges continuously from the Mohrland Portal. Long-term plans for the Bear Canyon Mine include a portal in Cedar Creek Canyon, near the Mohrland portals but on the south side of the canyon.

General Surface-water Quality

Table III-5: SUSPENDED SEDIMENT LOADS
(Danielsen and others, 1981, p. 17)

Stream	Date	Concentration (mg/L)	Load (tons/day)
Huntington Creek (09318000)	8-13-78	104	27
	11-17-78	72	2.5
	6-13-79	114	66
	8-7-79	44	15
Tie Fork Canyon (09317920)	8-13-78	12	0.03
	11-17-78	57	0.12
	6-13-79	38	0.68
	8-6-79	66	0.17
Bear Creek	10-25-78	8,860	1.9
	6-14-79	2,140	4.0

The State Division of Water Quality has classified waters in the Price River and its tributaries, below the Price City Golf Course, as Class 2B, 3C and 4. Huntington Creek waters in the Wasatch Plateau are classified as 1C, 2B, 3A, and 4. Classes 1C, 2B, 3A, 3C, and 4 designate domestic, secondary contact recreation, cold water aquatics, warm water aquatics, and agricultural uses, respectively (UDWQ, 2006).

Suspended sediment load is site specific. The suspended sediment concentrations varied in surface-water samples collected by the USGS (Danielsen and others, 1981) in Huntington and Cottonwood Canyons: data for three sites are included in Table III-5. The sample from Bear Canyon shows a high sediment concentration while Tie Fork is low relative to the other two sites presented: Danielsen and others attributed the high concentration in Bear Canyon to continuous erosion and sloughing of fine-grained sediments caused by the springs that emerge from the Blackhawk Formation in the headwaters. Suspended sediment concentrations generally increase as flows increase.

IV. PROBABLE HYDROLOGIC IMPACTS

In this section, potential impacts to ground water and surface water associated with mining are identified. Specific ground-water and surface-water resources within the CIA are identified and data are reviewed to determine potential impacts to the hydrologic balance. Probable impacts to the hydrologic balance are then determined.

RESOURCE HYDROLOGIC IMPACT ASSESSMENT

Quantity and quality may be affected by mining activities. Because of the semi-arid environment in Carbon and Emery Counties, potential changes in ground-water quantity seem to have been the recent focus of concern from the public. Changes in quality are discussed in conjunction with spring and surface-water uses (**Surface-Water Resource Hydrologic Impact Assessment**) because use in the region is primarily tied to the associated surface discharge points.

Mining may alter flow direction, water storage, and permeability and transmissivity. Altered flow characteristics result from intercepting adjacent water sources, from water transfer across basins, and from changes in permeability and transmissivity in rock units above, below, and within the mined rock units. Permeability and transmissivity changes may affect quantity, recharge, and transport characteristics.

Removal of the coal creates a void, increasing transmissivity and water storage. Subsidence increases pore space in overlaying strata and changes storage, permeability, and transmissivity characteristics. Mining can depressurize ground water in an underlying rock unit and lower the potentiometric surface, even if no direct interception of water occurs. Water retention time may be increased or decreased depending on the changes in storage volume and rate of water transmission. Increased flow rates and storage may result in a permanent lowering of potentiometric surfaces. Changes in residence time may affect seasonal flow patterns.

Mining and mining related subsidence may intercept water from surface-water sources, aquifers and other saturated zones, unsaturated zones, or faults and fractures. Ground water may return to its original flow path after interception or it may be redirected. Potential effects include a loss or gain in water quantity at a storage location, an increase or decrease in flow at an existing discharge point, and a newly created discharge location. Ground water is removed as moisture in the mined coal and evaporated by mine ventilation.

Quality changes may include changes in pH, TDS, nutrients, metals, salts, and other inorganic and organic constituents. Mining may alter the quality when it causes different types or sources of water to mix. Surface water may be intercepted by subsidence and mixed with ground water. Springs and aquifers above the mine may be intercepted and waters with different qualities mixed. Depending on the quality of the waters involved and the quantity or ratio of mixing, water quality may improve or degrade.

Mining activities can also change the chemistry of the system directly. Mining activities may affect the quality when mined surfaces are exposed to minerals or salts that can be transported with ground water. Weathering and oxidation can produce acid- and toxic materials. Mine rock dust generally increases TDS and may change the chemical signature of the waters. Spills, human waste, hydrocarbons, hydraulic fluids, and other chemicals used in operations may be discharged to surface and ground water.

GROUND-WATER INTERCEPTION

Information about ground water in the CIA is reviewed for mines, wells, and springs. Mine-water discharge analyses are discussed in the **Surface-Water Resource Hydrologic Impact Assessment** section of this CHIA.

Star Point Mine

Operations at the Star Point Mine occurred in two ground-water regions and affected a third. These regions are defined generally and some interaction between them apparently occurs. The first ground-water region is located on the east side of the Bear Canyon Fault, the second is located on the west side of the Bear Canyon Graben within Gentry Ridge Horst, and the third region is along the Trail Canyon Fault, the east boundary fault of the Pleasant Valley Graben (Map 3). The following section discusses water intercepted during mining operations: 1) east of the Bear Canyon Fault, 2) at the Bear Canyon Fault and Graben Crossing, 3) within Gentry Ridge Horst, and 4) along the Trail Canyon Fault, at the west side of the Gentry Ridge Horst - east side of the Pleasant Valley Graben, .

In general, the Star Point Mine did not discharge large volumes of water because the mine pumped and diverted the water into old workings, and the mine has also consumed some of the water intercepted. The primary diversion of ground water occurred from June 1992 to December 1997 when water was pumped from the Gentry Ridge Horst, across the Bear Canyon Graben, and into the older Third Seam workings east of the Bear Canyon Fault, mainly to Mother Goose sump in the Middle Seam. Water was also pumped to Mother Goose sump from the Wattis and Hiawatha Seams on the east side of the Bear Canyon Fault. During this pumping, decreased flows were observed at Upper Tie Fork Spring, and discharge from the Mohrland portal increased (Figure 1). Big Bear Spring and other Star Point Sandstone water sources in Huntington Canyon may have been affected, but no measurable or demonstrable impacts are evident in the data from these springs.

From June 1992 to December 1997, an average of over 500 gpm was pumped from the Gentry Ridge area of the Star Point Mine. Volume increased rapidly from 1992 until it exceeded 1,300 gpm, from December 1994 to February 1995, then even more rapidly declined to less than 100 gpm by January 1997 (Figure 1). Starting in late 1992, average discharge from the Hiawatha Mine's Mohrland Portal (UPDES 001 and 002 combined) rose until it was over 1,000 gpm in late 1994 and early 1995. (Between November 1992 and July 1995, there was no flow measured at UPDES discharge point UT0023094-002 because the water supply system for the town of Hiawatha was shutdown. Water that would have normally gone to the water tanks was discharging through UT0023094-001 to Cedar Creek.). The flow briefly spiked at over 1,600

gpm in August 1995, but dropped quickly, and by the time pumping at Star Point ceased in 1997 the average discharge from the Mohrland Portal was similar to, and perhaps somewhat less than, what it had been before pumping started. Figure 1 shows the strong correlation between the Star Point Mine pumping and increased discharges at the Mohrland Portal. However, pumping at Star Point Mine does not account for all high Mohrland discharges, such as occurred in July 1988, May 1991, April 1992 (just before pumping began), and August 2003. So in addition to Star Point Mine pumping, there appear to be other, unidentified factors that contribute to periodic high discharges from the Hiawatha Mine.

Star Point Mine: East of the Bear Canyon Fault

Star Point Mine piezometers indicated that east of the Bear Canyon Fault, the saturated zone would be below the coal seams in the Star Point Sandstone. The gradient is to the south-southeast, toward Miller Creek (Star Point Mine Plan, p. 700-10).

Most water intercepted east of the Bear Canyon Fault in the Star Point Mine was pumped to sumps within the mined areas. Mother Goose sump, the main sump of the system, was located in the Main West area of the Third (middle) coal seam (Star Point Mine Plan, Map 722.100e) at roughly the same location as in-mine well P 86-01-TD (Map 3). Flow meters monitored at Mother Goose sump measured water pumped to other areas of the mine. Father, Twin and New Goose sumps were located in the Wattis Seam workings, and Baby Goose sump was near the Mudwater discharge within the Third Seam. (Star Point Mine Plan, p. 700-24).

Water discharged at the Star Point Mine Mud Water Fan (UPDES UT0023736-001) was monitored beginning February 1985: there has been no discharge from UPDES 001 since July 1987 (Star Point Mine Plan, p. 700-31).

Some water was used to supply culinary needs for the Lion Deck bathhouse and office. Monitoring of water used from within the mine for culinary purposes was initiated in February 1985. Losses from fan ventilation evaporation have not been estimated (Star Point Mine Plan, p. 700-24).

In-mine ground water was monitored at 16 locations in the Star Point Mine from April 1985 to March 1986. The Star Point Mine plan states, "the total instantaneous flow from the 16 in-mine measuring points is an indication of the majority of flow made within the mine, but does not necessarily reflect the total flow made within the mine". "...thehe average annual flowrate from the 16 in-mine measuring points was approximately 150 gpm from April, 1985 to March, 1986. The average annual discharge from the mine over the same period at Mud Water Canyon [Star Point UPDES 001] was 129 gpm (66,611,600 gallons over the year). The average annual discharge from the mine to the surface facilities for coal washing and surface dust control was only 0.5 gpm (267,432 gallons). The average annual discharge for culinary use was approximately 4.4 gpm (2,289,000 gallons). Therefore, the total annual discharge from the mine to the surface was 134 gpm, excluding the undetermined flow that exits the mine as water vapor in the air." (Star Point Mine Plan, p. 700-25).

The Star Point mine plan states on page 700-25, "...the flow from the long wall area No. 12 has diminished over time since its peak in September of 1985 when long wall panel No. 3 was started. In March of 1986, the flow jumped to 120 gpm: the increase in seepage was from increased pumping of recycled water from the sump areas for dust suppression in the long wall panel area". The proximity of Panel 12 to the subsided area of the North Fork of the Right Fork of Miller Creek and a fracture zone probably influenced inflow in this region (Maps 3 and 3a).

When the Star Point Mine Plan was updated in 1996 for permit renewal, 1WN6 and 9L12 were the only sites being used for in-mine monitoring. These two stations were last monitored in October 1997. There are no mine discharges from the main Star Point Mine portals or any of the fan portals in Corner Canyon and Mud Water Canyon. All portals have been sealed and backfilled, the last portal being sealed in January 2001.

Measured inflows to the mine did not necessarily include all flow into the mine. In 1991, average inflow to the workings east of the graben was estimated to be:

1985 through 1986	237 gpm	0.53 cfs
1986 through 1987	218 gpm	0.48 cfs
1988	71 gpm	0.16 cfs
1989	49 gpm	0.11 cfs
1990	37 gpm	0.08 cfs
1991	24 gpm	0.05 cfs

The 1988 to 1991 data indicate an annual decrease of 25 to 40 percent per year. Based on the area exposed by the mine workings and the rates of discharge, PMC estimated 95 percent of the water came from storage, mainly from channel sandstones in the Blackhawk Formation, and that probably less than 5 gpm came from the surface (Star Point Mine Plan, p. 700-62)

Star Point Mine: Bear Canyon Fault and Bear Canyon Graben Crossing

A rock tunnel crossing was developed through the Bear Canyon Graben in 1989 to allow access to coal under Gentry and Castle Valley Ridges. The rock tunnel crossing extended from the Wattis Coal Seam east of the Bear Canyon Graben (elevation 8,492 feet) to the Wattis Coal Seam west of the graben (elevation 8,450 feet): the Wattis Seam was the only seam mined under Gentry Ridge. The rock tunnel was in the upper Blackhawk Formation, 200 to 325 feet above the Wattis Coal Seam. In exploratory borings, the saturated zone system was confirmed to lie 45 to160feet below the graben tunnel. The piezometric gradient is to the south, toward Huntington Creek (Star Point Mine Plan, p. 700-10, 700-12).

Water encountered during mining east of the graben was in perched, primarily fracture-related systems in the upper Blackhawk Formation, above the saturated zone. Water flowed into the mine at the Bear Canyon Fault (the eastern boundary fault of the graben) when the 2nd Left and 2nd West Mains intercepted the fault. Initial inflow at 2nd Left was 6 gpm from roof strata on the face offset (approximate elevation 8,780 feet). Within three weeks, liquefied gouge at the faces of entries #2 and #3 flowed approximately 10 to 15 feet into the entries.

Drilling from within the #1 entry penetrated 40 to 60 feet of gouge and fractured rock before tapping into what the mine operator called a "significant" ground-water conduit (the drill hole penetrated 400 feet into the graben). Inflow from the drill holes peaked at about 150 gpm before dropping to 50 gpm after 2 weeks, to less than 10 gpm after 10 weeks, and subsequently to 0 gpm.

In the 2nd West Mains (approximate elevation 8,490 feet), PMC experienced an initial inflow rate of about 20 gpm from the roof strata. This flow reduced to less than 10 gpm after 4 weeks. Very little water was found at the actual face. Inflow to the mine at the entry to the graben tunnel at 2nd West Mains dropped rapidly during drilling, from 20 gpm to 10 gpm over a four-week period and eventually to 0 gpm, indicating the dewatering of a perched aquifer system (Star Point Mine Plan, pp. 700-11 and 700-12).

Star Point Mine: Gentry Ridge Horst

PMC recognized the water table under Gentry Mountain would be intercepted during mining so they entered into a mitigation agreement with NEWUA. This agreement is discussed further under the section in this CHIA entitled **Material Damage.**

Wet floor was reported along the 3rd South Mains, south of the graben tunnel entries. Flows of up to 50 gpm were reported from several specific sites along these mains. Volumes generally increased downdip, to the south.. Water seeped through the floor of the 4th and 5th Right entries, and from the roof at the west end of the 2nd and 3rd Right entries. Larger flows were generally associated with the Trail Canyon Fault, the western boundary fault for the horst, and auxiliary finger-faults and fractures. As mining continued down dip, flow rates of 50 to 250 gpm were recorded in the bleeders and set-up rooms along the west side of the mined area, near the headwaters of Wild Cattle Hollow (Star Point Mine Plan, p. 700-63; Map 728b).

Water from the Gentry Ridge area was pumped from June 1992 to December 1997 across the Bear Canyon Graben into the Third Seam workings east of the Bear Canyon Fault, mainly to Mother Goose sump. Volume increased rapidly from 1992 until it exceeded 1,300 gpm from December 1994 to February 1995, then even more rapidly declined to less than 100 gpm by January 1997 (Figure 1). Water was also pumped to Mother Goose sump from the Wattis and Hiawatha Seams.

UPDES permitted discharges from the Star Point Mine over this period were sporadic and usually low volume. However, discharges from the Mohrland Portal at the Hiawatha Mine mimicked the pumping rate from the Gentry Ridge Horst to Mother Goose sump, so it is a reasonable conclusion that most of the mine-water discharged from the Hiawatha Mine during this time originated as water pumped across the Bear Canyon Graben in the Star Point Mine. Figure 1 shows the flow rates from Hiawatha's Mohrland Portal (UPDES discharge points UT0023094-001 and –002), Big Bear Spring, Upper Tie Fork Spring, and Star Point's Gentry Ridge Horst pumping. The flows at Big Bear Spring had already declined before pumping began in 1992, and although flow rates fluctuated, there was no evident impact to this spring from the pumping. The impact at Upper Tie Fork was anticipated.

The total interbasin transfer of water pumped from the Gentry Ridge Horst to the Mother Goose sump was estimated by UDOGM. Flow rates from Upper Tie Fork Spring and flow rates monitored at the Gentry Ridge in-mine monitoring site GENTRID were used to make the estimate.

Losses at Upper Tie Fork Spring were estimated from data received on December 18, 1997 from Darrel Leamaster (CVSSD provides regular updates of these flow data. The combined flow of Upper and Lower Tie Fork is metered constantly, but separate data for the Upper and Lower springs can only be obtained on-site, so data for winter months are sometimes missing.) The following assumptions were made to obtain the estimated flow loss for 1992 to 1997:

1) Missing data from November 1993 through April 1994 were estimated by interpolation between the October 1993 and May 1994 flow rates;
2) The average monthly flow prior to dewatering was assumed to be 85 gpm (the rate observed on October 1991 prior to a recorded decrease in flow at the spring);
3) The dewatering period was assumed to extend into April 1996 simply because Upper Tie Fork Spring regained 85 gpm flow rate after this date.
4) Flow rates recorded from November 1991 through April 1996 were subtracted from 85 gpm then added together to estimate the total loss of flow at Upper Tie Fork Spring.

Using the method described above it was estimated that the total flow volume at Upper Tie Fork Spring decreased by 139.5 acre-feet (acre-ft) during the period of mining under Gentry Ridge. The estimated maximum annual loss was 58.7 acre-ft in 1995. The maximum loss to flow at Upper Tie Fork Spring occurred in May and June of 1995 and was 46 gpm (0.1cfs). A percentage of the loss can be attributed to 1987 - 1993 drought, but adjustments for climate were not assessed.

A monthly flow volume was determined and then totaled for the period when water was pumped from Gentry Ridge across the Bear Canyon Graben into the Mother Goose sump, east of the graben. Instantaneous flow rates from the Gentry Ridge monitoring station GENTRID were reported for June 1992 through December 1997. Water quantities reported to UDOGM were instantaneous readings only: no totalizing flow rates were reported. The following techniques and assumptions were made to estimate the flow volume pumped from Gentry Ridge:

1. Where there was one record per month, that value was applied to the entire month;
2. Where there was more than one record per month, the first recorded flow volume was applied from the first day of the month up to the date of that measurement, the volume of the second measurement was applied from the date of that measurement through the end of the month, and the average of the two measured flows was applied to each day between;
3. Where monthly flow values were missing, flows from the preceding and following months were averaged;
4. The pumping rate was assumed to be continuous, 24 hours per day.

Using this method the total water transported across the graben was estimated to be between 4,500 to 5,000 acre-ft.

The Star Point Mine Graben - Goose information provided to CVSSD was obtained on April 17, 1998. The data are available for June 1992 through December 1997; however, data for February, March, May, and June 1993 were unavailable because the meter was not functioning. The maximum reported instantaneous flow rate was 1,600 gpm on January 26, 1994, but the greatest average discharge was 1,398 gpm in December 1994. Based on the average monthly rate in the CVSSD data, the maximum monthly discharge volume, 143 to 146 acre-ft, occurred in March through May 1995. The maximum annual discharge was estimated to be 1,627 acre-ft in 1995.

The volume of water pumped from the Gentry Ridge Horst is much larger than the estimated loss for Upper Tie Fork Spring. When compared to the volume of water pumped from the Gentry Ridge Horst, the much smaller flow loss at Upper Tie Fork Spring indicates dewatering in the Gentry Ridge Horst drew water from a larger area than the immediate vicinity of Tie Fork Spring.

Impacts to other water sources have not been reported. The decline in flow at Bear Canyon Spring began before the Gentry Ridge Horst pumping. Flow remained fairly stable while the horst was being pumped, although there was a small drop in 1995 followed by a rise in 1996 (Figure 15). There is evidence these were responses to the 1987 – 1993 drought, but these 1995 and 1996 changes could be related to the intense pumping in 1994 and the rapid drop in pumping in 1995 (Figure 1). Likewise, the decline in flow at Birch Spring predates the Star Point pumping. A slow decline continued steadily through the pumping period, apparently unaffected by either the pumping or recovery from the drought (Figures 2 and 11).

Star Point Mine Well Information

Star Point Mine wells are identified below in Tables-IV-1 and - 2 to aid in understanding the monitored formations. Graphs showing well water elevations are presented in Figures 3, 4a, 4b, and 5a. The well data are grouped within each region: East of the Bear Canyon Fault (Figure 3); Gentry Ridge, in Gentry Ridge (Figures 4a and 4b); and flows from Tie Fork Spring and related data, on or west of the Trail Canyon (Figure 5a). Locations are found on Map 5 - Gentry Mtn. Geology.

East of the Bear Canyon Fault (Figure 3)

Table IV-1: Star Point In-Mine Monitoring Wells
East of the Bear Canyon Fault

Well Number	Depth and Formation Monitored	Relative Location	General Observations
P86-01-TD	145 feet - Spring Canyon Sandstone -27 ft below the Hiawatha Seam.	East of the Bear Canyon Fault near the Mother Goose Graben.	Increase of 45 ft of head since 1993. Abandoned 1998.

P86-02-HD Btm - 8402 ft	71 feet - Spring Canyon Sandstone - screened below the Hiawatha (screen interval 50 ft)	East of the Bear Canyon Fault on west side of Hoag Ridge.	Water level was always at or below the lowest well perforations - 8463 to 8413 feet. Abandoned 1998.
P86-03-WD	194 feet - Blackhawk screened below the floor of the Third Seam (screen interval 43.5 feet)	East of the Bear Canyon Fault on the west side of Hoag Ridge south of 86-02-HD and mining section 8 sumps.	Water level showed a small decline of 20 feet, 8,320 to 8,300 feet, with a few temporary drops that could have been due to climate, localized de-watering and mine-water routing, depressurizing from mining, subsidence, or measuring error (Drops occured in Nov. 86, July 87, Mar 91, July 93). Abandoned 1997.

Well P86-01-TD, 86-02-HD, and P86-03-WD were in-mine wells. They were abandoned in late 1997 to mid 1998 because the area of the mine where they were located was sealed. P86-01-TD, developed in the Spring Canyon Sandstone and located on the East Side of the Bear Canyon Fault and Graben, increased in head during early 1994 when pumping rates from Gentry Ridge peaked. This well was located south of the sumps located near the North Fork of Miller Creek. Well 86-02-HD was also developed in the Spring Canyon Sandstone. Water level was at or below the lowest screened elevation since it was developed. Well P86-03-WD, in the Blackhawk Formation below the Third Seam, showed a decreasing trend since it was first developed in 1986 and probably represented dewatering from mining in the Hiawatha Seam.

Gentry Ridge: West of the Bear Canyon Fault (Figures 4a, 4b, 5a, and 5b)

Star Point Mine workings in the Wattis Seam in the Gentry Ridge Horst penetrated over 200 feet below the Blackhawk – Star Point potentiometric surface. Large volumes of water were pumped from the Gentry Ridge Horst workings as mining progressed downdip in the Wattis Seam. Maximum monthly discharge volume was approximately 145 acre-ft in early 1995, and the estimated discharge for 1995 was 1,600 acre-ft. This pumping affected the potentiometric surface in the Gentry Ridge Horst (Figures 4a and 4b) and possibly in the McCadden Hollow area (Figure 5b), and flow at Upper Tie Fork Spring (Figure 5a).

The three Star Point Sandstone tongues are seen at outcrop exposures at Bear Canyon and north and south of the CIA, but exposures of the Star Point to the west are massive sandstone with no shale. Boreholes in the Star Point Mine area did not penetrate the entire Star Point Sandstone, so it is not certain that three distinct sandstone tongues are present there, although that is how they have been depicted (Bear Canyon Mine Plan, Plates 7J-1 and J-2). The pumping affected all saturated strata in the Gentry Ridge Horst, but the varying responses show that the Spring Canyon Sandstone Member and Blackhawk Formation, even though they might be hydrologically interconnected along faults and fractures, are not a homogeneous aquifer.

P92-10-1, drilled from the surface, was located between the Gentry Ridge Horst mine workings and Nuck Woodward Creek. The single measurement (Figure 4a) from the Star Point Sandstone indicates the gradient is higher to the north, apparently recharged in Nuck Woodward Canyon.

P93-01-WD was located in the northern Gentry Ridge mine workings. It was drilled to the Spring Canyon Sandstone Member in 1993, after pumping from the south end of the mine had started. The well was only screened over a 1-ft interval, and after a reported initial 9-ft drop in water level, the well went dry in 1995.

Table IV-2: Star Point Mine Monitoring Wells and Piezometers West of the Bear Canyon Fault

Well Number **Period of Record** **Collar Elevation** **Bottom of Well**	**Formation Monitored**	**Relative Location**	**General Observations**
P-92-10-1 1993 C.E. - Btm - -	Star Point Sandstone One point of data.	Surface well, ~1 mile from Nuck Woodward channel. Completed in the Gentry Ridge Horst near the west end of the 4th West Mains, but it did not intercept the mine workings.	The water elevation at the initial and only reading possibly indicated recharge from Nuck Woodward Canyon.
P93-01-WD 1993-1995 C.E. - Btm -	Star Point Sandstone This well has a screened interval of 1 ft.	In-mine well in the Gentry Ridge Horst, in the 3rd North Mains, north of 92-01-A(B,C)-WD.	The water level dropped below the top of the screened interval and went dry in 1995.
P-92-01-A-WD* 1992-1997 C.E. - 8364.5* Btm - 8291.5 ft	Blackhawk- screened 61 feet below floor of Wattis Seam (screen interval 8301.5 - 8291.5)	In-mine well nested with P-92-01-B and C. In the Gentry Ridge Horst, at the east end of 3rd West Mains, near the exit of the graben tunnel.	Water level dropped about 30 ft and did not recover appreciably during the monitoring period.
P-92-01-B-WD* 1992-1997 C.E. - 8364.5* Btm - 8248 ft	Blackhawk- screened 104.5 feet below floor of Wattis Seam (screen interval 8258 - 8248)	In-mine well nested with P-92-01-A and C.	Water level dropped about 46 ft by 1995 and did not recover appreciably during the monitoring period. Two anomalous drops in 10/93 and 10/94.
P-92-01C-WD* 1992-1997 C.E. - 8363.9* Btm - 8171.5 ft	Star Point Sandstone - screened 45.7 feet below the Hiawatha (screen interval 8186.5 - 8171.5)	In-mine well nested with P-92-01-A and B.	Water level dropped 108 ft by 1995, recovered to 68 ft below initial level by the time monitoring ended.
P-92-02-WD 1992-1997 C.E. - 8362.24 Btm - 8156.2 ft	Star Point Sandstone -screened 54.5 feet below the Hiawatha (screen interval 8171.2 - 8156.2)	In-mine well in the Gentry Ridge Horst, at the west end of 3rd West Mains.	Water level dropped 126 ft by 1995, recovered to 79 ft below initial level by the time monitoring ended.
P-92-04-WD 1992-1997 C.E. - 8363.0 Btm – 8193	Star Point Sandstone -screened 27 feet below the Hiawatha (screen interval 8204 - 8189)	In-mine well in the Gentry Ridge Horst, center of the 3rd West Mains, between 92-01-A(B,C)-WD and 92-02-WD.	Water level dropped 154 feet by 1995, recovered to 115 ft below initial level by the time monitoring ended.
P-92-03-WD 1992-1996 C.E. - 8377.4 Btm - 8232	Blackhawk- screened 32.5 feet below floor of Wattis Seam (screen interval 10.5 ft)	In-mine well in the Gentry Ridge Horst. In the 3rd South Mains, south of 92-01-A(B,C)-WD.	This was a flowing in-mine well. The potentiometric surface was 8,322 feet in 1992. It had dropped 70 ft as of 1996, the last measurement.
86-26-6 1994-1997 C.E. -	Star Point Sandstone	Surface well on the ridge between Wild Cattle Hollow and Gentry Mountain, ~1/2	Water level decreased 35 feet in the fall of 1995 but had increased to 74 feet above the

Btm -		mile south of the mine workings. Completed in the Gentry Ridge Horst,	first recorded elevation as of July 1997.
86-35-2-3; 86-35-2 and 86-35-3 1986 - present C.E. - Btm -	Star Point Sandstone	Upper Tie Fork Spring, located west of the Pleasant Valley Fault. Two sources, ~200 ft apart.	Two seismic exploration shot holes that had artesian flow. Developed by CVSSD - Huntington City as Upper Tie Fork Spring. Head dropped during pumping from the Gentry Ridge Horst but has since recovered.
85-35-1 1988-1997 C.E. - Btm -	Star Point Sandstone	Formerly part of Upper Tie Fork Spring, located east of 85-35-2-3 and east of the Trail Canyon Fault.	CPM coal-exploration borehole that had artesian flow. Added to Upper Tie Fork Spring system in 1988, it stopped flowing about a year later and was removed from the system.

*P92-01A-WD, P92-01B-WD and P92-01C-WD are nested wells. Collar elevations vary slightly because of individual casings.

P92-03-WD, P92-01A-WD, and P92-01B-WD, in-mine wells completed in the Blackhawk Formation, also decreased in head during mining (Figures 4a and 4b). The most notable decrease was at well P92-03-WD, which began as a flowing well when it was developed in March 1992. The water level dropped 35 ft even before pumping began, and dropped another 35 ft during mine dewatering. P92-01A-WD, screened approximately 50 feet above the Hiawatha Seam, and P92-01B-WD, screened approximately 10 feet above the Hiawatha Seam, are nested wells located near the middle of the Gentry Ridge workings. Pumping produced an immediate drop in water levels in both. Water levels dropped a few more feet as pumping increased up to 1995. Water elevations were the same in these two piezometers when first measured, but levels dropped about 15 ft more in the deeper well as pumping continued, showing that even though they may be interconnected, the Blackhawk strata are not a homogeneous aquifer or hydrologic system. At the time monitoring stopped in December 1997, water elevation at P92-01A WD had recovered to 30 ft below the initial elevation and P92-01B-WD had recovered to 43 feet below the initial elevation (Figure 4b).

P92-01C-WD, screened approximately 50 feet below the Hiawatha Seam in the Spring Canyon Sandstone, dropped 108 ft, and then began to recover as soon as the pumping rate declined in 1996. At the time monitoring stopped in December 1997, water elevation had recovered to 68 ft below the initial elevation (Figure 4b). The other two in-mine wells completed in the Spring Canyon Sandstone, P92-02-WD and P92-04-WD showed similar responses to the pumping.

Well 86-26-6, developed in the Spring Canyon Tongue of the Star Point Sandstone, responded in a pattern similar to Upper Tie Fork Springs (Figure 5a). Pumping from the mine workings lowered the potentiometric surface 35 ft, to a minimum elevation of 8, 094 ft in August 1995. The water level was rising in1996 as pumping rates declined (Figures 4a and 4b). Water levels were measured using gas pressure, and measurements after September 1997 in 86-26-6 are not valid because the gas line was partially blocked.

Upper Tie Fork has been discharging above the pre-earthquake flow rate since late 1996 (Figure 5). Both the earthquake and the mining activities affected the flow. Changes in the

recharge area, porosity, and transmissivity are possible mining-related factors that increased flow at the Upper Tie Fork Spring. (The cause of the precipitous drop in 2002 is not known.) The wells that lie farther north and to the center of the graben may never recover to their initial elevation except during extremely wet climatic periods because there is increased storage capacity (porosity) in the mined region: the volume of water inflow, outflow, and storage is the same but there is more void space to fill.

Bear Canyon Mine Interception

Bear Canyon Mines #1 and #2 are located in the Bear Canyon Graben. Flows have primarily entered the #1 and #2 Mines through fractures and channel sandstones. Some water was observed from roof bolts and from the mine floor. Flows from faults and fractures were stated to produce the largest volume of water flowing into the mine during the early mining periods, but the Bear Canyon Fault, the major boundary fault, has yielded only minor amounts of water. Flows from roof bolts in the ceiling typically flowed moderately for one or two months and then eventually de-water (Attachment to Appendix 7-J, Bear Canyon Mine Plan). Water intercepted during mining primarily occurred in the Blind Canyon Seam and not in the overlying Tank or underlying Hiawatha Seams.

Hiawatha Seam

Plate 7-10B of the Bear Canyon Mine Plan shows the areas where water was encountered in the Hiawatha level of Mine #1. Only three areas are identified, and only small flow volumes were reported. One was a roof drip of less than 0.1 gpm in the northwest area of the mine.

Water seeped at under 1 gpm from a rib where the main entries crossed a fault. The fault, with 5 feet of down-to-the-west offset, is probably part of the Bear Canyon Fault system. The flow lasted for a few months.

In the northwestern corner of the Hiawatha workings, where the Hiawatha Seam entries approached but did not intercept the Blind Canyon Fault, water seeped through the floor at 4 gpm. A few months after the flow was encountered, the area was sealed because of a roof fall, so duration of flow is unknown (Personal communication, Mark Reynolds, February 21, 2007).

Holes drilled nearby drain water from the Blind Canyon level down to the Hiawatha level, and the combined flow from the Hiawatha and Blind Canyon workings provides the water supply for the Bear Canyon Mine. The water-supply line passes through the seal in the # 1 Mine portal, and the water is monitored at SBC-9A. Flow from September 2002 to August 2006 averaged 28 gpm.

Blind Canyon Seam

The majority of ground water intercepted in the Bear Canyon Mine has come from the Blind Canyon Seam channel sandstone, which was deposited in a channel eroded into the coal deposits. Many similar sandstone channels encountered in coal mines are discontinuous, but this sand channel spans the mined area and appears to extend from the Blind Canyon Fault to the

Bear Canyon Fault (Map 4). In August 1989, mining operations in the North Mains in the #1 Mine approached the margins of the channel sandstone in the mine roof. By November 1989, large roof drips began to flow into the mine in this area. Initial flows measured in February 1990 at SBC-9 were 120 gpm, and flows reached a maximum of 175 gpm in 1993 - 1994 (Figure 6).

In January 1992, monitoring began at SBC-10 in the 1st East entries: flow started at 250 gpm, and combined flow measured at SBC-9 and SBC-10 in February was 382 gpm. Mining in the North Mains reached the main body of the sandstone April 27, 1993, and SBC-9 was moved closer to the channel sandstone. Flows rapidly declined at SBC-10, dropping to approximately 25 gpm by 1994. SBC-10 became inaccessible in 1995. Flow at SBC-9 declined gradually from 1995 to 1999 and was 55 gpm October 1999, just before the area was sealed in November 1999. In 1997, water that is believed to be from the SBC-10 area began discharging from the gob at SBC-13. When monitoring ceased in February 2002, flow was averaging approximately 28 gpm and appeared to be slowly declining. In 2002, a hole was bored up from the Hiawatha level to drain the Blind Canyon workings, and the flow down the hole was monitored at SBC-9A. Water entered a pipe nearby and was carried out of the mine to storage tanks, and this water provides the culinary and process water supply for the Bear Canyon Mine. A roof fall in 2003 made SBC-9A inaccessible, but the water line remained intact. The water line was shielded to protect against further damage from roof falls, and the #1 and #2 Mine portals were sealed in 2003 – 2004. The combined discharge from the Blind Canyon and Hiawatha workings of the Bear Canyon #1 Mine is piped through the seal and continues to provide the water supply for the Bear Canyon Mine. Monitoring point SBC-9A was relocated to outside the mine, to a valve on the water line (Figure 6).

Water users have postulated that water discharging from the channel sandstone was previously recharging Birch Spring; the details associated with Birch Spring flows are discussed in the Resource Hydrologic Impact Assessment section.

When mining began in the Blind Canyon Seam, the first inflows were identified as coming from the floor in the Second East Entry and it was thought that this water originated from the Spring Canyon Tongue. Initial hydrologic evaluations from the Bear Canyon Mine Plan, Appendix 7-N (April 16, 1993) described the mine as intercepting the potentiometric surface of the Spring Canyon Tongue in the north ends of the North Main and Second East entries. It is now believed that this water originated from the Blind Canyon channel sandstone.

Before inflow from the Blind Canyon channel sandstone was encountered, water draining from faults and fractures produced the largest volumes flowing into the mine. Prior to the start of mining operations by Co-Op Mining in 1982, water flowed to old, abandoned workings. When Co-Op developed the East Bleeders fault crossing (NE/4NE/4, Section 23) flow to the abandoned workings ceased, and flow from the faults was approximately the same as what had previously flowed to the old workings. "Inflow to the East Bleeders continued until the summer of 1989, when water was encountered as the North Main entries were advanced northward. According to Wendell Owen, inflow to the East Bleeders gradually diminished and flow into the North Mains was approximately 110 gpm" (Bear Canyon Mine Plan, Appendix 7-N).

Initial mining in the Wild Horse Ridge area was in the Tank Seam, with a rock tunnel down to the Blind Canyon Seam and breakout of the Blind Canyon portals from inside. The Wild Horse Ridge workings are separated from the Bear Canyon #1 Mine workings, where the Blind Canyon Seam was very wet due mainly to the large channel sandstone, by the Bear Canyon Fault. Mining projection maps (Bear Canyon Mine Plan, Map 5-1A) show Wild Horse Ridge workings will remain several hundred feet east of this fault: Bear Canyon has been eroded along this fault and the Blind Canyon Seam crops out between the Wild Horse Ridge mines and the fault. There are also large sections of burned coal along the outcrop. If water is present in the Bear Canyon Fault, mining the Blind Canyon Seam under Wild Horse Ridge should not cause interference with its flow.

On March 22, 2000 a Division Order required Co-Op Mining to modify the permit application by including "a minimum of one in-mine drill hole located in the northern portion of the Wild Horse Ridge Addition." That requirement was complied with by addition of plans for monitoring well DH-5, which will be located at the northern boundary of the Wild Horse Ridge mine extension and central to the combined Wild Horse Ridge and Mohrland extensions.. The drill hole will be tested using the same methodology that was used in the previous in-mine wells, as described in Appendix 7-N of the Bear Canyon Mine Plan.

Tank Seam

At the Bear Canyon #1 Mine, Co-Op Mining Company drilled eight exploratory drill holes up into the Tank Seam from the Blind Canyon Seam (p. 7-23; Plate 6-1; Appendix 6-A, Bear Canyon Mine Plan). All were essentially dry except T-13 (no drillers log), where initial flow was 0.5 gpm and declined to approximately 0.1 gpm by 1997. Stratigraphically, the Tank Seam is 250 feet above the Blind Canyon Seam and approximately 8 to 10 gpm of water has been pumped from the Blind Canyon Seam workings into the Tank Seam for mining operations.

Initial mining in the Wild Horse Ridge area will be in the Tank Seam. This seam has proven to be basically dry in the adjacent Bear Canyon workings, which are separated from the Wild Horse Ridge workings by the Bear Canyon Fault. Mining projection maps (Bear Canyon Mine Plan Map 5-1C) show the workings will remain several hundred feet east of this fault: Bear Canyon has been eroded along this fault and the Tank Seam crops out between the planned mine and the Bear Canyon Fault, and there are also large sections of burned coal along the outcrop. If water is present in the Bear Canyon Fault, mining the Tank Seam under Wild Horse Ridge should not cause interference with its flow.

Bear Canyon Mine Well Information

Wells that have been monitored at the Bear Canyon Mine include: DH-1A, DH-2, DH-3, DH-4, SDH-1, SDH-2, SDH-3, MW-114, MW-116, and MW-117. Locations are shown on Maps 4 and 5.

Co-Op drilled in-mine bore holes DH-1A, DH-2, and DH-3 to the Mancos Shale. As each sandstone member of the Star Point Sandstone was encountered, the static water level was measured, then the sandstone member was isolated between the underlying shale and a packer

and a slug test was conducted. Finally, the holes were plugged-back and developed as monitoring wells in the Spring Canyon Member. DH-1A, DH-2, and DH-3 were drilled in late 1991 and early 1992. DH-3 became inaccessible and was abandoned in November 1993. Replacement well DH-4 was drilled to and completed in the Spring Canyon Sandstone Member in January 1994. Retreat mining made all these wells inaccessible by 2002 (Figure 7).

In 1995, SDH-1, SDH-2 and SDH-3 were drilled from the surface and completed in the Spring Canyon Tongue. SDH-1 and SDH-2 were located to monitor, in conjunction with the DH series of wells, the potentiometric surface in the block between the Bear Canyon and Blind Canyon Faults. SDH-1 plugged and was lost in 1996. SDH-3 was installed west of the Blind Canyon, Dry Canyon, and Trail Canyon Faults in order to observe the effect of the faults on ground water in the Spring Canyon Sandstone. Well SDH-3 is separated from Bear Canyon by the Blind Canyon and Trail Canyon Faults. Little other information on the hydrology of this area is available.

PMC drill holes MW-114, MW-116, and MW-117 lie east of the Bear Canyon Fault. They were developed in the Spring Canyon member of the Starpoint Sandstone, in 1991. ; T-1, -2, -4, and –5, drilled by Savage Energy Services Corporation in the McCadden Hollow area in 1981 for Norwest Coal, provide additional insight into water levels in the Spring Canyon Sandstone Member. Drillers log information, including water levels, is summarized on Plate 7-9 in the Bear Canyon Mine Plan.

Based on information from these boreholes, potentiometric surfaces for the Spring Canyon, Storrs, and Panther Canyon sandstones were plotted. These cross-sections and potentiometric surface maps are shown on Plates 7J-1 and 7J-2 and 7N-3, 7N-4, and 7N-5 of the Bear Canyon Mine Plan. As measured in DH-1A, DH-2, and DH-3, the gradient of the potentiometric surface of the Spring Canyon Member (0.04 ft/ft) is to the south. That of the Storrs (0.04 ft/ft) is to the southeast, and in the Panther Member the gradient of the potentiometric surface (0.05 ft/ft) is to the south-southeast, intermediate between the directions in the two shallower members.

No additional wells have been drilled for the Wild Horse, Cedar Creek, McCadden Hollow areas, but Co-Op has committed to drill at least one additional in-mine well, DH-5, from the Tank Seam entries, to monitor the Spring Canyon Tongue. Projected location is in the NW/4, Section 19, T. 16 S., R. 8 E.

Hydraulic conductivities from the three sandstone members of the Star Point Sandstone were obtained from slug injection tests in DH-1A, DH-2, DH-3, and DH-4. A loss of drilling fluid in the Panther Tongue, below 410 feet, suggested DH-1 may have intercepted a fracture. DH-2 had a quick displacement of water and a hydraulic conductivity equal to 0.054 ft/min in the Storrs Sandstone, but field checks indicated that the bladder had not sealed and allowed water to flow around the packer during the test. These tests found the three sandstone members had separate, distinct static water levels. Potentiometric gradients vary between the three members. None of the members was fully saturated in DH-3, the southernmost of the holes, and the Spring Canyon and Panther were not fully saturated at DH-1A (Bear Canyon Mine Plan, Appendix 7-N, Section 4.0). Variations in the chemistry of waters from the Defa #1 Spring in

the Storrs Member and the Defa #2 Spring in the Panther Member also indicate the sandstone members of the Star Point Sandstone contain distinct hydrologic systems.

Following recovery from the slug tests, the first notable change at DH-1A and DH-2 occurred in 1995: a ten-foot increase in head was recorded on July 13, 1995 at DH-2 (Figure 7), and water levels recorded at DH-1A, the well closest to DH-2, showed approximately a three-foot increase. These were short-lived increases and levels dropped back down within the year. It is possible that these were measurement errors, or are the result of in-mine sumping operations; however, May 1995 saw the highest recorded flow at Lower Tie Fork Spring and flow reportedly jumped to 386 gpm at Star Point well 85-35-1 in June 1995 (Figure 5). These correspond with minimum flow (39 gpm) at Upper Tie Fork Spring in May and June 1995, and closely follow the maximum pumping from Gentry Ridge Horst in December 1994. TDS began to increase at 85-35-1 at the time of these events, rising from a pre-1995 average of approximately 350 mg/L to 562 mg/L in September 2001, when PMC stopped monitoring; both sulfate and Ca concentrations rose. TDS and sulfate increased at DH-1A at this time also, while Ca concentration dropped; however, by 1999, TDS, sulfate, and Ca had returned to pre-1995 levels. Both TDS and sulfate may have increased slightly at Upper Tie Fork Spring (86-35-2-3), but the change was not large and pre-1995 data are scattered, so the increases are within the range of pre-1995 values; also, Ca concentrations remained unchanged from pre-1995 levels. Water-quality data were not obtained at DH-2 during this period. No increased flow from the Blind Canyon channel sandstone was recorded during this period (Figure 6). The timing of these changes in water-quality and flow or water-level during May, June, and July 1995 suggest fracture-flow in the region between the Star Point and Bear Canyon Mines. This corresponds with the Shattered Zone mapped by the USGS (Brown and others, 1987) where the Pleasant Valley and Bear Canyon Grabens converge (Map 5).

The second notable change at DH-2 occurred soon after the 1995 spike. Water level dropped approximately three ft in 1996, followed by a further 12-ft drop during 1997 and 1998 (Figure 7). During 1999, the last year monitored, elevations yo-yoed over a 12-foot range. This erratic behavior in DH-2 may indicate direct connection through fractures with the surface, or with areas being actively impacted by mining. Except for the high in 1995 that was discussed previously, DH-1A showed a steady increase from mid-1992 through 1997. These changes occurred in the Spring Canyon Member, which is directly under the Hiawatha Seam (Bear Canyon Mine Plan, Plate 7J-1).

SDH-2 is approximately one mile north of the northernmost Bear Canyon Mine workings in the Blind Canyon and Tank Seams, and centered in a block of coal outlined in the projected mine plan. There is no mining planned for the Tank Seam in the McCadden Hollow area, but there is a possibility that the Blind Canyon Seam will eventually be mined there. The Spring Canyon potentiometric surface is higher at SDH-2 than it is to the south at SDH-1 and the DH series of boreholes: the water level at in-mine well DH-4, located near the northernmost extent of mining in the Blind Canyon Seam, is approximately 275 feet below the Tank Seam and 60 feet below the Blind Canyon Seam. The potentiometric surface is higher at SDH-2 than in MW-117 to the east, across the Bear Canyon Fault (Bear Canyon Mine Plan, Plates 7J-1 and 7J-2), and higher at SDH-2 than in SDH-3 to the west, across the Dry Canyon and Trail Canyon Faults. The elevation of the potentiometric surface at the Tie Fork Springs, located approximately one

mile to the northwest and across the Dry Canyon Fault, has not been measured, but these are flowing boreholes and the surface elevation at Upper Tie Fork Spring (86-35-2-3 on Map 5) is 8,010 feet. Therefore, the potentiometric surface at SDH-2 is apparently lower than at Tie Fork Springs.

As indicated on Plates 7J-1 and 7J-2 in the Bear Canyon Mine Plan, the Spring Canyon potentiometric surface is above the Tank Seam at SDH-2. The water elevation at SDH-2 was 7,964 feet in August 1994 when the well was developed. The observed water elevation at SDH-2 was 7,975.8 feet on September 02, 1997, an increase in elevation of 11.8 feet since the initial well development, and has been as high as 8,007 feet (June 21, 2000). The latest elevation, September 26, 2006, was 7,952.32 ft. The water elevation changes at SDH-2 may be the result of climatic variation, residual effects from the pumping conducted at the Star Point Mine, or both.

Water levels in SDH-2 and SDH-3 appear to roughly correlate with flow rates at Upper Tie Fork Spring (Figure 5a), but more observations are needed to conclusively determine a relationship. Currently, there is no explanation for these abrupt changes. There is no evident relationship to mining operations: the only mining activity in the area after 2001 was pillar pulling in the Bear Canyon Mine, which ceased in 2004 and did not produce any notable change in mine water discharge (Figure 6).

Hiawatha Mine Interception

The Hiawatha Mine had an extensive mining history prior to the enactment of SMCRA, therefore, a lot of information on mining from this period is unknown. Available information from references in the Star Point and Hiawatha Mine Plans are included.

The Middle Fork Mine complex includes parts of the old Hiawatha No. 1 and No. 2 Mines that were closed in 1928. The No. 2 Mine was used as a water storage reservoir that was constructed by sealing off the mine entries with reinforced concrete bulkheads. According to the mine plan, the bulkheads in the No. 2 Mine have been opened and the reservoir drained but the date it was drained is not presented. This reservoir contained about 60 million gallons (184 acre-feet) on average (Hiawatha Mine Plan).

The Mohrland Mine portal has been sealed, but mine water still discharges into Cedar Creek through a bypass system. This water was previously piped to the town of Hiawatha. UDOGM's records indicate that U.S. Fuel Company (now Hiawatha Coal Company) has been discharging mine water from Mohrland Portal from February 1979 to present. The mine discharge enters a diversion box containing a weir and a valve controlled supply pipe. The valve operates the amount of water that is diverted into a steel pipe that transmits it to the town of Hiawatha in Miller Creek (UPDES 002). The current practice to obtain the UPDES discharge rates for 001 and 002 is to measure the overflow of the weir, which goes to Cedar Creek, (001), shut the valve to the pipe flowing to Hiawatha, then take a second measurement of the weir flow. The difference is the flow to Hiawatha, (002). The flow represents all inflow from the three mined coal seams.

The water supply for the town of Hiawatha has been piped from the Mohrland Portal to water-storage tanks near the town. Hiawatha UPDES 001 monitors water discharged directly at the Hiawatha Mohrland Mine Portal. UPDES 002, in the past, measured overflow from the water tanks, so except for what is consumed from the water system, the combined flow from UPDES 001 and UPDES 002 represents the total discharge from the Mohrland portal. Prior to the pumping at the Star Point Mine, the average combined discharge from UPDES 001 and UPDES 002 was approximately 500 gpm. During the Star Point pumping, average discharge rose to almost 650 gpm; however, as can be seen on Figure 1, values fluctuated widely both before and during the Star Point pumping. By the time pumping ceased in December 1997, mining by U.S. Fuel had ended; the discharge became more consistent and the average dropped to 400 gpm. (Between November 1992 and July 1995, there was no flow measured at UPDES 002 because the water supply system was shutdown. Water that would have normally gone to the water tanks was discharging through UPDES 001 to Cedar Creek.)

As indicated on page VII-3 of section 7.1 of the Hiawatha Mine Plan (September 1986), "large water flows have been encountered in the past, mainly due to contact with the Bear Canyon Fault, which is a major water bearing structure. Old mine workings have contacted the fault at several points and this probably accounts for most of the mine water presently being discharged from the Mohrland portal". The major contact was in the 10th West Section in the King IV Mine in the 1970's. Mining was advancing in the B Seam, which is stratigraphically equivalent to the Blind Canyon Seam, when the Bear Canyon Fault was intercepted (Map 3c). Information in the Star Point Mine Plan indicates that the 10th West inflow was approximately 6,600 feet south of the Star Point Mine graben crossing, at an elevation of 8,180 feet. Inflows were as great as 100 gpm. Plate 7-22 of the Hiawatha Mine Plan illustrates the 10th West inflow location, along with other main points of mine water inflow.

Flows were encountered in the Star Point Mine before the graben crossing and mining in the Gentry Ridge Horst. According to a memorandum prepared by John Mercier of PMC, dated May 23, 1983 (Star Point Mine Plan, page 700-11):

> The 2nd Left encounter (in the Star Point Mine) initially experienced little water inflow (at 6 gpm) from roof strata on the face offset. Within three weeks, liquefied gouge in the faces of entries #2 and #3 flowed approximately 10 to 15 feet into the entries. Underground drilling in the #1 entry penetrated 40 to 60 feet of gouge and fractured rock before tapping into a significant conduit. Inflow peaked at about 150 gpm from drill holes before dropping to less than 10 gpm after 10 weeks (the flow dropped to 50 gpm in two weeks). Inflow from the drill hole that penetrated the fault at the 2nd Left encounter has since dropped to zero.
>
> A second encounter with the east side of the graben (in the 2nd West Mains) experienced an initial inflow rate of about 20 gpm from the roof strata. This flow was reduced to less than 10 gpm after 4 weeks of exposure. Very little water has been found at the actual face offset.

The elevation at the 2nd Left encounter was approximately 8,780 feet, and at the 2nd West Mains was 8,490. Because these flows did not persist and had limited volume, they appear to be from limited, perched systems in the upper Blackhawk Formation, and were perhaps fracture-related.

The Star Point Mine Plan states on page 700-12, that the King 4 Mine lies below the regional water table. The ground water encountered in the 10th West came primarily from the floor through an area the size of a bushel basket. The fault was not penetrated; therefore, water encountered within the mine is bounded on the west by the fault system gouge zone and presumably receives recharge from areas east of the fault. No dates were presented to identify when water was intercepted.

The Hiawatha Mine presently is not mining. However, Hiawatha Coal Company, Inc. became the operator in 1998 and it is expected that mining will resume under Hiawatha Coal Company's direction in the near future.

Even though the saturated zone is beneath the coal seams, Bear Canyon Mine piezometers indicate the potentiometric surfaces will be above the Hiawatha working as they advance to the northwest and approach the Bear Canyon Fault. There is a potential for water to up well from the Star Point sandstones in this area, mainly the Spring Canyon Member.

Otherwise, inflows were The Bear Canyon #1 and #2 workings were west of the Bear Canyon Fault, and only a few entries mined up to the fault: except for the large Blind Canyon Seam channel sandstone, typical inflows were less than 5 gpm and dried up shortly after initial encounter. Inflows in areas east of the Bear Canyon Fault are expected to be on the order of a few gpm because and dry up shortly after being encountered. Except where it might be crossed to access the block of coal under McCadden Hollow, the Bear Canyon Fault will not be intercepted by the proposed mining.

Hiawatha Mine Ground-water Well Information

No ground-water information is available from wells at the Hiawatha Mine. Drill hole logs from the Hiawatha Mine were used to construct the cross-section of Gentry Mountain on Plate 7-23 of the Hiawatha Mine plan. The potentiometric data on Plate 7-23, in the southern part of Gentry Mountain, come from Bear Canyon Mine wells. It is anticipated that when the Hiawatha Mine is reopened, more ground-water information will be obtained.

Trail Canyon Mine Ground-water Interception

Water discharging from abandoned portals at monitoring sites PS-1 and CS-1 originates from old mine workings in the Hiawatha Seam. Information from these sites is the only information on underground water from the Trail Canyon Mine area. There is no information available on water intercepted during mining.

CS-1 discharges ground water from the Community Mine (inactive in 1921) developed in the Hiawatha Seam, but the water originates from the Star Point aquifer along the Pleasant

Valley Fault. Water in this mine was developed for culinary use by Trail Canyon residents in the 1960's and is in compliance with the drinking water standards (Trail Canyon Mine Bond Release Application Addendum, December 28, 1995). CS-1 is located on the west side of Trail Canyon, beyond the west edge of the former Trail Canyon Permit Area Boundary. According to information in the Trail Canyon Mine Plan, the Trail Canyon Mine workings are hydrologically separated from CS-1 by the Trail Canyon Fault.

PS-1 is located on the east side of Trail Canyon in the Hiawatha Seam and was associated with the Freed Mines (operated from mid-1920's to 1936). Since 1970, water has been pumped from the Community Mine (CS-1) to the Freed portal, and the Freed Mine is used as a culinary water storage reservoir. The portals to the Freed Mine were sealed in 1991 by UDOGM's Abandoned Mined Land Program, but use as a reservoir was maintained. When culinary water is not being pumped into the reservoir from CS-1, no flow occurs from PS-1. This suggests little or no inflow occurs into PS-1, and indicates the piezometric surface of the Star Point/Blackhawk is below PS-1 and below the Trail Canyon Mine (Trail Canyon Mine Bond Release Application Addendum, December 28, 1995).

The Trail Canyon Mine was developed from 1938 through the 1980's, on the east side of Trail Canyon in the Blind Canyon Seam. The mine workings were relatively dry. Water would have to fill the Trail Canyon Mine workings to the north, 100 feet above the mine portals, to filter through to PS-1. No discharge has been observed from the closed portals associated with the Trail Canyon Blind Canyon Seam, indicating the workings are not flooded to that point (Trail Canyon Mine Bond Release Application Addendum, December 28, 1995).

Trail Canyon Mine Ground-water Well Information

No well information is available for the Trail Canyon Mine.

POTENTIAL HYDROLOGIC IMPACTS TO SPRINGS

Spring resources with a water-quality or water-quantity change noted over the mining period are presented in the mining and reclamation plans and the data are discussed in the following sections. The potential for noted hydrologic changes at these water resources are reviewed in relation to mining activities. Spring resources are categorically discussed on the basis of use: domestic, or wildlife and agricultural.

Spring SBC-14 (WHR6) is in a small sheltered area in the bottom of the drainage, adjacent to the proposed road to the Wild Horse Ridge portals. Despite steady flow (0.5 to 15 gpm measured from 1993 to 1997), there are no water rights issued on the water flowing from this spring. However, special care is to be taken during blasting and construction in this area to preserve not only this water source, but also the pristine characteristics that make the area around this spring unique.

Spring Sources with Domestic Uses

Tie Fork, Birch, and Big Bear Springs are the major ground-water resources in the CIA. Flow characteristics for these springs are presented in Figures 1, 2, 5, 8, 11a, 11b, 14a, 14b, 15, and 16a. Select water-quality data are summarized in Figures 9a, 9b, 10, 16a, and 16b in Appendix A. For information on associated water rights, see the discussion under HYDROLOGIC RESOURCES, Rights.

Fractures and faults that align with these springs extend to the north (Map 5). Although these areas to the north are miles from Birch and Big Bear Springs, they are the most likely sources for recharge. These areas are topographically higher and receive the greatest amount of precipitation. There are perennial streams in these higher areas. The Star Point Mine determined that the stream in Nuck Woodward Canyon has losing reaches that recharge the ground-water system through the Trail Canyon Fault. Losing reaches have not been confirmed in streams directly upgradient of Birch and Big Bear Springs, but Wild Cattle, Gentry, and McCadden Hollows align with large faults, where fractures and brecciated zones that would accommodate recharge are undoubtedly present. Strata dip generally southward from the structural high near the middle of Nuck Woodward Canyon. Information from boreholes, mines, and the Tie Fork Springs confirm that the potentiometric gradient is from north to south, with an eastward component, and the potentiometric surface is higher in the Bear Canyon Graben than to the east or west. The north - south orientation of the faults and fractures limits east-west ground-water flow and favors flow towards Tie Fork, Birch, and Big Bear Springs from these northern areas.

Tie Fork Springs

Development History and Hydrogeology

In 1981 and 1982, CVSSD built a new water line to Tie Fork Canyon and developed Upper Tie Fork Spring (Map 6). Ground-water flow at Upper Tie Fork was originally from two seismic-exploration shot holes, of unknown age, located where the Trail Canyon Fault (East Fault of the Pleasant Valley Graben) crosses Tie Fork Canyon. The depths to which these two wells were drilled are unknown. They were drilled into a breccia zone of the Trail Canyon Fault, or into an open sandstone fracture zone. Either they were never sealed or the seals failed, and water flowed to the surface from both holes. CVSSD developed these water sources by inserting pipe as far as it would go, and combined the flows into one line. In December 1982, Upper Tie Fork Spring was placed on the CVSSD system. Average flow was 85 gpm through 1987.

Artesian conditions were encountered in exploratory drill hole 85-35-1, drilled near the junction of Wild Cattle Hollow and Gentry Hollow in Tie Fork Canyon. This hole is located upstream of the Upper Tie Fork Spring and Trail Canyon Fault. The driller noted that fractures were intercepted at a depth of 357 feet. Information available indicates that these fractures are located within the Spring Canyon Member of the Star Point Sandstone (Star Point Mine Plan). Drill Hole 85-35-1 was deeded to Huntington City in 1988. CVSSD tried to develop this borehole as a water well. Pipe was installed, perforated, and hooked into the Upper Tie Fork system. However, the well ceased to flow and was removed from the CVSSD system. The

cause of the failure is not known; Darrel Leamaster of CVSSD suspects a seal inside the well failed (personal communication, February 13, 2007).

In October 1993, Upper Tie Fork Spring was removed from the town drinking water system under an agreement with PMC, because a potential for mining impacts was identified at the Star Point Mine. Lower Tie Fork Spring was developed and put into the CVSSD system as water replacement. Lower Tie Fork Spring is west of the Trail Canyon Fault, approximately one-half mile down stream from Upper Tie Fork. After mining and pumping in the Gentry Ridge Horst ended, the flow from Upper Tie Fork was returned to the CVSSD system.

Water Quantity

The absence of marked seasonal variation in flow volume at Upper Tie Fork Spring indicates a large recharge area, storage capacity, and minimal direct influence from seasonal precipitation and snowmelt. A flow increase was recorded at Upper Tie Fork Spring in August 1988. This increase correlates with a 5.3 magnitude earthquake on August 14, 1988. After the earthquake, Upper Tie Fork Spring flow reached 133 gpm, then slowly dropped to 86 gpm in August and September 1991 (Figures 1, 5, and 8). Flows observed prior to the earthquake averaged 84 gpm.

Mining beneath Gentry Ridge appears to have caused a direct and rapid decrease in flow to Upper Tie Fork Spring. This is related to the pumping of water across the Bear Canyon Fault from June 1992 through December 1997. However, some of the decrease can be attributed to the 1987 - 1993 drought (Figure 14a). A surge in flow related to an August 1998 earthquake counteracted and somewhat masked this decline (Figure 8). Flow declined to a minimum of 33 gpm in 1995, but recovered as pumping rates dropped and returned to pre-pumping levels by mid-1996, at which time there was still a small volume of water being pumped from Gentry Ridge (Figure 1).

Mining activities and the 1988 earthquake affected the flow rate at Upper Tie Fork Spring (Figure 5). The quick response time at the Upper Tie Fork Spring to the Gentry Ridge pumping indicates a fault - fracture type flow system is present. Discharge dropped from a pre-pumping average of over 80 gpm to 39 gpm in May and June 1995. Flow rebounded, and by the time the Gentry Ridge Horst pumping ceased, discharge was above pre-pumping levels, reaching 165 gpm in August 2002 (Figure 8). Monthly flow reached a maximum of 142 gpm in October 1998 and hovered at around 125 gpm until 2002 (Figure 14a). In 2002, flow at Upper Tie Fork Spring again surged from May to August before it dropped precipitously and settled at approximately 75 gpm: since 2002, flow at Big Bear Spring has declined while flow at Lower Tie Fork Spring has increased. The reason for these sudden changes at Lower Tie Fork Spring is unknown (Personal communication, Darrel Leamaster, February 13, 2007). They do not appear to be related to any coal mining activities.

Additional discussion related to water quantity at Upper Tie Fork Spring is found in the section on INTERCEPTION AND WELL INFORMATION for the Star Point Mine.

Flow at Lower Tie Fork Spring, developed in December 1993, has marked seasonal

variation (Figure 8). Because it was developed while the Star Point Mine was pumping from the Gentry Ridge Horst, pre-pumping data are lacking. High flow has typically been in April or May and the low around September. High-flow rate is typically two to three times that of low-flow. Low flow at Lower Tie Fork Spring declined from 62 gpm in 1994 to 41 gpm in 1995, recovered a little during the remainder of the pumping period, and reached 52 gpm in 1999, but flow did not rebound to the degree that it did at Upper Tie Fork Spring. Since 1999, the low-flow rate has fluctuated but has never been higher than 47 gpm (2003), but 1999 to 2004 was a period of drought. Low flow at Lower Tie Fork in October 1995 (41 gpm) lagged four months behind the lowest flow recorded at Upper Tie Fork Spring, 39 gpm in May and June 1995, but data from Upper Tie Fork do not show seasonal recession and it is not possible to compare the cyclicity of the two springs.

Water Quality

Water quality at the Upper Tie Fork Spring was affected by pumping at the Bear Canyon graben. The pH dropped as pumping started, reaching lows of 6 in January and June 1993. As pumping increased through 1994, pH values returned to pre-pumping values, although some elevated values were recorded. When pumping decreased in 1997, pH levels rose to over 8. After pumping stopped, the pH returned to pre-pumping values (Figure 9a).

When pumping started and as pH levels dropped, sulfate concentrations jumped, reaching a high of 66 mg/L in September 1992, but soon dropped back to pre-pumping levels. By January 1996, when pumping rates had dropped and pH values had risen, sulfate concentrations were near the pre-mining levels. After pumping stopped, the sulfate concentrations appeared to be in an upward trend, but there has been no water quality analysis since 2001 (Figure 9a).

Bicarbonate[2] generally remained in the range of pre-pumping values during pumping, even though higher than usual concentrations were measured in late 1993. After pumping stopped, bicarbonate concentrations were consistently high (Figure 9b). TDS fell during the pumping period, but recovered when pumping ceased, and several high values were reported during the post-pumping period (Figure 9b). The ratio of bicarbonate and sulfate to TDS increased over the sampling period, but at the time the Star Point Mine stopped doing water-quality analysis in 2001, the ratios appear to have been dropping back towards pre-mining levels.(Figure 10).

Increases in sulfate, and possibly other chemical constituents, to concentrations similar to the Blackhawk Formation (Figure 9a and 9b) may result from mining. These chemical changes may be the result from the mixing of Blackhawk Formation ground water with North Horn ground water.

Changes between dry and wet climatic cycles may effect oxidation and reduction within the hydrologic systems and create water chemistry changes similar to those observed. Variations in TDS, sulfate, bicarbonate, and pH may occur during future climatic cycles, independent of any mining activity.

2 Bicarbonate values in Figures 9b and 10 have been adjusted by a factor of 0.4917 to account for volatilization of H_2O and CO_2 during determination of TDS from dry residue (see Hem, 1992).

Birch Spring

Development History

Birch Spring was originally developed in the 1970's by the NEWUA (now NEWUSSD). The spring boxes were updated in 1977, and the lines to the spring boxes were re-developed in 1980 (Informal Conferences - permit renewal, cause No. C/015/025). Additional redevelopment work was done in the fall of 1984 because flow rates from the collection system where not as large as expected. Redevelopment in 1984 included some blasting and backhoe work conducted to increase flow rates, followed by collection system burial under impervious material. The water was re-connected for use after the 1984 development work. The collection system was developed again in 1986 (Figures 11a and 11b). In a letter dated April 13, 1998, Co-Op Mining Company posited that explosives used to redevelop Birch Spring in 1984 and 1986 may have opened fracture flow paths for water to by-pass the spring collection system.

The area over the spring collection system is well vegetated, which can reduce spring discharge through plant uptake and water transpiration. In 1998 the overflow pipe at the collection box was cleared of roots that were blocking flow. Roots may also have been clogging the collection lines, and silt may have accumulated in the lines as well.

In September 1998, NEWUA opened spring boxes #1 and #2. Pete Hess from UDOGM accompanied Jack Stoynoff from NEWUA. Mr. Hess noted that water was running over the top of collection box #1 when it was uncovered and that when opened, it was full of gravel and sediment. It was estimated that approximately 15 gpm flowed from source #1 after cleaning the box. Box #2 was also opened and cleaned, and several of the pipes in the collection system were cleaned or replaced. After this work in 1998, flow at Birch Spring remained at approximately 15 gpm until 2000, when it increased to 25 gpm. It currently flows approximately 20 gpm (Figure 11). This matches the flow reported by Danielson in 1978-1979 but is still well below the highs recorded in 1986 through 1990.

Hydrogeology

Birch Spring issues from a fault and fractures in the Panther Tongue of the Star Point Sandstone, west of the Bear Canyon Mine. It has been hypothesized that this fault is a splay from the Blind Canyon or Dry Canyon Fault (Map 4); however, field investigations have not identified a connection to any major fault. Fractures in the Birch Spring area are parallel, with consistent vertical and north-south orientation, not towards the mine. Transverse, interconnecting fractures have not been observed near Trail and Bear Canyon Mines, indicating that lateral hydraulic interconnectivity between faults and fractures is poor or nonexistent. Water movement across major faults, such as the Dry Canyon Fault that separates the mine from Birch Spring, does not seem likely based on general experience and information presented to date.

The Trail Canyon Mine lies directly in line with the northward projection of the Birch Spring fault. The Trail Canyon mine-workings map makes no note of this fault, but the text of

the Trail Canyon Mine plan mentions several minor faults encountered within the mine. There is no mention in the Trail Canyon Mine Plan of significant or continuous flows into the mine workings from any source.

Secondary faults and fractures, oblique to the main north-south structural fabric and able to transport water from the saturated sand channel exposed in the Bear Canyon Mine across the Blind Canyon fault to Birch Spring, have been inferred (Map 4). In the southern region of the Bear Canyon Mine, joint and fracture sets oriented N 15° E to N 17° E and a second set of minor joints oriented N 60° E have been described (informal conferences - Chris Hansen, Earth Fax Engineering). Mining in the Tank Seam has exposed a fault near the Blind Canyon Fault, north of the Blind Canyon Fan Portal, that strikes N 17° E, is offset 1.5 feet, and is down-dropped to the west; it was also observed in the Blind Canyon Seam (letter from the Co-Op Mining Company, April 13, 1998). According to Co-Op, the fault appears to terminate near the southern end of the Third West Bleeders, it did not intersect the Blind Canyon channel sandstone, and it appeared closed. An inferred fault has been projected northwest of the Blind Canyon channel sandstone (Map 4).

Farther north, in the Star Point Mine permit area, faults and joint sets that formed perpendicular to regional extensional stresses are oriented N 5° W, N 6° E, and N 14° E. These joint sets are open. Ground and surface-water migration is common along these fracture systems (Star Point Mine Plan). The Dry Canyon Fault could provide a flow path from the Shattered Zone, adjacent to Tie Fork Canyon, to Birch Spring (Maps 4 and 5); however, there are no data substantiating that the water flowing from Birch Spring originates here.

Information was collected during a field visit by Charles Reynolds, Environmental Engineer for Co-Op, and Jim Smith, UDOGM geologist, on October 15, 1998. The field-visit form and summary memo from Co-Op dated December 22, 1998 are presented in Appendix C. In summary, the documents state the following:

- The fractures do not completely converge, and they parallel the Blind Canyon Fault within the mapped area.

- Most of the area is jointed. Joints appear to be gradually converging up slope and may converge northward, upward, or both.

If the fracture zones or joint sets are open as a result of extensional stress, they may be more likely to carry flow. Detailed mapping of faults and joints would be needed to fully understand the relationship, if any, of these fractures to the hydrogeology of Birch Spring. However, Birch Spring flows at a relatively steady rate, showing little or no seasonal variation. Isotopic data also indicate there is no component of modern water in the Birch Spring discharge. These indicate that, even though numerous joints and fractures are found in the outcrops surrounding the spring, the system is not recharged locally through these fractures.

The most likely recharge area is farther north. Faults that extend north to the west side of the Shattered Zone align with Birch Spring. Other faults that flank Birch Spring extend to the Gentry Ridge Horst and Bear Canyon Graben and farther north (Map 5). Although they are

several miles from Birch Spring, these are the most likely sources for recharge to this spring. These areas to the north are topographically higher and receive greater amounts of precipitation. There are perennial streams in these higher areas. The Star Point Mine determined that the stream in Nuck Woodward Canyon has losing reaches that recharge the ground-water system through the Trail Canyon Fault. Losing reaches have not been confirmed in streams directly upgradient of Birch Spring, but Wild Cattle and Gentry Hollows align with mappable faults, and fractures and brecciated zones that would accommodate recharge are undoubtedly present. Strata dip generally southward from the structural high near the middle of Nuck Woodward Canyon, and information from boreholes, mines, and the Tie Fork Springs confirm that the potentiometric gradient is from north to south, with an eastward component in the Storrs and Panther Members. The potentiometric surface is higher in the Bear Canyon Graben than to the east or west. The north - south orientation of the faults and fractures limits east to west ground-water flow and favors flow towards Birch Spring from these northern areas.

Except for the large channel-sandstone intercepted in the Blind Canyon Seam in the #1 Mine, there were not significant inflows to the Bear Canyon Mine. Individual ground-water inflows were on the order of 5 gpm, and they did not persist. Mining did not intercept the Spring Canyon Member potentiometric surface (Bear Canyon Mine Plan, Plate 7J-1).

An issue presented by NEWUA was whether water intercepted in the Bear Canyon Mine at the channel sandstone, monitored at sites SBC-9 and SBC-10, decreased recharge to Birch Spring. Not only is there no evident hydrologic connection between Birch Spring, the mine, and the channel sandstone, but also the isotopic characteristics of water from between the Dry Canyon and Blind Canyon Faults are incompatible with flow from the mine to Birch Spring (Bear Canyon Mine Plan, Appendix 7-J).

Mining in the McCadden Hollow block is not likely to interfere with the Panther Member hydrologic system and flow to Birch Spring and Big Bear Spring. To access the Blind Canyon Seam in McCadden Hollow, entries will need to cross the Bear Canyon Fault. Fractures and brecciated zones adjacent to the fault may yield some water, but the fault crossing will be above the potentiometric surface, on both sides of the fault (Bear Canyon Mine Plan, Plate 7J-2). Tunnels are to be built down to the Blind Canyon Seam on the McCadden Hollow side of the fault. Projected mining in the McCadden Hollow block is to be done below the Spring Canyon potentiometric surface. Lower Blackhawk strata that lie between the Blind Canyon Seam and the Spring Canyon Sandstone will greatly reduce the possibility of groundwater upwelling through the mine floor. In the McCadden Hollow area, the Star Point Sandstone very likely consists of three distinct sandstone members, with separate hydrologic systems and potentiometric surfaces. This will isolate the hydrologic system in the Panther Member, which supplies Birch and Big Bear Springs, from possible impacts to the shallower members: reducing the head in the Spring Canyon Member would not be expected to effect flow at Birch and Big Bear Springs. Furthermore, the Dry Canyon Fault will act to laterally isolate Birch Spring from effects of mining in the McCadden block. Finally, encountering a large volume of water in the McCadden block would probably stop mining in this block because of poor economic return.

Water Quantity

Birch Spring is located in Huntington Canyon, about one mile south of the Trail Canyon Mine. Flow measurements done prior to installation of a flow meter in January 1992 are very sporadic and many are of questionable reliability. The more reliable flow measurements during this period ranged from 9 to 100 gpm (Figures 11). From 1992 through 2000, flows averaged 22 gpm; however, there was a slight downward trend over this period. Because mining activities ceased at Trail Canyon Mine in 1982, there is little probability this downward trend is related to activities at Trail Canyon Mine.

Flow data indicate two significant concerns: 1) decreased flow was observed from 1991 to 1998, and 2) peak flows such as those recorded in December 1988, June 1989, October 1989 through January 1990, and June 1990, have not been seen since. These peaks occurred in the middle of the 1987 – 1993 drought, so they were not caused by increased precipitation. The 1988 peak is very likely a result of the 1988 earthquake, which produced a jump in the flow at nearby Upper Tie Fork Spring. The remaining peaks may or may not be related to the earthquake.

The pre-1996 Star Point Mine Plan provided information on flow at Birch Spring from January 1985 through December 1990. It is not available from other sources. The spring flow information was obtained by Ben Grimes, who was employed by Star Point Mine but at the same time was also President of NEWUA. Although these flow data have been used in the past in matters relating to Birch Spring, UDOGM no longer considers the data from January 1985 to November 1988 to be valid. The data were collected by Jimmy Staker, an employee of NEWUA, who kept the records of his flow measurements at his home. Mr. Staker died several years ago and his original records cannot be found. Comparing the Birch Spring data between January 1985 and November 1988 with the data from Upper Tie Fork Spring for the same period, it is evident that it is the same data set. CVSSD's Upper Tie Fork records are continuous and can be confirmed back to December 1982, and the reported flows are more consistent with historic flows at Upper Tie Fork and less consistent with Birch Spring flow data. The data from December 1988 to December 1990 are also open to question because there is no way to confirm them.

NEWUA began measuring Birch Spring flows monthly between January and December 1991, using a bucket and stopwatch. After January 1992, an in-line flow meter was used and checked monthly with a bucket and stopwatch. Prior to 1991, Co-Op measured only the overflow of the collection system, so Co-Op's early measurements do not include the flow within the collection system. Since 1991, Co-Op has at times reported NEWUA's measurements and at other times has made independent measurements. Star Point began independent quarterly monitoring in October 1992. Since 1991, the independent measurements of Star Point and Co-Op closely match NEWUA's data.

Peak flow discharges, attributed to Staker□s measurements, reached 117 gpm during December 1988, 100 gpm in June 1989, 230 gpm in October 1989 through January 1990 and 85 gpm in June 1990. Based on Staker's data, each of these four peak flows at Birch Spring was followed by what appear to be periods of baseflow recession (Figure 11a). Both Co-Op and

NEWUA data confirm high flow during the October 1989 through January 1990 period; 129 gpm (of overflow) in October 1989 from Co-Op, and 100 gpm in January 1990 from NEWUA. Bill Malencik of UDOGM (memo dated November 1, 1989) measured 150 gpm on October 25, 1989, which did not include the flow in the adjacent ditch that was reported to flow 80 gpm on November 3, 1989.

Following this series of peak events, flows declined rapidly. Flow was 40 gpm in September 1990. Flows held fairly steady at around 33 gpm through 1991, but then began decreasing slowly in January 1992, reaching a low of 14.5 gpm in May 1997. From May 1997 until the spring was redeveloped by NEWUA in September and October 1998, flow increased slowly, reaching a maximum of 21 gpm in October 1997. Since the 1998 redevelopment, flow has been as high as 27 gpm (Star point data, March 2000), but flows as low as 15 gpm (Star Point and Bear Canyon data, May and June 1999) have been recorded during the same period. Data since March 2000 indicate flow is consistently above 25 gpm.

Peak Flow Events

Isotopic data and the lack of seasonal variation indicate Birch Spring baseflow comes from a large system that is buffered from seasonal fluctuations. The water source for the 1988 to 1990 peak flows was probably from a separate, perhaps local source. Three hypotheses explaining these peak flows have been considered: 1) water may have been released from the bulkheads at Trail Canyon, 2) water intercepted within the Bear Canyon Mine was pumped from the Blind Canyon Fan Portal into Dry Canyon and reached Birch Spring through subsidence above the Trail Canyon Mine workings (Map 4), and 3) the water originated from the sump in the south workings at the Bear Canyon Mine.

First Hypothesis

The first hypothesis is that the 1988 to 1990 peak flows at Birch Spring originated from water stored behind bulkheads in the Trail Canyon Mine. Flow data for Birch Spring that are presented by PMC for August, September, October, and November 1988 are considered invalid - as discussed above - but the high flow rates measured in December 1988 and later appear to be followed by periods of recession (Figure 11). These data also indicate a possible correlation with the August 14, 1988 earthquake. Hypothetically, water behind bulkheads in the Trail Canyon Mine was released during the earthquake and traveled along fault and joint systems to Birch Spring. However, it seems unlikely the three subsequent peak flows, which occurred some time after the earthquake, would be related to the earthquake.

A large sediment load was observed in Birch Spring collection system during the peak flows. A possible source of sediment in water originating at the Trail Canyon Mine would be a connection between the ground water and the surface. The only documented connection is a subsidence area observed on October 28, 1996 (Map 4). The surface subsidence effects in this area were on both sides of Dry Canyon and over a 100-foot-long section that dropped 6 to 8 feet along the ephemeral channel. This subsided area occurs over a mapped fault, the Dry Canyon Fault (west of the Blind Canyon Fault), that passes near Birch Spring. The subsidence was first identified on a map presented by Co-Op for the Trail Canyon Mine and dated March 22, 1983.

Second Hypothesis

The second hypothesis, presented by Mr. Galen Atwood for NEWUA during the 1996 Bear Canyon Mine informal conferences, contended that water intercepted in the Bear Canyon Mine was pumped from the mine through the Blind Canyon Fan Portal into Dry Canyon. This would have been in the late summer of 1989, when the 230 gpm flows were measured at Birch Spring. No factual evidence was presented for this hypotheses, although oil-and-grease, sediment, and dissolved solids levels and fecal coliform bacteria counts increased in the Birch Spring water during these high flows of late 1989 to early 1990. Isotopic data and the lack of seasonal variation since 1988 - 1990 indicate local recharge around Birch Spring does not normally occur. This may be due to low availability of water under normal conditions rather than hydraulic isolation from the surface, and a large flush of water into local drainages might have reached the Panther system and emerged at Birch Spring. Again, the Trail Canyon Mine subsidence might have allowed connection along the Dry Canyon Fault to Birch Spring. This hypothesis does not adequately explain how peaks occurred at Birch Spring several years in a row without being detected at the surface, but could perhaps explain the extreme flows in late summer of 1989.

Third Hypothesis

The third hypothesis suggests water sumped into the old workings at the Bear Canyon Mine resulted in the peak flows at Birch Spring. Pumping of water into the old south workings apparently began sometime after mid-1989 when water from the Blind Canyon channel sandstone began flowing into the North Mains (Figure 6), and ended in April 1991 when discharge to Bear Creek began under a UPDES permit. The water users have stated that water was flowing over the road below Birch Spring during this period.

Potential flow paths from this sump to Birch Spring could have resulted from subsidence features occurring adjacent to the mine sump area, at the southern end of the permit area (Map 4). This subsidence feature is located in the small drainage tributary to the alcove where Birch Spring is located. Co-Op mined beyond the permit area boundary in an area beneath the drainage in 1985. During mining a subsidence hole, with an average six-foot depth, developed in the drainage channel and a large fracture formed approximately 100 feet west of the subsidence hole. Ventilation stoppings and a barricade were installed in the mine, but no seal was installed (memo to file from Peter Hess, March 27, 1995). Approximately 150 feet southeast and up-slope from the larger hole, a smaller diameter hole, approximately 30 feet deep, subsided. It is unknown when this subsidence hole formed. The holes and fractures were observed during a UDOGM inspection in the fall of 1994 and are described in Appendix 3-N of the Bear Canyon Mine Plan. (NOV N94-46-4-1B was issued December 12, 1994, the subsidence damage in the drainage was mitigated, and the NOV was terminated in 1997.)

The subsidence holes and fractures might have facilitated a flow path between the sump and Birch Spring that would not require any substantial head increase in the old-workings sump. Water was not suspected to have exited from the subsidence features at the ground elevation, because the old workings are separated from the active mine by bulkheads. These bulkheads are

unable to contain pressures from a water reservoir with a large hydraulic head. Water would have seeped from behind the bulkheads if approximately a 20 ft head required for discharge at the surface developed. According to Co-Op there was no seepage from the bulkheads. However, the subsidence features might have provided a subsurface path for water and a source for sediment from the old workings to Birch Spring.

The adjacent Big Bear Spring also exhibited excess water during the Birch Spring peak flows. In October 1990 water was observed exiting the cliff face south of the Bear Canyon Mine. In December 1990 through January 1991, icicles were noticed on the cliffs above Big Bear Springs by UDOGM personnel and by Mr. Bryce Montgomery, hydrogeologist for CVSSD. It is believed that this discharge resulted from the water pumped into the abandoned workings at the south end of the Bear Canyon Mine. Sulfate, TDS, and oil and grease also increased in the Big Bear Spring water during this period.

According to the Informal Hearing, Cause No. C/015/025, UDOGM, under Findings of Fact: Relative Findings:

> #6 "There is evidence that pumping [in the Bear Canyon Mine] may have influenced quantity of flow from outcroppings at or near Big Bear or Birch Spring in the recent past."
>
> #7: "Pumping into the abandoned workings at the south end of the mine, directly north of the existing Bear Canyon Mine may have influenced the quantity of water seeping from outcrops above Big Bear and Birch Spring."

Water flowed from the cliffs at approximately the same elevation and the same stratigraphic section as the coal seam and the coal mine. Horizontal flow through the Blackhawk Formation is somewhat easier than vertical flow because of multiple layers of low-permeability clay, siltstone, and sandstone. As in other scenarios, it is most likely that faults or fractures provide a path from the mine workings to Birch Spring, which flows from a stratigraphic unit below the mine sump.

Long-term Declines in Flow

Flow rates from 9.3 gpm to 23 gpm were recorded at Birch Spring by the USGS (Danielson and others, 1981) during a drought period in 1978 and 1979 (Figure 11).

It is unclear whether the peak flows in 1988 to 1990 influenced long-term discharge from the spring. The lack of congruity and consistency in flow data makes such a determination difficult.

Based on NEWUA records, flow at Birch Spring declined from 33 gpm in February 1990 to about 19 gpm in 1997, with a 16 gpm low flow recorded May 1999. This decline in flow could have resulted from the drought that began in 1987 and continued through early 1993. Flows continued to decline to a low of 14 gpm recorded on June 1, 1999. Flows recovered from this low. NEWUSSD reported the spring was flowing 22.5 gpm in January 2007, and data since March 2000 indicate flow averages over 20 gpm.

Birch Spring was originally developed in the 1970's. The spring boxes were updated in 1977, and the lines to the spring boxes were re-developed in 1980. Because flow rates from the collection system were not as large as expected, additional redevelopment work was done in the fall of 1984 and again in 1986. Co-Op has suggested that the explosives used to redevelop Birch Spring in 1984 and 1986 may have opened fracture flow paths for water to by-pass the spring collection system (Co-Op letter, April 13, 1998).

Charles Reynolds noted in 1997 that water was issuing from the area between Huntington Creek and Birch Spring in a seep area that may have existed for two or three years, estimating from the vegetative growth in the area surrounding the seep. Co-Op felt this seep was the result of the collection system's reduced capacity and reduced ability to carry the available water.

The area over the spring collection system is well vegetated, which can reduce spring discharge through plant uptake and water transpiration. In 1998, the overflow pipe at the collection box was cleared of roots that were blocking flow. Silt may have accumulated in the lines as well.

In September 1998, NEWUA opened spring boxes #1 and #2. Pete Hess from UDOGM accompanied Jack Stoynoff from NEWUA. Mr. Hess noted that water was running over the top of collection box #1 when it was uncovered, and that when opened it was full of gravel and sediment. It was estimated that approximately 15 gpm flowed from source #1 after cleaning the box.

Information presented to date is not adequate to identify the cause of the decline in flow at Birch Spring from 1990 to 1999, but it does not support the assertion that the decrease in flow was the result of mining operations. There are spring development and maintenance history aspects that affect water quantity, but these are not all clearly documented or understood. Many unanswered questions about the resource at Birch Spring remain. With time, additional data and analyses from the mine operators and the water users may provide clarification.

Water Quality

Baseline water quality samples were collected at Birch Spring by Trail Canyon Mine from 1991 to 1993. Bear Canyon Mine collected baseline data in 1986, and has continued to monitor Birch Spring under the Bear Canyon Mine plan. Specific conductance and TDS both show large differences between minimum and maximum values. However, such anomalies may be characteristic of high and low flows associated with natural climatic and erosional processes, especially if the spring is influenced by surface hydrologic events. The main water quality issues at Birch Spring have been the temporary increases in coliform bacteria, dissolved solids, oil-and-grease, and sediment during the 1989 - 1990 high flow periods. There have been no significant overall changes in water chemistry at this spring during this monitoring period; therefore, it does not appear there have been any permanent or long-term adverse effects from mining. Monitoring of this spring will continue in conjunction with the Bear Canyon Mine permit (C/015/025).

Data in the UDOGM database, summarized in Table IV-3, show SBC-9 and SBC-10

have lower sulfate, bicarbonate, and chloride mean concentrations than Birch Spring, although high and low values sometimes do not show as clear a distinction. Mean solute concentrations tabulated in Table 3 of Appendix 7-J of the, Bear Canyon Mine Plan are basically in agreement with Table IV-3.

TABLE IV-3: SBC-9, SBC-10 and Birch Spring

Station	Bicarbonate (mg/L)			Chloride (mg/L)			Sulfate (mg/L)		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Birch Spring	373	439	281	8	25	3	111	298	38
SBC-9 – SBC-9A	355	440	270	6.0	27	0.5	62	347	20
SBC-10	321	412	152	8.4	20	1.0	52	100	5.0

Data from Bear Canyon Mine

Stiff diagrams are shown on Figure 15 of Appendix 7-J. Stiff diagrams for SBC-9, SBC-10, Birch and Big Bear Springs, and springs in Trail Canyon are similar in appearance.

Water quality varied some over time at SBC-10 and SBC-9/9A, most notably the jumps in chloride concentrations in 1992 and 1998 (Figures 12 and 13a). TDS and sulfate also had some variation in concentration. Values for sulfate in late 1990 and early 1991 at SBC-9 were greater than two standard deviations above average. The variability of these data may indicate intrinsic variability in the sand channel water or extrinsic influences from other water sources or mining. Water sampled at SBC-9/9A has been taken from a sump that was relocated at least once during mining, and some samples may have been taken directly from the channel sandstone. Samples from SBC-13, which are believed to be flowing through gob from the SBC-10 area, show water quality improving over time (Figure 13b), perhaps indicating that soluble minerals are being flushed from the gob.

Water Dating

Results are summarized in Table IV-4. Sample locations are on Map 4. Samples obtained on May 15, 1996 were collected during a joint sampling effort between the water users, represented by Peter Nielsen of SECOR, and Co-Op. Data from Mayo and Associates are in Table 4 of the Bear Canyon Mine PHC (Bear Canyon Mine Plan, Appendix 7-J). Analysis results for one sample from Birch Spring were obtained from the Star Point Mine Plan. The date was not provided, but the sample was collected prior to 1991, because the analytical results were first presented in 1991.

Table IV-4: Water Age Dating

Source		Date	Sample Source	Parameter		
				TU	Years Mean Residence Time * (Carbon 14 age)	δ34S
Birch	SBC-5	5/15/96	Co-Op	0.35		+3.8

		Not known	Star Point Mine	0.98		
	SBC-5	4/27/92	Earth Fax (Bear Canyon Mine Plan Appendix 7-J Table 4 4/30/93)	1.12		
	SBC-5	5/26/98	Mayo and Associates - Co-Op	0.49	1,700*	+3.0
	Source #1	10/29/98		0.33	3,600*	+5.1
	Source #2			0.37	2,500*	+5.0
	Overflow			0.47	1,100*	-7.8
SBC-9		11/13/96	Mayo and Associates - Co-Op	0.50	1,400*	
		1/6/99		3.62	2,200*	+3.5
DH-2 (Spring Canyon)			Mayo and Associates - Co-Op	-.03	900*	
		5/15/96	SECOR	0.40		+11.4
3rd West Bleeder		11/13/96	Mayo and Associates - Co-Op		500*	
		5/15/96	SECOR	2.22		+10.8
3rd West South		11/13/96	Mayo and Associates - Co-Op		5,400*	
		5/15/96	SECOR	0.0		-0.6
Big Bear Spring		5/15/96	Co-Op	14.2		5.4
		pre-1991	Star Point Mine	17.7		
		11/13/96	Mayo and Associates - Co-Op	15.8		
		5/26/98		14	Mixed	+6.0
		10/29/98		17	Mixed	+5.1
Hiawatha - Mohrland Portal		6/10/98 and 10/12/98	Mayo and Associates - Co-Op	5.52 5.41	Mixed/9,000* Mixed/9,000*	22
Star Point Mine 3rd West roof					2,500* (8,670)	

- - Mayo and Associates has revised ^{14}C ages shown on the lab reports to account for *dead carbon*

3rd West roof 2,500* (8,670)

Except for one slightly elevated value of 3.62 TU from June 1, 1999 for SBC-9, there is no indication that modern water is present in Birch Spring, or in the sand channel at SBC-9. Water from the Spring Canyon Member in DH-2 is younger (900 years) than the Blind Canyon channel sandstone (1,400-2,200). Computed mean residence times were determined for the data presented by Mayo and Associates using the Pearson, Mooks, and Fontes models. The ages from oldest to youngest are; 3rd West South, Birch Spring, SBC-9, and 3rd West Bleeder (Map 4).

Although Big Bear Spring has chemical characteristics similar to Birch Spring, dating indicates *mixed* waters with high TU identifying a modern or *young* component in the water recharging Big Bear Spring (Table IV-4). Chemical characteristics of the Trail Canyon springs are similar to Birch and Big Bear Springs; however, sampling to determine the mean residence time was not conducted on any Trail Canyon springs.

Conclusions made from the water dating analyses are:

1. 1) the age of the water at SBC-9 (1,400 to 2,200 years mean residence time) and Birch

Spring (1,100 to 3,600 years mean residence time) are similar, but all data considered together might favor Birch Spring as being slightly older,

2. no modern water was found at Birch Spring or SBC-9 water source, and
3. water from the 3rd West Bleeders is younger in age (500 years mean residence time) than Birch Spring.

Water flowing from Mohrland Portal is the oldest encountered in the Mayo and Associates samples, but TU values indicate a mixture with modern waters.

$\delta^{34}S$ represents the isotopic sulfur ratio and is used to identify sulfate sources in ground water. The Third West Bleeders and SBC- 9 have similar $\delta^{34}S$ levels, while the third-west south and Birch Spring are lower. These $\delta^{34}S$ levels become important if geochemical modeling is conducted.

Big Bear Spring

Development History

The Big Bear Spring was developed as a water source by Huntington City around 1920. At that time, a four-inch transmission line was used to convey the water, but the line capacity was not large enough to transport all water available during peak flows. In 1977 Huntington City upgraded the spring boxes and collection systems and installed a meter. This meter was used to collect spring flow data and was operating when Terry Danielson (Danielson and others, 1981) collected samples for the USGS in April through December 1978.

In 1981 the CVSSD replaced the four-inch line with a six-inch line and a new meter, which is adequate to transport all the spring flow. Following the new meter installation, flows are measured on the 15th and last day of each month by the CVSSD. The collection system was again modified in early 2001 to capture additional flow, but the results have not yet been determined. The telemetric system, connected to the spring collection system in 1995, currently records hourly flow rates. The spring was redeveloped in 2000 in an attempt to capture flow that was bypassing the collection system.

Hydrogeology

Big Bear Spring issues from fractures in the Panther Tongue of the Star Point Sandstone. The fractures and faults that extend north, to and beyond the Shattered Zone and the Bear Canyon Graben, align with Big Bear Spring (Map 5). Although these areas to the north are several miles from Big Bear Spring, they are the most likely sources for recharge to these springs. These areas are topographically higher and receive the greatest amount of precipitation. There are perennial streams in these higher areas to the north. The Star Point Mine determined that the stream in Nuck Woodward Canyon has losing reaches that recharge the ground-water system through the Trail Canyon Fault. Losing reaches have not been confirmed in streams directly upgradient of Big Bear Spring, but Wild Cattle, Gentry, and McCadden Hollows align with large faults, and fractures and brecciated zones that would accommodate recharge are undoubtedly present. Strata dip generally southward from the structural high near the middle of

Nuck Woodward Canyon. Information from boreholes, mines, and the Tie Fork Springs confirm that the potentiometric gradient is to the south, with an eastward component in the Storrs and Panther Members, and the potentiometric surface is higher in the Bear Canyon Graben than to the east or west. The faults and fractures limit east-west ground-water flow and favor flow towards Big Bear Spring from these northern areas.

It has also been suggested that recharge came from Bear Creek and local faults and fractures. Although recharge to the spring from the creek is not confirmed, baseflow to Bear Creek comes from the Bear Canyon Fault.

Except for the large channel-sandstone intercepted in the Blind Canyon Seam in the #1 Mine, there were not significant inflows to the Bear Canyon Mine, even in the Hiawatha Seam workings directly above the Star Point Sandstone. Ground-water inflows were on the order of 5 gpm, and individual sources did not persist. In-mine well DH-1 A was completed in the Spring Canyon Sandstone, directly under the Hiawatha Seam. Water in DH-1A was approximately 5 feet below the coal seam.

Mining in the McCadden Hollow block is not likely to interfere with the Panther Member hydrologic system and flow to Birch Spring and Big Bear Spring. To access the Blind Canyon Seam in McCadden Hollow, entries will need to cross the Bear Canyon Fault. Fractures and brecciated zones adjacent to the fault may yield some water, but the fault crossing will be above the potentiometric surface, on both sides of the fault (Bear Canyon Mine Plan, Plate 7J-2). Tunnels will need to be built down to the Blind Canyon Seam on the McCadden Hollow side of the fault. Projected mining in the McCadden Hollow block is to be done below the Spring Canyon potentiometric surface. Lower Blackhawk strata that lie between the Blind Canyon Seam and the Spring Canyon Sandstone will greatly reduce the possibility of groundwater upwelling through the mine floor. In the McCadden Hollow area, the Star Point Sandstone very likely consists of three distinct sandstone members, with separate hydrologic systems. This will isolate the Panther Member hydrologic system that supplies Birch and Big Bear Springs from impacts in shallower members. Finally, if a large volume of water were to be encountered in the McCadden block, the cost of moving the water could stop further mining.

Water Quantity

The changes in flow rates at Big Bear Spring over time are presented in Figure 14a. Little Bear Spring and Upper and Lower Tie Fork Springs are presented to show relationships with other HCIC water-right sources. Figure 14a also includes the Palmer Hydrologic Drought Index (PHDI) for Region 5. The PHDI is a drought index used to assess long-term moisture supply. It indicates the severity of a wet or dry spell, with negative values denoting a dry spell and positive values denoting a wet spell. Figure 14b shows Big Bear Spring and the PHDI, along with a chronology of significant mining events.

The most notable changes in the flow characteristics at Big Bear Spring are a marked decline in the size of seasonal peak flows and a drop in overall flow rate beginning in 1987 and 1988. There is an obvious correlation between the drought beginning in 1987 and the onset of these losses (Figure 14b). More contentious is the role mining might have had in these declines;

however, a connection to mining has not been determined.

The Drought

The drought, based on data presented for the PHDI in Region 5, began in 1987 and lasted until 1993 (Figure 14). Seasonal peak flows and total flow decreased at Little Bear and Big Bear Springs along with the drought index (Figure 14a). After 1990, the mean annual flow (obtained from the monthly means) did increase slightly for Big Bear Spring, but the magnitude of the increase in flow did not match the increase in the PHDI (Figure 15), and the seasonal peaks have never returned to pre-drought size.

The slow response to the end of the drought may result from a portion of the water, which would otherwise discharge at the springs, recharging storage drawn down during the drought, a type of hysteresis effect following the drought. Little Bear Spring is in a ground-water system that was unaffected by the Star Point Mine pumping or any other mining operations during this drought. In spite of the quick recovery of peak flows at Little Bear Spring following the end of the drought in 1993, the lowest flow at Little Bear Spring occurred in 1995, two years after the end of the drought (Figure 14a). This indicates the affect of the drought on water storage in the Little Bear Spring system extended beyond the actual drought period. The Little Bear low (April 1995) corresponds with the minimum flows reported for Big Bear (May 1995) and Upper Tie Fork Springs (May and June 1995), suggesting a similar extended response in those systems. In contrast, Lower Tie Fork Spring was out of synchronization with these other springs and had the highest recorded flow in May 1995.

Mine Water

The response at Upper Tie Fork Spring to Star Point Mine's pumping at Gentry Ridge was anticipated and mitigated. Although the 1995 flow minimum at Big Bear Spring and the 1996 jump in flow correlate with the drought response at Little Bear Spring, the timing also suggests a component could be in response to the Star Point Mine pumping, which was at its greatest at the end of 1994 and dropped sharply in 1995 (Figure 1). Such a rapid response would further suggest the possibility of a direct hydrologic connection from the Gentry Ridge Horst – Bear Canyon Graben area to Big Bear Spring, but existence of such a connection is not supported by any other information.

Star Point Mine-water Interception

East of the Bear Canyon Fault

Intercepted ground water averaged 150 gpm from April 1985 through 1986 at the Star Point Mine. Flows originated from longwall panels #3 and #12 (Map 3). Longwall panel #3 was initiated in August 1982 and ended in March 1986. This panel was centrally located in the series of longwall panels just east of the Bear Canyon Graben and on the west edge of the mining block. Intercepted flow peaked within longwall area #3 in September 1985. Development of longwall panel #12 in the Wattis Seam was conducted in 1989 and the longwall was pulled in 1990. Little information on flow at the #12 longwall panel was found in the Star Point Mine

Plan. According to the mine maps, panel #12 is located near the subsidence that occurred under the North Fork of the Right Fork of Miller Creek and is not suspected to be related to changes at Big Bear Spring.

Water intercepted in the Star Point Mine in 1986 through 1987 averaged 218 gpm. During this period, longwall panels #4 and #5 in the Wattis Seam were mined adjacent to the Bear Canyon Fault. A surface subsidence fracture occurred above panel #4 that may have contributed inflow from the surface and formations above the coal. A decrease in peak flow was noted at Big Bear Spring in 1987, so timing suggests that the mining in panels #4 and #5 might have intercepted flow to Big Bear Spring.

However, fault related ground water was clearly encountered earlier (pre-1983), when the mine intercepted the east side of the Bear Canyon Fault at two locations: the 2nd Left (8,780 ft) and the 2nd West Mains (8,490 ft) in the Wattis Seam. Where the 2nd Left Main contacted the Bear Canyon Fault, initial inflow was 6 gpm from the roof. Liquefied gouge flowed from the faces of entries #2 and #3, extending approximately 10 to 15 feet into the entries after three weeks. Underground drilling in the #1 entry penetrated 40 to 60 feet of gouge and fractured rock before tapping into what was called "a significant conduit". Inflow from the drill holes peaked at about 150 gpm, dropping to 50 gpm in two weeks, less than 10 gpm after 10 weeks, and finally to zero. The encounter on the east side of the fault in the 2nd West Mains produced an initial inflow rate of about 20 gpm from the roof. This flow reduced to less than 10 gpm after 4 weeks of exposure and eventually dropped to zero. Very little water was found at the actual face. (Star Point Mine Plan, pp. 700-11 and 700-12).

The Bear Canyon Fault and related fractures, at the level of the Blackhawk coal seams, contained perched water, and a thick section of gouge separated the east and west sides. Star Point Mine operations east of the fault would not have interrupted recharge or flow to Big Bear and other springs west of the fault.

Bear Canyon Graben Crossing

The rock tunnel crossing through the Bear Canyon Graben was developed in 1989. Based on the results of borings done from the surface and from the in-mine drilling described by Mr. Mercier, the water encountered in the graben crossing originates from perched systems associated with fractures. A hole bored from within the tunnels confirmed that the Star Point Sandstone potentiometric surface was 160 feet below the tunnel, at an elevation of approximately 8,300 ft (Star Point Mine Plan, pp. 700-10 through 700-12).

Gentry Ridge

Throughout the mining process, flow entered from the mine roof. Water also seeped through the floor in the 4th Right and 5th Right longwall panels, which were mined in 1992 and 1993. Inflows that were not associated with fracturing or faulting were relatively small. Some sections of the Gentry Ridge workings were noted to have damp conditions: 3rd South and 1st, 2nd and 3rd Right Mains had small wet areas on the floor. PMC personnel speculated that this was indicative of conditions that would be expected in a aquitard located beneath the water table,

and felt that these wet conditions were consistent with forecasts made prior to entry into the Gentry Ridge area.

Smaller inflows were found in the 3rd South Mains, near the Western Boundary Fault of the Bear Canyon graben. Flow rates up to 50 gpm were reported 1992-1993, the size of these flows generally increasing as mining progressed to the south.

Larger inflows within the Star Point Mine have been where mine workings intercepted segments of the western boundary fault of the Gentry Ridge Horst, which is also the eastern boundary fault of the Pleasant Valley Graben and may be continuous with the Trail Canyon Fault to the south (Map 3). Two large flows from floor fractures were encountered at the far western end of the 3rd West Mains. Combined flow was 100 gpm in January 1992, dropping to 40 gpm by April 1992, and was dry by May 1998 Star Point Mine Plan, page 700-63 and Sheet 728b). A roof fracture in the south mains for the second longwall panel (3rd Right Mains) flowed an estimated 100 gpm in April 1992, but this was dry by October 1993. Approximately 50 gpm was measured flowing from the roof in the south mains of the third longwall panel (4th Right Mains) in May 1992, but this also was dry by October 1993. As mining progressed downdip, to the south, in 1993, flows of as much as 200 to 250 gpm were reported from the vicinity of the western boundary fault during development near the headwaters of Wild Cattle Hollow, but there are no additional data for these locations. Inflows were pumped from the mined section until late 1995 when longwall mining ceased. Subsequent to that time, mine waters inflows have begun to re-establish the local potentiometric surface in the Pleasant Valley graben. No measurements or levels are known.

Bear Canyon Mine Water Inflows

Previous mining at this site dated back to 1938, but there had been a hiatus of approximately 30 years before Co-Op began mining at the Bear Canyon Mine in 1982, in the Blind Canyon Seam. Flow has been measured sporadically at SBC-7, a sump just inside the portals, in the old workings. Flow at SBC-7 was 18 gpm in March 1988 and generally remained at 16 to 19 gpm through November 1989. When monitored in February, May, and August 1990, water had ceased flowing at SBC-7, and after monitoring in November 1990 and February 1991, this site was considered dry and monitoring was discontinued. The first significant flow of water into the new workings of the Bear Canyon Mine was from the roof near the sump in the East Bleeders. Flow was first measured from the sump at SBC-8 in March 1988, varying between 18 to 22 gpm until February 1989. The water originated from faults and fractures and produced the largest volumes flowing into the mine during the early mining periods. The combined flow of SBC-7 and SBC-8 was 30 to 40 gpm up to November 1989, after which flow into the mine at these two locations became inconsistent and then ceased (Figure 6).

Other significant inflows, recorded at SBC-10 and SBC-9 (Figure 6), originated from the Blind Canyon channel sandstone. In August 1989, mining operations in the North Mains of the Bear Canyon Mine, in the Blind Canyon Seam, approached the margins of the channel sandstone in the mine roof. By November 1989, large roof drips began to flow into the mine in this area. Initial flows measured in February 1990 at SBC-9 were 120 gpm, and flows reached a maximum of 175 gpm in 1993 - 1994 (Figure 6). The increasing inflow in the North Mains corresponded

with the onset of inconsistent and diminishing flows at SBC-7 and SBC-8.

In February 1992 monitoring began at SBC-10 in the 1st East entries: flow started at 250 gpm, and combined flow measured at SBC-9 and SBC-10 jumped to 382 gpm. Mining in the North Mains reached the main body of the sandstone in April 27, 1993, and SBC-9 was moved closer to the channel sandstone. Flows rapidly declined at SBC-10, dropping to approximately 25 gpm by 1994; however, from 1993 to 1995 combined flows were relatively stable at 150 to 200 gpm. SBC-10 became inaccessible in 1995. Flow at SBC-9 declined gradually from 1995 to 1999 and was 55 gpm when the area was sealed in November 1999. In 1997, water that is believed to be from the SBC-10 area began discharging from the gob at SBC-13: When monitoring ceased in February 2002, flow was averaging approximately 28 gpm and appeared to be slowly declining (Figure 6). The water now monitored at SBC-9a comes from various sources throughout the Blind Canyon and Hiawatha workings, but most probably still comes from the Blind Canyon channel sandstone.

Mining under Wild Horse Ridge is not expected to impact Big Bear or Birch Springs. Reasons for this conclusion are discussed on pages 130-132 of Appendix 7-J the Bear Canyon Mine plan:

1) Faults with as much offset as the Bear Canyon Fault, 200 to 250 feet, are typically filled with low permeability gouge, which prevents movement of water both across and along the fault plane. Fault gouge is visible in the Bear Canyon Fault where it is exposed near the head of Bear Canyon;

2.) Fractures adjacent to such large faults typically transmit water parallel to the fault plane, but the fractures on the east (Wild Horse Ridge) side of the fault will not have good hydraulic communication with the fractures on the west side because of the fault gouge;

3.) Recharge most likely occurs in areas where the Panther Tongue crops out, rather than vertically through overlying strata;

4.) Dip is to the southeast, and flow will be strongly influenced to move in the direction of dip, rather than to the southwest towards Big Bear Spring;

5.) The gouge in faults will further inhibit lateral movement towards the west and Big Bear Spring;

6.) Water quality in three springs east of the Bear Canyon Fault is significantly different than water in Big Bear Spring, again indicating no or poor hydraulic communication between the Wild Horse Ridge area east of the fault and Big Bear Spring.

Hiawatha Mine Water Inflows

The dates when water was intercepted near the Bear Canyon Fault are not given in the Bear Canyon Mine Plan. However, the mean residence time of water flowing from the vicinity of the fault in the Hiawatha Mine is older than that for waters from the either the Bear Canyon Mine or Big Bear Spring (Table IV-4), indicating water intercepted near the Bear Canyon Fault in the Hiawatha Mine has not been flowing to either the mine or the spring.

Big Bear Spring Compared to Other Springs

Annual average flow from Big Bear Spring declined steeply from 1986 through 1990, then remained fairly constant until the 1995 low (Figure 15). Bear Canyon flows increased in 1996 but did not approach the pre-drought flow rates, and have generally declined since. CVSSD worked on the collection system at Big Bear Spring from January to March 2001 in an attempt to recover additional flow.

Big Bear, Little Bear, Upper Tie Fork, and Lower Tie Fork Springs had a historic low flow during 1995, but Birch Springs did not (Figures 14a and 11). Little Bear Spring showed a quick increase in flow following this low and recovered to pre-drought output. Upper Tie Fork also recovered to pre-drought conditions, but more slowly, probably because of the continued, although diminished, pumping at the Star Point Mine. Flow at Big Bear Spring increased after the 1995 low but remained below pre-drought levels. Lower Tie Fork reached a low three months after Upper Tie Fork (Figure 8), but data are insufficient to make any conclusions about the impact of either the drought or the Star Point pumping on this spring.

Of these springs, Little Bear Spring is farthest from mining at the Star Point and Bear Canyon Mines, yet it was the first of these springs to reach minimum flow in 1995. It is significant that Little Bear Spring flow was at a minimum during this 1995 period (Figure 14a and Table IV-5) because Little Bear Spring is in a separate hydrologic system from the Gentry Mountain springs: it is located on East Mountain, south of Huntington Canyon, and elevated well above the canyon floor. Recent geophysical and dye-tracer work done by CVSSD indicates recharge is dominantly from Mill Fork Canyon, through the faults of the Roan Canyon Graben.

Although Big Bear and Upper Tie Fork Springs had minimum flows recorded in May and June 1995, Lower Tie Fork had its highest recorded flow in May 1995 (Figure 14a) and the water level in well 85-35-1 spiked (Figure 5a). Lower Tie Fork Spring reached a low in October 1995, five months after the May peak. All these extreme events occurred during dewatering of Gentry Ridge by the Star Point Mine. The correspondence of the 1995 extreme lows at Big Bear and Upper Tie Fork Springs with the low at Little Bear Spring (Figure 14a) indicates these lows were due to regional climatic influences. Climate and pumping do not explain the peaks observed at Lower Tie Fork Spring and well 85-35-1. Lower Tie Fork Spring responds independently from Upper Tie Fork Spring, indicating separate flow paths and possibly separate recharge zones for these two springs, even though they are near each other and no fault has been identified between them.

At Big Bear Spring, the 1995 flow minimum and the 1996 jump in flow correlate with the drought response at Little Bear Spring. They also coincide with the pumping induced minimum and recovery at Upper Tie Fork. This suggests a component of the changes at Big Bear Spring could be in response to the Star Point Mine pumping, which was at its greatest at the end of 1994 and dropped sharply in 1995 (Figure 1), but no other information connects the Star Point pumping to the drawdown at Big Bear Spring. Such a rapid response would further suggest a fairly open hydrologic connection from the Gentry Ridge Horst – Bear Canyon Graben area to Big Bear Spring.

Table IV-5: Historic Lows and Highs for Selected Springs

Spring – Source of Data	Historic Low Flow		Historic High Flow	
	Flow (gpm)	Month/Year	Flow (gpm)	Month/Year
Big Bear Spring – CVSSD	76	May 1995	378	July 1983
Upper Tie Fork Spring – CVSSD	39	May and June 1995	165	Aug 2002
Lower Tie Fork Spring – CVSSD	37	Aug 2002	147	May 1995
Little Bear Spring - CVSSD	195	Feb 2003	484	June 1998
Birch Spring - NEWUA	2.5	Nov 1994	100	Jan 1990
Birch Spring: other reported extreme flows (see Figure 11a).	15.8 (Co-Op at SBC-5 just prior to redevelopment of the spring in September. Reported flow in September was 0.5)	Aug 1998	230 (NEWUA via Star Point Mine: reliability of data not known)	Oct 1989 thru Jan 1990

Water Quality

The change in hydraulic conductivity in mined strata may change the residence time for water traveling through the system. Data from the Big Bear Spring show a slight increase in TDS with time (Figure 16a), but this is probably related more to decrease in flow than to changes in residence time caused by mining (Figure 16b). TDS was generally lower during the high flow period before 1988 (Table IV-6 - Note: TDS was not determined during the highest flows during this period). TDS was higher than average during 1990 - 1991 and 1995 - 1996. The 1990 - 1991 increase in TDS corresponds to when Star Point Mine began mining under Gentry Ridge. It also roughly corresponds to when Bear Canyon Mine began discharging water intercepted in the mine in 1987 and then increased discharge beginning in 1991. The 1995 increase corresponds to the period when flows at several springs were at their lowest due to drought and when pumping from the Gentry Ridge Horst across the Bear Canyon Graben reached its maximum average monthly flow (Figure 1). The high value in 1999 is an unexplained single-point anomaly. No definitive conclusions can be drawn about the relationship between mining operations at the Star Point and Bear Canyon Mines and changes in TDS at Big Bear Spring, although some short-term increases do

appear related to mining activities.

Table IV-6: Big Bear Spring TDS

Average - 1980 to 1988	Average - 1989 to 2000	Historic Average 1971 2006
289	360	354

Data from Bear Canyon Mine and CVSSD.

The data presented by Bear Canyon and Star Point Mines show that Big Bear Spring water differs in oxygen and hydrogen isotopic-ratios in relation to the Meteoric Water Line (Figure 17). Big Bear Spring data plot below the Meteoric Water Line for the sample presented by Co-Op in 1995 and the data plot above the water line for the sample obtained by Star Point prior to 1991.

Water with an isotopic composition that plots below the meteoric water line is considered to be isotopically enriched, and that above is isotopically depleted. Isotopic enrichment or depletion may result from the climate at the time of precipitation, geochemical changes that have occurred in the subsurface, or both. The variation between the two Big Bear Spring samples may simply reflect seasonal changes. The data are insufficient to make a definitive interpretation.

Spring Sources with Wildlife and Agricultural Uses

Miller Creek Springs

Springs 229, 232, 238, 492, 494, 500, 530, 753, 978, and S18-2 (Map 6) were monitored in association with USGS Water-Resources Investigations Report 95-4025 (Slaughter and others, 1995). These springs may have been affected by subsidence caused by longwall mining in the Star Point Mine (Map 3). Discharge from spring 500 diminished, following mining in the Wattis seam but prior to mining the Third Seam. Discharge from spring S18-2 diminished substantially about the same time and then became dry after June 1991. Spring 229 diminished in mid-summer, which is not unusual, but the spring did not regain measurable discharge after June 1989. Slaughter drew no definitive conclusion on the effect of mining subsidence on spring discharge.

Water quality in four springs did vary between pre-mining and post-mining data with slight increases in sulfate and slight decreases in bicarbonate recorded at springs 530, 238, 492, and 978 in 1992. No substantial variation in water quality was determined between the pre-mining and post- mining periods by the USGS study (Slaughter and others, 1995).

New springs may have developed below Gentry Ridge along the coal outcrops southeast and down dip from the mine sumps and well P86-01-TD (Figure 3). Water was pumped across the Bear Canyon Graben from the west into the Mother Goose sump in the Third Seam (Map 3).

In a field visit to the Hiawatha Mine in 1997, UDOGM personnel noted that a considerable amount of water was flowing from seeps above and along the coal outcrops in the South Fork of Right Fork of Miller Creek. If these seeps and springs resulted from the pumping operations at the Star Point Mine they would have been expected to diminish after pumping operations ceased. No seeps or spring surveys were conducted in this region during or following pumping operations, and there was no follow-up visit.

Gentry Ridge Springs

On August 16, 1997, Lee McElprang, a private citizen concerned for the springs and water rights in the area, accompanied David Darby of UDOGM; Liane Mattson, Jeff DeFreest, and Charles Yankowitz of the USFS; and John Pappas of the Star Point Mine to observed springs in the Gentry Mountain region near Wild Cattle Hollow (Map 6). There is a concern that springs 424, 450, 452, 753, 971, 458, and 486 had been affected by mining subsidence. During this site visit the springs were flowing; however, it was raining the day of the visit so flow rates could not be measured accurately. It should be noted that some factors had changed by the time these springs were visited: 1) the drought period lasting through 1995 had ended, and 2) mine de-watering had ceased. Spring 971 east of the Bear Canyon Fault lies over longwall panels 4 and 5 where subsidence occurred (Map 3). This spring has been monitored on an irregular basis, since 1989. The only flow recorded was in May 1990; however, water-quality data were obtained on May 30, 1990 and July 15, 1991. This spring is roughly 1,200 feet above the Wattis Seam and was mined under in June 1987. From July 1987 through July 1988, longwall panels were mined in the Third Seam. This spring could have been directly affected by mining in the Wattis and Third Seams, but because there are no flow data prior to 1989, any impact of mining on the flow of this spring cannot be determined.

SURFACE-WATER RESOURCE HYDROLOGIC IMPACT ASSESSMENT

Under this section, potential surface-water impacts are described first, then mine-water discharge information is discussed and finally data from drainages are reviewed for impacts associated with mining. This review focuses on the drainages with mine-water discharge or other identified potentials for impact.

POTENTIAL IMPACTS TO SURFACE-WATER QUALITY AND QUANTITY

Water Quality - General

Increases in TDS and sulfate are the most commonly observed changes in surface-water quality that result from mining in the CIA. These chemical changes are not often significant, because there is a large variability in TDS in the natural system and the water quality degrades downstream naturally. Mining may alter surface-water quality when surface water is re-routed and mine-water flows are discharged to the surface.

Re-routing surface water may change localized water quality by increasing the runoff retention time from a mine-site and decreasing sediment loading. The changes in peak flows and sediment load may increase or decrease stream competence and downstream channel aggregation

or degradation.

Mining operations may change water quality due to contamination from acid- or toxic-forming materials, hydrocarbon and chemical contamination, other materials associated with mining such as rock-dust and road salting, increased sediment yield from disturbed areas, flooding and streamflow alteration.

Surface-water quantity changes include mine-water discharge, losses to stream flow through interception from subsidence, and diversion of surface water. Re-directing surface water may change localized flow characteristics, increase the detention time for runoff from a mine site, or may locally decrease or increase peak flows rates and flow velocities. Disturbed areas may increase the runoff volume and decrease infiltration, and sedimentation ponds may locally increase infiltration or evaporation rates. Mine-water discharges may be at constant or varied rates and be of sufficient volume to change the flow regimen. Subsidence holes or fractures that propagate to the surface may reduce or relocate stream flow or ephemeral flow. Subsidence induced landslides or rock fall may interrupt stream flow.

Streams within the CIA receive maximum flow rates in May through July in response to snowmelt runoff (Price and Plantz, 1987). Flows decrease significantly during the autumn and winter months. Summer thunderstorms may cause localized short-duration, high-intensity runoff.

Water Use

The Price and San Rafael River Basins are primarily used for stock watering, farming, coal mining, electric power generation, and industrial purposes. Within the Castle Valley, agriculture and power production utilize nearly all of the in-flowing water (Mundorff, 1972). Flows in the gauged streams may occasionally approach zero. Storage reservoirs are common at higher elevations west and north of the CIA.

Minewater Discharge to Surface Waters

The mine water discharged from the Bear Canyon and Hiawatha Mines as reported by the Utah Pollutant Discharge Elimination System (UPDES) Permit. Discharge Monitoring Reports (DMR) are summarized in Table IV-7. Because the DMR data are sparse at some sites, operational monitoring discharge data from several of the same locations are included in Table IV-7. The Deer Creek Waste Rock Site and the Trail Canyon Mine do not have mine-water discharge. Not all monitored sites have provided data from a totalizing flow meter, therefore total flow volumes discharged from some mines are unknown.

Table IV-7: Minewater Discharge, from UPDES Discharge Monitoring Report (DMR) and Operational Monitoring Data in UDOGM's Database

Mine (period of record)	Average Flow	Maximum Flow		Maximum Average Flow (DMRs only)		Reports of Zero Flow
	GPM	GPM	Date	GPM	Date	

Star Point Final Mine Discharge UPDES-011 (06/95 - 05/00)	14	150	Nov. 1996	150	Nov. 1996	11 Records Zero Flow – 9
Star Point Final Mine Discharge Operational (10/90 - 12/010)	0	0	-			111 Records Zero Flow – 111
Hiawatha Mohrland Portal Discharge UPDES-001 (5/91- 2/02)	416	1,050	July 1994	1,050	July 1994	9 Records [1] Zero Flow – 0
Hiawatha Mohrland Portal Discharge Operational (1/79 - 6/06)	316	1,584	October 1993			320 Records Zero Flow – 31
Hiawatha Mine Discharge to Miller Cr. UPDES-002 (1/83 - 3/97)	13,244	149,306	May 1992	104,861	May 1992	8 Records [2] Zero Flow – 0
Hiawatha Mine Discharge to Miller Cr. Operational 1/83 - 3/97	182	1,221	May 1991			281 Records Zero Flow – 31
Hiawatha Mine Discharge - No. Fk Vent UPDES-010 (5/91 - 5/92)	1.0	2.1	May 1991	1.4	May 1991	3 Records [3] Zero Flow – 0
Hiawatha Mine Discharge - No. Fk Vent Operational (6/83 - 7/94)	2.6	14	May 1984			46 Records Zero Flow – 0
Hiawatha Mine Discharge - #6 Mine UPDES-013 (5/91 - 7/94)	0	0	-	0	-	9 Records Zero Flow - 9
Bear Canyon Mine Discharge to Bear Ck UPDES-004 (10/91 - 3/02)	121	350	Jan. 1992	318	Feb. 1992	106 Records Zero Flow – 0
Bear Canyon Mine Discharge to Bear Ck Operational (3/85 – 9/06)	73	318	February 92			315 Records Zero Flow – 98

1 UDOGM's database contains DMR data for only nine months, between May 1991 and February 2002.
2 UDOGM's database contains DMR data for only eight months, between May 1991 and November 1992. 3 UDOGM's database contains DMR data for only three months, between May 1991 and May 1992.

THE SAN RAFAEL RIVER BASIN

Huntington Drainage

Nuck Woodward Creek and Little Park Canyon

Cypress Plateau collected data at monitoring sites 78-10-2CV and 87-10-3CV on Nuck Woodward Creek, respectively above and below Little Park Canyon (Map 6), from June 1993 to September 2001. There were no obvious changes to the water quantity or quality through the monitored period. There are no discharges from mine sites to this drainage.

Mining in the Castle Valley Ridge area was designed to protect the channel in Little Park Canyon by leaving a block of coal beneath the channel. This channel was monitored during June, July, August, and September or October from 1993 to 2001 (87-10-1CV). Zero flow was reported at least once for each month during this monitoring period. No subsidence was recorded for this area.

Bear Creek

Water Quantity

Stream flow in Bear Creek varies greatly depending on precipitation and runoff factors. Table IV-8 below summarizes Bear Creek flows and mine-water discharge. Mining artificially increased flows to the creek through mine-water discharge. Water continues to discharge to Bear Creek at UPDES UTG04006-004, although volumes have decreased since mining ceased in the #1 and #2 Mines. Figure 18 shows the difference between flows recorded in Bear Creek at BC-1 above the Bear Canyon Mine and BC-2 below the mine. It also shows the discharge from UTG04006-004, the Bear Canyon Mine-water discharge point. Before significant discharge from the mine began, flows above and below the mine were similar. The larger flow downstream at BC-2 from 1991 through 1999 can be attributed to the Bear Canyon Mine discharge. Since 2000, upstream and downstream flows are again similar.

The #1 and #2 Mines were sealed and the areas reclaimed in 2006. However, gravity drainage through the #1 Mine portal continues, and as of 2007 water was still being drawn from the mine-discharge line to provide water for culinary and surface-operation uses; future consumption is not expected to decrease natural streamflow rates.

TABLE: IV-8: Bear Creek and Mine-water Discharge in gpm

Station	Before mine-water discharge Average 9/80 -3/91	During active discharge Average 4/91 - 12/99	After active discharge Average 2/00 - 9/06
Upper Bear Creek BC-1	80	90	36
Lower Bear Creek BC-2	80	212	54
Mine-water Discharge UPDES Discharge Point UTG04006-004	0.2 gpm on 3/18/85 This is the only report from this period:	116	9

Because little water was encountered in the #2 Mine, water was pumped from the Blind Canyon Seam, reducing the discharge to Bear Creek. A waterline was installed from the Blind Canyon Seam up through a borehole to the Tank Seam.

Water Quality

Sediment

Total Suspended Solids (TSS) levels in Bear Creak above the Bear Canyon Mine are typically higher than below the mine (Table IV-9). Mine water is discharged into Bear Creek between the upper and lower sites. The mine discharge water contains considerably less TSS than the stream water and dilution is a factor in the decreases noted at the lower sampling location (BC-2). Additionally, the stream gradient decreases down canyon, reducing stream velocity and allowing suspended sediments to be deposited.

TSS at BC-1 (upstream) and BC-2 (downstream) average 2,347 and 2,265 mg/L. During precipitation events large amounts of sediment are transported in Bear Creek, thus large data ranges are observed for TSS. The maximum TSS for the BC-1 and BC-2 are 23,098 and 22,270 mg/L, respectively.

The TSS levels from the mine water DMR (UTG04006-004) are lower than stream background levels. Water in the mine is contained in sumps until settling allows discharge water to be in compliance with the mine's UPDES permit.

From a total of 132 TSS mine-water discharge samples collected as of June 2004, 79 samples have been below the detection limit. Average TSS of the remainder is 11 mg/L. The maximum mine-water discharge value recorded as 83 mg/L, which is much lower than the levels recorded for Bear Creek.

TABLE IV-9: Bear Creek Total Dissolved and Suspended Solids

	Total Dissolved Solids (mg/L)		Total Suspended Solids (mg/L)	
Station	Average	Maximum	Average	Maximum
Upper Bear Creek BC-1	509 (11/84 – 11/06)	3,200	2,347 (09/80 – 11/06)	23,098
Lower Bear Creek BC-2	469 (11/84 – 11/06)	3,310	2,265 (09/80 – 11/06)	22,270
Mine-water Discharge UTG04006-004	404 (04/91 – 06/04)	998	11 (04/91 – 06/04)	83

Data from UDOGM database.

The minewater discharge, containing little sediment, can increase the waters ability to transport sediment (competence). The increase in competence may increase degradation (down cutting) below the discharge point until equilibrium is reached: however, the potential for increased sediment transport is naturally decreased because the gradient decreases downstream from the mine-water discharge. This in turn can create a shallow stream channel that will need to adjust to the sediment loading.

According to Susan White, Reclamation Biologist with the UDOGM, Bear Creek does not support fish and is not considered a cold water fishery. It may support some cold water species of macro-invertebrates. Huntington Creek is a local cold water fishery and has a Class 3A state water-quality designation. Recreational use (Class 2) of Bear Creek is primarily from

the neighboring Trail Canyon City residents. The increased mine flow would not negatively impact the recreation at this site.

Total Dissolved Solids

The Class 4 water-quality standard for TDS is 1,200 mg/L. The maximum TDS level in the Bear Canyon Mine water is 782 mg/L with an average concentration of 363 mg/L, which is less than TDS concentrations upstream. Mine-water TDS may decrease the natural water TDS at the downstream Bear Creek site.

Additional Quality Standards

Acid forming discharges are uncommon in the region and acid forming materials are not known to be extensive in Utah coal mines. Should the presence of pyrite in the mine area cause a decreased pH locally the mixing with higher pH waters in the system would result in localized affects in the permit area and is not likely occur off the permit area due to downstream buffering.

THE PRICE RIVER BASIN

Sand Wash Drainage

Potential discharges within the Sand Wash Drainage would come from two UPDES discharge points located at the south west end of the Hiawatha Mine (UT0023094-006A, and -007A). No discharge has been recorded for these sites.

Mudwater Canyon

Mudwater Canyon received mine discharge from the Star Point Mine, UT0023736-001 several years ago. This drainage is in an ephemeral system and impacts appear to have been minimal. Data from monitoring the UPDES parameters are summarized in the Star Point Mine Plan. Their table lists the recommended EPA standards for wildlife as taken from the EPA. The results from their table show the following:

- Iron, Manganese, and pH are well below EPA standards;
- Oil & Grease and Total Suspended Solids levels are low; and
- Levels have increased significantly in 1996, but the level discharged is still no higher than the receiving stream.

Fish Creek

Some portions of the Fish Creek drainage along Wild Horse Ridge may be subsided. Because of the thickness and nature of the overburden, mining should not impact this drainage. Monitoring stations FC-1 through FC-8 were added to the Bear Canyon Mine plan to monitor water quality and quantity in the creek.

Miller Creek Drainage

The direction of surface water movement is from Star Point Ridge, east of the Bear Canyon Graben, is down-dip to the south-southeast, toward Miller Creek. Baseflow to Miller Creek from the Star Point Sandstone was estimated to be on the order of 60 gpm, based on a stream survey conducted on the North Fork of the Right Fork of Miller Creek by Star Point Mine personnel. This survey is discussed on pages 700-22 and 700-23 of the Star Point Mine Plan, and locations M-1 through M-15 that are referred to in the following discussion are shown on Map 722.100d.

Significant baseflow occurs to North Fork of the Right Fork of Miller Creek where the stream crosses the Star Point Sandstone. Between the headwaters region and stream monitoring station ST-1, sulfate concentrations increase significantly.

TDS concentrations at ST-1ranged from 240 mg/L to 1,472 mg/L over 10 years between August 1980 to September 1990 (Star Point Mine Plan). Specific conductance was 592 micro-mhos/cm at the head of the reach with the largest gain, and it doubled to 1,190 micro-mhos/cm at the bottom of the reach (Star Point's M-14 to M-15), indicating a significant inflow of poorer quality water.

Subsidence Impacts

Longwall mining in the Wattis Seam began August 2, 1988 and ended April 26, 1990. The Third Seam was mined in December 1990 through November 3, 1991. The overburden thickness above the Wattis coal seam is about 300 to 500 feet. As a result of subsidence, three surface fractures - 8 inches, 4 feet and 7 feet wide - had occurred by August 1992. The following changes to the hydrology of the Right Fork of Miller Creek resulted from the longwall mining. (Slaughter and others, 1995):

- Intercepted surface flows occurred at two locations. Surface water was diverted into fractures;
- Debris slide/rockfall deposition associated with subsidence occurred in the North Fork of the Right Fork of Miller Creek;
- Intercepted water was discharged at a new location where the existing channel traversed the Star Point Sandstone below the coal seam (surface-water monitoring station M-8); and
- Water-quality changes downstream of the mining included increased TDS from 300 mg/L to 1,500 mg/L and changed from predominate ions of magnesium, calcium and bicarbonate to predominate ions of magnesium and sulfate.

Intercepted Flows

The two interceptions of surface flow occurred in the North Fork of the Right Fork of Miller Creek in Section 18, T. 15 S., R. 18 E. and in a side canyon to the North Fork of the Right Fork in Section 12 (Star Point Mine, 1996 Annual Report, Subsidence Monitoring Report). The 1996 Star Point Mine PHC quantified the loss to stream flow as ...the maximum potential loss to the base flow of the North Fork of the Right Fork of Miller Creek is less than nine gpm.

The subsidence features in the North Fork Right Fork of Miller Creek located in Section

18 are associated with fractures. The stream water was diverted into the mine near subsidence monitoring point GS-1 in 1989. The subsidence affected a section of the stream approximately 800 feet long. (Star Point Mine, 1996 Annual Report, Subsidence Monitoring Report). The stream was diverted into the fractures at surface-water monitoring point M-6 in January or February 1989. At this location overburden is about 300 feet above the Wattis Coal Seam.

The side canyon to the North Fork of the Right Fork of Miller Creek, in the NW/4, Section 12, T. 15 S., R. 18 E., was diverted into the ground due to mining subsidence sometime between January 27 and April 27, 1989. It was again diverted at an upstream location in June 1990. Both surface-water interceptions occurred at sandstone-siltstone contacts. Overburden above the Wattis Seam is about 500 ft, at monitoring site M-3 (Slaughter and others, 1995) and subsidence was associated with known faults. Subsidence varied from hairline fractures to 6 inches and vertical displacement across the cracks varied from none to 2 feet. Width varied from hairline to about 2 feet. The cracks were fenced in the summer of 1991.

Beginning in July 1990, flow was observed in the section of the stream where flow had been previously intercepted. Flows have been observed during years with increased snow precipitation. These flows may suggest the fractures are healing. The Star Point Mine committed to collect additional data to determine if the fractures are healing (Star Point Mine, 1996 Annual Report, Subsidence Monitoring Report), but the outcome of those investigations is not known.

Debris Slide/Rockfall Deposition

In October or November 1988, a rock slide moved soil, rock, and vegetation into the North Fork of the Right Fork of Miller Creek. The debris slide, about 150 feet wide, originated in the Blackhawk Formation and Castlegate Sandstone. The movement of water through this debris could account for some of the changes in the chemical composition of the water that are discussed below.

Subsidence and Surface-water Quantity Changes

Streamflow appears to have increased through the stream reach traversing the Blackhawk Formation. Direct seepage to the stream from ground water is about 21 gpm; however, of the 15 gpm increase between measuring points M-6 and M-8, a substantial inflow is presumed to be derived from the Star Point Sandstone and a channel sandstone at the base of the Blackhawk Formation where the Hiawatha Coal Seam has been locally displaced. According to the Star Point Mine 1996 Annual Subsidence Monitoring Report, the increase in flow due to seepage from the system was anticipated from the Spring Canyon Member of the Star Point Sandstone. The water table identified within the Spring Canyon Member flows to the southeast toward Miller Creek. The remaining 12 gpm increase measured between M-2 and M-8 is believed to be derived from the saturated zone system of the Star Point Sandstone.

According to the Star Point Mine 1996 Annual Subsidence Monitoring Report, the loss in streamflow between measuring points M-9 and M-14 is believed to be due to flow from the

stream into alluvial deposits that are present in the channel below station M-9. North Fork of the Right Fork of Miller Creek experiences a substantial gain in stream flow through the Storrs and Panther members of the Star Point Sandstone, based on a 49 gpm gain in flow between measuring points M-14 and M-15.

Subsidence and Surface-water Quality Changes

The most downstream point of impact to North Fork of the Right Fork of Miller Creek is at monitoring Site M-8. Selected water-quality parameters at this point were used to summarize the resulting change in water-quality characteristics to Miller Creek from mining subsidence. Water samples collected indicate the concentration of dissolved constituents increased from 310 to 799 mg/L between September and December 1988 and the type of water changed from magnesium calcium bicarbonate to magnesium sulfate. Dissolved solids increased to a maximum of 1,602 mg/L in July 1990 (Slaughter and others, 1995).

Mine-water Discharge Surface-water Quality Changes

The Hiawatha Mine surface facilities are located primarily within the Miller Creek Drainage. Numerous UPDES Discharge points are associated with the mine (UPDES Permit No. UT0023094). The following UPDES sites have no recorded discharge over the period of record:

-003	Upper Coal Storage Yard Pond
-004	Pond #4, North of Slurry Pond #1 (reclaimed-no longer exists)
-005	Pond #5, East of Slurry Pond #1.
-006	Pond #6, East of Slurry Pond #4.
-007	Pond #7 South East of Slurry Pond #5.
-008	Middle Fork Mine Yard.
-009	South Fork Mine Yard.
-011	Truck Loading Pond.
-013	Number 6 Mine-water tank overflow.

All these sites have a period of record from July 1994 through May 1991 except for site -013, which has a period of record from May 1991 through July 1994.

The information presented in Table IV-10 summarizes data for the three sites with recorded discharge to the Miller Creek Drainage. These sites include: The Hiawatha North Fork Ventilation Fan (UPDES UT0023094-010), a discharge valve on the Mohrland Pipe Line that is monitored when drained (UPDES-012), and the Miller Creek Mine-water Discharge (UPDES-002).

Mine-water discharges from UPDES No. UT0023094-002 through a pipe south of the Hiawatha Preparation Plant area, enters an underground culvert beneath the preparation plant, exits the culvert to the north of Refuse Pile #4, and finally drains to a tributary to Miller Creek. Iron coatings are observed at both the mine pipe and culvert discharge locations. To check for acid production, Bob Davidson and Susan White of UDOGM conducted sampling during a site visit on July 8, 1977. Although the mine water is acidified within the mine increasing the

ferrous iron (Fe +2) concentration in solution, the contact with CO_2 and $CaCO_3$ raises the pH and results in Fe $(OH)_3$ deposition and pH within the 6.5 -9 limits.

Table IV-10: Mine-water Discharges Reported by UPDES Discharge Monitoring Report

Hiawatha Mine-UPDES Permit No. UT0023094	North Fork Ventilation Fan UPDES-010			Hiawatha ComplexDischarge UPDES-012			Hiawatha Miller Creek Mine-water Discharge UPDES-002		
	Max	Min	Avg.	Max	Min	Avg.	Max	Min	Avg.
Flow (gpm)	14	0.0	2.6	274	0.0	27.6	1,221	0.0	180
Field Specific Conductance umhos/cm	720	370	556	973	799	911	1,435	539	968
Field pH	8.4	6.7	7.8	8.11	6.8	7.4	7.6	5.0	7.2
TSS(mg/L)	63	0.5	6.3	14.0	4.0	9.4	60	.0.5	5.6
TDS(mg/L)	667	213	383	918	641	718	1,010	233	720
T-Iron (mg/L)	0.44	0.04	0.17	0.96	0.09	0.6	1.3	0.02.	0.15
Oil and Grease	4.4	0.4	2.0	1.6	1.2.	1.5	5.6	0.0	1.42

Serviceberry Creek

A major portion of the mine facilities surround Sage Brush Canyon, a tributary to Serviceberry Creek. Both Sage Brush Creek and Serviceberry Creek function as ephemeral drainages (Map 6), the channels are usually dry except during rainstorms or when snow melts. The main stem of Serviceberry Creek has no water monitoring locations; however, water monitoring site 10-1 is located in Sage Brush Canyon. The site once had an average flow of 3.5 gpm and a maximum flow of 35.9 gpm. The source for these flows was the overflow from the make-up water storage tank. The make-up water supplied the coal treatment plant and received water from mine discharge. When the tank overflowed it discharged into Sage Brush Creek under UPDES permit UTG-0040025-011, the mine labeled it monitoring site 011. Longwall operations ceased production in November 1996, all of Star Point's entries are closed (sealed) and backfilled. The Star Point Mine no longer discharges water as of January 2000. Three sedimentation ponds (Ponds 005, 006 and 009) and several small settling contain the runoff from the coal refuse pile. Ponds 005 and 009 and all the catch basins will be destroyed as coal refuse is removed from the piled. Pond 006 will be reclaimed to meet approximate original contour. Removal of the refuse by SCA will only benefit the area by reducing the volume of refuse and ensuring that it will never be exposed. All runoff will be controlled by alternate sediment control measures until vegetation is established and effluent standards to receiving streams are met.

The substitute soil stockpile is located in a Serviceberry Creek. All of the stockpiled material will be removed and the site regraded to AOC. The drainage on the site will be restored to transmit flows. As with the refuse pile alternate sediment control measures will be implemented to control sediment loading to receiving streams.

The area permitted by SCA lies within the Gentry CIA. No other potential impacts will take place than have already been identified in the CIA boundary, established before SCA acquired the refuse pile and subsoil stockpile.

Tie Fork Canyon

Water-quality changes in Tie Fork Canyon may occur from changes in the water quality of Upper Tie Fork Spring. No surface-water quality monitoring sites are currently monitored in lower Tie Fork Drainage. Sites 34-1 and 34-2 are located near the Gentry Hollow and Wild Cattle Hollow confluence (Map 6). When the discharge from Upper Tie Fork is not diverted into CVSSD's collection system, it may change stream water quality because of its significant flow rate. Tie Fork Spring water characteristics are discussed in the section on Tie Fork Spring.

V. MATERIAL DAMAGE CRITERIA

Material damage to the hydrologic balance is not defined directly in either the Utah or federal regulations.

The Utah Coal Mining Rules define material damage with respect to alluvial valley floors (AVF). "Materially Damage the Quantity or Quality of Water" means ... to degrade or reduce, by coal mining and reclamation operations, the water quantity or quality supplied to the alluvial valley floor to the extent that resulting changes would significantly decrease the capability of the alluvial valley floor to support agricultural activities.

For the purposes of R645-301-525, which addresses subsidence control plans, material damage means:

(a) Any functional impairment of surface lands, features, structures or facilities;
(b) Any physical change that has a significant adverse impact on the affected land's capability to support any current or reasonably foreseeable uses or causes significant loss in production or income; or
(c) Any significant change in the condition, appearance or utility of any structure or facility from its pre-subsidence condition.

Criteria that are used to determine material damage to hydrologic resources in coal mining programs administered by other states or by the federal Office of Surface Mining (OSM) include:

- Actual or potential violation of water-quality criteria established by federal, state or local jurisdictions;
- Changes to the hydrologic balance that would significantly affect actual or potential uses as designated by the regulatory authority;
- Reduction, loss, impairment, or preclusion of the utility of the resource to an existing or potential water user;
- Short term (completion of reclamation and bond release) impairment of actual water uses that cannot be mitigated;
- Significant actual or potential degradation of quantity or quality of surface water or important aquifers; and
- Any situation that would create imminent danger to a person.

Key to applying these definitions in determining material damage to the hydrologic balance is determining what changes or impacts are significant and whether or not they can be mitigated.

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

The following criteria, alone or in-combination with other criteria, may be used to determine Material Damage and will be based on factors related to the use of a resource:

- Utah Department of Health Classification; waters in and adjacent to the CIA are classified as 1C -protected for domestic use with prior treatment, 3A- protected for cold water species of game fish and cold water aquatic life, and 4 - protected for agricultural uses;
- Water-quality Standards for waters of the State of Utah set by the Utah Department of Environmental Quality and the state Division of Water Quality (UDWQ, 2006);
- Primary (PDW) and secondary (SDW) drinking water standards set by the Division of Drinking Water in Rules for Public Drinking Water Systems, R309 (Utah Administrative Code);
- Water-quality standards, 40CFR Ch.1 Subpart 434.55, applies to underground mine-water drainage at Post-Mining Areas after best practicable control technology currently available is applied;
- Changes in water quality and quantity that cause irreparable impairment of use. These would be commensurate with identified land and water uses within and adjacent to the mine;
- Category 1 Waters within boundaries of a National Forest, with specific exceptions, are designated by the Utah Division of Water Quality as High Quality Waters and are subject to the state's anti-degradation policy to maintain water at the existing high quality. New point source discharges of wastewater, treated or otherwise, are prohibited (UDWQ, 2006, R317-2-3.2 and R317-2-12.1);
- The Utah Department of Environmental Quality, Division of Water Quality authorized discharge into surface waters under the Utah Pollutant Discharge Elimination System (UPDES); and
- Contamination, interruption, or diminution of a state appropriated water supply or water right.

Applicable UPDES standards are listed in Table V-I. Additional limits apply to each site and are reviewed and presented in detail if the limit is exceeded. Toxic pollutant discharge limitations apply, based on the occurrence, concentration levels, and discharging or placing wastes that produce an undesirable effect.

DAMAGE TO RESOURCES

Hydrologic Impacts to the Upper Tie Fork Spring were mitigated by PMC through an agreement with the CVSSD and HCIC.

Available information does not definitively identify a cause for the decline in flow at Birch and Big Bear Springs. There are spring development and maintenance aspects that may have affected water quantity, but all of these, especially earlier ones, are not documented or clearly understood.

The flow paths of ground water to Birch Spring and Big Bear Spring are not known in detail, but it is evident from the geology and topography that the source area is to the north, between the Bear Canyon Fault on the east and the Pleasant Valley Fault on the west, and that flow is dominantly through fractures. The potentiometric surface of the Spring Canyon Sandstone Member of the Star Point Sandstone is above the Blind Canyon Seam in the McCadden Hollow area, but the flows at Big Bear and Birch Springs are at the level of the Panther Sandstone Member, where the underlying Mancos Shale effectively stops any further downward infiltration. Mining operations in the Blind Canyon Seam in the McCadden Hollow area, should they occur, are not expected to intercept this deeper flow system or impact flows at Big Bear and Birch Springs. Mining operations east of the Bear Canyon Fault are not expected to impact of Birch, Big Bear, or Tie Fork Springs.

Utah Administrative Rule R645-301-728.340 requires a probable hydrologic consequences determination of whether underground coal mining and reclamation activities may result in contamination, diminution, or interruption of "State-appropriated Water in existence within the proposed permit or adjacent areas at the time the application is submitted." R645-301-731.530 requires the permittee to replace any such waters affected "...by UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES conducted after October 24, 1992, "

Hiawatha Coal Company supplied additional information and studies conducted to update their mine plan as defined by UDOGM in the permit renewal process. One factor reviewed was to identify the potential impacts from mining within the Hiawatha Mine Complex permit area to Big Bear Spring.

The Big Bear Spring flow hydrograph reflects high seasonal peak flows from 1980 to 1987 (Figure 14a). The PHDI shows those were also years with above normal wet conditions. Drought conditions from 1987 to 1993 could have contributed to the decrease in the peak flows. Flow at Little Bear Spring recovered fully after 1993 but the flow at Big Bear Spring did not return to pre-drought levels (Figure 14a). Mining has been considered among the possible influences to Big Bear Spring flow, but no conclusive connection has been made.

Big Bear Spring is located in Bear Canyon and within the Bear Canyon graben (Map 4). All mining conducted in the Hiawatha Complex mines took place east of Bear Canyon Fault and the graben (Maps 3a, 3b and 3c). Mining in the B Seam intercepted the Bear Canyon Fault at several locations, and most inflows to the mine were reported in the B Seam. Plate 7-22 of the Hiawatha Mine Plan shows inflow in 10th North that was very large, reported to be approximately 1,000 gpm when first contacted in the 1970's, then falling to 100 gpm over time.

Since the Hiawatha Mine closed in 1993, inflow locations and quantity are not completely known. Total mine discharge is measured at the Mohrland Portal. UDOGM's records indicate that U.S. Fuel was discharging mine water from Mohrland Portal from February 1979 to present (2007). Hiawatha Coal Company has committed to age date and characterize mine water inflows when the mine re-opens.

From the information presented on geology and ground water it is likely that the Bear Canyon Fault stores some water and acts as a barrier to ground water moving east or west. Hiawatha Coal Company recently supplied stratigraphic contour maps, Plates 6-6, 6-9 and 6-12 in the Hiawatha Mine Plan, which show that any drainage intercepted and directed into the mine would travel in a southwesterly direction. This is the reason for the discharge at the Mohrland portal. Flow from the Morhland portal represents the total flow of ground water into the mine. Some water is known to be coming from the 10th West section of the King 4 Mine. Other flows are known to be coming from the older King 2 Mine, since it was used as a sump area at one time. Plate 7-1 of the Hiawatha Mine Plan identifies four areas in the mine where water flows into the mine. During the years Star Point was pumping water to their underground reservoir east of the Bear Canyon fault, the discharge at Mohrland increased (Figure 1). Water pumped from the Gentry Ridge Horst and sumped in the Star Point Mine, up dip of the Hiawatha Mine, seeped through the coal barriers between the mines and flowed out the Mohrland portal.

It appears from all information submitted by Hiawatha Coal Company that all mining that could intercept ground water along the Bear Canyon fault was completed prior to 1983. The information provided does not point to any specific cause for decreased flows to Big Bear Spring as far as mining within the Hiawatha Mine Complex is concerned.

Springs impacted by the subsidence occurring east of the North Fork of the Right Fork of Miller Creek were not specifically tied to a water right; therefore, no material damage was identified in association with these springs. Water was intercepted by the mine and is believed to re-issue down stream where new flow was documented.

DAMAGE TO SURFACE-WATER RESOURCES

Miller Creek Drainage

Water Right number 92-174 located on the Right Fork of Miller Creek is owned by U. S. Fuel Company and is reserved for industrial purposes (3.3 cfs). U.S. Fuel Company made an agreement with PMC to allow impacts due to mining. Prior to mining, the flows were around 6 gpm (Star Point Mine 1996 Annual Report, Subsidence Monitoring Report). Although surface-water quality and quantity changes occurred because of mining in the North Fork of Miller Creek, no determination was made by the Division of Water Resources or the State Department of Environmental Quality showing that changes to the hydrologic balance would significantly affect actual or potential uses. These waters were outside of the National Forest boundary and therefore were not subject to the anti-degradation policy that applies within the National Forest boundary. Although TDS and sulfate levels have increased there was no identified impairment of the designated use, thus no material damage has occurred.

SUBSIDENCE EFFECTS

Noticeable cracks have occurred in the Blackhawk Formation where pillars have been pulled in both the Star Point and Bear Canyon Mines, in areas with a shallow overburden, and on narrow promontories and ridges with steep side slopes. As mitigation, some of these features were fenced to the satisfaction of the USFS. No material damage claim was identified in

association with this subsidence from the landowner (USFS).

Co-Op mined extensively in the head of Bear Canyon and in the southern portion of the ridge between Bear Canyon and Trail Canyon using room-and-pillar methods. This resulted in rock-falls and escarpment failures in both canyons. The most noticeable impact is on the west side of Bear Canyon where subsidence focused along a fault and produced a very visible scarp that cuts across the surface.

To date, longwall mining under Gentry Mountain has produced minimal subsidence impacts. Results have been similar on East Mountain, located south of Gentry. Tension fractures up to 6 inches wide are occasionally found around the margins of subsidence-panel, the larger cracks occurring at topographic features such as ridges and plateau margins. Subsidence can focus along a fault because tension cannot transfer across the fracture.

Table V-1: Mine-water Discharges Reported by UPDES Discharge Monitoring Report

Limitations	Trail Canyon Mine-Bear Canyon Mine UPDES Permit UTG0040000			Star Point Mine UPDES Permit UT-0023736			Hiawatha Mine UPDES Permit UT0023094 - Not located within the Mine Plan. To be incorporated later.			PacifiCorp Deer Creek Coal Mine UPDES Permit UT0023604		
Field pH (range)	6.5-9.0			6.5-9.0			6.5-9.0			6.5-9.0		
Discharge	30-Day	7-Day	Daily Max	30-Day	7-Day	Daily Max	30-Day	7-Day	Daily Max	30-Day	7-Day	Daily Max
Flow (gpm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TSS (mg/L)	25	35	70	25	35	70				25	35	70
TDS	NA	NA	2,000 (lb/day)	NA	NA	2,000 (lb/day) *1,300				NA	NA	2,000 (lb/day)
T-Iron (mg/L)	NA	NA	1.0	NA	NA	*2.0 (a)				NA	NA	1.0 (b)
Oil and Grease (mg/L)	NA	NA	10	NA	NA	10				NA	NA	10

a. Total Iron exceeding 2.0(mg/L) requires review of actions necessary to achieve compliance. No daily maximum will exceed 7 mg/L.
b. Total Iron standard may be approved if water-quality standard is not violated.
c. TDS limit applies to a total for all discharge points associated with this UPDES permit.
* Applies to site 001.

VI. STATEMENT OF FINDINGS

Since the inception of SMCRA, mining in the CIA has been conducted in accordance with applicable rules and without material damage to the hydrologic balance. Some post-SMCRA mining related impacts have been mitigated through agreements between the mine companies, water rights holders, and landowners. There is no evidence that state-appropriated water supplies for this area have been permanently diminished, contaminated, or interrupted by coal mining or reclamation operations.

The area west of the Bear Canyon Fault is of special concern because several springs located there provide public water supply. Past mining west of the Bear Canyon Fault has not resulted in material damage or significant impact to hydrologic resources. The temporary decline in flow at Upper Tie Fork Spring, caused by the pumping of large volumes of water from Star Point Mine workings west of the Bear Canyon Fault, was foreseen and satisfactorily mitigated. The Utah Board of Oil, Gas and Mining determined that evidence does not indicate a hydrologic connection between the Bear Canyon #1 and #2 Mines, located west of the Bear Canyon Fault, and Big Bear Spring and Birch Spring, and the Supreme Court of the State of Utah upheld that decision. The Board has also found that evidence does not connect decreased flow in Big Bear Spring or Birch Spring with subsidence or water interception east of the Bear Canyon Fault at the Hiawatha Complex.

The Permittee will monitor water at streams, springs, wells, and inflows within the mine. UDOGM will continue to assess water monitoring data and other information to identify any mining related changes and impacts to the hydrologic regime of the CIA.

Should there be diminution, contamination, or interruption of a state-appropriated water supply due to mining, Permittees have committed to replace those water supplies. In addition, in accordance with federal lease stipulation 21, the Permittee of the Bear Canyon Mine has committed to replace any impacted water resource on USFS managed lands that has been identified for protection. The Permittees hold shares in HCIC that could be transferred or retired to cover such impacts, but other options include use of guzzlers, wells, liners, grouting, or other available technologies to restore or replace an impacted water supply or water resource.

UDOGM has found no probability of material damage to the hydrologic balance from anticipated coal mining operations.

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APPENDIX A.

WATER RESOURCE HYDROLOGIC IMPACT ASSESSMENT FIGURES

Figure 1: Star Point Mine Pumping - Hiawatha Mine Discharge: Big Bear and Upper Tie Fork Springs
Figure 2: Tie Fork, Big Bear, and Birch Springs
Figure 3: Star Point Wells: East of Bear Canyon Fault
Figure 4a: Water Levels Under Gentry Ridge
Figure 4b: Water Levels Under Gentry Ridge – Variation from Initial Elevation in Feet
Figure 5a: Upper and Lower Tie Fork Springs and Piezometer 86-26-6
Figure 5b: Flow at Upper Tie Fork Spring Compared to Water Levels at SDH-2 and SDH-3
Figure 6: Bear Canyon Mine: In-Mine Flows
Figure 7a: Bear Canyon Mine: In-Mine Drill Holes – Star Point Sandstone WL Elevation
Figure 7b: Bear Canyon Mine: In-Mine Drill Holes – Star Point Sandstone WL in Feet Above or Below Initial WL Elevation
Figure 8: Upper and Lower Tie Fork Springs and the Palmer Hydrologic Drought Index (PHDI)
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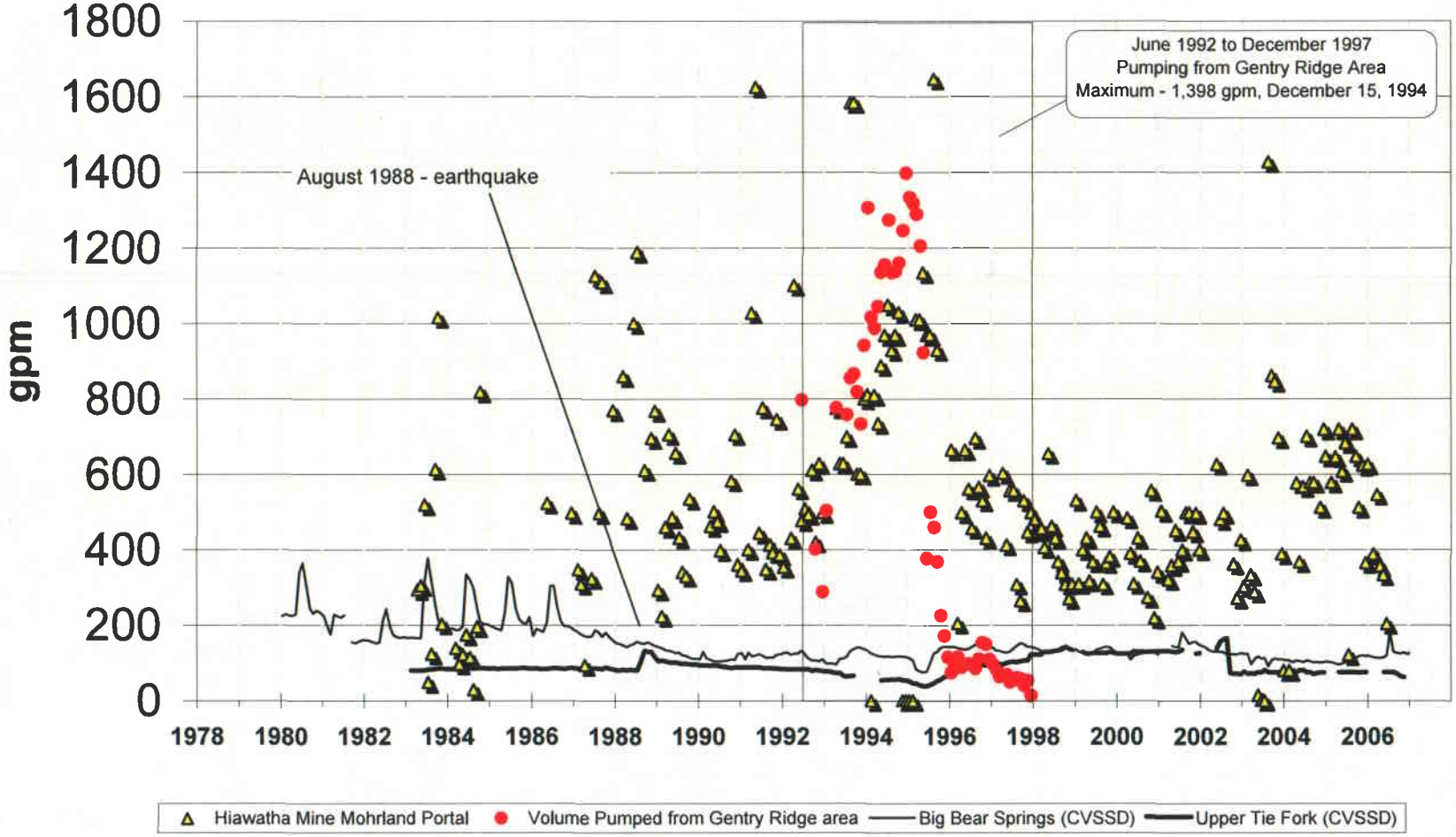
Figure 9b: Bicarbonate and TDS: Upper Tie Fork Spring (85-36-2-3)
Figure 10 Bicarbonate and Sulfate vs TDS: Upper Tie Fork Spring (86-35-2-3)
Figure 11: Birch Spring Flow: Combined Data Sources
Figure 12: Chemistry at SBC-9 and -9A: Sand Channel
Figure 13a: Chemistry at SBC-10: Sand Channel
Figure 13b: Chemistry at SBC-13: Sand Channel
Figure 14: Palmer Hydrologic Drought Index – PHDI: Utah Regions 4, 5, and 7 (Map 1a)
Figure 14a: Flow of Selected Springs and Region 5 PHDI
Figure 14b: Big Bear Spring, the PHDI, and Mine-Water Interception
Figure 15: Big Bear Spring: Annual Flows-NEWUSSD
Figure 16a: Bear Canyon Mine: Big Bear Spring - TDS vs Time
Figure 16b: Bear Canyon Mine: Big Bear Spring - TDS vs Flow
Figure 17: Meteoric Water Line: Deuterium and Oxygen 18
Figure 18: Bear Canyon Mine Discharge & Bear Creek Flows: Flow vs Time

APPENDIX A

Star Point Mine Pumping - Hiawatha Mine Discharge



Hiawatha Mine Mohrland Portal discharge is the total of the flows from UPDES UT0023094-001 and -002.

Figure 1

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Tie Fork, Big Bear, and Birch Springs

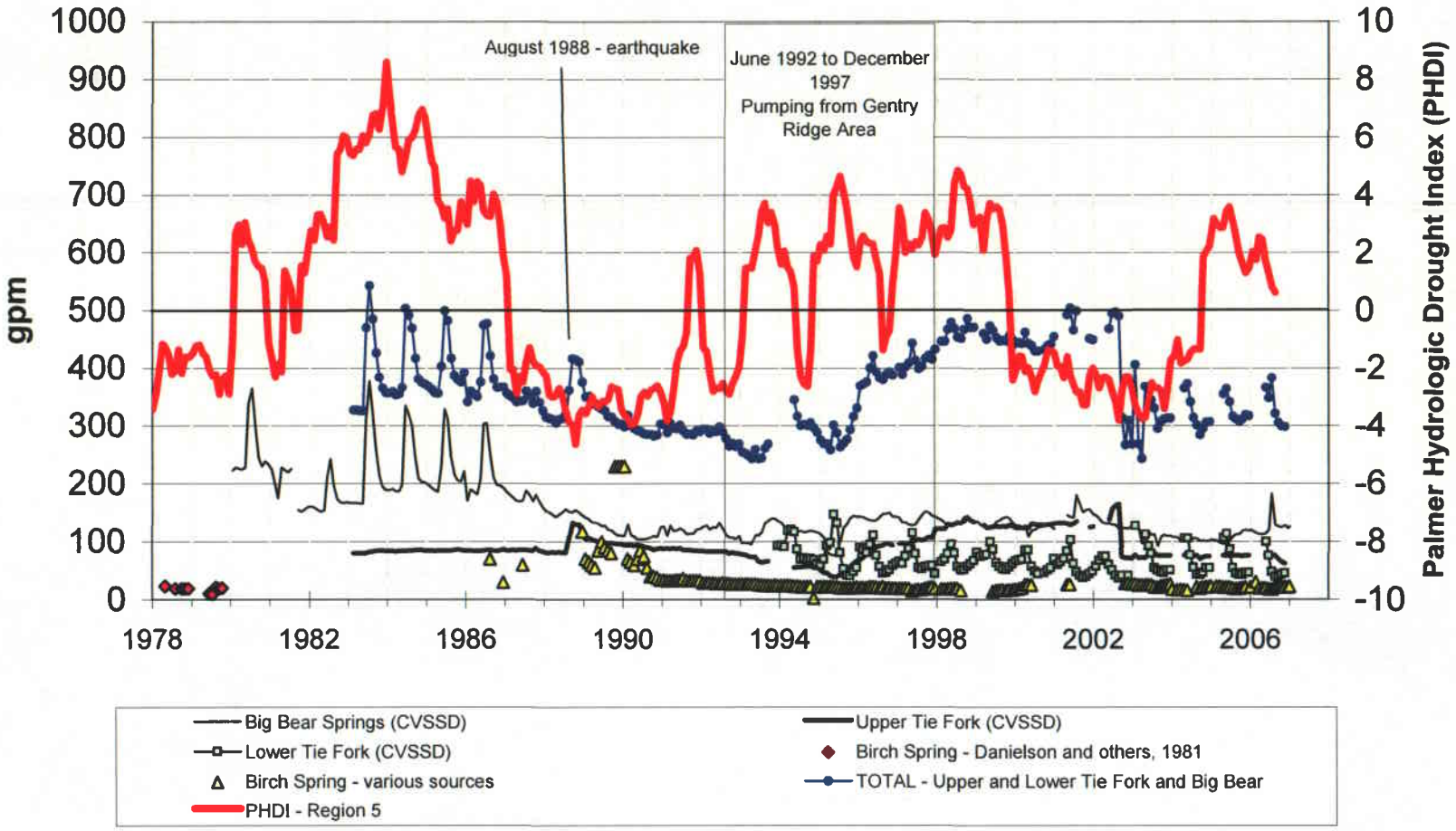

Figure 2

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Star Point Wells

East of The Bear Canyon Fault

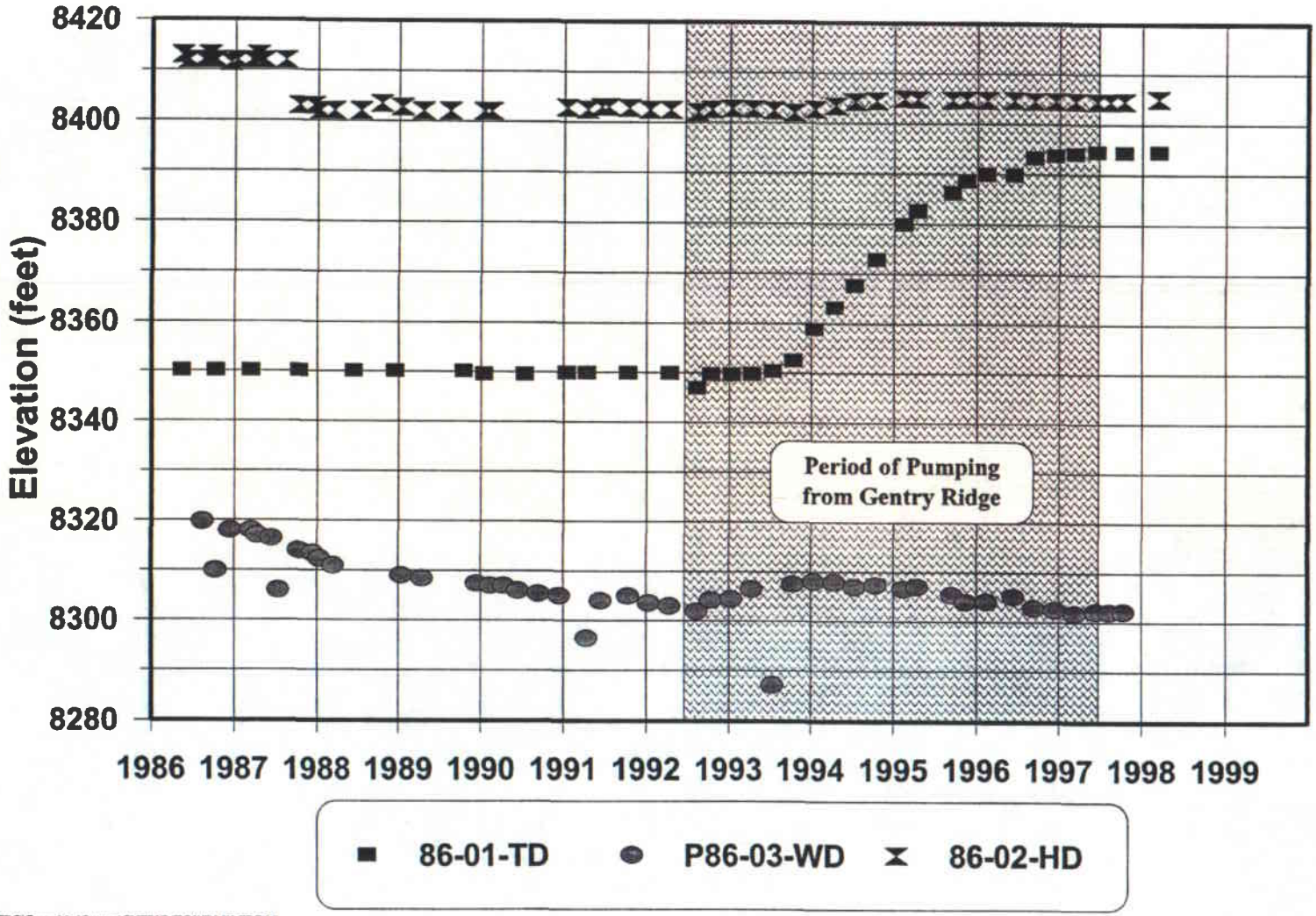

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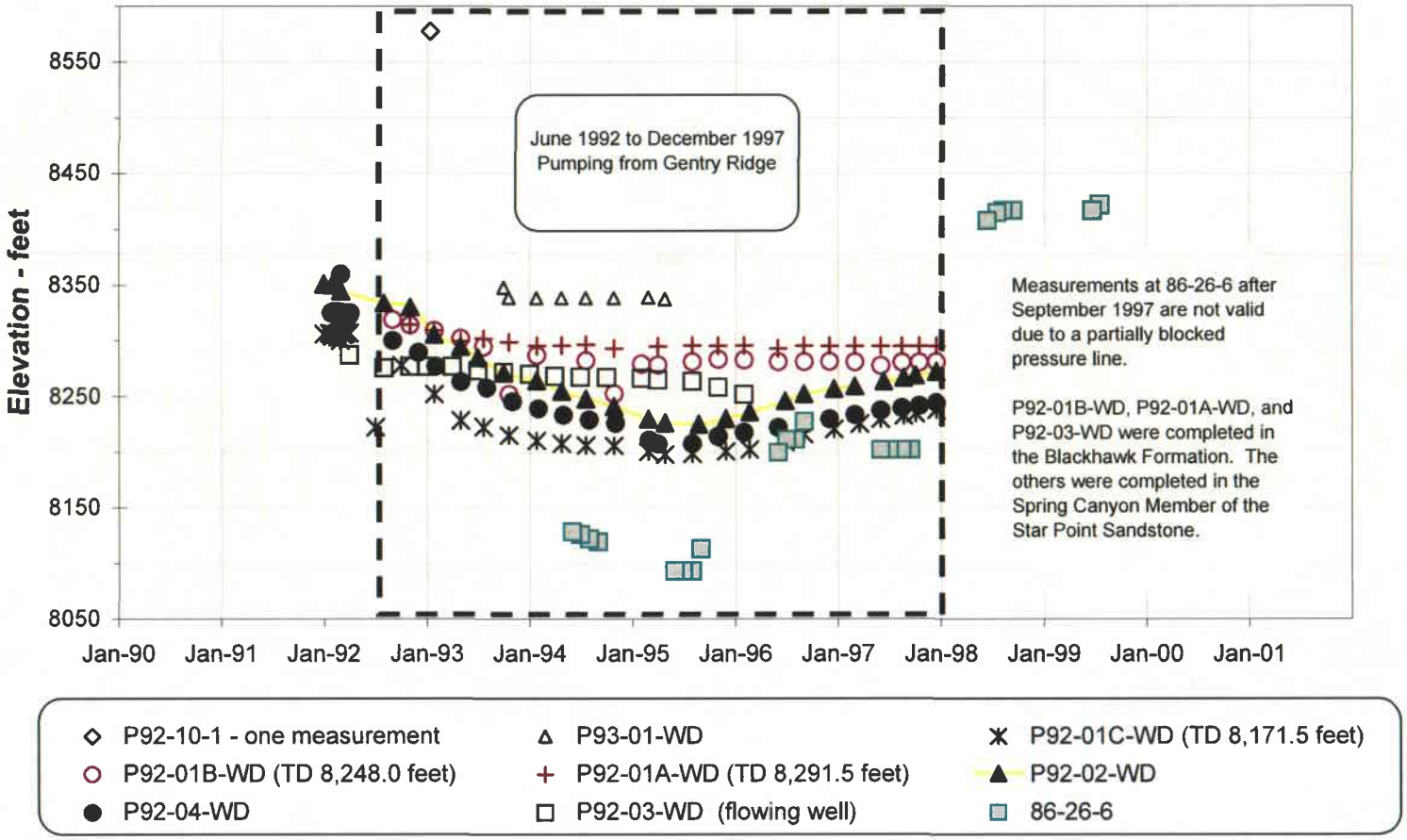
Figure 3

Water Levels Under Gentry Ridge



Listed in order, from north to south: P92-10-1 and 86-26-6 are surface wells located, respectively, north of and south of the mined area.
P93-01-WD went dry in March 1995.
P92-01A, B, and C are nested wells: TD is elevation at the bottom of the well.

Figure 4a

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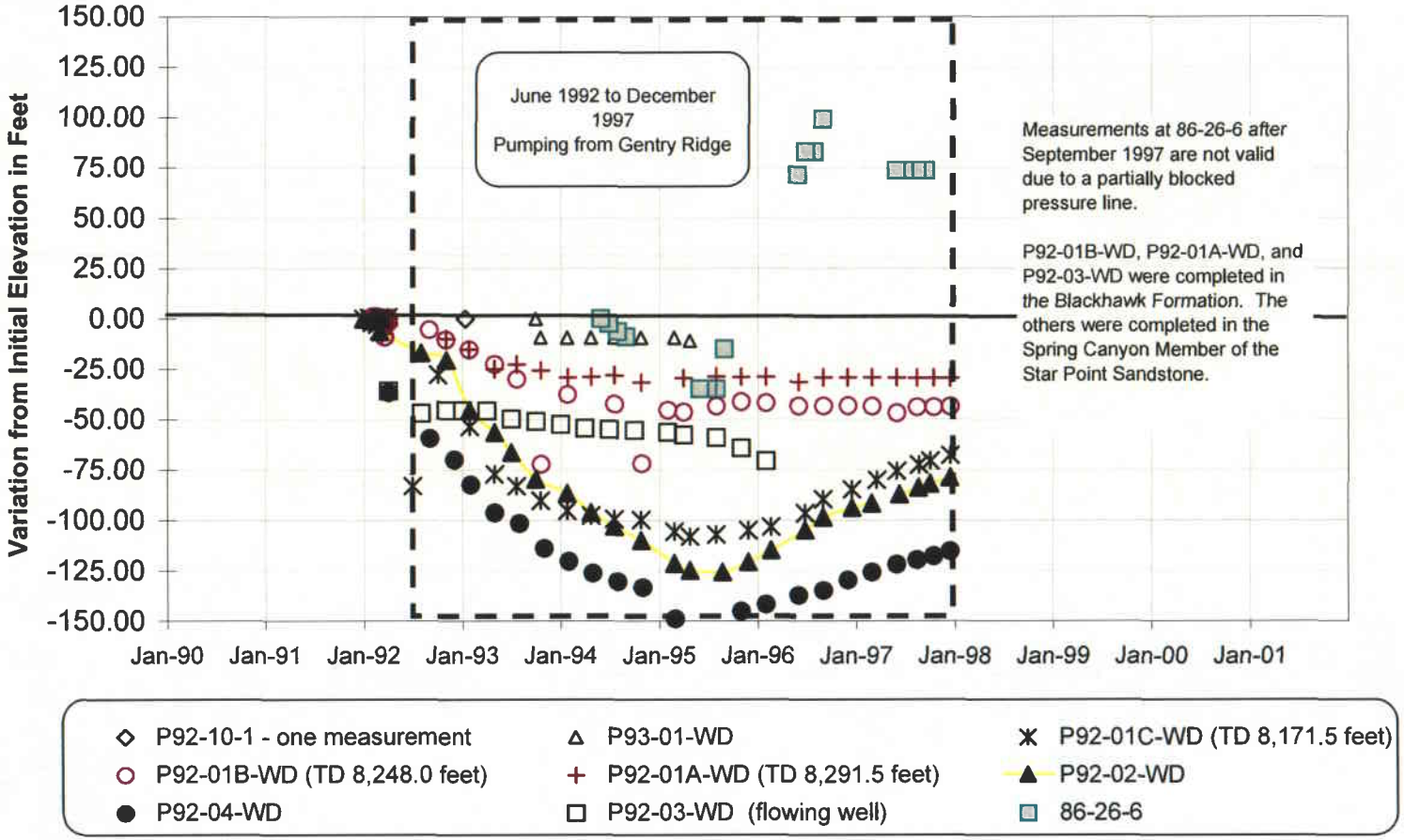
Water Levels Under Gentry Ridge



Listed in order, from north to south: P92-10-1 and 86-26-6 are surface wells located, respectively, north of and south of the mined area.
P93-01-WD went dry in March 1995.
P92-01A, B, and C are nested wells: TD is elevation at the bottom of the well.

Figure 4b

O:\CHIA\CHIAS\Gentry Mountain\Figures\Star Point Spreadsheets\Figure 4.xls:Figure 4b

UPPER and LOWER TIE FORK SPRINGS

and Piezometer 86-26-6

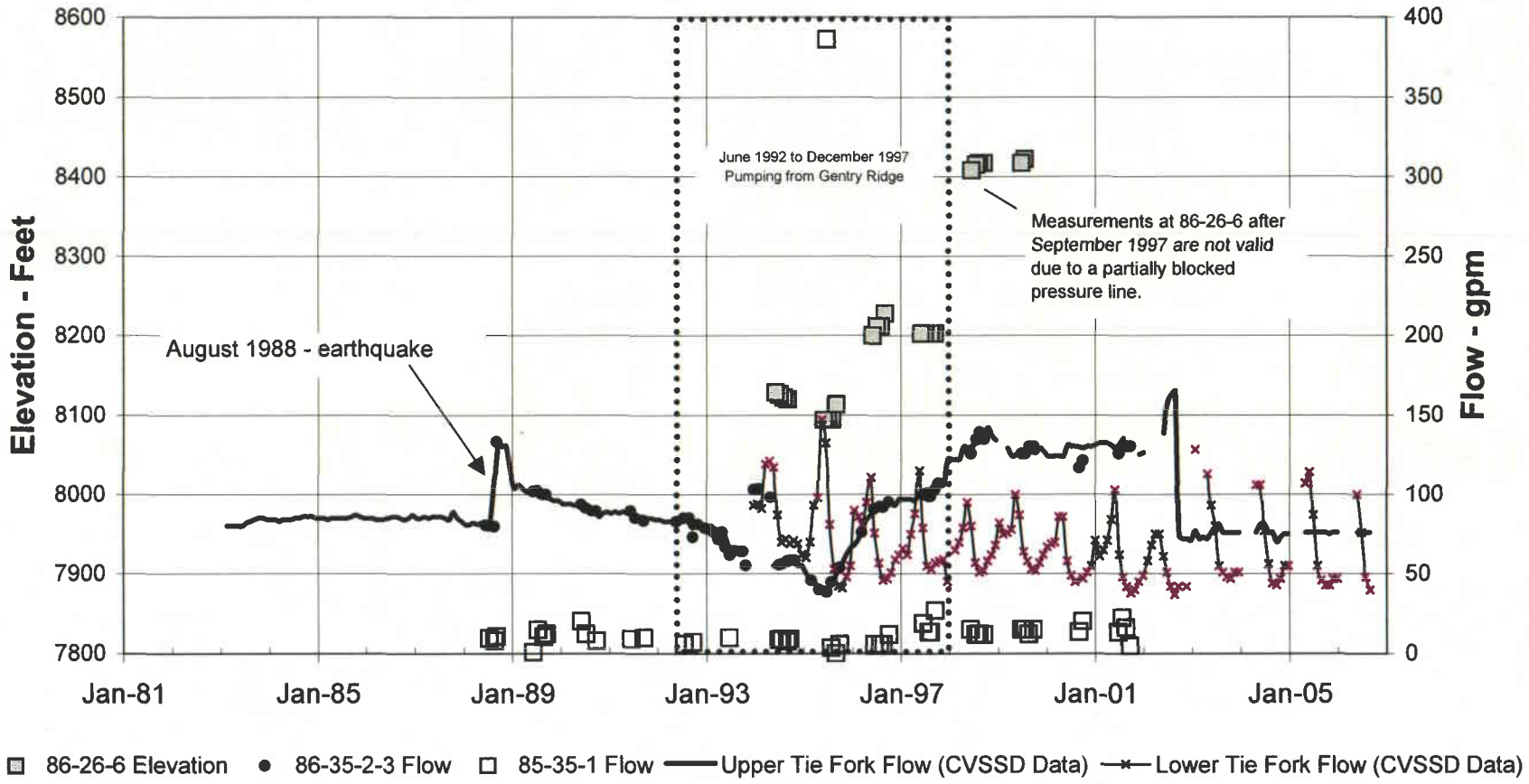


Figure 5a

O:CHIA\CHIAS\GentryMountain\Figures\Star Point Spreadsheets\ Figure 5a.xls:Figure 5a

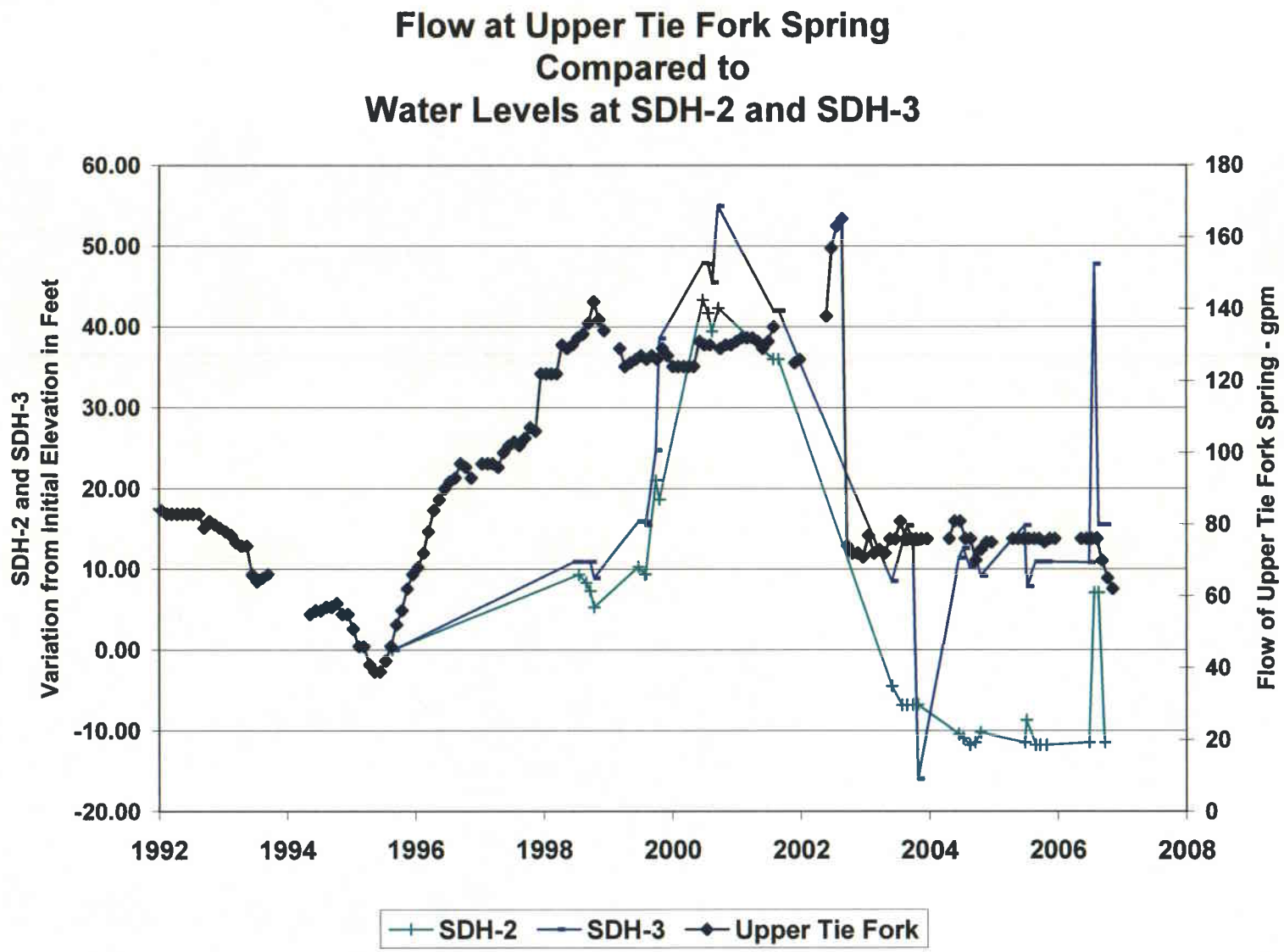


Figure 5b

O:\CHIA\CHIAS\Gentry Mountain\Figures\Bear Canyon Spreadsheets\All Wells:Figure 5b

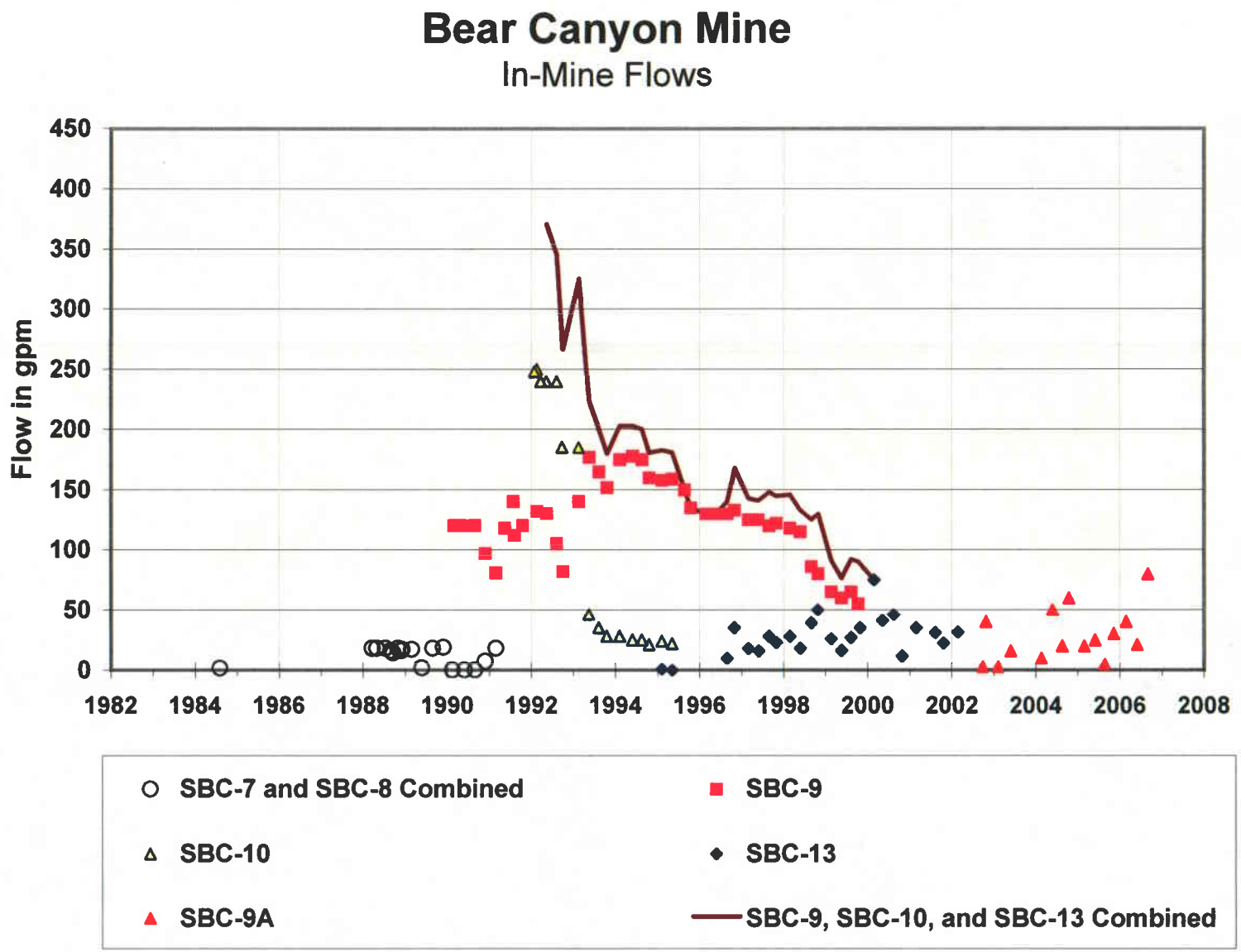
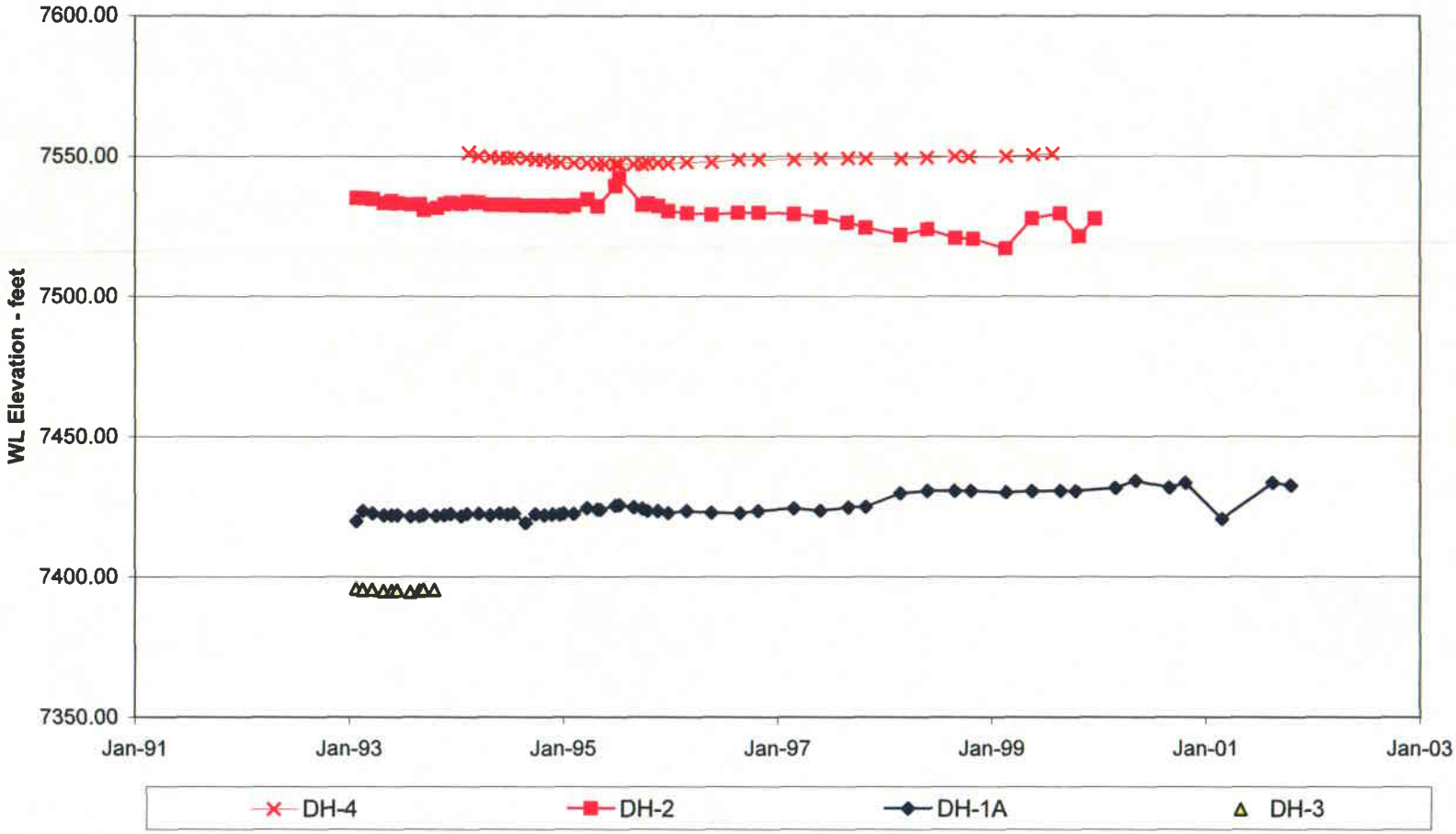


Figure 6

O:\CHIAS\CHIA\Gentry Mountain\Figures\Bear Canyon Spreadsheets\SBC9 SBC 10 and SBC13.xls

Bear Canyon Mine: In-Mine Drill Holes

Star Point Sandstone



In order from north (DH-4) to south (DH-3)

Figure 7a

O:\CHIA\CHIAS\Gentry Ridge\Figures\Bear Canyon Spreadsheets\DH-1A DH-2 DH-3 ands DH-4:Figure 7a

Bear Canyon Mine: In-Mine Drill Holes

Star Point Sandstone

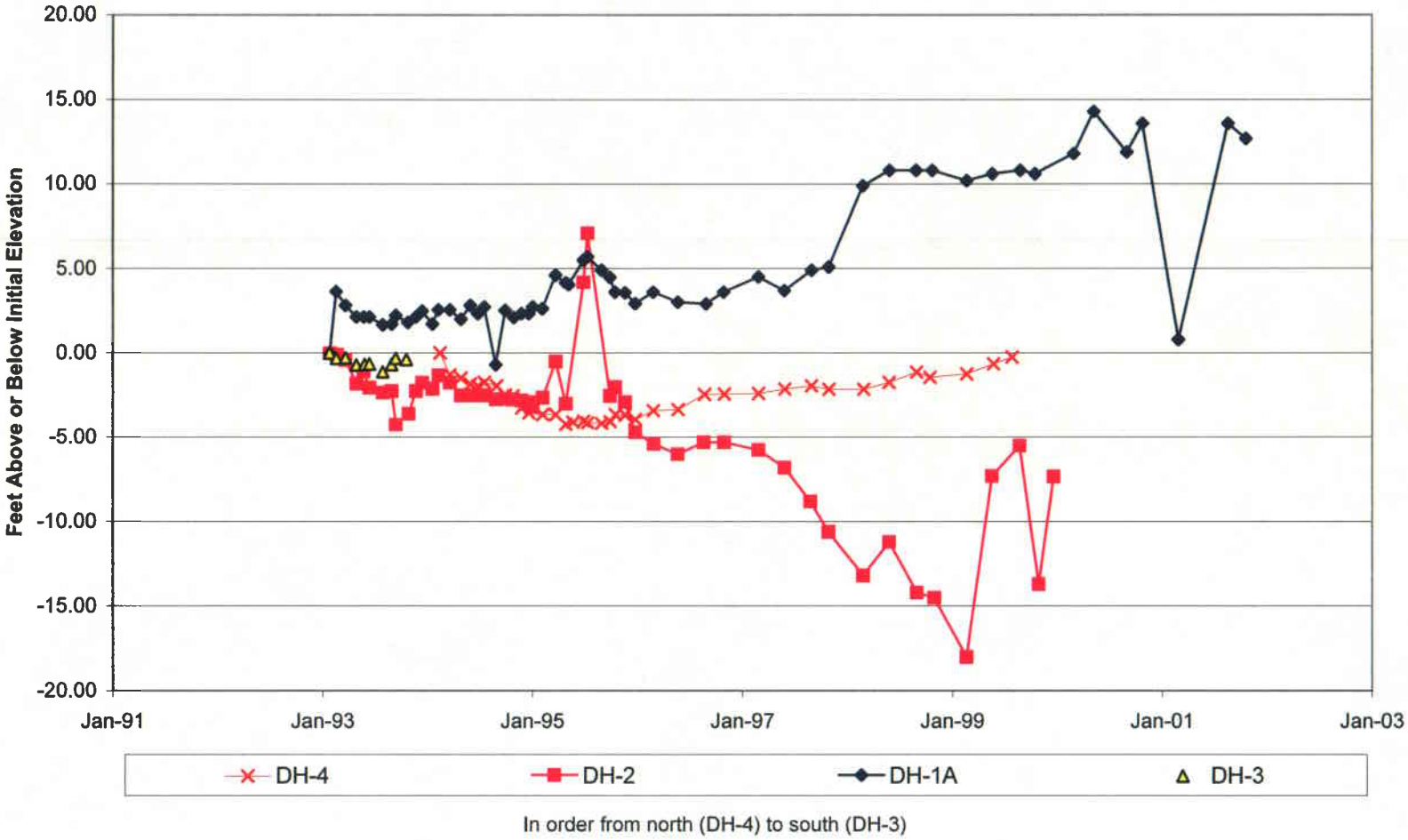


Figure 7b

O:\CHIA\CHIAS\Gentry Ridge\Figures\Bear Canyon Spreadsheets\DH-1A DH-2 DH-3 ands DH-4:Figure 7b

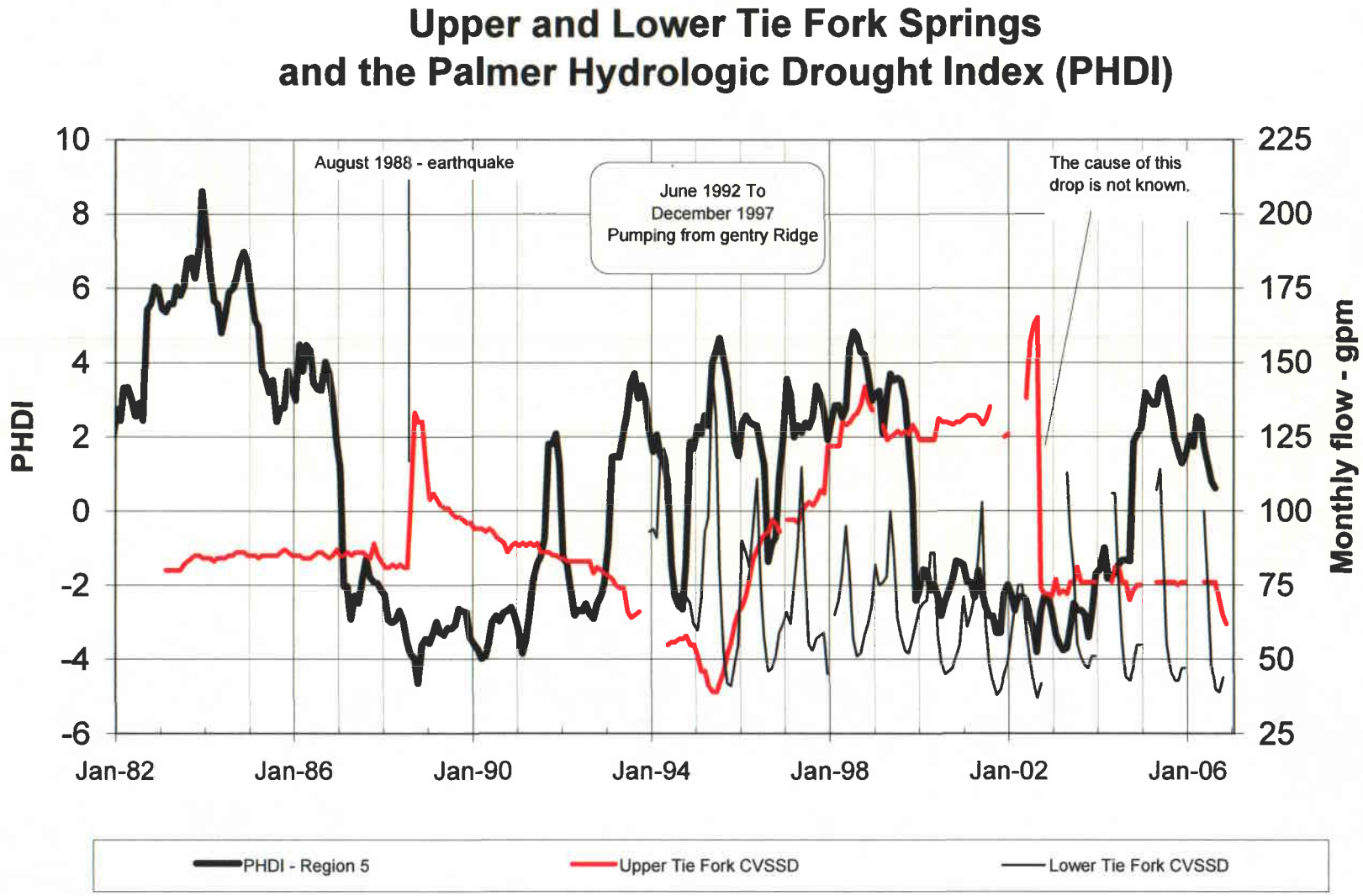


Figure 8

O:\CHIA\CHIAS\Gentry Mountain\Figures\Star Point Spreadsheets\Figure 8.xls:Figure 8

Sulfate and Field pH

Upper Tie Fork Spring (86-35-2-3)

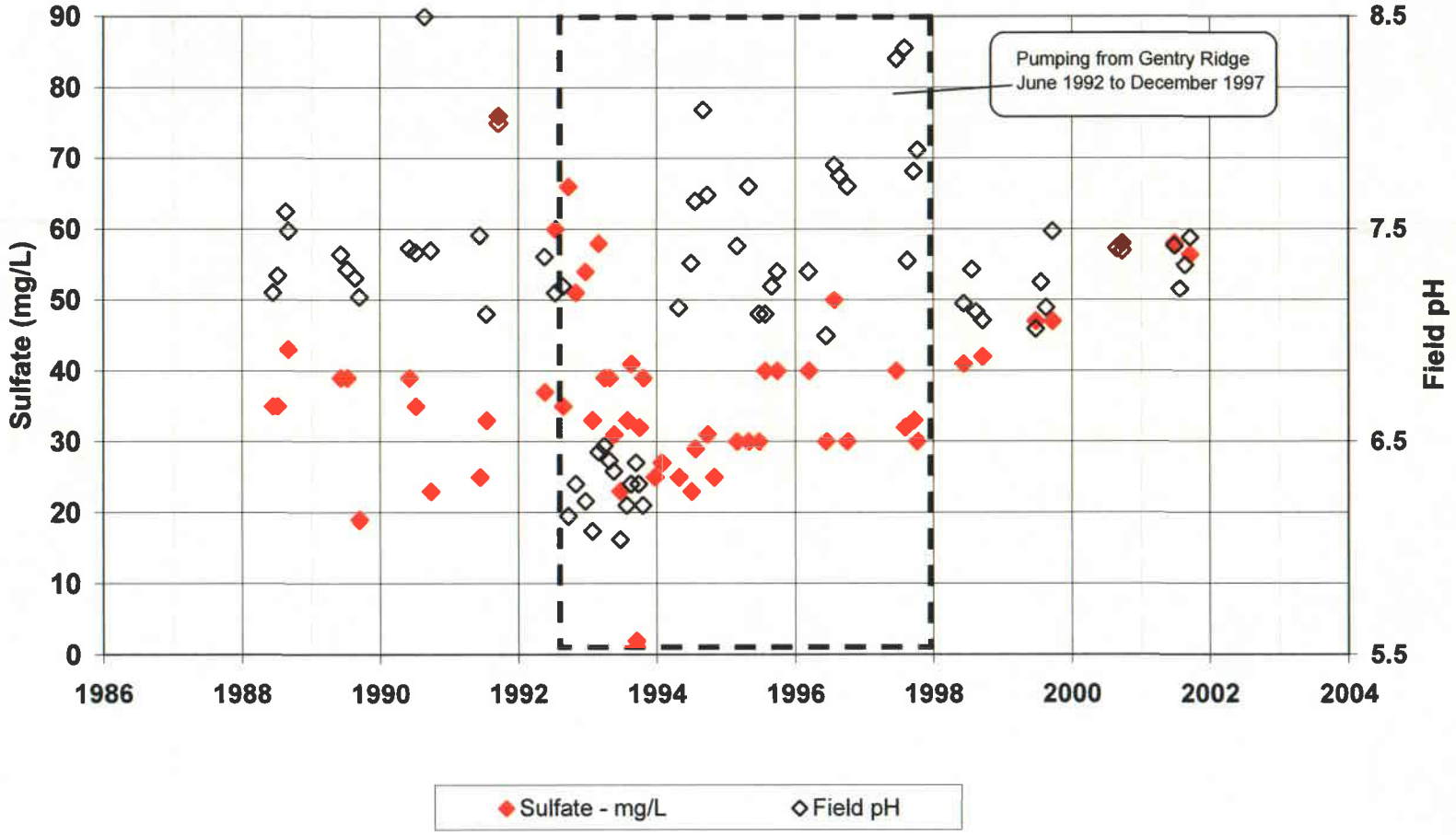


Figure 9a

O:\CHIA\CHIAS\Gentry Mtn\Figures\Star Point Spreadsheets\Figures 9 and 10 Upper Tie Fork.xls Figure 9a Sulfate and pH

Bicarbonate and TDS

Upper Tie Fork Spring (86-35-2-3)

(Bicarbonate values adjusted to account for volitilization during dry residue TDS determination)

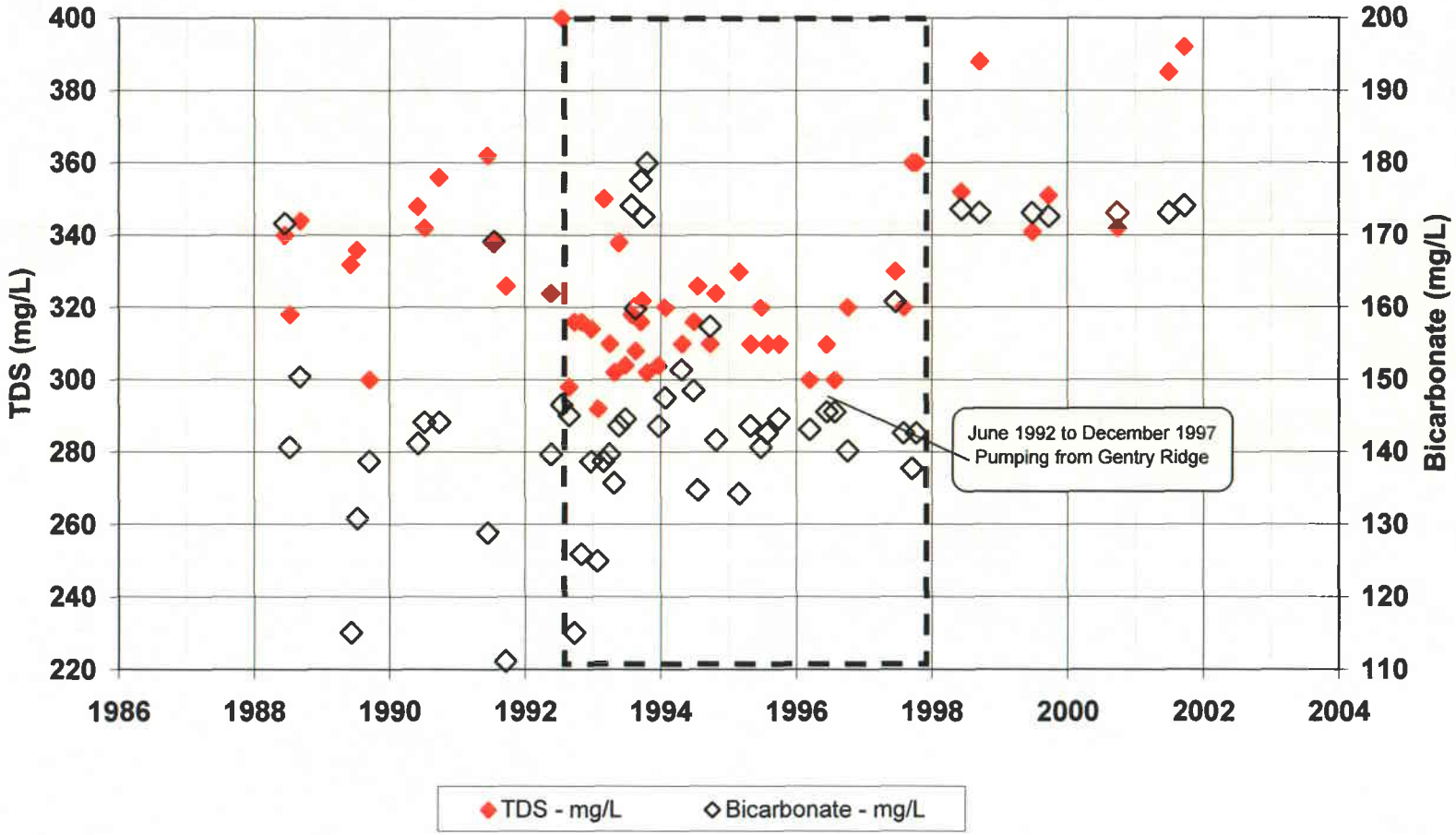


Figure 9b

O:\CHIA\CHIAS\Gentry Mtn\Figures\Star Point Spreadsheets\Figures 9 and 10 Upper Tie Fork.xls:Figure 9b

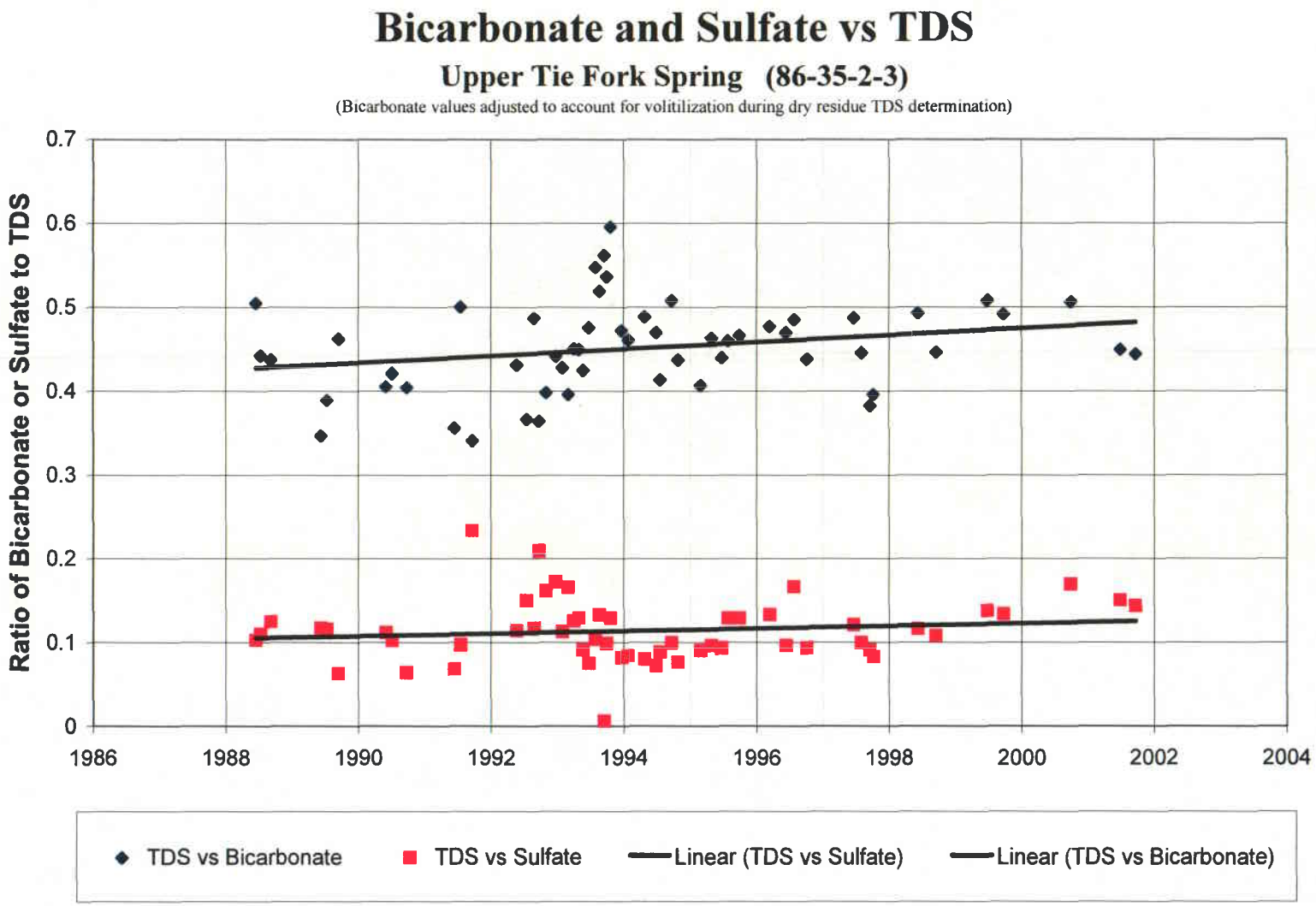


Figure 10

O:\CHIA\CHIAS\Gentry Mtn\Figures\Star Point Spreadsheets\Figures 9 and 10 Upper Tie Fork.xls Figure 10

Birch Spring Flow
Combined Data Sources

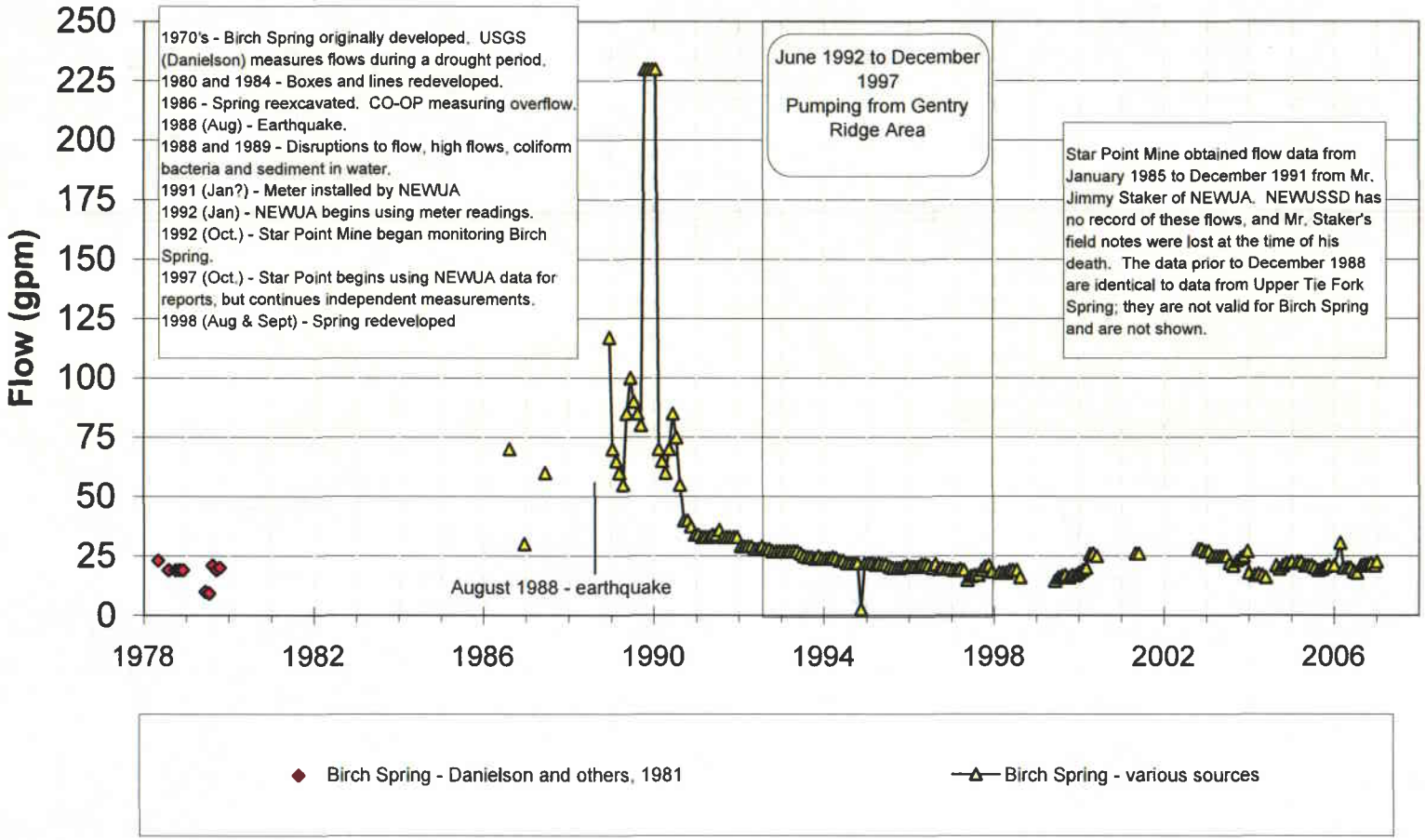


Figure 11

O:\CHIA\CHIAS\Gentry Mountain\Figures\GNTRYMTD.Jan1978toDec2006.xls:Figure 11

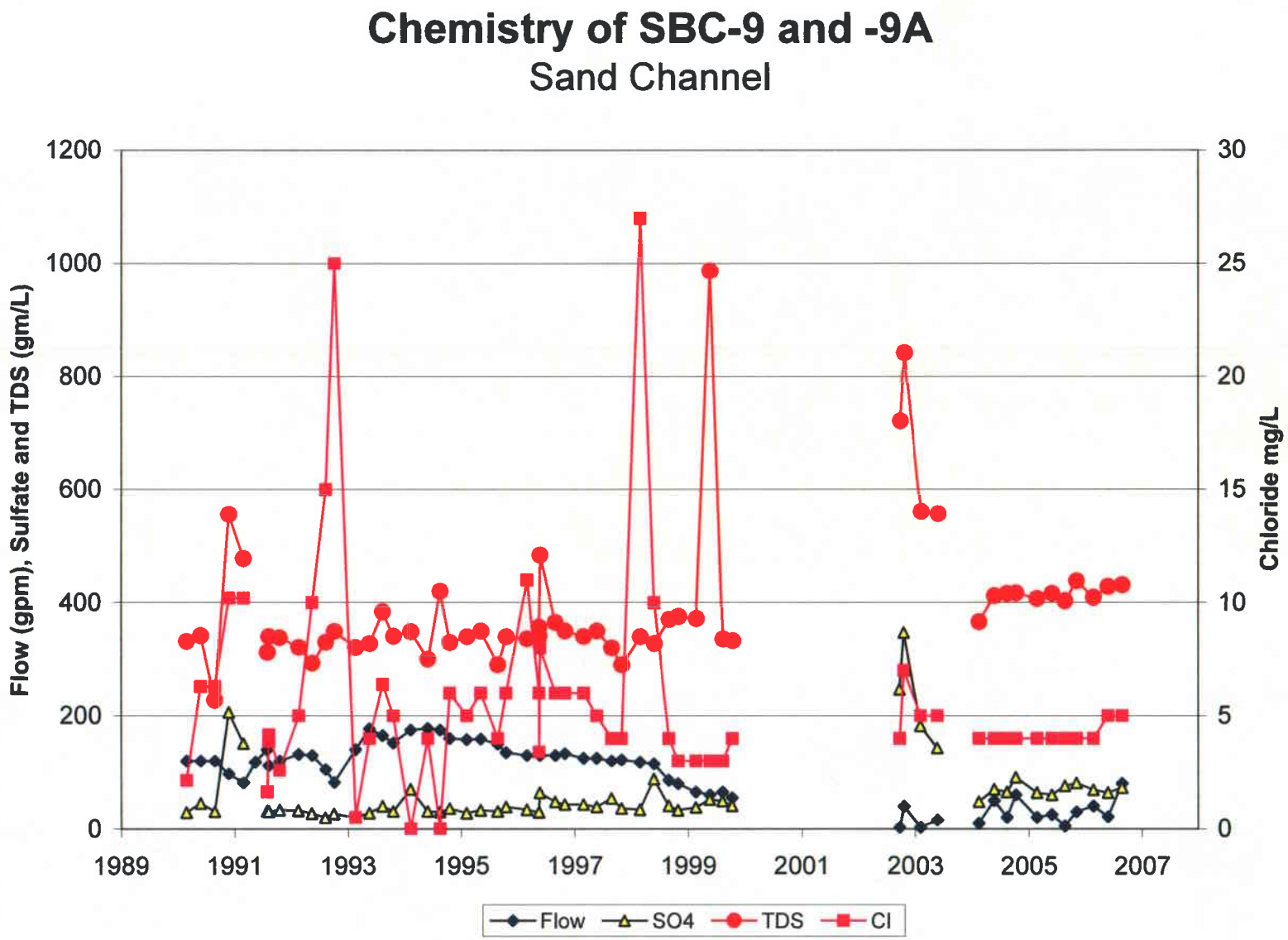


Figure 12

O:\CHIA\CHIAS\Gentry Mountain\Figures\SBC--9, SBC-10, and SBC-13:Figure 12

Chemistry of SBC-10

Sand Channel

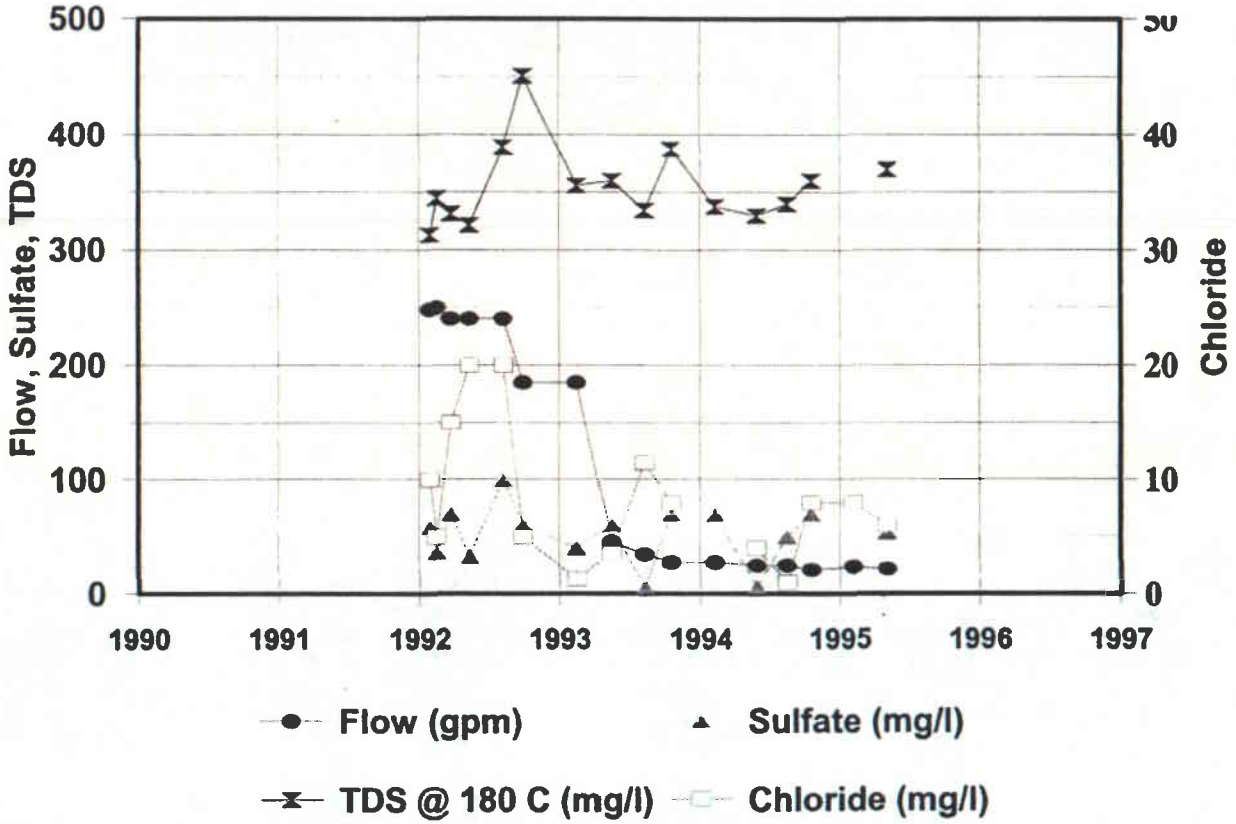


Figure 13a

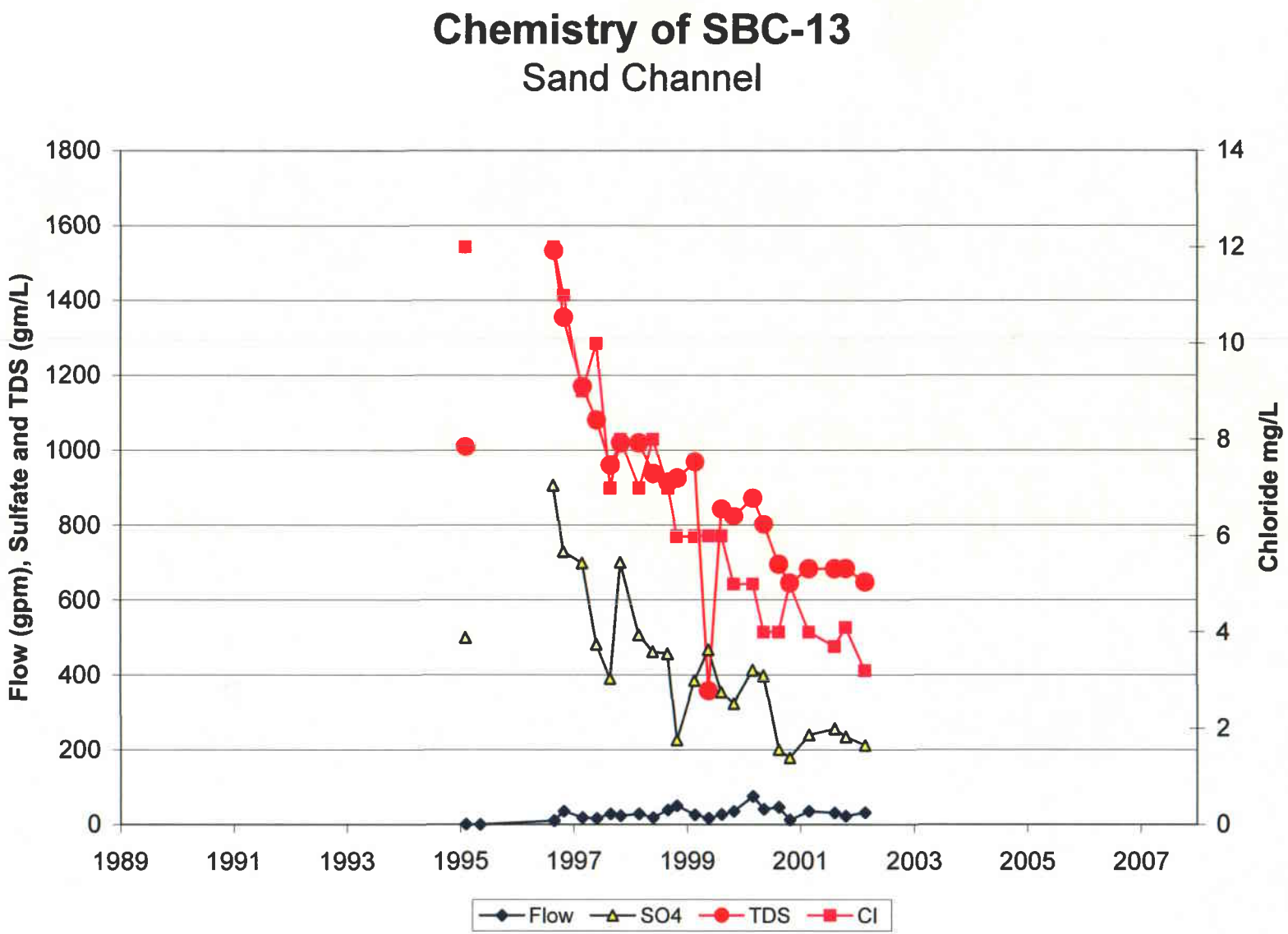


Figure 13b

O:\CHIA\CHIAS\Gentry Mountain\Figures\SBC-9, SBC-10, AND SBC-13:Figure 13b

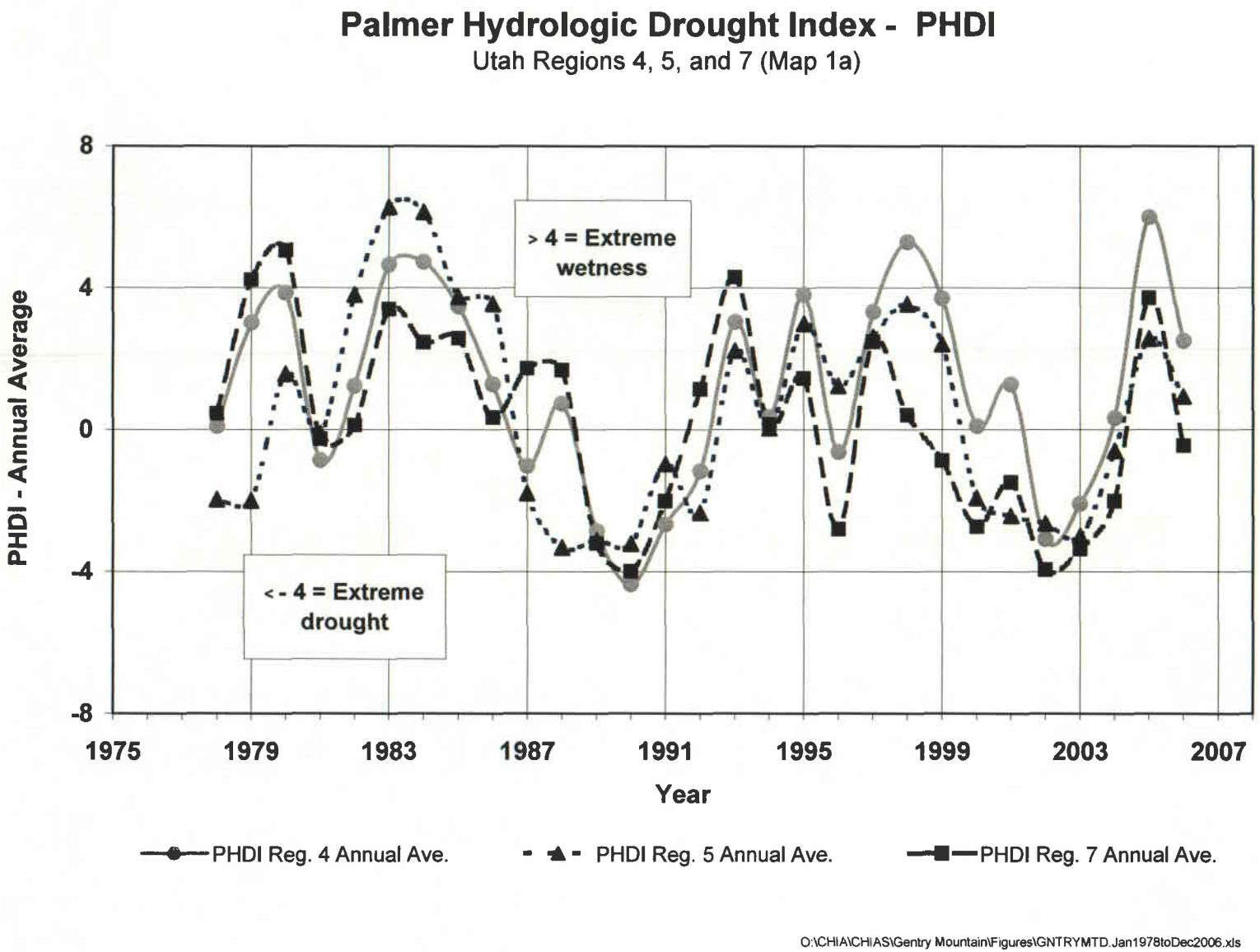
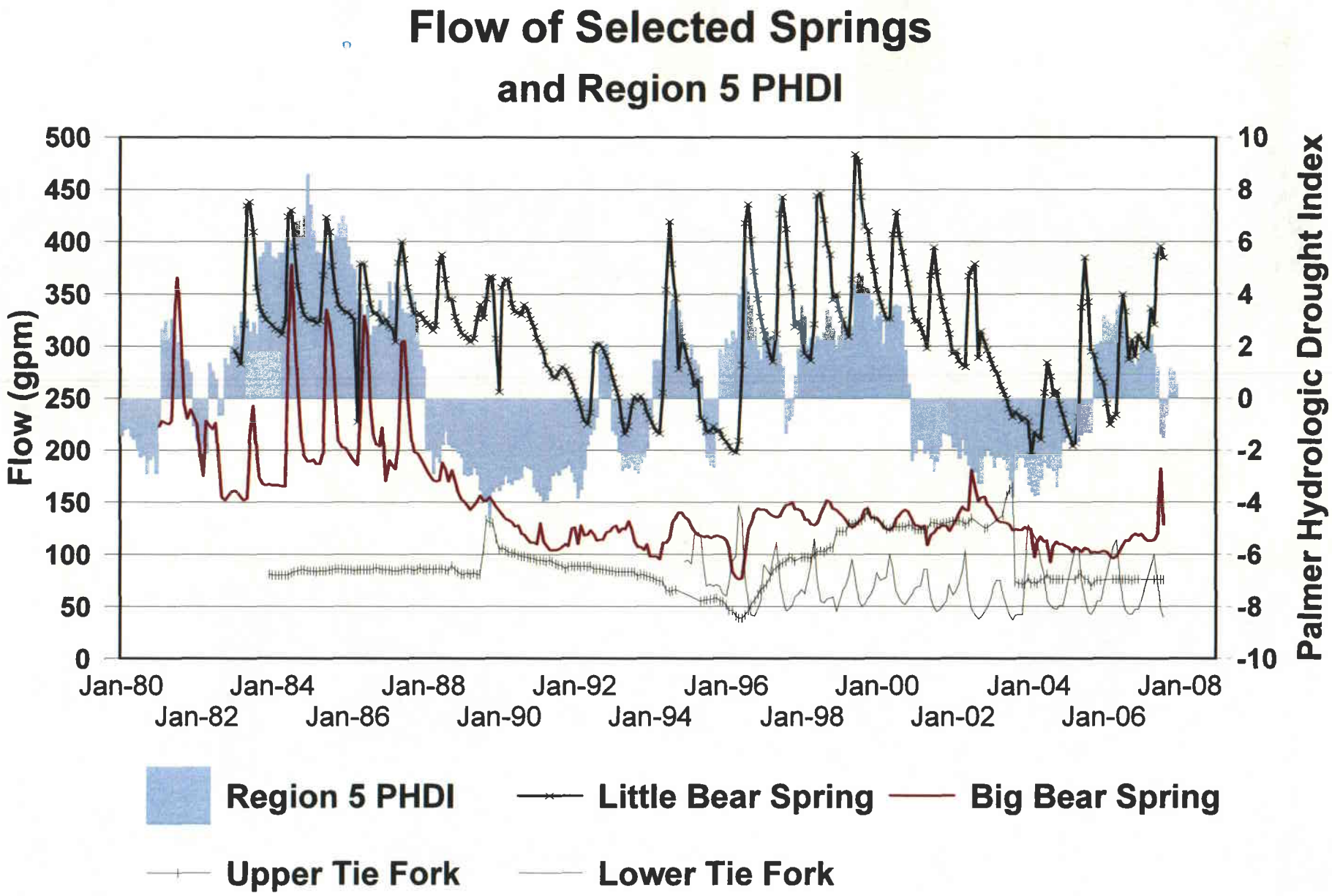

Palmer Hydrologic Drought Index - PHDI
Utah Regions 4, 5, and 7 (Map 1a)
PHDI - Annual Average
8
4
0
-4
-8
> 4 = Extreme wetness
< - 4 = Extreme drought
1975
1979
1983
1987
1991
1995
1999
2003
2007
Year
PHDI Reg. 4 Annual Ave.
PHDI Reg. 5 Annual Ave.
PHDI Reg. 7 Annual Ave.
O:\CHIA\CHIAS\Gentry Mountain\Figures\GNTRYMTD.Jan1978toDec2006.xls

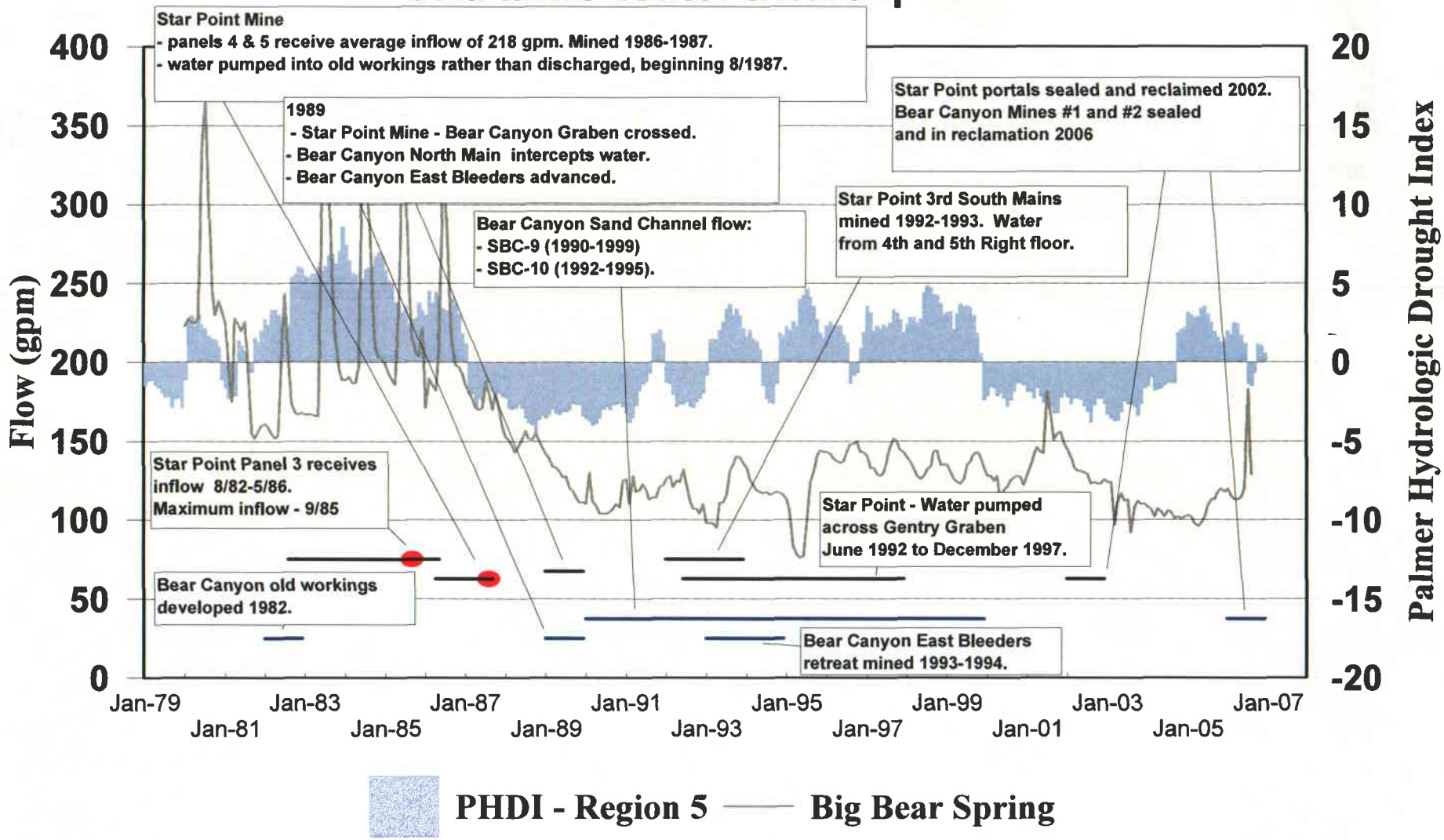
Figure 14



O:CHIA\CHIAS\Gentry Mountain\Figures\GNTRYMTC WB2 LBBBRegion5

Figure 14a

Big Bear Spring, the PHDI, and Mine Water Interception



O:CHIA\CHIAS\Gentry Mountain\Figures\GNTRYMTC.WB2 bigbmining 29JAN2007

Figure 14b

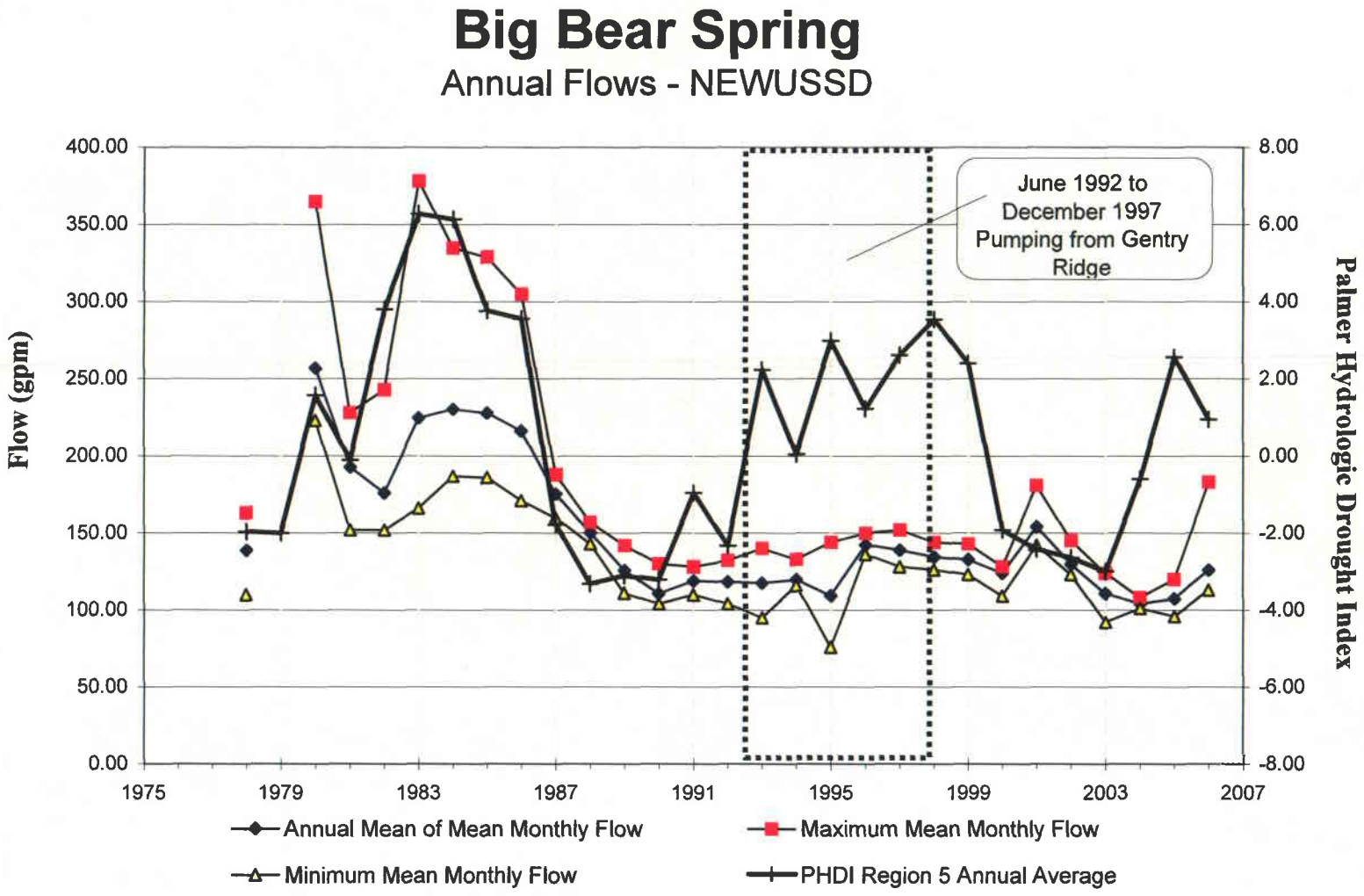
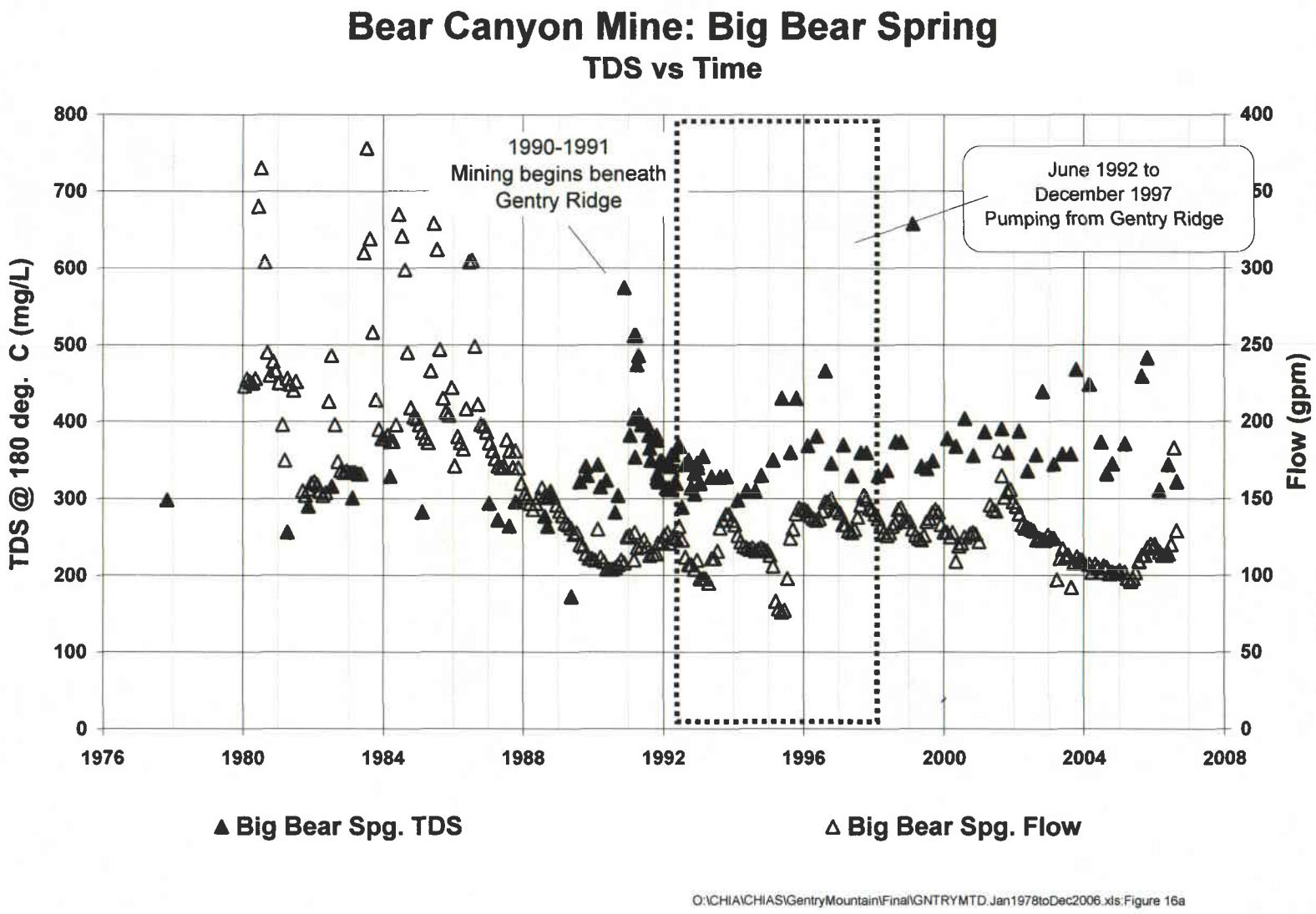


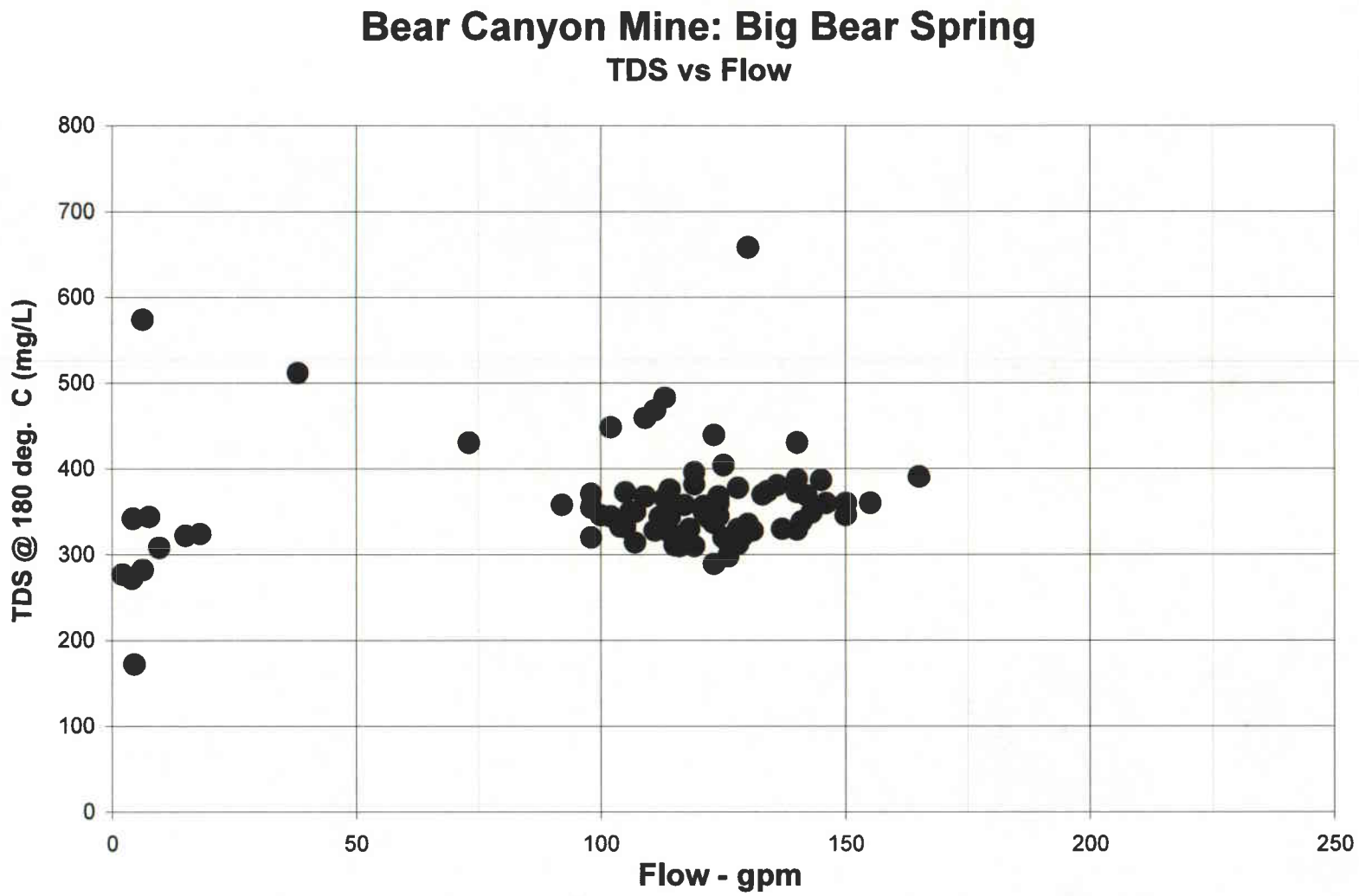
Figure 15

O:\CHIA\CHIAS\Gentry Mountain\Figures\GNTRYMTD.Jan1978toDec2006.xls:Figure 15



O:\CHIA\CHIAS\GentryMountain\Final\GNTRYMTD.Jan1978toDec2006.xls:Figure 16a

Figure 16a



O:\CHIA\CHIAS\GentryMountain\Final\GNTRYMTD.Jan1978toDec2006.xls:Figure 16b

Figure 16b

Meteoric Water Line
Deuterium and Oxygen 18

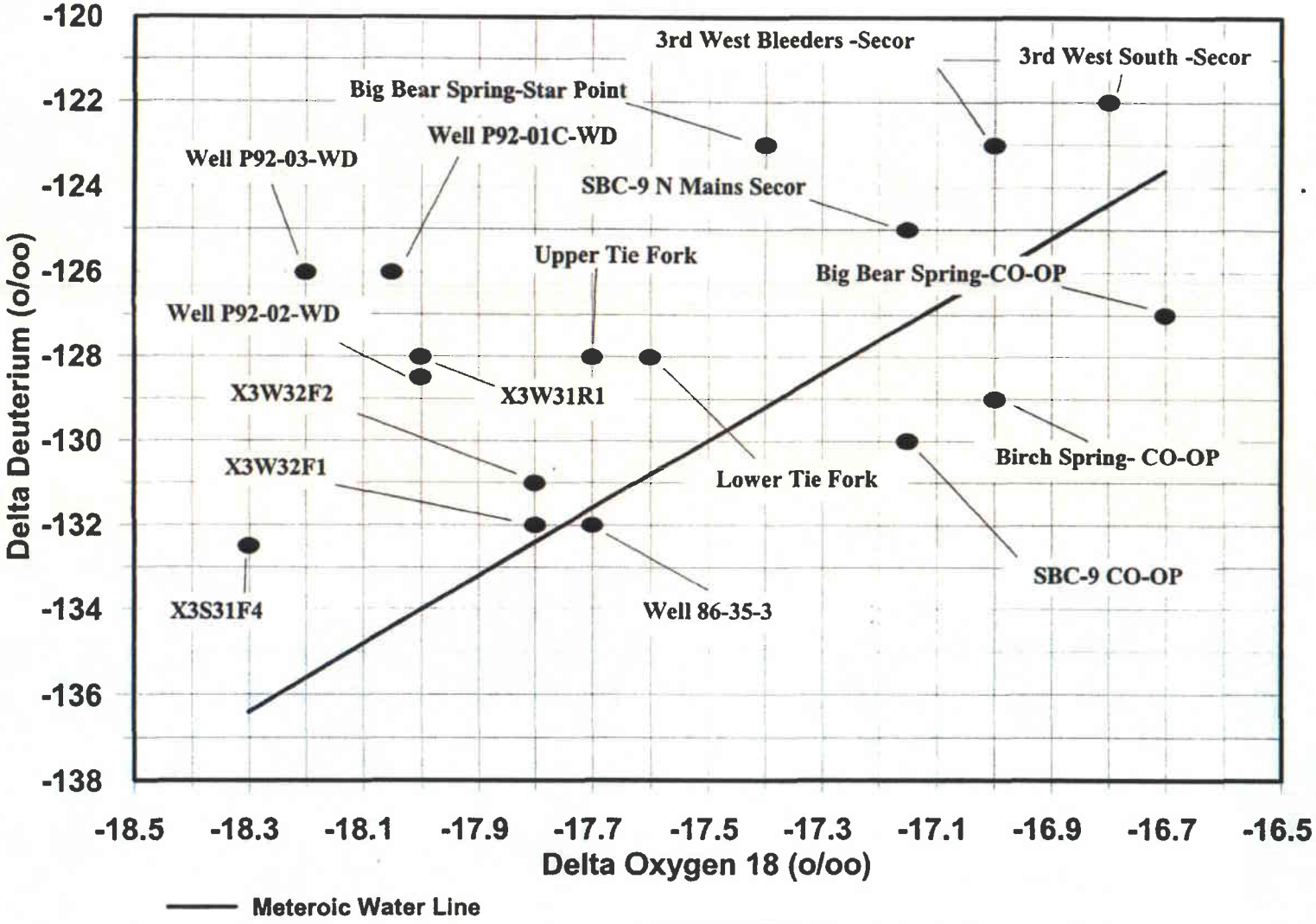


Figure 17

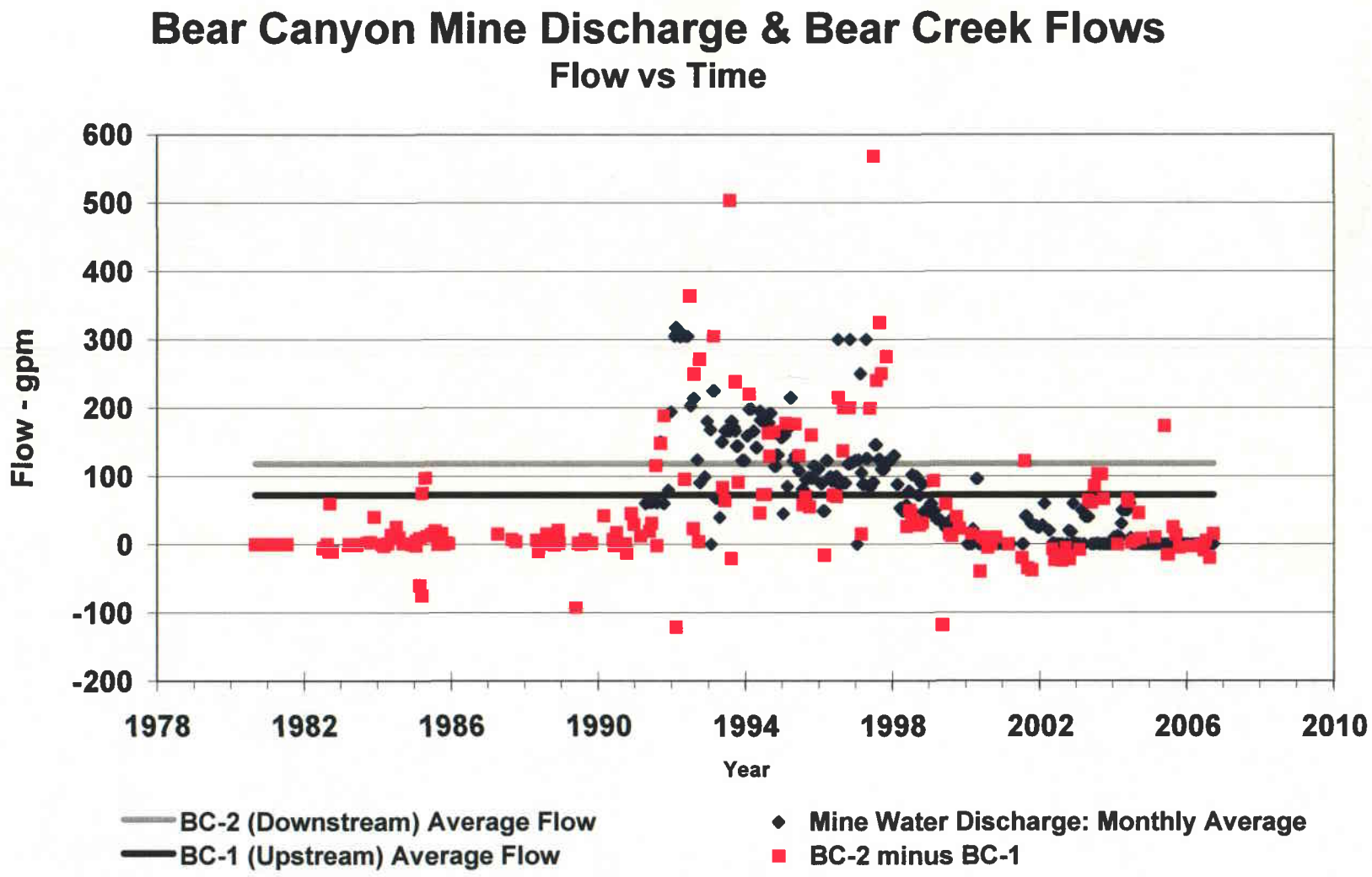


Figure 18

O:\CHIA\CHIAS\GentryMountain\Figures\Bear Canyon Spreadsheets\BC-1 and BC-2.xls: Figure 18

APPENDIX B.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT MAPS

Map 1: **Gentry Mountain CHIA Location Map**
Map 1a: **Utah Coal Permit Areas and Palmer Hydrologic Index Climate Divisions**
Map 2: **Cumulative Impact Area (CIA)**
Map 3: **Star Point and Hiawatha Mining & Subsidence Areas**
Map 4: **Bear Canyon & Trail canyon Mining & Subsidence Areas**
Map 5: **Gentry Mountain Geology**
Map 6: **Gentry Mountain CHIA surface Hydrology**

APPENDIX C.

UTAH DOGM FIELD REPORT and SUMMARY MEMO from CHARLES REYNOLDS REGARDING OCTOBER 15, 1998 INVESTIGATION of BIRCH SPRINGS and RELATED FAULTS and FRACTURES

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING
1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

Michael O. Leavitt
Governor
Lowell P. Braxton
Division Director

DQ 74

DIVISION OF OIL GAS & MINING
FIELD VISIT FORM
TECHNICAL

Date : 15 October, 1998

Time: 9:00 a.m. to 3:00 p.m.

Mines: CO-OP Bear Canyon Mine.

File Number: ACT/015/025

DOGM Staff: Jim SMITH

Other Attendees: Charles REYNOLDS, CO-OP

Purposes:

1. To examine the 3-dimensional orientation, continuity, and interconnectivity of joints (fractures) associated with Birch Spring.

2. To examine the relationship of the Blind Canyon fault to Birch Spring and associated joints.

3. To examine possible relationships between Birch Spring and the geology and geography of the terrain immediately surrounding the spring.

Observations:

1. Birch Spring is not a single source but several sources flowing from fractures and a fault, mainly on the west side of the box canyon containing the springs.

2. The Blind Canyon fault is evident on aerial photos and on the ground: the fault in the box canyon is not the Blind Canyon fault.

3. Joints and faults appear to strike consistently N-S $\pm$ 5°, but there are a few joints that strike approximately N 20°W.

4. Joints and faults appear to be basically vertical and planar, but on large vertical exposures the joints are often seen to be gently curved or even sinuous.

5. Observed faults are characterized by zones, several feet wide, of large, blocky rubble or breccia. Fracturing in the zone is dominantly vertical to near vertical, for example the fault at the west side at the head of the box canyon containing Birch Spring.

west side at the head of the box canyon containing Birch Spring.

6. Faults and large joints can be followed vertically from the Storrs Sandstone, up through the overlying shales, and into the Spring Canyon Sandstone; however, .

7. Some large adjacent joints, such as those exposed above sources #1 and #2 at Birch Spring, are connected by sets of steeply dipping fractures, similar to the fault zones only not vertically extensive.

8. Large joints can be followed or projected for hundreds of feet along strike.

9. Joints appear to be gradually converging upslope (north) and may actually converge northward or upwards or both.

10. Most of the area is jointed, the distance between joints ranging from 2 or 3 feet to 35 feet; one section between the Blind Canyon fault and Birch Spring is not visibly jointed across an exposure approximately 50 feet wide.

11. Vegetation is growing on the three reclaimed breakout/subsidence areas in Section 28, but the easternmost has continued to settle or subside.

Conclusions:

1. Birch Spring does not issue from the Blind Canyon fault, but the several water sources that constitute Birch Spring issue from large joints and a fault zone.

2. Joints and faults have good continuity vertically and along strike, which is roughly N-S. Ground-water flow from north to south would be facilitated along these fractures.

3. There are thick unfractured sections, and lateral interconnectivity between joints and faults is not as well developed. East-west flow would be impeded relative to north-south flow.

4. Although the terrain is steep, the extensive jointing could allow local recharge from precipitation and snowmelt.

5. Additional reclamation work is needed at the subsidence area in Section 28.

Recommendations:

No further action at this time. Charles REYNOLDS is preparing a response to the complaint from NEWUA, as outlined in Tech-005, that will include his interpretation of the geology and geography of the area around Birch Spring. Further action will depend on the acceptability of CO-OP=s response and on the time and effort UDOGM can allocate to the problem. Further actions could include detailed geologic interpretation from low-altitude aerial photos and 3-dimensional mapping and modeling using EarthVision.

CO-OP MINING COMPANY

P.O. Box 1245
Huntington, Utah 84528

Office (435) 687-2450
FAX (435) 687-2084

RECEIVED
DEC 28 1998
DIV. OIL, GAS & MINING

December 22, 1998

Coal Program
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

ACT/015/025 #2
Pam, Ken, Sharon

To Whom It May Concern,

Re: Birch Spring Action Plan, Tech Directive 005, Bear Canyon Mine, ACT/015/025, Emery County, Utah

This letter is to summarize the progress of the work which has been accomplished on Steps 3 and 4 of the Action Plan which was approved by the Division per letter dated August 7, 1998.

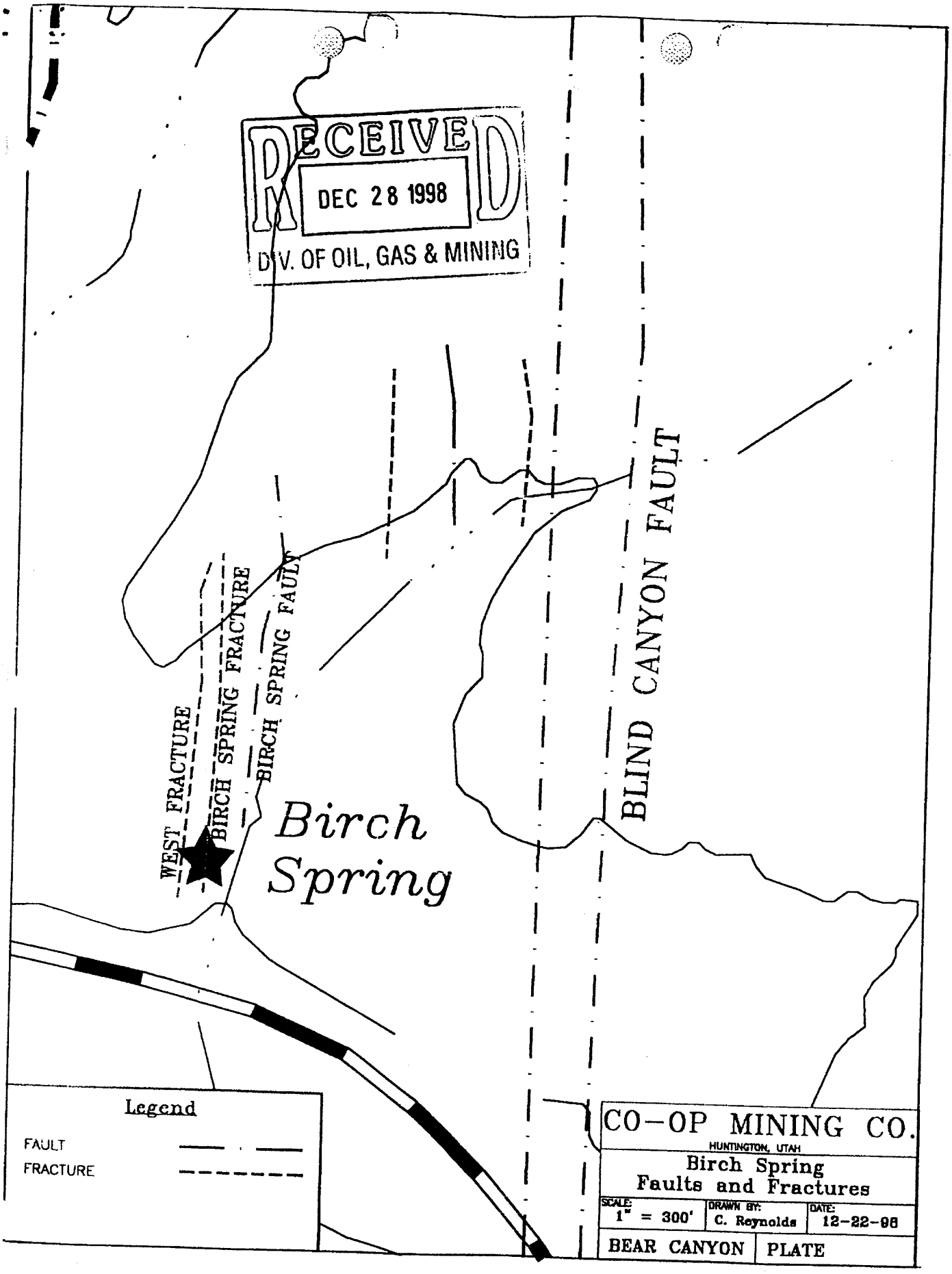
Step 3 consisted of conducting additional on-the-ground investigations of faults, fractures, and joints in the area of Birch Spring. On October 15, 1998, afield survey was conducted involving myself and Jim Smith, Division representative.

The survey included identifying the faults and fractures associated with and adjacent to Birch Spring. The survey began at Birch Spring. Birch Spring No. 1 and 2 sources flow from the South joint of a double fracture. A significant fracture was also identified 20 feet West of the Birch Spring fracture. A fault was observed East of Birch Spring having at least three points of offset totaling approximately 15 feet. These three geologic structures were then tracked simultaneously to the North.

During the survey, additional faults and fractures were identified East of these three structures. Two additional fractures and one additional small fault was observed East of Birch Spring and West of the Blind Canyon Fault. The total distance across this area was approximately 600 feet, with each structure being separated by what appeared to be competent blocks of formation with no significant fracturing, some as wide as 50'.

The two fractures and the fault surrounding Birch Spring were mapped Northward to the Ridge between the Birch Spring drainage and Blind Canyon (approximately 1,000 ft). The lack of outcrop prevented following the fractures beyond this point.

In mapping these fractures northward, the mapping simultaneously progressed up through the tongues of the Starpoint Sandstone. The following observations were made:


RECEIVED
DEC 28 1998
DIV. OF OIL, GAS & MINING
BLIND CANYON FAULT
BIRCH SPRING FAULT
BIRCH SPRING FRACTURE
WEST FRACTURE
Birch Spring
Legend
FAULT
FRACTURE
CO-OP MINING CO.
HUNTINGTON, UTAH
Birch Spring
Faults and Fractures
SCALE: 1" = 300'
DRAWN BY: C. Reynolds
DATE: 12-22-98
BEAR CANYON
PLATE

APPENDIX D.

HYDRAULIC PROPERTIES of STRATA in the
WASATCH COAL FIELD, UTAH

HYDRAULIC PROPERTIES of STRATA in the WASATCH COAL FIELD, UTAH

- Various methods were used to determine these values.
- Some tests determined hydraulic conductivity, others transmissivity. Thickness of the saturated interval is given with transmissivity values, and hydraulic conductivity has been calculated.
- For values determined in ft/day and ft^2/day, conversions to cm/sec and cm^2/sec are in parentheses.

cm/sec = hydraulic conductivity cm^2/sec = transmissivity
ft/day = hydraulic conductivity ft^2/day = transmissivity

		Price River	North Horn	Blackhawk	Star Point
USGS Lab Measurements on Cores (Lines, 1985, Table 3)	17-6 27bda Horizontal			Ss $1.5x10^{-2}$ ft/day (~$5.3x10^{-6}$ cm/sec)	
				Silt 9.3 $x10^{-8}$ ft/day (~$3.3x10^{-11}$ cm/sec)	
				Shale - impermeable	
				Ss 1.1 $x10^{-2}$ ft/day (~$3.9x10^{-6}$ cm/sec)	
				Shale 1.1 $x10^{-8}$ ft/day (~$3.9x10^{-12}$ cm/sec)	
				Silt 2.0 $x10^{-7}$ ft/day (~$7.0x10^{-11}$ cm/sec)	
					Ss 3.1 $x10^{-2}$ ft/day ($1.1x10^{-5}$ cm/sec)
					Ss 1.5 $x10^{-2}$ ft/day ($5.3x10^{-6}$ cm/sec)
	17-6 27bda Vertical			Ss $3.7x10^{-3}$ ft/day (~$1.3x10^{-6}$ cm/sec)	
				Silt $1.2x10^{-7}$ ft/day (~$4.2x10^{-11}$ cm/sec)	
				Shale - impermeable	
				Ss $3.9x10^{-3}$ ft/day (~$1.4x10^{-6}$ cm/sec)	
				Shale – not measured	
				Silt $2.2x10^{-6}$ ft/day (~$7.8x10^{-10}$ cm/sec)	
					Ss $1.1x10^{-2}$ ft/day $3.9x10^{-6}$ cm/sec
					Ss $6.6x10^{-3}$ ft/day $2.3x10^{-6}$ cm/sec
USGS Recovery or Drawdown Test (Lines, 1985, Table 4)	17-6 24dcd-1			2 ft^2/day (180 ft interval) ($2.2x10^{-2}cm^2$/sec ~ $3.9x10^{-6}$ cm/sec)	
	17-6 27bda-1			8 ft^2/day (590 ft interval) (8.6 $x10^{-2}cm^2$/sec ~ $4.8x10^{-6}$ cm/sec)	
					6 ft^2/day (80 ft interval) (6.4 $x10^{-2}cm^2$/sec ~ $2.6x10^{-6}$ cm/sec)

APPENDIX D

			Price River	North Horn	Blackhawk	Star Point
		17-6 28bad-2	0.8 ft^2/day (50 ft interval) (8.6 $x10^{-3}cm^2$/sec ~ 5.6$x10^{-6}$ cm/sec)			
		17-6 34dda-1		10 ft^2/day (45 ft interval) (1.1 $x10^{-1}cm^2$/sec ~ 7.8$x10^{-5}$ cm/sec)		
					0.7 ft^2/day (15 ft interval) (7.5 $x10^{-3}cm^2$/sec ~ 1.6$x10^{-5}$ cm/sec)	
		18-6 4bac-1			100 ft^2/day (611 ft interval) (1.07 cm^2/sec ~ 5.8$x10^{-5}$ cm/sec)	
Genwal Mine Slug Tests	Genwal MRP	MW-1 (1987)				0.1 ft/day (3.5$x10^{-5}$ cm/sec)
		MW-4 (1992)				0.6 ft/day (2.1$x10^{-4}$ cm/sec)
		MW-5 (1992)				2.5 ft/day (8.8$x10^{-4}$ cm/sec)
	Mayo and Associates, 7 Nov 1997	MW-2 Spg Cyn (1997)				4.8 to 4.9$x10^{-8}$ ft/sec (1.5$x10^{-6}$ cm/sec)
		MW-6a Spg Cyn (1997)				4.4 to 5.9$x10^{-8}$ ft/sec (1.3 to 1.8$x10^{-6}$ cm/sec)
		MW-7 Spg Cyn (1997)				7.4$x10^{-8}$ ft/sec (2.2$x10^{-6}$ cm/sec)
		MW-6 Panther (1997)				6.2 to 7.4$x10^{-8}$ ft/sec (1.9 to 2.2$x10^{-6}$ cm/sec)
Trail Mountain Mine		TM-3				5.1$x10^{-3}$ cm/sec
Skyline Mine Hansen Associates, 1979, p. 85		Blackhawk coal			2.7$x10^{-8}$ cm^2/sec (~4.4$x10^{-6}$ cm/sec)	
		Aberdeen Ss			2.5$x10^{-2}$ cm^2/sec (~2.5$x10^{-6}$ cm/sec)	
Tests Bear Canyon Mine Plan, App.	Spring Cyn Tongue	DH-1A				12.9 ft^2/day (88 ft interval) 1.4$x10^{-1}$ cm^2/sec (~5.1$x10^{-5}$ cm/sec)
		DH-2				1.2 ft^2/day (103 ft interval) 1.3$x10^{-2}$ cm^2/sec (~4.2$x10^{-6}$ cm/sec)
		DH-3				3.8 ft^2/day (65 ft interval) 4.0$x10^{-2}$ cm^2/sec (~2.0$x10^{-5}$ cm/sec)

APPENDIX D

			Price River	North Horn	Blackhawk	Star Point
		DH-4				29 ft^2/day (178 ft interval) $3.1x10^{-1}$ cm^2/sec (~$5.7x10^{-5}$ cm/sec)
	Storrs Tongue	DH-1A				3.0 ft^2/day (97 ft interval) $3.2x10^{-2}$ cm^2/sec (~$1.1x10^{-5}$ cm/sec)
		DH-2				-
		DH-3				0.07 ft^2/day (87 ft interval) $7.5x10^{-4}$ cm^2/sec (~$2.8x10^{-6}$ cm/sec)
		DH-4				-
	Panther Tongue	DH-1A				51 ft^2/day (70 ft interval) $5.5x10^{-1}$ cm^2/sec ($2.6x10^{-4}$ cm/sec)
		DH-2				2.2 ft^2/day (88 ft interval) $2.4x10^{-2}$ cm^2/sec ($8.8x10^{-6}$ cm/sec)
		DH-3				6.9 ft^2/day (72 ft interval) $7.4x10^{-2}$ cm^2/sec ($3.4x10^{-5}$ cm/sec)
		DH-4				-
Horizon Mine Paln Slug test and AQTESOLV		HZ-95-1				16.1 ft/day ($5.7x10^{-3}$cm/sec)
		HZ-95-1S	alluvium 20.7 ft/day ($7.3x10^{-3}$cm/sec)			
		HZ-95-2				0.25 ft/day ($8.8x10^{-5}$cm/sec)
		HZ-95-3				0.2 ft/day ($7.1x10^{-5}$cm/sec)

APPENDIX D

			Price River	North Horn	Blackhawk	Star Point
Star Point Mine Plan, Table 728e		P92-01A-WD			2.35×10^{14} ft/day (8.1×10^{-8}cm/sec)	
		P92-01B-WD			5.49×10^{17} ft/day (2×10^{-10}cm/sec)	
	Spring Cyn Tongue	P92-01C-WD				3.7 ft/day (1×10^{-3}cm/sec)
		P92-02-WD				0.44 ft/day (2×10^{-4}cm/sec)

From: Jill Marriott
To: John Baza; Mary Ann Wright; Paula Dupin-Zahn
Date: 03/29/2007 10:23 AM
Subject: Fwd: UT FY'06 A&E S0AF12122

FYI- It appears they have accepted this. See below.

>>> "Frank Atencio" <FAtencio@osmre.gov> 03/28/2007 2:44 PM >>>
The SGO submitted amendment 04 for this Utah A&E Regulatory Grant on 03/27/2007 to return it to a twelve-month grant. A previous amendment action had reduced this grant to eleven-month performance period. The new budget period is now 07/01/2006-06/30/2007 with final reports due now later than 09/30/2007. The total award amount for this grant remains at $1,698,219.00.

Please call Frank s. Atencio at (303) 844-1400 Ext. 1428 if you have any questions on this grant amendment.

State of Utah

Utah Oil Gas and Mining

Coal Regulatory Program

Bear Canyon Mine
Co-Op Mining Company
Technical Analysis
April 3, 2007

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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 MRP for permit change, renewal, transfer, assignment, or sale of permit right for conformance to the R645-Coal Mining Rules. The Permittee must comply with all the 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 MRP 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:

Chapter 2 provides information regarding ownership and control of the Bear Canyon Mine. The Permittee is Co-Op Mining Co. (also known as C.W. Mining Co.), a Utah corporation located in Salt Lake City (p. 2-3). C. W. Mining Co. is registered with the State of Utah to do business as (DBA) Co-Op Mining Company. [09152005]

The federal identification number for C. W. Mining Co. is 87-0399230. The last names and initials of the Officers and Directors of C.W. Mining Co. are provided along with their addresses and titles. C.W. Mining Co. will pay the abandoned mine fee.

Co-Op Mining Co. also held Utah coal mining permit C/015/021for the Trail Canyon Mine. Trail Canyon Mine received final bond release on December 29, 2000.

By definition, the owner of the coal lease is presumed to have ownership or control over the Lessee (see R645-100-200. Definitions) and therefore R645-301-112.400 requires that the Permittee provide ownership and control information for the coal leaseholder, unless no controlling interest can be demonstrated. The Permittee has provided the officers and directors of C.O.P. Coal Development Co., the coal lease owner, but has also indicated that the company has no control over C.W. Mining. [09152005]

The current plan includes MSHA numbers for the Bear Canyon No. 1 and No. 2 Mines, and the MRP shows an MSHA number for the facilities at the Bear Canyon No. 3 Mine. The MSHA number for the Bear Canyon No. 4 Mine is listed as MSHA 42-02335, (See Chapter 1, Section 112.700, page 1-7 of the MRP). [01092006]

Findings:

The information provided meets the identification of interests' requirement of the regulations.

VIOLATION INFORMATION

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

Analysis:

Appendix 1-A of the MRP contains current information on violations issued by DOGM. In conjunction with the permit renewal, the Division conducted a check of the AVS system on March 23, 2007 and found no reports of violations. [02012007]

Findings:

The information provided in the MRP meets the violation reporting requirements of the regulations.

RIGHT OF ENTRY

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

Analysis:

Right of entry to the subsurface was secured by C. O. P. Coal Development Co. through lease assignments and lease agreements found in Appendices 1-B and 1-E. C. O. P. Coal Development Co. is the owner of record of fee ground and federal coal leases U-024316, U-20668, U-38727, U-46484, U-61048, and U-61049 within the permit area (federal lease U-024318 was mined out in 1984-1985 and is not in the permit area). CO-OP Mining Co. leases the fee and federal coal from C. O. P. Coal Development Co (letter dated January 1, 2001 in Appendix 1-B. [02012007]

The legal description of the lease area describedin chapter one page six includes the NE1/4 of the NE1/4 of section 24, T. 16 S., R. 7 E. Right of entry was specifically granted by the BLM in a letter from James Kohler, Bureau of Land Management Chief, Solid Minerals, to the Division, dated February 9, 2005. Coal ownership is shown on Plate 1-3. [03282007]

Findings:

The information provided in the MRP meets the right of entry requirements of the regulations.

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:

Plate 1-1 shows the Permit Area, Plate 1-2 shows Surface Ownership, Plate 1-3 shows Sub-Surface Ownership. The initials COP on the plates stand for C.O.P. Coal Development Company. Table 1-3 lists the owners of the surface and mineral property rights within the permit area. The legal description for the permit area is included on page six of chapter one. [03282007]

The operations are not within 100 feet of a public road. The operations are within 300 feet of three occupied dwellings owned by C.O.P. Coal Development Co. (Appendix 1- F contains waiver letters from the owners and occupants of these buildings.) Plate 3-3 shows a dwelling (hunting cabin) in the SW1/4 SE1/4 Sec 24, directly above the Tank Seam mine workings shown on Plate 3-4C and within 1000 ft of the Blind Canyon Seam workings shown on Plate 3-4C (Section 3.4.2.4). There is no portion of the area permitted within an area designated as unsuitable for mining (MRP, section 2.5). The Division is unaware of any study or petition for designation as unsuitable. [02012007]

Findings:

The information provided in the MRP meets the legal description requirements of the regulations.

PERMIT TERM

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

Analysis:

The permit area description is found in (Sec. 112.500 and 112.600). The permit area falls within Township 16 South, Ranges 7 and 8 East, SLBM as shown on Plate 1-1. The permit area acreage now totals 10,967.39 acres. The permit area is categorized by surface and subsurface ownership in Table 1-3. Plate 1-2 provides the key to understanding Table 1-3. The 2007 lease additions increase the private surface area by 3754.16 acres and the federal surface area by 3837.13 acres.

Disturbed area boundaries are shown on Plates 5-2, which are the surface facilities maps. The surface acreage disturbed by the mine encompasses approximately 40.46 acres. The disturbed acres are listed in Table 2-7, Reclamation Area Summary. [02012007]

The current permit was issued on November 2, 2005 and expires on November 2, 2010. There were no special conditions placed on this permit other than using the electronic water monitoring database. The previous special condition regarding monitoring of groundwater inflows into Mine #1 was removed when the Permittee notified the Division that reclamation of Mine #1 was initiated on December13, 3003 (2003Incoming folder, document 0037.pdf). [02012007]

The legal description for the permit area is:

Permit Area

Township 16 South, Range 7 East, SLBM

Sec. 1: Lots 1 and 2, S1/2 NE1/4, SE1/4;
Sec. 10: N1/2, N1/2 S1/2, SE1/4 SW1/4, S1/2 SE1/4;
Sec. 11: All;
Sec. 12: All;
Sec. 13: All;
Sec. 14: NE1/4, E1/2 NW1/4, S1/2;
Sec. 23: E1/2, E1/2 W1/2;
Sec. 24: All;
Sec. 25: All;
Sec. 26: NE1/4 NE1/4, NW1/4 NE1/4, N1/2 SW1/4, NE1/4 and the access/haul road and topsoil storage area as shown on Plate 2-1.

Township 16 South, Range 8 East, SLBM

Sec. 6: Lots 11-14, E1/2 SW1/4, W1/2 SE1/4, SE1/4SE1/4;
Sec. 7: All;
Sec. 8: NW1/4, W1/2 E1/2, N1/2 SW ¼, SE1/4 SW1/4, SW1/4 SW1/4;
Sec. 16: All;
Sec. 17: All;
Sec. 18: All;
Sec. 19: S1/2 NW1/4, SW1/4, SW1/4 SE1/4, N1/2SE1/4, S1/2 NE1/4, Lot 1, NE1/4 NW1/4, N1/2 NE1/4;
Sec. 20: S1/2 NW1/4, N1/2 SW1/4, N1/2 NW1/4, NE1/4, NE1/4 SE1/4;
Sec. 21: E1/2 NW1/4, NE1/4, N1/2 SE1/4,W1/2 NW1/4, N1/2 SW1/4,SE1/4SW1/4,S1/2SE1/4;
Sec. 30: W1/2, W1/2 NE1/4, NW1/4 SE1/4; and
Sec. 31: NE1/4 NW1/4, NW1/4 NE1/4
[03282007]

Findings:

The information provided in the application meets the requirements of this section of the regulations.

PUBLIC NOTICE AND COMMENT

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

Analysis:

Previous publication affidavits are provided in Appendix 1-D. The most recent lease addition was published in the Emery County Progress on October 18, 25, November 1, and 8, 2005. [02012007]

Appendix 1-C contains the current general liability insurance which provides effective coverage on an annual basis. An aggregate amount of $2,000,000 is provided for bodily injury and property damage; $1,000,000 is the amount of provided coverage for each occurrence. [02012007]

The Division received a request for an informal conference on January 27, 2000. The request was from J. Craig Smith and Scott M. Ellsworth of Nielsen and Senior representing the Huntington-Cleveland Irrigation Company. The conference was conducted February 22, 2000, and the MRP has been modified in accordance with requirements of the order resulting from that conference. [06072005]

Findings:

The information provided meets the requirements for public notice and liability insurance requirements of the Regulations.

FILING FEE

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

Analysis:

A filing fee was paid at the time of initial permit issuance.

Findings:

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

PERMIT MRP FORMAT AND CONTENTS

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

Analysis:

A reformatted, electronic version of the Bear Canyon MRP was approved in 2005. The Bear Canyon Mine is commended as the first in the State of Utah to provide a completely electronic version of their permit.

The .xls file included with the January 27, 2003 electronic copy of the submittal provides a cross reference for new and old plate numbers and provides new appendix numbers, but does not cross reference changes to the narrative. The technical analysis contains cross-reference charts for the narrative, appendices, tables and maps for information pertinent to soils of the site.

Soils information previously located in Chapter 8 and Appendices is now found in Chapter 2 and Appendices; consequently all the maps and table numbers begin with 2 (i.e. Plates 2-1A rather than 8-1 which is the Main Area Soils Map). Cross-reference charts are key to the understanding of previous technical memos on the Bear Canyon Mining and Reclamation Plan.

The MRP-Part B meets the requirements of R645-301-121.100, R645-301-121.200, and R645-301-121.300 for the Biology Chapter and Archeology Section because the Permittee presents current, clear, and concise information that follows Division format.

Outside materials are cited throughout Chapters 6 and 7. A bibliography has been added at the end of Chapter 6. Chapter 7 has two reference sections.

Findings:

Information provided in the MRP meets the requirements of this section of the regulations.

REPORTING OF TECHNICAL DATA

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

Analysis:

The following table shows the biology-related appendix numbers from the older and newly formatted MRPs, titles of appendices, and numbers of pages in each appendix:

NEW FORMAT	OLD FORMAT	TITLE	NUM OF PGS
Appendix 3-A	Appendix 9-A	Vegetation analysis - reference area	35
Appendix 3-B	Appendix 9-B	Miscellaneous data	6
Not included	*Appendix 9-C*	*Vegetation monitoring*	
Appendix 3-C	Appendix 9-D	Shower house pad veg. and reference area	29
Appendix 3-D	Appendix 9-E	Tank seam access road vegetation	21
Appendix 3-E	Appendix 9-F	Vegetation studies for the fed. lease area	15
Appendix 3-F	Appendix 9-G	Vegetation sampling in the wild horse ridge area	40
Appendix 3-G	Appendix 9-H	Vegetation sampling in the wild horse ridge tank seam area	33
Appendix 3-H	*Proposed submittal*	Morland vegetation study	
Appendix 3-I	Appendix 10-A	Fish and wildlife resource information	36
Appendix 3-J	Appendix 10-B	Mitigation and impact avoidance procedure, general to all	17
Appendix 3-K	Appendix 10-C	Vertebrate species of southeastern Utah	73
Appendix 3-L	Not included	*Wildlife survey information*	21

The following table shows the older and newly formatted MRP table numbers and titles:

NEW FORMAT	OLD FORMAT	TITLE
Table 3-1	Table 9.3-1	Vegetation types
Table 3-2	Table 9.2-1	Vegetation reference areas
Table 3-3	Not included	*Recommended seed mix for interim reclamation*
Table 3-4	Table 9.5-1	Revegetation schedule
Table 3-5	Table 9.5-2	Recommended seed mix for riparian-creek bottom
Table 3-6	*Table 3-7*	*Recommended seed mix for pinyon juniper grass*
Table 3-7	Table 3-8	*Suggested proportions of tack to fiber*

Tables 3-3, 3-6, and 3–7 are new submittals.

The following table shows the older and newly formatted MRP figure numbers and titles:

NEW FORMAT	OLD FORMAT	TITLE
Figure 3-1	Figure 10-1	Endangered mammalian species in relation to permit area
Figure 3-2	Figure 9-19	Correct planting procedures
Figure 3-3	Figure 9-20	Seedling storage

The following table shows the older and newly formatted MRP plate numbers and titles:

NEW FORMAT	OLD FORMAT	TITLE
Plate 3-1	Plate 9-1	Vegetation map
Plate 3-2	Plate 10-1	Wildlife use area

Plate 3E-1	Plate 9F-1	Vegetation resources map for federal lease area

Also pertaining to Biology, Plate 5-3b shows the raptor nests in relation to planned subsidence.

Findings:

The Division considers information in the MRP adequate to meet the requirements of the Biology-related information for Permit MRP Format and Contents section of the General Contents regulations.

ENVIRONMENTAL RESOURCE INFORMATION

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

GENERAL

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

Analysis:

Analyses of the existing, premining environmental resources within the permit and adjacent area that may be affected or impacted by the proposed underground mining activities are discussed under other headings in this technical analysis.

Findings:

The Division has determined that each section of the MRP is complete and accurate.

PERMIT AREA

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

Analysis:

The permit area has increased from 3,376.18 acres to 10,991.83 acres (Sec. 112.500 and 112.600 and Plate 1-1). Table 1-3 outlines surface ownership, and subsurface ownership: coal, minerals, oil and gas, as well as grazing rights within and adjacent to the existing permit area. Areas A through E in Table 1-3 are illustrated on Plate 1-2. (Area E, a category of land with U.S.F.S. surface ownership and C.O.P. Coal Development Co. subsurface ownership (fee coal) is adjacent to the existing eastern permit boundary, but not within the permit area. Consequently, Area E is not described in Sec. 112.500 and 112.600 as part of the permit area).

The disturbed area (40.46 acres) is illustrated on Plates 5-2. Total disturbed acres are described in Table 1-4. [02012007]

Findings:

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

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

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

Analysis:

The MRP provides information about cultural resource sites within the permit area (Appendix 4A). One of the survey reports provides the results of a survey for the entire Wild Horse Ridge area and discusses the significance of a historic resource site. This single site is considered eligible for listing in the National Register of Historic Places.

The MRP also provides a copy of a cultural resource report conducted by Kenneth Juell of the University of Utah Archeological Center. Part of this survey included the Wild Horse Ridge area, and four drill sites associated with access roads (mainly on Wild Horse Ridge). The results show that no cultural resource sites were found. According to this report, there were no other sites in the area.

It is not clear from the report done by Mr. Juell whether the report included all available information about cultural resources in the Wild Horse Ridge area. In response to this concern, the Permittee conducted a literature search for all records of cultural resources in the area . .

A cultural resource survey of the proposed lease addition areas,(submitted July 22, 2005), is also provided for in the MRP as appendix 4F. This survey basically included the cliff faces and escarpments in sections 19 and 30 for the Wildhorse Ridge addition. Sagebrush Consultants LLC conducted a literature search for the Bear Canyon Lease addition areassee Appendix 4H and 4I. The search identified a number of eligible sites located in the escarpment areas of the Castle Gate sandstone formation. According to Bruce Ellis, (FS Archaeologist) and Matt Seddon, (SHPO), the results of the literature search indicated the need to conduct a ground survey of the escarpment and high probability areas. The permittee and representatives from Sagebrush Consultants L. L. C. met with Bruce Ellis and defined the scope of the project. It was determined that approximately 820 acres of Federal and private land would be surveyed. Mr. Ellis reviewed the results of the completed survey including the private land portions. A copy of the final survey prepared by Sagebrush Consultants L. L. C. has been included in the MRP. A concurrence letter from the State Historic Preservation Office is on file at the Division office in Salt Lake. ***There are stipulations that are included as Attachment A to the permit. The stipulations require the permittee to monitor subsidence annually throughout the life of the mine and survey those areas that have subsided that were not included in previous survey inventories.***

Findings:

Information in the MRP is adequate to meet the requirements of this section of the regulations.

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

Section 724.400 discusses current climatic information. [06072005]

Findings:

The MRP meets the requirements for this section of the regulations.

VEGETATION RESOURCE INFORMATION

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

Analysis:

The MRP includes a vegetation survey of the reference area in Trail Canyon (Mel Coonrod 1982 and 1983; Appendix 3-A). The MRP also includes surveys conducted by Patrick Collins for the Tank seam access road reference area (Appendix3-A) and shower house pad site and reference area (Appendix 3-C). The Permittee presents information in the Environmental Information section apparently related to these surveys. Although this information is somewhat disconnected, it provides scope, methods, equations, and results.

Appendix 3-F provides a report on the vegetation along the conveyor system and road for the Wild Horse project. This report includes quantitative measurements of vegetative cover and woody plant density. The report also contains measurements of vegetation productivity. Disturbances are narrow; therefore, the Permittee did not sample vegetation communities separately. The Permittee, in consultation with the Division, selected the reference area for the conveyor system and road as transitional between the lower drainage area and the pinyon/juniper/grass areas on the upper slopes.

Plates 3-1 and 3E-1 illustrate the vegetation community types for the permit area.

Vegetation resource information is included in chapter three of the approved Mining and Reclamation Plan, (MRP). Additional information regarding the Bear Canyon Lease Addition includes the redline strike out of page 3-2 and paragraphs one, two and three on page 3-3, 05/15/2006 of the submittal received on August 9, 2006. Plate 3-1 does include the reference areas and the text referring to the reference areas as described on page 3-1. Plate 3-1 was ground truthed with the permittee on June 13, 14, 27, August 22, and September 20, 2006. The riparian communities associated with the springs and perennial streams have been documented in the text on page 3-32 section 322.220. A consensus of the locations of riparian areas within the proposed lease additions was determined after consulting with Pat Collins from Mt. Nebo Scientific and Mark Reynolds from Co-op Mining Company.

Findings:

Information in the proposal 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:

GENERAL WILDLIFE

Plates 3-2 and 5-3b show raptor and big game habitat.

Ungulates: The entire Wild Horse Ridge area is either critical elk or deer winter range.

Aquatics: The right fork of Bear Creek is perennial, but it is not a fishery. The right and left forks of Fish Creek are also perennial but not fisheries.

Raptors: There are several raptor nests in the area including two within about 2000 feet of the Wild Horse surface facilities site.

THREATENED, ENDANGERED, AND SENSITIVE ANIMAL/PLANT SPECIES

TES Plants

The TES plant species that could occur in Emery County include: Barneby reed-mustard, Jones cycladenia, last chance Townsendia, Maguire daisy, Despain footcactus, Wright fishhook cactus, and the Winkler cactus. These species, however, occur at lower elevations than the mine.

The USFS (Region 4) lists canyon sweetvetch (*Hedysarum occidentale* Var. *canone*) and Link trail columbine (*Aquilegia flavescens* Var. *rubicunda*) as sensitive plant species. There are populations of these species within or adjacent to the Bear Canyon mine permit area. The Permittee has GPS locations for the known populations of sweetvetch within the permit area.

TES Animals

Bald eagles are common in the area during the winter and could occasionally fly through or roost within or adjacent to the permit area.

There are no recent, confirmed sightings of black-footed ferrets in Emery County.

The disturbed area for the Wild Horse Ridge project includes willows and other riparian vegetation. Populations of these vegetation types are not large enough to provide habitat for southwestern willow flycatchers.

For the Bear Canyon Lease Addition the MRP includes Appendix 3M-1, (Bat and Owl survey), Plate 3-2, (Deer habitat), Plate 3-3, (Elk habitat), Plate 3-4, (Black Bear habitat), Plate 3-5, (Bobcat habitat) and text revisions to pages 3-IV, 3-2, 3-14, and 3-28 and 3-29. Plates 3-2 and 3-3 were ground truthed with the permittee on June 13, 14 and 27, 2006. Mountain Lion habitat parallels that of the Mule Deer as described in Appendix 3-I. Since Mountain Lion habitat is wide spread no specific mapping is available through the DWR.

Findings:

Information provided in the MRP 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:

A reformatted, electronic version of the MRP was approved in 2005. Soils information previously located in Chapter 8 is now found in Chapter 2. An .xls file accompanying the submittal provides a quick check to the changes made in Plate and Appendix titles. The Division

has created the cross-references for the narrative sections and table for use when reading the previous technical memos.

The .xls file included with the Public information Center January 2003 copy of the submittal provides a cross reference for new and old plate numbers and new plate titles. It is reprinted below with map titles added by the Division. New listings are in bold. This .xls file is not found on the other electronic copies of the submittal or in the hard copy.

Plate 2-1A	Formerly 8-1	Soils Map (Main Area)
Plate 2-1B	Formerly 8-1A	Soils Map (WHR Area)
Plate 2-2A	Formerly 8-2	Main Topsoil Stockpile Area
Plate 2-2B	Formerly 8.7	WHR Topsoil Stockpile Area
Plate 2-2C	**Created for WHR Tank Seam**	**WHR Tank Seam Topsoil**
Plate 2-2D	**Created for Mohrland**	**Mohrland Topsoil Stockpile Area**
Plate 2-2E	Formerly 8-6	Tank Seam Road Topsoil Stockpile
Deleted	Plate 8.4	Ballpark Topsoil Pile Area
Plate 2-3A	Formerly 8-5A	Reclamation Area (TS 1 & 2 Ballpark Area)
Plate 2-3B	Formerly 8-5B	Reclamation Area (TS 2, 3, 4, & 9, Shower House Area)
Plate 2-3C	Formerly 8-5C	Reclamation Area (TS 5-8, Load-out Area)
Plate 2-3D	Formerly 8-5D	Reclamation Area (TS 6, Mine Access Road Area)
Plate 2-3E	Formerly 8-5E	Reclamation Area (TS 10 & 11, Tank Seam Portal Area)
Plate 2-3F	Formerly 8-5F	Reclamation Area (TS 12 & 13, WHR Access Road Area)
Plate 2-3G	Formerly 8-5G	Reclamation Area (TS 12, 14, 15, 16, & 17, WHR Portal Area)
Plates 5-2 series	Formerly 2-4 series	Surface Facilities Blind Canyon

Plates in Chapter 2 (Soils) of the document are exactly the same as the existing MRP with one exception, Plates 2-2C (WHR Tank Seam Topsoil Stockpile Area) and 2-2D (Mohrland Topsoil Stockpile Area) are new listings and neither could be assessed. Apparently they have not been created yet.

Plate 2-2F Ballpark Topsoil Pile Area has been removed from the new format. This is appropriate since the Division approved the removal of the Ballpark from the disturbed area in 2001; and, Table 2-5, Topsoil Summary, does not include the Ball Park soils for use as substitute topsoil during final reclamation. Figures 2-1 and 2-2 in Chapter 2 are the same as Figures 8.9-1 (Photographs of the Ball Park Area) and 8.9-2 (Ball Park Topsoil Storage Pile) in the approved MRP. This information has been retained for historical purposes.

The .xls file included with the submittal provides new appendix numbers. For information pertinent to soils of the site, a cross-reference from the current MRP to the reformatted MRP is provided in the table below. There are no new listings of appendices for soils information.

Appendix 2-A	Formerly 8A	Soil Test Reports
Appendix 2-B	Formerly 8C	Prime Farm Lands
Appendix 2-C	Formerly 8D	Substitute Topsoil Material (Downcast)
Appendix 2-D	Formerly 8E	In-Place Plant Growth Material
Appendix 2-E	Formerly 8B	SCS Soil Survey
Appendix 2-F	Formerly 8F	WHR Soil Resource Inventory and Assessment
Appendix 2-G	Formerly 8G	WHR Tank Seam Soil Resource Inventory and Assessment
Appendix 5-I	Formerly 3-L	Cut & Fill calculations (for areas TS3-9)
Appendix 5-K	Formerly 3-P	WHR Tank Seam Pad and Access Road
Appendix 5O	Formerly 3-K	Sediment Pond Material
Appendix 7K	Formerly 7K	Alternate Sediment Control Areas (includes topsoil piles)
Appendix 5D	Formerly 3-E	Toxic Materials & Handling

The .xls file included with the submittal did not itemize changes to the tables. Tables in Chapter 2 (Soils) of the document are exactly the same as the existing MRP with one exception; the Analytical Parameters For Baseline Soil Data Table 8.8-1 has been replaced with two tables (Table 2-4a and 2-4b) that were taken from the January 2003 DRAFT Division Soils Guidelines for Management of Topsoil and Overburden. Below is a cross-reference of the current and previous table numbers and new table titles in Chapter 2 of the document:

Table 2-1	Formerly 8.3-1	Soil Map Units
Table 2-2	Formerly 8.3-2	Soil Unit Acreage Within the Disturbed Area
Table 2-3	Formerly 8.9-2	Available Substitute Topsoil Material
Table 2-4a	**Replaced** 8.8-1	Analytical Methods for Baseline Soils Data
Table 2-4b	**Replaced** 8.8-1	Additional Analyses Required for Substitute Topsoil, Overburden, Spoil and Coal Mine Waste
Table 2-5	Formerly 8.9-5	Topsoil Summary Table
Table 2-6	Formerly 8.9-4	Ball Park Seed List
Table 2-7	Formerly 8.9-1	Reclamation Area Summary
Table 2-8	Formerly 8.9-3	Substitute Topsoil Summary
Table 2-9	Formerly 8.11-1	Final Grading Test Sample Density
Table 5K-1	Formerly Table 3P-1	WHR Tank Seam Topsoil Recovery
Table 5O-1	Formerly Table 3K-1	Analytical Parameters for Overburden (in Appendix 5O)

The .xls file included with the submittal did not cross-reference changes to the narrative. Below is a cross-reference of the current and previous narrative sections pertaining to the soils

resource information, topsoil and subsoil operations plan, soils redistribution plan, and stabilization plans.

Section R645-301-221	Formerly 8-6	Prime Farm Lands
Section R645-301-222	Formerly 8-1 & 8-2	Soil Survey
Section R645-301-222.100	Formerly 8-1	Soil Maps
Section R645-301-222.200	Formerly 8-3	Soil Identification
Section R645-301-222.300	Formerly 8-3	Soil description
Section R645-301-222.400	No previous reference	Soil Productivity
Section R645-301-223	Formerly 8-7 and 8.7-1	Soil Characterization
Section R645-301-224	Formerly 8.9-1	Substitute Topsoil
Section R645-301-230	Formerly 8.8.1.1	Operation Plan
Section R645-301-231	Formerly 8.8.1.1	General Requirements
Section R645-301-231.100	Formerly 8.8.1.1 and 8.8.1.2 & 8.9.7	Topsoil Removing and Storing
Section R645-301-231.300	Formerly 8.11	Soil Testing Plan
Section R645-301-231.400	Formerly 8.9, 8.9.2 through 8.9.6	Construction, Modification and Maintenance
Section R645-301-232	No previous reference	Topsoil and Subsoil Removal
Section R645-301-232.100	Formerly 3.5.4.2	Topsoil Removal Prior to Disturbance
Section R645-301-232.200	No previous reference	Insufficient Topsoil
Section R645-301-232.300	No previous reference	Topsoil Material Less Than 6 in Thick
Section R645-301-232.400	No previous reference	Area where topsoil will not be recovered
Section R645-301-232.500	No previous reference	Subsoil Segregation
Section R645-301-232.600	No previous reference	Timings
Section R645-301-233	Formerly 8.9	Topsoil Substitutes and Supplements
Section R645-301-234	Formerly 8.8.1.3	Topsoil Storage
Section R645-301-240	Formerly 8.9.1	Reclamation Plan
Section R645-301-241	No previous reference	General Requirements
Section R645-301-242	Formerly 8.10	Soil Redistribution
Section R645-301-243	Formerly 8.11	Soil Nutrients and Amendments
Section R645-301-244	Formerly 8.5	Soil Stabilization
Section R645-301-250	Formerly 8.4	Performance Standards

Cross-reference charts are key to the understanding of previous technical memos on the Bear Canyon Mining and Reclamation Plan.

Chapter 2, Soil Resources, Sections R645-301-221 through R645-301-250, discusses the soil resources for the Bear Canyon Mine.

Prime Farmland Investigation

A Prime Farmland site investigation was performed by the Natural Resources Conservation Service (NRCS). A negative determination was made for Prime Farmland or farmland of statewide importance within the proposed Wild Horse Ridge area (sec 24 and 25, T. 16 S., R. 7 E. and sec 19 and 30 T.16 S. R. 8 E.). The determination letter from the NRCS is dated July 9, 1999, and is included in Appendix 2-B.

Soil Survey Information

Chapter 2 supplies soil resource information for the Bear Canyon Mine and the proposed Wild Horse Ridge expansion based on the following soil surveys:

- 1980. Soil and vegetation survey for Bear Canyon, USDA San Rafael Soil Conservation District and the Soil Conservation Service, Appendix 2-B pp 1 to 13.
- 1990. Order I soil survey, USDA Soil Conservation Service, Appendix 2-B pp 13.
- 1992. Substitute topsoil survey for Bear Canyon, Appendix 2-E.
- 1996. Soil samples collected by Co-Op for Wild Horse Ridge. Appendix 2-F.
- 1998. Order II soil survey of Wild Horse Ridge, USDA Natural Resource Conservation Service.
- 1999. Order I soil survey of Wild Horse Ridge, conducted by Environmental Industrial Services, Appendix 2-F. The survey incorporates information from the 1998 Order II, NRCS soil survey and the 1996 soil sampling.

All mapping and soil survey work were performed according to the standards of the National Cooperative Soil Survey.

The 1990 and 1999 Order I soil survey for the Bear Canyon Mine and Wild Horse Ridge cover Bear Canyon and in the Wild Horse Ridge mine expansion area. Soil maps Plate 2-1 and Plate 2-1A illustrate the soil mapping units and disturbed areas.

Approximate range and average soil salvage depth for each soil map unit, based on evaluations of all field and laboratory data, plant rooting depth and soil rock content is provided for the Wild Horse Ridge in Appendix 2-F. For the Wild Horse Ridge survey, documentation of field data is presented in Map B-Soil Data Collection Map; Appendix C-Field Soil Profile Descriptions and Transect Data; Appendix D-Soil Profile and Landscape Photographs. Appendix F contains information comparing soil-mapping units between the 1999 Order I soil survey to the NRCS Order II soil survey. Similar information is provided in Appendices 2-A, 2-B, and 2-E for the previously disturbed areas.

Soil Characterization

Section R645-301-222.200 and 222.300, Soil Information, identifies and describes each of the 10 soil groups as contained in the 1990 and 1999 Order I soil surveys. Soil descriptions for each of the ten-soil mapping units are summarized in Table 2-1 and in Section R645-301-222.300.

Information specific to Wild Horse Ridge is found in Appendix C within Appendix 2-F. Test results are included with the Order I soil Survey in Appendix F. Pit locations are shown on Plate 2-1B. Soil samples were sent to Inter-Mountain Laboratories, Inc. for analysis. Appendix B contains the analytical data on seven soil samples selected from representative soil layers in the Wild Horse Ridge survey. These samples were characterized according to the 1988 State of Utah Division of Oil, Gas and Mining (DOGM) guidelines for topsoil and overburden.

For all soils, except CW10-1, soil tests indicate that the soils generally rate fair to good for reclamation use. The one exception is soil sample CW10-1, which was taken from a light-colored soil layer at about 20 to 30 inches in depth on a road cut in Soil Map Unit F. The sample was taken to document properties of a calcic horizon in a Guben soil. Soil test results indicate an unacceptable level of selenium (0.26 mg/Kg) and a poor rating for electrical conductivity (10.2 mmhos/cm). The sample SAR value was 3.7 and pH was 8.3. The CW10-1 sample site is at the edge of the existing road accessing the future portal site. Every effort should be made to minimize disturbing and/or mixing the deeper subsoils (20 to 30 inches) of this section of road cut.

Soil productivity information is found in Appendix 2-E, SCS Soil Survey and Appendix 3-B Miscellaneous Vegetation Information.

Substitute Topsoil

The PAP does not propose any borrow as a source for substitute topsoil. However, in 1992, in-place overburden and disturbed soils within the facilities area, were evaluated for use as substitute topsoil material. Results are contained in Appendix 2-D.

Findings:

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

LAND-USE RESOURCE INFORMATION

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

Analysis:

According to information in the MRP, the permit area is zoned by Emery County as Mining and Grazing and Critical Environmental. The land is used for mining, cattle grazing, timber, recreation, and wildlife. Parts of the area are included in a Private [Posted] Hunting Unit, and the access road to the Wild Horse Ridge surface facilities also provides access to a hunting cabin. This road will be maintained during the mining operations.

The MRP discusses previous mining activity in the area. Various entities have operated mines in the area since 1885.

The MRP says there are no public parks, cemeteries, or units of the Wild and Scenic Rivers system or the National System of Trails.

Findings:

Information in the MRP 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 Bear Canyon permit area does not contain alluvial valley floors as defined in R645-100. It is primarily an upland area with grazing and wildlife habitat land uses. Deposits are mostly colluvial with some water-laid deposits from sheet flow and other unconcentrated runoff events.

Applicability of Statutory Exclusions

Findings:

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

PRIME FARMLAND

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

Analysis:

A Prime Farmland site investigation was performed by the Natural Resources Conservation Service (NRCS). A negative determination was made for Prime Farmland or farmland of statewide importance within the proposed Wild Horse Ridge area (sec 24 and 25, T.16 S. R., 7 E. and sec 19 and 30, T.16 S., R. 8 E). The determination letter from the NRCS is dated July 9, 1999, and is included in Appendix 2-B.

Findings:

The Division concurs with the Natural Resources Conservation Service that there are no prime farmlands within the disturbed area.

GEOLOGIC RESOURCE INFORMATION

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

Analysis:

The MRP includes geologic information in sufficient detail to assist in determining the probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface and ground-water monitoring is necessary, and determining whether reclamation as required by the Utah Coal Mining Rules can be accomplished and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area.

The MRP includes a description of the areal and structural geology of the proposed permit and adjacent areas, including federal leases U-024316, U-61048, U-46484, U-61049, U-020668, and U-38727 and fee coal tract owned by C.O.P. Development. The description is based on maps and plans required as resource information for the plan, detailed site-specific information, and geologic literature and practices. Additional geologic information has been submitted as part of Appendix 7J, *Investigation of Groundwater and Surface Water Systems and Probable Hydrologic Consequences*, a report by Mayo and Associates, LC.; Appendix 7-J was updated in 2007 with *Probable Hydrologic Consequences of Coal Mining in the Mohrland Permit Area*, These descriptions show how areal and structural geology may affect the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water.

The permit boundary as shown on revised Plates 6-1 through 6-12 includes the federal leases and fee coal owned by C.O.P. Development. Plate 6-1 is the Geology Map. Plates 6-2, 6-6, and 6-10 are overburden maps, Plates 6-3, 6-7, and 6-11 are isopach thickness maps, Plates 6-4, 6-8, 6-12 are structure contour maps, and Plates 6-5 and 6-9 are interseam isopach maps. Plates 6-2 through 6-12 are based on information from numerous borings and outcrop measurements: logs from many of these borings are in the MRP.

Plates 7-9 and 7-9A are stratigraphic cross-sections. Generalized logs for bore-holes T-1, T-2, T-3, T-5, SDH-1, SDH-2, and SDH-3 are shown on Plate 7-9 and those for WHR-1, WHR-2, WHR-3, WHR-5, WHR-8, F-76-1, F-77-5, F-76-6, 77-3A, and F-77-11-A are on Plate 7-9A. 7-J1 and 7-J2 are stratigraphic cross-sections based on logs from boreholes SDH-1, SDH-2, MW-116, and MW-117. Well completion diagrams for SDH-1, SDH-2, SDH-3, MW-116, and MW-117 are in Appendix 7-A, but the MRP does not contain original logs for any of these bore holes. The well completion diagram for MW-114 is in Appendix 7-A. Except for F-76-4 and F-77-B (Plate 7-9A), Plate 6-2 shows the locations for all bore-holes on Plates 7-9, 7-9A, 7J-1, and 7J-2.

Appendix 7-A also contains logs for in-mine drill-holes 1- and 2-UP and 1-, 6-, 7-, 9-, 10-, 11-, 12-, 13-, and 14-DOWN and SBC-2, -3, and -4, but locations for these are not on a map. Locations for an H series of in-mine bore holes are shown on Plates 6-5 and 6-7, but there are no logs for these holes in the MRP.

Drill-hole DH-3 was abandoned in 1993 and replaced by DH-4. Borehole logs and well completion diagrams for DH-1, DH-2, DH-3, and DH-4 are in Appendix 7N-G.

Logs for drill holes TS-6 through TS- 10 and TS-14 are in Appendix 6-A, but logs are not available for TS-12 and TS-13: there is apparently no TS-11. Locations for TS-6 through TS-10 are shown on Plates 6-9, 6-10, and 6-11.

There is no hydrology information available for the WHR series of boreholes (Section 7.1-4).

Revised Plates 3-4A and 3-4C show projected mining in the Blind Canyon and Tank seams, respectively, in the Wild Horse Ridge addition.

Subsidence is discussed in Appendix 3-C.

Tonnages in Table 3.4-1 have been updated to match the most recent R2P2. [09212005]

At this time the Division does not require the collection, analysis, and description of additional geologic information to protect the hydrologic balance, to minimize or prevent

subsidence, or to meet the performance standards. The Permittee has made no request to the Division to waive in whole or in part the requirements of the borehole information or analysis required of this section. [02262007]

Findings:

Information on geologic resources is considered adequate to meet the requirements of this section of the regulations.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Sampling and Analysis

The MRP meets the requirements for Sampling and Analysis as provided in R645-301-723. The Division finds that these regulations are met because the following sampling and analysis information is provided in the MRP. On page 7-3 of the MRP, the Permittee states that all water quality analyses will be conducted "according to the methodology in the current edition of Standard Methods for the Examination of Water and Wastewater or the methodology in 40 CFR Parts 136 and 434". In addition, the Permittee has committed to having all samples analyzed by certified laboratories.

Baseline Information

The MRP meets the requirements for Baseline Information as provided in R645-301-724. The Division finds that these regulations are met because the following baseline information is provided in the MRP. Pages 7-26 and 7-36 of the submittal outline the monitoring and data collection commitments provided by the Permittee for groundwater and surface water respectively. In each instance, the Permittee has committed to obtaining three years of hydrologic baseline data prior to mining in the affected area, which exceeds the minimum requirements provided by law. In addition, the Permittee has committed to following the Division recommended list for baseline parameters.

Page 7-53A of the submittal contains a surface and ground water monitoring matrix (Table 7-14A and Table 7-14B respectively) that list sites to be utilized in collecting baseline data. The Permittee has provided a baseline monitoring start date that insures that a minimumof three years of baseline data will be obtained prior to mining in that area. In addition, references to Tables 7-13 and 7-17 are provided. These tables provide a comprehensive list of the ground

and surface water quality monitoring parameters that will be analyzed for. Table 7-14 is referenced which details the sampling months and actual monitoring schedule. Plate 7-4 depicts the locations of the current and proposed monitoring points.

Appendix 7-J, Investigation of Groundwater and Surface-Water Systems in the C.W. Mining Company Federal Coal Leases and Fee Lands, Southern Gentry Mountain, Emery and Carbon Counties, Utah: Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Groundwater Monitoring provides further discussion of hydrologic resources within the permit area. Appendix 7-M, Spring and Seep inventory Federal Lease Area, provides a discussion of the seeps, springs, and streams in and adjacent to the Wild Horse Ridge addition. Attachment 7M-A, Surface and Groundwater Water Quality Information provides the lab sheets for baseline monitoring.

Water Rights within and adjacent to the permit area are depicted on Plate 7-12, Water Rights. The map depicts the location of the water right, the water right number and (when applicable) the points of diversion. Table 7-6 on pages 7-32 thru 7-33B of the MRP lists the water rights, the owner of the water right, the priority date, the place of use, the point of diversion as well as the nature of the water right use. Additional water right information is provided in Appendix 7C of the MRP.

The information presented in Appendix 7-J describes the surface water and ground water systems of the Bear Canyon permit area as well as the adjacent areas. Surface water and ground water resources were evaluated by analyzing: 1) solute and isotopic compositions of surface waters and ground waters, 2) surface water and ground water discharge and quality data, 3) piezometric data and 4) geologic information.

Hydrographs are presented for the springs from each of the geologic units as well as for streams and other surface water features within the proposed lease expansion areas. In addition, the reports in Appendix 7-J discuss the seasonal flow variations in the springs and streams as well as discussing the chemical composition of the various water sources, both surface and ground water.

Water quality data is provided in several places within Appendix 7-J. Table 3 provides the mean solute chemistry of creeks, springs, wells and mine inflows as well as theminimum and maximum concentrations obtained from the various sampling points throughout the permit area and adjacent areas. A tabulation of both field parameters obtained during sampling as well as the trace constituent water quality data obtained from laboratory analysis is provided as well.

State Appropriated Water Rights

The application meets the hydrology requirements for Environmental Description of State Appropriated Water Rights as provided in **R645-301-724.100 and –724.200**.

Table 7-6 of the MRP on pages 7-32 thru 7-33B provides a comprehensive list of the state appropriated water rights within the existing permit area as well as in the proposed lease expansion area. The table lists the water right number, the owner of the water right, the priority date, a legal description of the place of use, a description as to the type of diversion as well as the nature of use.

Plate 7-12: Water Rights depicts the locations of the water rights identified in Table 7-6. In addition, Plate 7-12 depicts the extent of point-to-point diversions for the state appropriated water rights that are utilized in that manner.

In addition, Appendix 7-C contains supplemental Water Right information.

Ground-water Information

The MRP meets the Environmental Description regulations for Ground-water Information as provided in R645-301-724.100. The Division finds that these standards are met because of the ground-water information provided in the MRP as outlined below. Appendix 7-J of the MRP contains detailed hydrologic study conducted by Mayo and Associates in June of 2001. The report, 'Investigation of Groundwater and Surface-Water Systems in the C.W. Mining Company Federal Coal Leases and Fee Lands, Southern gentry Mountain, Emery and Carbon Counties, Utah: Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Groundwater Monitoring' provides a detailed evaluation and discussion of the ground water resources within the permit area at the time of the report (2001), the Wild Horse Ridge area as well as the Mohrland expansion area. On February 7, 2007, the Permittee provided the Division with an addendum to the Appendix 7-J report to address the hydrologic systems within Federal Leases U-46484, U-61048, U-61049, U-024316 as well as the Mohrland fee surface. The Permittee has committed to collecting 3 years of baseline data on ground water resources that could potentially be impacted by mining activity. Plate 7-4 depicts the proposed monitoring sites. Upon comparing Plate 7-4 with the mine workings maps (Plate 5-1A Blind Canyon Seam Workings, Plate 5-1B Hiawatha Seam Workings and Plate 5-1C Tank Seam Workings) and based on several field visits in the proposed lease expansion, the Permittee has produced a monitoring plan that will adequately quantify and monitor groundwater resources in the area. The Division recommended list for baseline parameters will be followed which exceeds the minimum required by law. In addition, every five years baseline parameters will be collected. The remainder of the time, field readings will be collected.

Baseline data presented in Appendix 7-J of the MRP provides the names, locations, ownership, and descriptions of all ground water resources within the permit area as well as adjacent to it. In addition, water quality and quantity information is presented in Appendix 7-J that demonstrates seasonal variation in the ground water features. Table 7-6 of the MRP on

pages 7-32 thru 7-33B provides a comprehensive list of the state appropriated water rights within the existing permit area as well as in the proposed lease expansion area. The table lists the water right number, the owner of the water right, the priority date, a legal description of the place of use, a description as to the type of diversion as well as the nature of use. Additional water right information is presented in Appendix 7-C.

Appendix 7-N Revised Hydrogeologic Evaluation of the Bear Canyon Mine Permit and Proposed Expansion Areas (1993) contains additional ground water information.

Plate 7-12: Water Rights depicts the locations of the water rights identified in Table 7-6. In addition, Plate 7-12 depicts the extent of point-to-point diversions for the state appropriated water rights that are utilized in that manner. Plate 7-4, Water Monitoring, depicts the locations of the ground water resources both within the permit area as well as adjacent to it.

Two general types of ground water systems exist in Gentry Mountain: perched groundwater systems and Star Point Sandstone fracture-flow ground water systems. Perched systems occur in the Flagstaff Limestone, North Horn Formation, Price River Formation and Blackhawk geologic formations. Fracture flow ground water systems exist in the Star Point Sandstone. Natural discharges from fracture-flow ground water systems support two significant Star Point Sandstone Springs on Gentry Mountain. These springs are Big Bear Spring (SBC-4) and Birch Spring (SBC-5), which are located immediately south of the existing permit area.

Surface Water Information

The MRP meets the Environmental Description regulations for Surface Water Information as provided in R645-301-724.100. The Division finds that these standards are met because of the surface water information provided in the MRP as outlined below. Appendix 7-J of the MRP contains a detailed hydrologic study conducted by Mayo and Associates in June of 2001. The report, 'Investigation of Groundwater and Surface-Water Systems in the C.W. Mining Company Federal Coal Leases and Fee Lands, Southern Gentry Mountain, Emery and Carbon Counties, Utah: Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Groundwater Monitoring' provides a detailed evaluation of hydrologic resources within the permit area at the time of the report (2001), the Wild Horse Ridge area as well as the Mohrland expansion area. On February 7, 2007, the Permittee provided the Division with an addendum to the Appendix 7-J report to address the hydrologic systems within Federal Leases U-46484, U-61048, U-61049, U-024316 as well as the Mohrland fee surface.

The permit area contains the headwaters of several perennial streams that could be affected by underground mining activity. As such, the major groundwater sources providing base flow to these drainages are to be monitored. In addition, surface water monitoring sites have been selected at all major confluences and at other points of interest as identified by

stakeholders (water right holders, USDA Forest Service). The parameters to be tested for and the schedule to be followed are based on the probable hydrologic consequences (PHC) as outlined in Appendix 7-J. Three years of baseline data will be collected which exceeds that required by law. The Division recommended list for baseline parameters will be followed which also exceeds the minimum required by law. Sampling will be primarily achieved through field parameters with a full suite of baseline data collected every five years. Plate 7-4 depicts the current and proposed monitoring sites. Upon comparing Plate 7-4 with the mine workings maps (Plate 5-1A Blind Canyon Seam Workings, Plate 5-1B Hiawatha Seam Workings and Plate 5-1C Tank Seam Workings) and upon several field visits in the proposed lease expansion, the Permittee has produced a monitoring plan that will adequately quantify and monitor groundwater resources in the area.

Baseline data presented in Appendix 7-J of the MRP provides the names, locations, ownership, and descriptions of all surface-water bodies including streams, lakes and impoundments both within the permit area as well as adjacent to it. In addition, water quality and quantity information is presented in Appendix 7-J that can sufficiently demonstrate seasonal variation in the various surface water features. Table 7-6 of the MRP on pages 7-32 thru 7-33B provides a comprehensive list of the state appropriated water rights within the existing permit area as well as in the proposed lease expansion area. The table lists the water right number, the owner of the water right, the priority date, a legal description of the place of use, a description as to the type of diversion as well as the nature of use. Additional water right information is presented in Appendix 7-C.

The information in Appendix 7-J and the MRP identify Trail Creek, Bear Creek, Lower Cedar Creek and the Left and Right Forks of Fish Creek as perennial streams. The upper Trail Creek, McCadden Hollow, Blind Canyon and Upper Cedar Creek are intermittent or ephemeral.

Most of the stream flow is attributed to runoff from snowmelt or rain. Spring flow contributes the most to the baseflow of the streams in later summer and fall months.

Baseline Cumulative Impact Area Information

The MRP meets the hydrology Environmental Description for Baseline Cumulative Impact Area Information as provided in R645-301-725. The Division finds that these standards are met because Chapter 7 of the MRP and the PHC determinations located in Appendices 7-J, 7-N adequately present hydrologic and geologic information for the cumulative impact area needed by the Division to provide an assessment of the probable cumulative hydrologic impacts.

Modeling

The Division finds that the MRP meets the Environmental Resource Information requirements for Modeling as provided in R645-301-726. The Division finds that these

requirements have been met in that actual surface and ground water information was provided in the preparation of the MRP. As such, ground and surface water modeling are not deemed necessary at this time.

Alternative Water Source Information

The Division finds that the MRP meets the Environmental Resource Information regulations for Alternative Water Source Information as provided in R645-301-727. The Division finds that these standards are met because of the information provided on pages 7-61D thru 7-61F of the MRP. The PHC has identified the potential for mining activity to potentially impact surface and ground water resources within the permit area as well as adjacent to it. The aforementioned pages outline the Permittee's commitment to provide alternative water sources in the event that mining activity causes a contamination, diminution or interruption of an underground or surface source of water. The MRP discusses the transfer or retirement of water shares held by C.W. Mining to the affected parties on page 7-61E. Additional alternative water sources could also be provided by the utilization of guzzlers, wells or other available technologies as outlined on page 7-61D.

Probable Hydrologic Consequences Determination

The Division finds that the MRP meets the Environmental Resource Information regulations for Probable Hydrologic Consequences as provided in R645-301-728. The Division finds that these standards are met because of the information provided in Appendix 7-J. Appendix 7-J contains a report compiled by Mayo and Associates, LC in June 2001. The report, *Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Groundwater Monitoring*, describes the surface-water and groundwater systems of the mine lease area (prior to 2001), the Wild Horse Ridge Area and the Mohrland area. In addition, the potential for mining related impacts to ground and surface water resources are discussed in the document. The PHC determinations presented in Appendix 7-J are based on the baseline hydrologic information. The PHC determinations make findings on potential hydrologic impacts due to coal mining in the permit area as outlined in R645-301-728.300. The PHC determinations are accurate and complete and find that the coal mining activities proposed for the permit area will not result in the contamination, diminution, or interruption of State-appropriated water or of surface water or groundwater within or adjacent to the permit area.

Dr. Mayo was contacted by C.W. Mining to provide an addendum to the 2001 report in light of the lease expansion being approved by the Division. The addendum was provided in an effort to more specifically address the potential impacts of mining in the lease expansion. The original report produced in 2001 examined the ground and surface water resources in the 2007 expansion area. However, upon review of the document, it was determined that a more detailed analysis was required. Dr. Mayo, for clarification, refers to two distinct areas contained within

the 2007 expansion area: the Mohrland Area and the McCadden Hollow Area. The Mohrland Area includes federal leases U-61048, U-61049 and U-38727 as well as a large area of fee land. The McCadden Area is located in the northwest portion of the 2007 lease expansion and is contained within federal lease U-46484 and U-24316. The Bear Canyon Fault separates these two areas.

The Gentry Mountain Cumulative Hydrologic Impact Assessment (CHIA) provides a detailed discussion of the potential impacts from coal mining activity within the Bear Canyon permit area.

Findings:

Information provided in the MRP meets the Hydrologic Resource Information requirements of the R645-State of Utah 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:

Affected Area Boundary Maps

The Permittee did not give the Division a map that identifies the affected area boundaries. The Division usually assumes that the permit and affected area boundaries are the same unless otherwise noted. Information in the MRP suggests that the permit area and affected area boundaries are the same. The Permittee did give the Division a permit boundary map, Plate 2-1. The Division found Plate 2-1 to be adequate.

Archeological Site Maps

Chapter 4 (Confidential Binder) provides maps showing survey areas and historic resources. Maps have been updated to include the Bear Canyon Lease Addition. 820 acres of federal and private land were surveyed for the class two survey.

Coal Resource and Geologic Information Maps

Maps 6-1 through 6-12 have been updated to show the addition of the IBC to the permit area. [09212005] Maps have been updated to include the Bear Canyon Lease Addition.

Cultural Resource Maps

Chapter 4 (Confidential Binder) provides maps showing survey areas and historic resources.

Existing Structures and Facilities Maps

The only existing structure in the Wild Horse Ridge Area mentioned by the Permittee is a hunting cabin and the access road. Both are shown on Plate 2-4G and Plate 3-7G. The hunting cabin is labeled on Plate 3-7G, and an outline of the building is shown.

Existing Surface Configuration Maps

Plate 3-7F and Plate 3-7G show the existing surface topography.

Mine Workings Maps

The Permittee gave the Division maps that show the mine workings in the Blind Canyon Seam, Plate 5-1A, the Hiawatha Seam, Plate 5-1B and the Tank Seam, Plate 5-1C.

Monitoring and Sampling Location Maps

The MRP meets the requirements of the Environmental Resource Information regulations for Monitoring and Sampling Location Maps as provided in R645-301-731. The Division finds that these standards are met because of the information provided within the MRP. Plate 7-4, Water Monitoring, provides a depiction of all the active water (both surface and ground) monitoring and sampling locations utilized in producing baseline information. Plate 7-4 further identifies historical water monitoring sites (i.e. sites that are no longer active, but at one time were utilized to gather baseline data for the permit area).

Permit Area Boundary Maps

Plate 1-1, Permit Area, shows the location of the permit boundaries. The Division addressed the permit boundary maps in the permit area section of this technical analysis.

Subsurface Water Resource Maps

The MRP meets the hydrology Maps, Plans, and Cross Sections of Resource Information for Subsurface Water Resource Maps as provided in R645-301-722.100. Plate 7J-1, North-South Cross Section Bear Canyon Mine Area, depicts the potentiometric surface for all three tongues (Spring Canyon Tongue, Storrs Tongue and Panther Tongue) of the Star Point Sandstone. Plate 7J-2, General West East Cross Section East Portion of Federal Lease U-024316, depicts the

potentiometric surface of the Spring Canyon Sandstone. The Star Point Sand Stone is the geologic unit that contains the greatest quantity of water within and adjacent to the permit area. The Star Point Sandstone is of particular concern in light of its proximity and location directly below the Blackhawk Formation. The Permittee has provided adequate subsurface water resource maps to identify the potential for the Star Point Sandstone aquifer to be evaluated. Plate 7-12, Water Rights, depicts the water rights within and adjacent to the permit area. Plate 7-4, Water Monitoring, depicts the locations of springs and water wells within and adjacent to the permit area.

Surface and Subsurface Manmade Features Maps

These maps are included in chapter 5 of the current MRP.

Surface and Subsurface Ownership Maps

Plate 1-2 shows the surface ownership with the permit boundaries for the current permit area. Plate 1-3 shows the subsurface ownership with the permit boundaries for the current permit area.

Surface Water Resource Maps

The MRP meets the hydrology Maps, Plans, and Cross Sections of Resource Information for Surface Water Resource Maps as provided in R645-301-722.100. Plate 7-12, Water Rights, depicts the water rights within and adjacent to the permit area. Plate 7-4, Water Monitoring, depicts the locations of the surface water resources within and adjacent to the permit area.

Vegetation Reference Area Maps

Plate 3-1 illustrates the revegetation reference areas.

Contour Maps

There are several maps that show the topography for the entire permit boundary, such as Plate 7-4, Water Monitoring. Plate 3-7F and Plate 3-7G show premining contours. Plate 3-7G shows the premining contours extending 100 ft beyond the disturbed area boundaries. Plate 3-2G shows the postmining contours extending 100 ft beyond the disturbed area boundaries.

Findings:

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

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR 784.2, 784.11; R645-301-231, -301-526, -301-528.

Analysis:

General

C.W. Mining Company moved all coal mining operations in Bear Canyon from the west side of Bear Creek (#2 Mine sealed in 2002, the #3 Mine in December 2003) to the Wild Horse Ridge area in 2003. The #3 Mine, (Blind Canyon seam), and the #4 Mine (Tank seam) utilize continuous mining methods for the development of main and submain entries, and the extraction of pillars. The #4 Mine is developing longwall panels in the Mohrland addition as of January 2007.

Type and Method of Mining Operations

"Development mining at the Bear Canyon complex is done utilizing continuous mining methods. Secondary extraction is conducted using both longwall (approved during 2007) and continuous mining pillar extraction. The continuous miners discharge into shuttle cars (diesel or electric), which carry the coal to a feeder breaker. The feeder breaker discharges the coal onto the belt conveyor where it is taken out of the mine." In the longwall secondary extraction areas, a shearer cuts the coal from the face, discharging it onto an armored chain conveyor, which transports it to a stage loader / crusher. The stage loader discharges onto a conveyor belt, which transports the product out of the mine. The Permittee indicated during 2006 that a need to expand the tipple capacity and truck loading capability was necessary to take advantage of the increased production capability of the longwall method of secondary extraction. This permitting action will occur during 2007. If market conditions warrant, annual production will reach 2,500,000 tons per year.

Facilities and Structures

A list of new structures associated with the Wild Horse Ridge disturbed area is given in Appendix 3A. The new structures are shown on Table 3A-1, in Appendix 3A. The new structures include a conveyor belt, substation, shop building, water tank and fuel tank. See the Support Facilities and Utility Installations section of this technical analysis for more details.

Structures which had previously been associated with the Bear Canyon #1 and #2 Mines have been or are in the process of being reclaimed. Appendix 5-A has been updated accordingly.

Findings:

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

EXISTING STRUCTURES

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

Analysis:

The MRP states that the only existing structure in the mineable portion of the permit area consists of a hunting lodge that exists in the Wild Horse Ridge area. The hunting cabin is shown on Plate 2-4G.

A road exists in the permit area that allows access for property owners and the Forest Service. That road is a permanent feature that will remain after mining.

Findings:

Information provided in the amendment is adequate to meet the regulatory requirements for this section.

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

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

Analysis:

Historic resource 42EM1572 is within the permit area and is eligible for listing in the National Register of Historic Places. This site, however, is not within the disturbed area.

The Division received a letter from the State Historic Preservation Office concurring with the Division's determination that no historic resources would be affected for those areas inventoried within the current permit area..

There are no public parks within the permit area.

Maps have been updated to include the Bear Canyon Lease Addition. 820 acres of federal and private land were surveyed for the class three surveys.

Findings:

Information in the proposal 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:

No public roads exist in the Wild Horse Ridge area. However, the Bear Canyon haul road and the No. 3 Mine Access road are also used by customers of Sportsman's Hunting to access a hunting cabin that exists in the right fork of Bear Canyon. Hunters will use the road primarily from May to November, typically 2-3 times per week.

A road can be defined as a public road if there is more than incidental use by the public. The term incidental use is not defined but is left to the discretion of the Division. The Division considers the use of a road 2-3 times per week for seven months by a hunting club's members incidental because (1) the general public does not access the area because of the steep canyon slopes that limit recreational activities that can be accessed by the road and (2) hunting club members will use the cabin less than 100 times per year.

Findings:

Information provided in the amendment is adequate to meet the regulatory requirements of this section of the regulations.

AIR POLLUTION CONTROL PLAN

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

Analysis:

Permittee Appendix 4-D contains a copy of the Air Quality Approval Order DAQE-145-02 (AO). Section 423 of the plan indicates that the Permittee will water roads; drop points and storage piles as described in the AO.

DAQE-145-02 gives the Permittee approval 1.95 MTPY per 12 month rolling period. The approval of Task ID #2734, Bear Canyon Federal lease addition, U-46484 and U-61049, will authorize the use of longwall secondary extraction methods, which will increase the Permittee's anticipated tonnage projection to 2.5 MTPY. The Permittee has been informed by the DOGM that ***"C.W. Mining Company must amend the air quality approval order to allow for the increase in throughput to 2.5 MTPY. This document must be in place before the Permittee exceeds the approved 1.95 MTPY".***

Findings:

Information in the MRP is adequate to meet the requirements of the currently approved throughput of 1.95 MTPY. In order to increase the projected annual production to the anticipated 2.5 MTPY, the Permittee must amend the air quality AO through the Utah DEQ/Division of Air Quality.

COAL RECOVERY

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

Analysis:

Coal recovery is addressed on page 5-14, **Recovery Rate** of the Task ID #2292 submittal. Utilizing continuous miner advance and retreat techniques, a seventy percent recovery rate has been determined. Table 5-1, Coal Reserves – Bear Canyon Mine lists the in place tonnage, as well as the recoverable tons for seven federal coal leases (U-46484, U-61048, U-61049, U-024316, U-024318, U-020668, and U-38727: lease U-024318 has been mined out and is not included in the current Bear Canyon Mine permit). Tonnages for the fee coal area are also listed.

Based upon information learned during a meeting with the USDOI / Bureau of Land Management / SLO on July 11, 2006, the coal reserves associated with Federal lease U-46484 are segregated on the east end of the lease by the Bear Canyon fault and several smaller faults. In order for that lease to be mined in a cost efficient manner, the Permittee must develop the underground workings such that the lease can be accessed from the north side. It is not known if the Permittee has any exploration data for the lease area. Page 5-15, as received on August 9, 2006, contains information relative to in place tonnage, as well as recoverable tons from Federal

lease U-46484. Thus, Table 5-1 has been updated to correctly include the recoverable tonnage (based upon knowledge available on July 11, 2006) to be mined.

The Permittee has provided a copy of the lease information for the 2,740 acres of fee coal owned by C.O. P. Coal Development Company. This agreement is included in the R2P2 information and is considered current.

The USDOI / BLM / Utah State Office provided the Division a copy of the R2P2 approval / modification letter for Federal coal leases U-61048, U-61049 and U-46484 on September 27, 2006. The approval letter was forwarded to the Office of Surface Mining in Denver, Colorado, with the following comments:

1) The R2P2 addresses all required items per 43 CFR 3482.1(b).
2) The BLM finds that the R2P2 complies with the Mineral Leasing Act of 1920, as amended, the lease terms and conditions, and the regulations in 43 CFR 3480.
3) The BLM has determined that maximum economic recovery of Federal coal will be achieved.
4) The BLM recommends that the Secretary of the Interior approved the R2P2 modification as part of the Federal mine plan approval.

Although the above information was not provided directly by the Permittee, the Division accepts the provided information as meeting the regulatory requirements of this section of the R645 Coal Mining Rules.

Findings:

The regulatory requirements of this section of the R645 Coal Mining Rules have been met.

SUBSIDENCE CONTROL PLAN

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

Analysis:

Renewable Resources Survey

The Permittee and the Division found that renewable resources exist within the Wild Horse Ridge mining unit. The Division is concerned that subsidence could: impact ground and surface water, that large subsidence cracks similar to those that occurred on the Bear Canyon Ridge could also occur in the Wild Horse Ridge area, and that escarpment failure could damage

or destroy eagle nests. Since renewable resources were found in the area, the Permittee was required todevelop a subsidence control plan.

The Permittee has submitted three maps (Plate 7-4, Water Monitoring; Plate 7-12, Water Rights; and Plate 7N-2, Appendix 7N (water monitoring locations) depicting water monitoring locations as part of the Task ID #2597 submittal.

Plate 7N-2 depicts the water monitoring sites used for the Appendix 7N study, "Revised Hydrogeologic Evaluation of Bear Canyon Mine Permit and Proposed Expansion Areas".

Plate 7-12 depicts all of the State appropriated water rights held in the proposed lease addition. A revised Plate 7-12 was received on November 21, 2006.

Plate 7-12 is submitted at a scale of one-inch equals 1,000 feet, (or 1:12,000).

Pre-Subsidence surface contours are clearly shown.

There are no commercial buildings or residential dwellings depicted.

Water rights for the proposed lease addition are listed in Chapter 7, Table 7-6, Page 7-32. Quantity and quality information relative to these water sources is contained in the Utah DOGM water-monitoring database. The Permittee has committed to monitoring all water sources within the proposed permit addition.

Subsidence Control Plan

- The Permittee proposes to use room-and-pillar mining to extract all the coal in the Bear Canyon complex. The Permittee expects to recover 75% of the coal in full extraction areas and 50% in first mining areas. The sequence and timing of mining is shown on the mine maps 3-4A, Blind Canyon Seam (lower), and 3-4C, Tank Seam (upper). No mining is scheduled for the Hiawatha Seam in the Wild Horse Ridge project. Subsidence should not occur in first mining only areas but should occur in areas where second mining (pillar recovery) occurs.

- The Permittee shows the underground workings for the Blind Canyon Seam (lower) on Plate 3-4A and the Tank Seam (upper) on Plate 3-4C. Plate 3-3 shows the projected subsidence for the Wild Horse Ridge project. Plate 3-4A and Plate 3-4C show the projected subsidence for each seam.

- Plate 3-3, Subsidence Map, shows the subsidence protection areas that include escarpment areas. Plate 3-4C shows where pillars will be left as part of the subsidence protection zone.

- The Permittee shows where second mining (pillar recovery) will occur on the mine maps. Areas marked panel or development will be first mined only. Areas that will be second mined are identified as pillar and development.

- The descriptions of the physical conditions that affect the likelihood or extent of subsidence are addressed in the geologic section of the technical analysis.

- The Permittee described the monitoring program in Appendix 3C in Section 5 of the amendment. The Permittee committed to installing 26 monitoring points in the Wild Horse Ridge area. The stations will be monitored yearly plus they will conduct an annual on the ground survey to look for subsidence effects. The subsidence-monitoring program is similar to the existing program that has proven to be adequate.

- The Permittee proposes to protect sensitive surface features from subsidence by first mining only. The protected areas are marked on the Plate 3-3. The pillars in the subsidence protection zones have safety factors of 1.5. The Permittee quoted references indicating that subsidence should not occur if the pillar safety factor is at least 1.5. The reference is a NIOSH publication that the Permittee included in the MRP.

- The estimated amount of subsidence in the Blind Canyon Seam is 3.2 ft and subsidence in the Tank Seam is 4.1 ft. The maximum amount of subsidence in the Wild Horse Ridge area is 7.3 ft.

The Permittee described the measures that will be taken to mitigate or remedy any subsidence-related damage. The main item of concern is water replacement. The Permittee committed to purchase either water rights to replace damaged water rights, or to repair damage to existing rights. Should subsidence cracks occur, the Permittee will fill those cracks to the extent practical.

Appendix 5-C contains the subsidence monitoring and control plan and begins by discussing subsidence controls that have been implemented relative to secondary pillar extraction utilizing continuous mining methods. A revision added to page 5-16, section **R645-301-525** Subsidence Control Plan contains the following statement; "An escarpment stability and subsidence evaluation was performed by Malecki Technologies. This report calculated the maximum subsidence effects of longwall mining and then reduced them by 50% for room and pillar. In the areas where longwall mining will take place the maximum effects will be used." (See Page 13, bullet #3 of "Modeling of Castlegate Sandstone Escarpment Stability" by Maleki Technologies, Inc.) This report is included as Appendix 5Q."

Appendix 5Q contains a single document titled "Modeling of Castlegate Escarpment Stability" by Malecki Technologies, Inc., Consulting Mining and Geotechnical Engineers. The document evaluates surface subsidence in the Wild Horse Ridge addition of the Bear Canyon permit area. The affects of secondary coal extraction (room and pillar secondary extraction / CM methods) on the stability of the escarpments located in that area is also part of the evaluation.

In addition to continuous mining methods the approval of the Bear Canyon Federal Lease Addition (Task ID #2734) authorizes usingthe retreating longwall method of secondary coal extraction. Continuous mining will be used to develop both room and pillar and longwall secondary extraction areas.

The revisions submitted to the subsidence control and monitoring plan rely heavily on the report authored by Mr. Hamed Malecki, "Prediction of Surface Deformation Resulting From Longwall Mining Over the Bear Canyon Reserve". All surface deformation predictions are based on the "three-dimensional influence function method while accounting for site specific conditions" method of modeling used by Malecki Technologies, Inc., and an angle of draw of 22.5 degrees.

The USDOI/ /BLM-USO provided Resource Recovery and Protection Plan maps for the mining projections in the Tank Seam, the Blind Canyon Seam, and the Hiawatha Seam of the Federal lease addition. These maps are included as part of the Federal R2P2 approval. Plate LMU-3, CO-OP Mining Company, Tank Seam / B Seam Projected Mining, depicts the anticipated mine entry layout for the main entries, sub-main entries, pillar areas using continuous methods, protection barriers, and longwall secondary extraction areas. Overburden depths are shown using isopach lines.

Page 5C-9, **PROTECTION**, states that "in order to protect water resources and state appropriated water rights from impacts, C.W. Mining has designed their mine layout so that the areas where these resources exist with less than 900 feet of overburden between the resource and the coal, the resource will be outside of the affected area."

Chapter 5, page 5-18, **Protection of Natural Surface Structures,** lines 12 and 13 state that "adequate barrier zones will be left to protect adjacent stream channels, in Bear Creek and the forks of Fish Creek".

There are no impoundments or dams within the proposed lease addition that require protection.

Appendix 5-C describes what considerations the permittee utilizes relative to the layout of the underground mine workings in order to minimize or prevent damage to surface areas where planned subsidence is not projected. These considerations may include:

1) Orientation of longwall and /or pillar panels to strike/dip of the seam.
2) Width of longwall panels.
3) The design of non-yielding pillars for bleeder and /or sub-main protection.
4) The design of yielding pillars for gate roads between adjacent longwall panels and their affect on the subsidence trough profile throughout.
5) The design of barriers to protect surface features requiring protection.

The Permittee does not project the use of barrier abutments between adjacent longwall panels for the purpose of ground control. The Division anticipates that it will be necessary for the Permittee to revise its Mine projection to implement barrier abutment pillars for the purpose of ground control when mining at depths near or in excess of 2,300 feet.

R645-301-525.410 requires that the Permittee include, as part of the method of underground extraction, a description of the method of underground mining including the size, sequence and timing of the development of the underground workings. This map must show when and where specific portions of the mine's workings will be developed and extracted. This map is also needed to ensure that surface property owners are properly notified at least six months in advance of mining in accordance with the requirements of R645-301-525.700.

The Permittee has submitted a projection of the proposed #4 Mine workings in the Tank seam (See PLATE 5-1C/ LMU-3). The first longwall panel to be extracted (TS LW 1) is depicted as being extracted from June of 2007 through September of 2007. This panel has dimensions of 4080 feet by 500 feet (face width).

Sequential longwall panels with their projected extraction dates are also depicted, as well as areas that will see primary development and secondary extraction via continuous mining methods.

R645-301-525.420 requires that the application contain a map of the underground workings that describes the location and extent of the areas in which planned-subsidence mining methods will be used, and that identifies all areas where the measures described in 525.440, 525.450, and 525.470 will be taken to prevent or minimize subsidence and subsidence related damage.

PLATES 5-1A, 5-1B, and 5-1C meet the requirements of 525.420 because the locations of barriers (support pillars of coal) which will be left, the locations where planned subsidence is to be implemented, and areas where pillar designs are implemented to prevent or minimize to the extent possible (i.e., yielding pillars in the gate roads) subsidence related damage are depicted. Barrier pillars between adjacent longwall panels are not being implemented as part of the current mining projection in the Tank seam.

Section **3.0 MINING, GEOLOGIC CONDITIONS AND SUBSIDENCE CHARACTERISTICS,** pages 7-11, (MTI report) describes the methods which the Permittee, through consultation with MTI, have implemented to reduce the potential for subsidence related cracking near the surface.

As described in **3.1, Conceptual Mine Layout Designs**, C.W. Mining engineers have oriented the longwall panels that are being proposed in the Federal lease addition on a bearing of N 55 degrees W. MTI determined in 2001 that major geologic joint sets have an orientation of either N 15 degrees W, or N 85 degrees W. Thus, the panel orientation varies at least 30 degrees from either of the major geologic joint sets (i.e., slip surfaces) in the area. Malecki Technologies, Inc., states that this offset alignment is beneficial for the stability of development workings because it avoids alignment of joints and mine openings. This 30-degree offset in the orientation of the longwall panels with the major joint sets also "increases its chances of limiting the number and length of mining induced surface fracturing at final mining boundaries".

MTI also states that this 30-degree variance in orientation is effective in reducing the potential for subsidence related cracking at the surface.

The second mining engineering design method utilized by C.W. Mining Company to minimize the potential for subsidence related damage to surface lands is the utilization of yielding pillars for gate road support. These yieldable pillars are developed on fifty-foot centers, utilizing three mine entries. Thus, two complete pillars are developed per cross-cut.

The size of the yielding pillars has been selected by the C.W. Mining staff in order to control gate road pillar bumps. The thirty-foot wide pillars will reduce the potential for strain energy accumulation. The size was selected, based upon successful experience in the East Mountain and Trail Mountain longwall operations (i.e., Energy West Mining Company).

These yieldable pillars have also been shown to collapse completely as the adjacent panels are extracted on retreat, rendering virtually no effect on the subsidence trough being generated. The tensile stresses that are ccumulative over the gate road entries ("transient" subsidence, see page 5 of the MTI report) in adjacent panels crush out. This has been confirmed by Dyni, 1991. Thus, the subsidence trough is extended across adjacent panels until the width of the lease is extracted.

The use of barrier pillars to protect either critical areas of the underground workings or surface features which have been identified as needing protection is discussed on pages 5-16, and 5-17. A minimum barrier width of 100 feet is left to prevent the transfer of mining induced subsidence impacts "across boundaries and property adjacent to the permit boundary". The Permittee claims that this 100-foot width is adequate to protect property from subsidence effects transmitted via the influence of angle of draw within the area.

Mine main and sub-main entries are protected by barriers having a minimum width of 100 feet to assure protection of those entries for their usable life.

Outcrop protection is discussed on page 5-17 of the MRP. Outcrops in the Bear Canyon permit area are either buried under overburden, or are burned some distance from the surface. Where neither condition exists, the coal is weathered or oxidized, and its marketable quality is jeopardized. Mining is stopped within 200 feet of the surface to minimize the potential for this negative affect on Mine product, as well as to leave support for the outcrop area.

Barriers will not be left where natural surface features are over or adjacent to coal burn areas. It is not always possible to leave barriers directly beneath the feature. Coal burn may surround the area directly beneath the surface feature, or the surface feature may lie over the burnt coal/unburned coal interface. As coal burn material has no structural support, leaving a barrier here would "cause an interruption between the natural and man made subsidence causing greater impacts to the surface. Because of this, no barrier will be left in these areas unless it is needed for roof stability or temperature considerations (MSHA), in which case the minimum possible size will be used" (100 foot width).

The Division must note in this document that mining projections are changed regularly all through the coal industry. Therefore PLATES 5-1A, 5-1B and 5-1C may or may not be accurate by the time the Mines are developed.

Performance Standards For Subsidence Control

The Permittee is required to meet the performance standards for subsidence control.

Page 5-18, **Protection of Natural Surface Structures & Streams** of the mining and reclamation plan discusses the methods to be utilized by the Permittee to protect escarpments, raptors, and down stream water quality. The Permittee has provided maps (PLATES 5-1A, 5-1B and 5-1C) that correlate the surface location of the areas to be protected with the underground workings, and how the protection area correlates with the extraction area.

Notification

The Permittee has provided projection maps of the #4 Mine workings depicting the anticipated dates when development mining will cross into the proposed lease additions. The Permittee has developed the information necessary to send the required notification letters to the surface owners in the time frame mandated under **R645-301-525.700.**

Findings:

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

SLIDES AND OTHER DAMAGE

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

Analysis:

In case of a slide or other damage, the Permittee committed to notify the Division by the fastest possible method. The Permittee will repair the damage. If the Permittee is unable to determine the best way of repairing the damage, they will wait for the Division to recommend a repair plan.

Findings:

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

FISH AND WILDLIFE INFORMATION

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

Analysis:

Protection and Enhancement Plan

Ungulates

The Permittee must comply with exclusionary periods during construction and reclamation phases. The general exclusionary periods are December 1 through April 15 and May 15 through July 5. [09152005]

The deer and elk tended to winter and feed on the exposed ridge faces above the Wild Horse Ridge area. This surface facility site will disturb the big game habitat during the life of the mine. The Division, in consultation with DWR (Chris Colt; March 13, 2001), decided not to require mitigation for the big game habitat loss associated with the Wild Horse Ridge project.

This exclusion is for this project only. DWR sent the Division a follow-up letter restating this agreement on September 6, 2005.

The MRP includes design information for the Wild Horse conveyor. Conveyors can inhibit big game movement. Deer and elk, however, are known to cross under conveyors with clearances greater or equal to three ft. The Permittee designed the conveyor to provide a three-foot minimum clearance.

Migratory Birds, Game Birds, and Raptors

The Permittee must comply with raptor exclusionary periods during construction and reclamation phases. The general exclusionary periods are December 1 through April 15 and May 15 through July 5. [09152005]

Plate 5-3b illustrates known raptor nests in relation to planned subsidence.

Page 3-38 describes the protection of vegetative resources. The Permittee has committed to developing a mitigation plan with the Division and surface owner in the event vegetation is impacted by subsidence. The MRP includes subsidence and water monitoring plans that would reveal any substantial changes to vegetation or habitats of high value to wildlife. The overburden for the Tank Seam mining ranges from 400'-1400'. The lower overburden areas near the outcrops are also designated as buffer zones that will not be mined under. Subsidence is typically minimal with longwall mining in areas of approximately 1400' of cover. Wildlife populations are typically not affected unless their habitat is impacted by subsidence in which case the Permittee is monitoring the spring, pond and stream locations in areas of high value habitat. If monitoring of these areas indicates a loss in flow or change in the vegetative communities the Permittee has committed to implementing a mitigation plan that will restore the water and vegetation resources in those areas impacted.

Plants

The Permittee plans to collect seed from the local populations of canyon sweetvetch (sensitive species) and seed topsoil piles. The intent of this project is to generate a seed bank for final reclamation that includes this species. The sweet vetch was discovered prior to site development of the Wildhorse Ridge Facilities. [09122005]

Endangered and Threatened Species

The MRP includes a current list of Threatened and Endangered plant and wildlife species for the proposed lease addition areas as noted in paragraph two on page 3-28 of the May 22, 2006 submittal, and a narrative about the existence of those species listed for the county, (Emery), where the lease additions are located. According to the Division of Wildlife Resources,

(DWR), the only species of concern because of the relatively high elevation were the Townsend's Big Eared Bat and the Flamulated Owl for which a study was completed. The results of the study revealed that neither of the species occurred in the area. [03132007]

The Division, in consultation with USFWS, determined that the Wild Horse Ridge project and lease additions would not adversely affect listed or proposed threatened or endangered species with the possible exception of four listed fish species of the upper Colorado River basin.

Colorado River Fish

An adverse result of mining on water quantity to the Colorado River drainages affects four Colorado River endangered fish species (Colorado pikeminnow [squawfish], humpback chub, bonytail chub, and razorback sucker). The USFWS considers depletions or significant changes to contributions to the Colorado River drainage as a potential jeopardy to these endangered fish. The permittemay have to mitigate if there are considerable changes to contributions or if water consumption is greater than 100 acre-ft per year. Currently, the mitigation fee is approximately $15.00 per acre-foot of depletion, but may change marginally from year to year. [09122005]

The Permittee provided the mass balance equation-parameters and total expected water loss from mining operations (Sec. 3-3.6). The amount of water loss expected from the Wildhorse Ridge mining operations is 36.2 acre-ft.

As noted in Chapter 7 page 7-45 and 46 the current and projected mining operations consume approximately 69 acre-feet of water per year. According to the U. S. F. W. S. this constitutes an adverse effect to the endangered fish species identified in the Colorado Fish Recovery Program. The permittee has included the criteria and calculations used to calculate this figure as well as calculations for mine water consumption in the proposed lease area additions. The figures have been revised in the current MRP to reflect projected mine water consumption in the longwall areas to be mined. These figures should be checked again when longwall mining operations commence in the new lease areas.

Bald and Golden Eagles

The Division, in consultation with USFWS and DWR, decided that construction of the Wild Horse Ridge facilities would adversely affect nesting raptors and eagle nests in the area. These agencies agreed that the Permittee must implement a mitigation project for the loss of nesting habitat near the Wild Horse Ridge area. The mitigation effort originally included artificial nests, and big game and raptor habitat enhancement. (Refer to the Division's TA SR98 (1)-5b for communication and decision details for this mitigation effort.)

The Division, in consultation with USFWS and DWR, decided to substitute the habitat enhancement project with a raptor prey base study. The reason for this change was that DWR did not know which plant species to use for the raptor prey habitat enhancement because it is unknown whether the high elevation raptors prey on high or lower elevation animals. The information gained could help the industry more accurately design seed mixes to increase prey populations. The Permittee has submitted a plan and implemented the prey base study for the Wild Horse Ridge area. [04022007]

As of 9/1/05, USFWS and DWR decided to remove the recommendation of installing artificial nests based on the success of these nests in the Huntington Canyon area. [09152005]

The Permittee predicts that mining operations could cause subsidence under four known raptor nests in the Mohrland area. The Permittee will monitor the nests at least 2 years prior (2006/07) and 1 year following undermining. The Permittee may need to protect these nests depending on the timing of undermining. The Division, in consultation with DWR and USFWS, will determine whether the Permittee must protect the nests. Results from the 2006 fly-over survey will help direct that determination. Protection could include chain-link fencing over the nest or some other agreed protection method. [09152005]

If the Division determines that mining could impact any of the four nests, the Permittee will provide a mitigation plan prior to the approval of the Mohrland permit. The Division will provide a determination immediately after the 2006 fly-over survey. [09152005]

There are no protection plans for transient bald eagles.

According to the 2006 raptor survey and data with the DWR Bald Eagles are not known to nest in the proposed lease area but may pass through the area during the winter months or periods of migration. The permittee has committed to conducting Raptor surveys yearly during the life of the mine.

Chapter three page 3-68 of the MRP includes a commitment to develop a raptor mitigation plan by July 1, 2007 in consultation with the DWR, DOGM, U. S. F. W. S., U. S. F. S. and BLM to mitigate impacts to nests and or raptors from potential escarpment failure caused by subsidence. A map of the 2006 DWR raptor survey with the nest site locations is included in the MRP as plate 5-3A. Plate 5-3A also shows that nests 902, 903, 904, 907, 908, 920 and 921, are within the limits of predicted subsidence. The mitigation plan needs to include site-specific analysis of these nest sites and possibly others for potential loss due to escarpment failure. It should also be noted that C. W. Mining Company would need authorization from the Forest Service to mine under escarpment areas, (Federal Lease Stipulation #13). The permittee has also proposed to avoid mining activities in the panels during nesting periods. If unavoidable, obstructions such as fencing will be placed over the nest sites to prevent nesting. Additional

alternatives will be included in the mitigation plan. This plan will cover raptor nests and habitat in addition to the 4 nests included in the Wildhorse Ridge mitigation plan.

Wetlands and Habitats of Unusually High Value for Fish and Wildlife

The Wild Horse Ridge project will not impact significant stands of wetland habitat. The Permittee covered the conveyor to help protect the drainage from coal fines.

With regard to the Bear Canyon lease additions, page 3-32 paragraph two, Section 322.220 of the MRP includes information that addresses this section of the regulations. The MRP includes an evaluation of the status of Habitats of high value for Fish and Wildlife for the lease addition areas and a discussion about the potential impacts from subsidence. They include springs, ponds and riparian areas as shown on plate 3-1. Due to the depth of cover no impacts are anticipated. However the permittee has included these areas in their water-monitoring program and mitigation plan that addresses the replacement of water and vegetation resources should it be demonstrated that they have been impacted by subsidence activities.

Findings:

Information provided in the MRP 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 Permittee has recorded the storage of subsoil and topsoil in Table 2-5 as16,134 yd^3 of topsoil and the 36,452 yd^3 of substitute topsoil, for a total of 52,586 yd^3.

Table 2-7 and Sec. 645-301-242 indicates that there are 28.03 acres of post-SMCRA disturbance, including Wild Horse Ridge and associated access roads.

Chapter 2, Soil Resources, R645-301-230 through R645-301-232.500 describing the removal, storage and protection of soils, and selected overburden materials or substitutes, and App. 5J, 5K and 5M are all pertinent to the discussion of the plan for topsoil salvage and protection during operations of the Wild Horse Ridge area. Five tables in the plan for the Wild Horse Ridge area are also key to the soil salvage activity:

Table 2-8, Substitute Topsoil Summary.
Table 2-2, Soil Unit Acreage Within the Disturbed Area.
Table 2-7, Reclamation Area Summary.
Table 2-9, Final Grading Test Sample Density.
Table 5K-1 and 5K-2, Summary of Cut and Fill Volumes.

The Permittee considers the Summary Table 2-7 as being the most accurate table in the plan.[1] All other Tables must reconcile with this one. Table 2-7 divides recontoured areas by operational areas and reclamation areas. Table 2-2 is specific to the Wild Horse Ridge and divides recontour acres by soil type within the 3.6 acre Wild Horse Ridge disturbance. Table 2-8 provides a summary of topsoil and subsoil stored at the site.

In Table 2-7, the Permittee itemizes 40.27 acres of disturbed area. In Tables 2-5 and 2-8, the Permittee summarizes the available topsoil and substitute topsoil for the 40.27 acres as approximately 52,000 yd^3.

Topsoil and Subsoil Removal

Wild Horse Ridge

Wild Horse Ridge topsoil salvage areas are identified on the Soil Suitability Map C, Appendix 2-F, Order 1 Soil Survey. Cut and fill volumes are located in Tables 5J-1, 5K-1 and 5K-2 of Appendix 5K, Wild Horse Ridge Tank Seam Access Roads and Appendix 5J, Wild Horse Ridge Blind Canyon Seam Pad and Conveyor Access Roads.

For Wild Horse Ridge, Table 5J-1 estimates that 8,700 yd^3 of topsoil was salvaged from the lower conveyor access road, the upper conveyor access road, and the Blind Canyon seam portal pad. The topsoil is shown on Plate 2-2B, WHR Topsoil Stockpile and Plate 7-1F, Hydrology Map. Section 645-301-231.400 indicates that the soil below the stockpile (Doney soil, map unit D) could provide an additional 2, 354 yd^3 of topsoil for Wild Horse Ridge during reclamation. This potential additional soil is included in the 11,054 yd^3 total listed as available for Wild Horse Ridge in Summary Table 2-8.

Table 2-3 and 2-2 also project that approximately 11,049 yd^3 of soil are stockpiled for reclamation of the Wild Horse Ridge area (soils with symbols PC, WIN, WR, DON, DG, GP, DCP).

[1]Personal communication with Charles Reynolds during site visit 3/23/01.

In Table 2-7, reclamation areas for the Wild Horse Ridge are labeled TS-12, TS-13, TS-14, and TS-15. Table 2-7 itemizes the acreage to be reclaimed within each area and acreage to be graded within each of these areas. According to Table 2-7, areas TS-12 through TS-15 will add 7.3 acres of total area to the permit. All of the 7.3 acres will be reclaimed, however, only 3.6 acres will have soil salvaged and require recontouring during reclamation (Tables 2-2 and 2-7). The difference is due to:

1. The Wild Horse Ridge access road, 3.04 acres of which is pre-existing; and
2. The lower conveyor belt access road, 0.36 acres of which will not require grading during final reclamation; and
3. The upper conveyor belt access road, 0.3 acres of which will not require regrading during final reclamation.

The Permittee states supervisory personnel will be present during topsoil salvage to direct the salvage. Supervisors will document topsoil salvage operations, including salvage history, soil salvage areas, soil salvage volumes, and soil placement in the stockpiles.

Subsoil Segregation and Soil Salvage Practices

Soil salvage will be between 10 and 40 inches based on the Order I soil survey, App. 2-F. A single elevated report of selenium was noted in Guben-Pathead soil taken from a cutslope near the switchback of the existing Wild Horse Ridge Road. The site of the sample is shown on Map B in Appendix F as CW 10 (20 - 30 inches depth). During road construction described in Sec. 645-301-527, the top ten inches of this soil will be salvaged and placed in the topsoil pile. The subsoil will be used as road base.

Section R645-301-231, 400, states that topsoil will be salvaged from all areas accessible by equipment, including soils with high rock content.

The main idea is that native soils with a higher intrinsic rock content than the 1988 Division guidelines deem acceptable, offer a greater potential for reclamation success as follows:

1. Allow a greater potential for moisture infiltration into the interstitial soils.
2. Provide for a more stable reclaimed surface.
3. Provide additional surface cover in sparsely vegetated areas, thus helping protect against raindrop impact and resulting soil surface erosion.
4. Create wildlife habitat niches.
5. Create microclimates for plant establishment and vegetation survival.

Topsoil Storage

Wild Horse Ridge topsoil pile is estimated as containing the 8,700 yd^3 of salvaged soils and 2,354 yd^3 of soil beneath the pile (in-place) for a total of 11,054 yd^3 of soil. The native, undisturbed soil was demarcated by permeable fabric strips placed over the soil surface prior to formation of the stockpile (see Section 645-301-231.400, Plate 2-1B, and Plate 5-2F).

The topsoil pile will be located adjacent to a catch basin, which will be created in the ephemeral drainage. The topsoil pile itself will be approximately ten ft in elevation and 20 ft distant from the ephemeral drainage. The topsoil stockpile will be surrounded with a containment berm and protected as discussed in Section R645-301-234.

Prior to construction on the shower house pad, topsoil was salvaged and stockpiled. The final topsoil stockpile consisted of 1,200 yd^3. This topsoil was relocated to the Wild Horse Ridge topsoil stockpile (Plate 2-2B).

Approximately 1,000 yd3 of topsoil was salvaged and stockpiled from the Bear Canyon Mine Tank Seam access road during construction. During construction of the Wild Horse Ridge area, this topsoil was also relocated from the upper storage pad to the Wild Horse Ridge topsoil stockpile (Plate 2-2B).

The Wild Horse Ridge topsoil stockpile is detailed on Plate 2-2B which shows the projected stockpile, size, placement, final configuration and cross sections. According to Plate 2-2B, typical slopes range from approximately 6:1 for east facing, 2:1 for west facing, 3:1 for north facing, and 2:1 for south facing.

Appendix 5J, Fig.5J-1 and associated cross sections show the lower conveyor access road and topsoil stockpile. Cross sections showing the topsoil stockpile final configuration and resulting slopes correlate with Plate 2-2B.

Findings:

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

VEGETATION

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

Analysis:

Appendix 3G includes a plan for interim revegetation. The plan includes to drill or broadcast seed (Table 3-3), apply 1500-2000 pounds per acre of wood fiber hydromulch with a tackifier. The seed mix has one species that is not native. The Permittee will monitor interim revegetation sites and reseed when necessary.

The following paragraph addresses vegetation requirements for the addition of the Bear Canyon Leases.

Page 3-38 describes the protection of vegetative resources. The permittee has committed to developing a mitigation plan with the Division and surface owner in the event vegetation is impacted by subsidence. The MRP includes subsidence and water monitoring plans that would reveal any substantial changes to vegetation or habitats of high value to Wildlife. See protection an enhancement plan under Fish and Wildlife Information section The mitigation plan for these types of impacts is also described in appendix 5C and chapter 7 .

Findings:

Information provided in the proposal 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:

Road Classification System

The roads associated with the Wild Horse Ridge project are all classified as primary roads. Those roads are the existing Wild Horse Ridge road, the extension of the Wild Horse Ridge road to the portal area and the two new conveyor access roads. Note the extension of the Wild Horse Ridge road is referred to in the permit MRP package as the No. 3 Mine Portal Access Road and the extension of the road to the portal area is called the No. 3 Mine Portals and Pad Area.

The No. 3 Mine Portal Access Road is an existing road 4,850 ft long. The road has an average grade of 10.5% with the steepest grade being 18%. The road existed prior to mining and will be retained for the postmining land use.

The conveyor access roads will provide access to the areas where the conveyor system will be built, operated, and reclaimed. The lower road is approximately 600 ft long and has an average grade of 10%. The upper road is approximately 590 ft long and has an average grade of 19.5%. Those two roads will be reclaimed after mining is completed.

The Division has concerns about the steep grades. However, the Division does not have standards that require gentler grades. For road designs the Division relies heavily on the judgment of the engineer that designed as certified the roads.

The Division does not consider the No. 3 Mine Portals and the Pad Area a road. The Division considers that area as a pad area. Therefore, detailed road designs are not required.

The addition of Federal Leases U-61048, U-61049, U-46484, U-024316 and the Mohrland Fee Area did not necessitate the construction of new roads.

Plans and Drawings

Plate 3-5D and cross sections in Appendix 3-O show the road widths and drainages. The roads slope at 2% to ditches that parallel the roads to direct runoff. The cross sections are on 100-foot centers and show cut and fill requirements for both construction and reclamation. The Division will use that information to do bond calculations.

In Appendix 3-O, the Permittee shows a detailed plan for the construction and reclamation of the roads. In Section 3.6.12 of the amendment, the Permittee gives a detailed reclamation plan for the roads in the Wild Horse Ridge site. Since no material will be down cast, all fill material will either be hauled back to the site or excavated from the fill areas. Because the native material contains large boulders (3 ft to 5 ft in diameter), the lifts will be a maximum of 36 in. The fill will be compacted with earthmoving equipment. The Permittee and its consultant do not believe that conventional compaction equipment will work at the site. Therefore, compaction will be done with earth moving equipment.

The Division recommends that the Permittee use a maximum lift thickness of 8 in. The Division is concerned that inadequately compacted slopes could fail. Since the Division does not have any standards that apply directly to lift thickness and the designs have been certified by a licensed professional engineer the Division will not require the Permittee to change the maximum lift thickness.

The designs for the main haul road in the No. 3 Mine Portals and Pad Area are in Appendix 3-O. The Permittee will reclaim most of the cut slopes. Since some cut slopes do exist in the area total elimination of cut slopes may not be possible.

Performance Standards

The Permittee committed to repair road damage caused by a catastrophic event as soon as practical. In addition to the above, primary roads will meet the following requirements:

- Primary No.3 Mine Access Road is the main road to the portal area. Certified maps showing the road are Plate 3-5D Road-Details and Plate 2-4G, 2-4F Surface Facilities.

- Primary Conveyor Access Road No.1 is the lower conveyor access road and is shown on Plate 3-5D Road-Details and Plate 2-4F Surface Facilities.

- Primary Conveyor Access Road No.2 is the upper conveyor access road and is shown on Plate 3-5D Road-Details and Plate 2-4G Surface Facilities.

- The cross sections on Plate 3-5D show the road width and drainage. The roads slope at 2% slope and have parallel ditches that direct runoff. The cross sections in Attachment 2 of Appendix 3-O show cuts and fills. The Division will use those cross-sections to determine reclaimability, which will be discussed in the reclamation section of this technical analysis.

- Appendix 3-O-6 contains the slope stability study conducted by Dames & Moore. The consultant outlined the soil and rock sampling, procedures and testing. The stability analysis was described. All slopes had a minimum safety factor of 1.6, and the minimum required safety factor is 1.3.

- Most of Primary No. 3 Mine Access Road will be constructed on an existing dirt road. By upgrading the existing dirt road, the Permittee will be minimizing erosion. Since the roads must be constructed in a narrow canyon, the Permittee has limited options about where to place the road. The Division reviewed the road designs and concluded that the erosion will be minimized and that the roads are located on the most stable available surface.

- The Permittee does not propose to construct fords in any perennial or intermittent streams.

Primary Road Certification

All primary road designs have been properly certified.

Other Transportation Facilities

The conveyor system goes from the coal bin near the portals to the tipple facilities then to the coal storage pad. The conveyor system will be enclosed to minimize fugitive coal dust emissions. The R645 rules have few design specifications for conveyor systems. The Division reviewed the conveyor plans and found that they meet the engineering requirements. See Appendix 7K Page13 for information on dust control.

Findings:

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

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

Noncoal waste will be placed in metal dumpsters that are on the property. A local trash collector will remove and replace the bins when they are near capacity. This is standard procedure for most coal mines.

The permittee experienced an unanticipated roof fall in the 1st North section of the Bear Canyon #1 Mine on January 14, 2003 that buried a battery-powered coal hauler, an electrical distribution box, and a shop trailer. Appendix 7-P contains information on the abandoned equipment, including Material Safety Data Sheets (MSDS) for the lubricants and hydraulic fluid, battery electrolyte, and lead contained in the DC power cells. Plate 7-10B, a PE certified map of the #1 Mine, shows where the equipment is buried. Plate 7-10B also shows floor seeps and roof drippers, vertical boreholes that connect the Hiawatha seam with the overlying Blind Canyon seam, areas of the 1st North section where water collects near the buried machinery, and mine water discharge lines.

The Permittee reported this accident to the USEPA and also notified other state, federal, and local agencies. On May 27 and 28, 2004, the Division's PFO confirmed the receipt of that letter by each agency. The Permittee faxed a copy of the notification letter to the Division on May 28, 2004. [06072005]

Coal Mine Waste

Sediment pond clean out is described in Appendix 5O. A maximum of 150 cu yd of coal mine waste will be temporarily stored on the main storage pad shown on Plate 5-2C. The material will not be stored at that site for more than 15 days. The Permittee will keep logs recording when the material is placed and removed from the storage site. Permanent storage of the coal waste material will be either underground or at the Hiawatha mine.

Waste rock from the Wild Horse Ridge will be hauled to Hiawatha slurry pond 5A. Prior to being hauled it will be tested according to Table 5O-1 of Appendix 5O. The Hiawatha plan has been amended to allow for this activity.

In the event the coal mine waste should catch fire, the Permittee will extinguish the material by spreading it out on the surface and allowing the material to burn out and/or distinguishing the fire with water.

Refuse Piles

The Permittee does not propose to construct a refuse pile. All refuse (coal mine waste) will be disposed of underground (pending MSHA and Division approval) or at the Hiawatha Mine.

The Division has approved the disposal of coal mine waste at Hiawatha's Pond No. 5A.

Impounding Structures

The Permittee does not propose constructing any impoundments utilizing coal mine waste as the construction material.

Burning And Burned Waste Utilization

In Section 528.323, the Permittee states a plan for extinguishing potential fires in the waste rock pile.

Return of Coal Processing Waste to Abandoned Underground Workings

The Permittee has approval for disposing of coal mine waste underground. The plan is mainly for small amounts of roof material.

Excess Spoil

The Permittee does not plan on generating any excess spoil.

Findings:

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

HYDROLOGIC INFORMATION

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

Analysis:

General

The MRP meets the requirements for General Hydrologic Information as provided in R645-301-731.

The MRP includes operational ground-water and surface-water monitoring plans based upon the PHC determination and the analysis of baseline hydrologic and geologic information in the permit application. These plans provide for the monitoring of parameters that relate to the suitability of surface and ground water for current and approved post mining land uses and to the objectives for protection of the hydrologic balance, as well as the effluent limitations found at 40 CFR Part 434. They identify the quantity and quality parameters to be monitored, sampling frequency, and site locations.

The locations of operational monitoring stations are depicted on Plate 7-4, Water Monitoring. Table 7-14, Water Monitoring Matrix: Operational Phase of Mining, lists all of the ground and surface water sites that will be monitored during mining operations.

Table 7-12, Ground Water Sampling, provides an overview of the ground water sampling for the baseline, operational and post mining phases of the mine. Table 7-13, Ground Water Quality Parameter List, provides a list of the ground water quality parameters to be analyzed.

Table 7-16, Surface Water Sampling, provides an overview of the surface water sampling for the baseline, operational and post mining phases of the mine. Table 7-17, Surface Water Quality Parameter List, provides a list of the ground water quality parameters to be analyzed.

On page 7-61A, the Permittee provides a list of the hydrologic resources that have been identified as Protected Waters by the USDA Forest Service. A map depicting these protected waters is provided on page 7-61B.

The hydrologic monitoring parameters have been selected in consultation with UDOGM directive Tech-004.

The water discharged from the mine through SBC-9A is the culinary water supply for the Bear Canyon Mine. The MRP includes a description of the installation of the 6-inch diameter polypropylene pipeline that continuously drains ground water from the area of the abandoned mine equipment. Plate 7-10B shows the location and routing of the pipeline. Figure 7P-1 is a typical cross-section of the cribbed pipeline installation. [06072005]

Surface And Groundwater Monitoring

Table 7-12 and Table 7-16 provide detailed information regarding Baseline, Operational and Post-mining water monitoring for ground and surface water respectively. The Permittee has committed to obtaining three years of baseline data prior to mining in a given area. The Permittee states that operational monitoring will involve continued monitoring every year until two years after surface reclamation activities have ceased, and that the sites will be monitored four times annually. The tables also provide descriptions as to the types of data that will be collected as well as their respective reporting requirements.

Table 7-14 on page 7-53 "Water Monitoring Matrix: Operational Phase of Mining" lists the streams, springs and monitoring wells that will be monitored as well as the proposed monitoring schedule. The proposed monitoring program is based on the PHC analysis compiled in Appendix 7-J. Based on this, the Permittee has proposed an adequate ground and surface water-monitoring program. All of the sites listed on table 7-14 are depicted on Plate 7-4 Water Monitoring.

Stakeholders identified several water resource sites during the expansion of the permit area into Federal Leases U-61048, U-61049, U-46484, U-024316 and the Mohrland Fee surface (during sit down discussions as well as field visits). The Permittee incorporated these additional sites into the water-monitoring program. These sites include: springs SBC-16A and SBC-16B located in T 16S R8E Sect 13 NE ¼ NW ¼, Wild Horse Spring (SBC-22) located in T 16S R7E Sect 13 SE ¼ SE ¼ and Bear Canyon Spring (SMH-5) located in T 16S R7E Sect 12 NE ¼ SW ¼. These additional sites are listed in Table 7-14 as well as depicted on Plate 7-4.

On page 7-60A, the Permittee describes the surface and groundwater monitoring procedures that will be utilized during undermining of the upper reaches of the Left and Right Forks of Fish Creek. The Permittee has committed to weekly monitoring of the areas one month prior to mining in the area. The weekly monitoring will continue until one month after mining

has left the area. Monitoring will then be reduced to once a month after mining activities have passed the area. Monitoring will then be reduced to once a month for an additional 6 months at which time, monitoring will fall back to a quarterly schedule. During the weekly monitoring, the Permittee will submit weekly reports to the Division via e-mail. The actual start time of the weekly monitoring will be determined based on continual underground surveying that is required by MSHA.

Eight sites have been identified for weekly monitoring during the undermining phase of the Left Fork of Fish Creek. Five sites have been slated for weekly monitoring on the Right Fork of Fish Creek. See Table 7-14 for a listing of the sites and Plate 7-4 for their respective locations. The sites slated for weekly monitoring on each of the drainages encompass both surface and groundwater sampling sites. In addition, upon field inspections, areas where perennial flow began for both the Left and Right Forks of Fish Creek were focused on and representative sampling sites in these areas were incorporated into the weekly monitoring program. The increased monitoring will include sites FC-2, FC-3, FC-4, FC-5 and SCC-2 for the Right Fork of Fish Creek. The Left Fork of Fish Creeks weekly monitoring sites include SBC-16, SBC-16A, SBC-16B FC-1, FC-6, SBC-18, SBC-20 and SBC-21.

Groundwater Monitoring

The MRP meets the hydrology Operation Plan requirements for Ground Water Monitoring as provided in R645-301-731.210. The Division finds that these standards are met because the ground water monitoring plan is based on the PHC determinations provided in Appendix 7-J.

Plate 7-4 depicts the current and proposed monitoring sites. Upon comparing Plate 7-4 with the mine workings maps (Plate 5-1A Blind Canyon Seam Workings, Plate 5-1B Hiawatha Seam Workings and Plate 5-1C Tank Seam Workings) and upon several field visits in the proposed lease expansion, the Permittee has produced a monitoring plan that will adequately quantify and monitor groundwater resources in the proposed lease expansion as well as in adjacent areas.

Table 7-12 on page 7-51 provides an overview of the ground water sampling program to be utilized during baseline monitoring, operational mining as well as post-mining monitoring. Table 7-13 on page 7-52 provides a list of the ground water quality parameters that will be analyzed for during the monitoring program. Table 7-14 on page 7-53 provides a comprehensive list of the groundwater monitoring sites (springs and monitoring wells) to be monitored during the operational phase of mining. Plate 7-4 depicts the locations of the current and proposed monitoring site locations.

The Permittee has committed to sampling numerous ground water sites with the increased monitoring protocol outlined on page 7-60A, Undermining of Perennial Streams. Page 7-60A

details the increased monitoring to be performed during the undermining of the Left and Right Fork of Fish Creek. Ground water sites included in this increased monitoring schedule include SBC-16, SBC-16A, SBC-16B, SBC-18, SBC-20, SBC-21 and SCC-2. Table 7-14, Water Monitoring Matrix: Operational Phase of Mining on page 7-53 denotes all sites slated for increased monitoring during the undermining of perennial drainages with a footnote.

Additionally, the Permittee has committed to monitor additional sites identified by the USDA Forest Service as protected waters. On page 7-61B the Permittee provides a map (Figure 7-0: Forest Service Protected Water Resources) that depicts the names and locations of these protected waters. Page 7-61A provides a table of the protected water resources with their respective Forest Service names and corresponding water monitoring site names. Upon consultation with Forest Service personnel, the Permittee agreed to monitor the South McCadden Trough spring located in T 16S R7E SE ¼ of the SW ¼ of Section 11 (site SMH-3 as depicted on Plate 7-4) and historical monitoring site FBC-12 located in T16 S R7E NW ¼ of Section 13 (site SBC-23 as depicted on Plate 7-4). The Permittee has also corrected an error identified on Plate 7-4 in the previous analysis. Historical monitoring site SBC-12 (16-7-13-1) was incorrectly depicted in two locations. It is now correctly depicted on Plate 7-4.

Groundwater monitoring sites were selected because they were either major contributors to surface water systems, or they were springs that have been developed for beneficial use or have water rights assigned to them. The major contributors to surface water systems in the proposed lease expansion are SBC-16, SBC-16A, SBC-16B, SMH-3, SMH-4, SBC-12, SBC-18, SBC-20, SBC-21, SCC-1, SCC-3 and SCC-5. Perennial portions of the streams fed by sites SBC-16, SBC-16A, SBC-16B, SBC-18, SCC-2, SBC-20 and SBC-21 will be undermined. As such, these sites will be monitored for flow weekly starting one month prior to undermining and continuing until one month after undermining at which time they will be monitored monthly for six months before returning back to quarterly monitoring. See Table 7-14. (See previous paragraph's comments regarding sites to be added to the increased monitoring schedule during the undermining of perennial streams)

Various stakeholders identified several groundwater resource sites during this process (during sit down discussions as well as field visits) that weren't initially included in the proposed monitoring plan. The Permittee has incorporated these additional sites into their proposed water-monitoring program. These sites include: springs SBC-16A and SBC-16B located in T 16S R8E Sect 13 NE ¼ NW ¼, Wild Horse Spring (SBC-22) located in T 16S R7E Sect 13 SE ¼ SE ¼ and Bear Canyon Spring (SMH-5) located in T 16S R7E Sect 12 NE ¼ SW ¼. These additional sites are listed in Table 7-14 as well as depicted on Plate 7-4.

On March 22, 2000, an order from the Division required the Permittee to modify the permit MRP by including "portions of the February 21, 2000 letter 'Responses to concerns of Castle Valley Special Services District' from Mayo and Associates, LC to Charles Reynolds, Co-Op." That requirement was complied with by inclusion of the letter in Appendix 7-J. A second

requirement of that Division Order was to include " a minimum of one in-mine drill hole in the northern portion of the Wild Horse Ridge Addition." That requirement was complied with by addition of monitoring well DH-5 shown on Plate 3-4C. The well is located at the northern boundary of the mine addition. The drill hole "will be tested using the same methodology which was used in the previous in-mine wells, described in Appendix 7-N." [01/09/2006]

Surface Water Monitoring

The MRP meets the hydrology Operation Plan requirements for Surface Water Monitoring as provided in R645-301-731.220. The Division finds that these standards are met because the groundwater-monitoring plan in the MRP was based on PHC determinations found in Appendix 7-J. Surface water monitoring sites were selected based on the conclusions of Appendix 7J (PHC determination document) as well as upon the field investigations by regulating agencies and various stakeholders during the course of the permitting process.

Table 7-14A, Surface Water Monitoring Matrix: Baseline Collection, located on page 7-53A lists the surface water sites that will be utilized for baseline data collection. Page 7-57 provides a comprehensive list of the surface water monitoring sites and their corresponding site name. Table 7-16, Surface Water Sampling, on page 7-58 provides an overview of the surface water sampling program to be utilized during baseline monitoring, operational mining as well as post-mining monitoring. Table 7-17 on page 7-59 provides a list of the surface water quality parameters that will be analyzed for during the monitoring program. Table 7-14 Water Monitoring Matrix: Operational Phase of Mining on page 7-53 provides a comprehensive list of all the proposed monitoring sites. Plate 7-4, Water Monitoring, depicts the locations of the monitoring sites.

As discussed by the Permittee, representatives of the USDA Forest Service and the Division on August 31, 2006, a surface water-sampling site (MH-2 as depicted on Plate 7-4) was established in the upper reach of McCadden Hollow. It was agreed upon by the respective agencies and the Permittee that the MH-2 would be located up-stream of SMH-4 and south of historical monitoring site 16-7-12-6. The site has been added to Table 7-14, Water Monitoring Matrix, as well as to the list of proposed surface water monitoring sites listed on page 7-57 of the MRP.

Page 7-57 lists the streams that will be monitored during the operational phase of the mining activity. Ten additional surface water-monitoring sites were incorporated into the proposed monitoring program as a result of the lease expansion into Federal Leases U-61048, U-61049, U-46484, U-024316 and the Mohrland Fee area. Two sites were added to Cedar Creek (CK-1 and CK-2) with four additional sites added to the Right Fork of Fish Creek (FC-2, FC-3, FC-4 and FC-5), three additional sites added to the Left Fork of Fish Creek (FC-6, FC-7 and FC-8) and one additional site on the upper reaches of McCadden Hollow.

Flows of perennial streams will be determined by direct measurement (depth times width times 2/3 velocity), by use of portable or stationary weirs or flumes. Qualified personnel following standard procedures with calibrated instruments will take measurements.

Replacement of State Appropriated Water Supply

The MRP meets the hydrology Operation Plan requirements for Replacement of State Appropriated Water Supply as provided in R645-301-731.530. The Division finds that these standards are met because beginning on page 7-61 and continuing through page 7-61F, the Permittee outlines the measures and mitigation efforts that will be utilized in the event that a state appropriated water supply is impacted by mining activity. On page 7-61, the Permittee states, "If a state appropriated water supply is impacted by mining and/or mining related activities, C.W. Mining will replace it as required under R645-301-731.530 of the Utah State Code. Also in accordance with federal lease stipulation 21, if any water resource that has been identified for protection is impacted, C.W. Mining will replace the water resource". The Permittee provides the locations for state appropriated water rights with points of diversion within the proposed permit expansion area on Plate 7-12. Figure 7-0 on page 7-61B depicts the water resources identified for protection by the U.S. Forest Service. In addition, on page 7-48 of the submittal, the Permittee states, "If any state appropriated water rights are impacted in the future, C.W. Mining will meet with the water right holder and the Division and develop a site specific water replacement plan".

The Permittee identifies C.O.P. Coal Development, ANR Inc., the United States Forest Service and Huntington, Cleveland Irrigation Company (HCIC) as the primary water rights holders that could potentially be impacted by underground mining activity. On page 7-61C, the Permittee provides a discussion as to possible measures and mitigation efforts that could be taken in the event that a state appropriated water right held by one of the aforementioned water right holders is impacted by mining activity.

Mitigation efforts in relation to USDA Forest service water rights are discussed on page 7-61D. The Permittee indicates, "because of the nature of their use, if these water rights were impacted, the Forest Service would need the water to be restored to the original location." As discussed during the permitting process, the USDA Forest Service would, in all likelihood, require that their water replaced at the source of the flow in the event that there were mining related impacts. The Permittee commits to utilizing pond liners, grouting or other technologies available to repair any cracks that could potentially impact water resources. The Permittee commits to replacing the water at its source. If the impact was a displaced spring, the Permittee has committed to installing guzzlers, wells or other available technology to restore the water.

On page 7-61E, the Permittee discusses possible mitigation efforts in the event that HCIC's water rights are impacted. HCIC's points of diversion for their state appropriated water rights are located downstream of the subsidence area. Because of this, the stock-watering and

irrigation uses for HCIC may not require replacement at the source of the flow. HCIC has indicated; however, that they would require the same quantity of water to reach their points of diversions. The Permittee states, "If stock watering or irrigation water were impacted, C.W. Mining would transfer or retire enough of their shares in HCIC to cover the lost water, or any course of action agreed upon between C.W. Mining and HCIC". The Permittee commits to replacing lost flow with equivalent flow from existing springs that they hold water rights on.

On page 7-61F, the Permittee indicates that the requirement to replace or mitigate state appropriated water rights, would be contingent upon the Division finding that the mining activity had contaminated, diminished or interrupted said water rights.

Acid- and Toxic-Forming Materials and Underground Development Waste

Section 542.200 refers the reader to Appendix 5D and Appendix 6C for acid toxic information. Appendix 5D Toxic Materials & Handling provides limited information on the characteristics of soil, coal and sediment pond sludge through 1989. Appendix 6C Coal & Rock Characteristics has samples of roof and floor through 1995 and includes samples analyzed in January 2003 of the roof; floor, coal, and sediment pond clean out. The mine roof RM1 samples show that the coal has a pH of 3.7, no neutralization capacity and boron content of 10 ppm.

Additional sampling was conducted in 2004 that has not been added to Appendix 6C as of 04/02/2007.

Transfer of Wells

No discussion on transfer of wells in the new permit area is provided. It is assumed all wells will be properly abandoned when no longer needed for mining.

Discharges Into An Underground Mine

It was estimated that 0.05 cfs water will be required for mining associated with the Wild Horse Ridge. A water line from #1 mine to the #3 and #4 mines is located along the conveyor. This water is to be used for a bathhouse, drinking water, and for spray on the working face, at coal belt heads, at transfer points, and at the tipple for dust suppression. Page 7-56 indicates, "No water will be discharged into the mine during or following reclamation."

Gravity Discharges From Underground Mines

No gravity discharges are expected for the Wild Horse Ridge mines, Bear Canyon No. 3 or No. 4.

Water-Quality Standards And Effluent Limitations

Water quality standards and effluent limitations must be conducted according to State Standards and the approved UPDES permit. A copy of the current permit, which includes a discharge point for Pond D is included in Appendix 7-B.

Monitoring of the mine discharge will continue for the life of the mine (Appendix 7-P). Potential contaminants from the abandoned equipment are identified in Appendix 7P, and copies of the MSDSs are in Appendix 7-P. Water not consumed by culinary uses and mine operations is discharged to the stream in Bear Canyon under the UPDES permit. [06072005]

Diversions: General

Diversion designs are provided for the 10-year, 6-hour event. The Permittee committed to maintain the minimum required cross sectional area. Freeboard was presented to be 0.30 to 0.48 ft. Standard engineering practices generally use a minimum of 0.3 ft, so this is acceptable. Along the roads, additional culverted cross drains may be advantageous in meeting the ditch requirements without requiring changes in the road surface slope.

The culvert containing Bear Creek for the road to get to the new addition has been designed to meet the 100-year 6-hour storm. This is described in Appendix 7-G. This is the appropriate design storm.

Road Drainage

The Permittee should consider placing a culvert at the approximate location of label D-21U on Plate 7-1 F. The primary road retains this drainage along the in slope for a significant distance in this region. Also, the slope breaks from a steep section to a low gradient area at this location that may result in maintenance problems due to sediment settling out in the ditch. As of 2/12/2007 the information on plate 7-1F did not show the installation of a culvert in that location.

Stream Buffer Zones

Construction in the buffer zone will be necessary to build the roads and portal in the east fork of Bear Creek. Map 2-4 shows buffer zone markers all along the access road, along the conveyor belt roads, and along the lower edges of the topsoil storage piles. The diversion channels and culverts have been properly designed according to the appropriate sections of the regulations. Several safeguards have been included to prevent adverse impacts to the stream. These include sediment control with silt fences, berms around the topsoil storage piles, enclosure of the conveyor system, sediment traps to catch coal fines, alternate sediment control areas, a berm around the fuel tank, and sediment pond D at the portal. These measures are expected to

prevent violation of water quality standards and prevent mining operations from adversely affecting the stream.

An approved stream alteration permit obtained from the State Division of Water Rights for the proposed several stream channel alterations is provided in Appendix 7-O.

Sediment Control Measures

Construction - Sediment Control Methods

A berm will be created on the downslope side of a cut. Road cuts will be made into the slope rather than parallel to the slope. Blasts will be designed to drop material into the cut area behind the berm (Appendix 3-O). The blasting methods used here will be the same as have proven successful in constructing the other roads in the permit area. Along the Blind Canyon Seam portal pad, temporary and permanent silt fences will be placed to treat all runoff from the disturbed area not contained by a berm. Fences will remain in place until all runoff is directed to the sedimentation pond and erosion control matting will be used on the outslope of the Blind Canyon Seam portal pad fill (Appendix 3-O).

Discussions related to culvert placement and pad and operational construction in the drainages are detailed. The MRP states that, "Following initial pad contouring the sediment pond will be constructed followed by road crowning and ditch and culvert placement." (Appendix 3-O). More construction detail is contained in Appendix 3-O. Culverts will first be placed in the ephemeral drainages at each crossing to separate disturbed and undisturbed drainages in the event of storms during construction. Also, that way the catch basins will not receive runoff from undisturbed drainages. Special care is to be taken at a "small riparian area adjacent to this road". This is above the spring designated SBC-14, (WHR-6) which is a unique area. It contains a small population of the Forest Service Region 4 sensitive species Link Trail columbine. A site visit by the Division evaluation team followed by discussions with the Permittee resulted in a commitment (Appendix 3-O) that the Division hydrologist will be notified in time to make a field visit when the blasting is to occur above this spring, SBC-14, (WHR-6) and when construction for the culvert above this spring is to take place.

Operational - Sediment Control Methods

Sediment control measures include using a sedimentation pond and BTCA erosion controls for areas V and W. The BTCA for area V includes the out slope along the conveyor access road and the Blind Canyon portal pad out slope area. These areas are mapped on Plate 7-1G. Erosion control matting will be used on the out slope and a berm will be placed on the outside edge to prevent water from flowing onto the slopes.

BTCA area W includes the conveyor belt areas. A silt fence will be placed down slope during construction, and it will be evaluated for removal following construction. During operations, coal fines will be captured in a metal pan below the belt and will be cleaned off the pan. A dust cover will be placed over the belt to prevent fine coal wind transport. Details of the conveyor belt are presented in Figure 7K-1, Typical Conveyor Pan Structure. These appear to be reasonable measures to minimize the amount of coal fines leaving the conveyor belt.

In the lowest belt area, the pan will be cleaned with water draining to disturbed area ditch D-3D, which reports to the lower area sediment pond. The two upper conveyor belt areas will report to two catch basins, No. 1 and 2. The Wild Horse Ridge Coal Storage Bin area also reports to catch basin No. 2. These catch basins were included at the request of the Division to provide additional control of possible coal fines coming from the conveyor system. These areas are mapped on Plates 7-1C, 7-1F and 7-1G. The designs, calculations and certification for these basins are provided in Appendix 7-K. Capacity was based on a 10-year, 6-hour storm peak. Catch basins will be inspected and cleaned as necessary to maintain capacity. Both of the catch basins have an outlet spillway, so flow from the basin is controlled under situations that exceed the storage volume. These are detailed in Figures 7K -3 and -4. The spillways are provided with riprap linings.

Siltation Structures: General

See: Sedimentation Ponds.

Siltation Structures: Sedimentation Ponds

The Wild Horse Ridge area includes designs for sedimentation pond D. All runoff from the portal pad area reports to this pond. The pond was designed to the appropriate 10-year, 24-hour storm event using runoff curves of 90, which is appropriate for the pad area and the rocky drainage area leading to the pond. The pond is designed to store the full volume of the design storm. Reference Table 7.2-15, and Plate 7-11.

The sedimentation pond must maintain adequate sediment storage capacity. The proposed cleanout level of 60% meets this requirement. Reference Section 7.2.8.4 and Plate 7-11, Sediment Pond D. At pond D, the decant structure is located above the 60% cleanout level. The cleanout elevation is 0.55 ft below the decant elevation. A Decant Structure Detail is included with the oil skimmer end in the pond and a control valve for sampling and draining at the downstream end.

A single open channel spillway is proposed for discharge from the pond. The spillway is appropriately designed using a 25-year, 6-hour design event and the spillway is lined with riprap. The D-50 rock size is six inches and appears appropriately designed. A fuel tank is located about 100 ft away from this pond. Plate 2-4 shows a containment berm should the tank leak. This

berm and its design are to be part of the SPCC plan, which has been completed. Full containment berms around fuel tanks are standard on the rest of the site, and has been included for this one.

Siltation Structures: Other Treatment Facilities

No Other Treatment Facilities are proposed.

Siltation Structures: Exemptions

No exemption from siltation structures are proposed.

Discharge Structures

Discharge structures are designed to minimize erosion.

Impoundments

The only new impoundment associated with the Wild Horse Ridge addition is Pond D. Since the pond will be removed during reclamation, the pond is considered temporary. Therefore the requirements that apply specifically to permanent ponds do not apply.

The size and height of the impoundment may require the pond to meet additional design requirements. Such ponds are unofficially called MSHA ponds.

The following requirements apply to both temporary and permanent impoundments:

- MSHA requires that all impoundments meet additional standards if the pond 1) impounds water to an elevation of 5 ft or more above the upstream toe of the structure and can have a storage volume of 20 acre-ft or more; or (2) impound water to an elevation of 20 ft or more above the upstream toe of the structure; or (3) as determined by the district manager. Pond D has a maximum storage capacity of 4,113 ft^3 (0.094 acre-ft), storage capacity above the decant. The height of the pond from the bottom of the pond to the top of the embankment is 7.5 ft. The pond does not qualify as an MSHA pond.

- Plate 7-11 shows the plans and cross sections for Pond D. The plans have been certified by Charles Reynolds, a registered professional engineer.

- Dames and Moore conducted a stability analysis for the Portal Staging Area sedimentation pond. This analysis for steady state seepage assumes a 7-foot-deep pond is full and two seepage conditions exist: (1) A straight line condition through the

fill, and (2) Seepage controlled by the native sandstone and colluvium interface. Results suggest during a pseudo-static loading condition, shallow surface slide and sloughing from the structural fill and native slopes could be expected with strong ground movement. Proposed embankments have a minimum safety factor of 1.46. The pond is required to have a minimum static safety factor of 1.3.

- The Division and the Permittee used STABLE, a slope stability program, to determine that the pond would be stable under rapid drawdown conditions.
- No highwalls are associated with Pond D.
- The Division will review the inspection reports for Pond D during some monthly inspections, all complete inspections, and during the review of annual reports.

Ponds, Impoundments, Banks, Dams, and Embankments

Casing and sealing of wells

No changes to the plan for casing and sealing of wells are proposed. The existing plan is adequate to handle this regulatory requirement.

Findings:

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

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

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

Analysis:

The Permittee lists the existing and proposed structures at the Bear Canyon Mine in Appendix 3A, Table 3A-1. The new facilities include (1) Wild Horse Ridge conveyor belts, (2) Wild Horse Ridge substation, (3) Wild Horse Ridge shop, and (4) Wild Horse Ridge water and fuel tanks. The new facilities are shown on Plate 2-4.

Findings:

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

SIGNS AND MARKERS

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

Analysis:

R645-301-521.200 requires the Permittee to post (1) mine and permit identification signs, (2) perimeter markers signs and (3) topsoil marker signs. The Permittee has committed to and placed those signs as required. The Division's inspectors routinely check the site for signs and markers. Should a problem occur the Division will deal with it during a routine inspection.

Findings:

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

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

A blast design is submitted as Appendix 3-M that describes a blasting plan for the construction of the conveyor access roads associated with the Wild Horse Ridge addition that will comprise the Bear Canyon #3 and #4 Mines. The anticipated blasting plan has been prepared and signed by Mr. Kevin Petersen who is known to have a current surface blasting certificate issued through the State of Utah.

The plan clearly indicates that there are no active or abandoned underground coal mines, dwellings or public buildings within the radial distances described within R645-301-524.211 and -524.212. The response clearly states that there are no active or abandoned underground coal mines within 500 ft of the proposed Wild Horse Ridge blasting area. No other buildings exist within 1,000 ft of the proposed Wild Horse Ridge blasting areas. Although a hunting cabin exists approximately 750 ft from the nearest proposed blasting area, the building cannot be classified as a dwelling or as a public building, (school, church, etc.). Although the Permittee's response does contain an anticipated blast design, it was not necessary to submit it. Regulations R645-301-524.210 through -524.212 have been adequately addressed. The anticipated blast design that has been submitted appears to be able to successfully meet the fragmentation requirements being sought without incurring significant damage to the surrounding environment.

The Permittee's response provides the following information to address deficiencies aired in the initial response:

1) A drawing that shows the burden, spacing and depth of boreholes for the bench type blasting to be used for bedrock removal (establishment of road grade) has been provided. A verbal description of the method to be used for boulder breakage has also been provided.

2) Page 3M-3 of the revised blasting plan clearly states that satchel type directional charges will not be used in order to minimize air blast and fly-rock. A description of the explosive to be used (Irecoal D 378) is not a satchel type directional charge.

3) Borehole will have the proper diameter for safe blasting.

4) The revised blast design has more than doubled the weight of explosive which will be used per borehole. They will be using 1.3 pounds per hole, with a maximum of ten holes per round; hence a maximum of 13 pounds of explosive will be used per round. This improves the powder factor significantly in the anticipated blast design. The ability to adjust fragmentation within the round is within the jurisdiction of the certified blaster performing the work, and it is not necessary to obtain DOGM approval for minor changes in powder factor.

Findings:

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

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

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

Analysis:

Affected Area Maps

The affected area is shown on Plate 5-2C.

Mining Facilities Maps

Plates 5-2A through 5-2H are contained in the Bear Canyon reformatted mining and reclamation plan, and have been approved and incorporated by the DOGM.

Mine Workings Maps

Mine workings are depicted on Plates 5-1A and 5-1C for the Blind Canyon seam (#3 Mine) and the Tank seam (#4 Mine) respectively. The Plates that have been re-submitted as part of Task ID #2680 are certified by a Utah registered professional engineer.

Plates 5-1A and 5-1C show the anticipated dates of secondary extraction for the mining sections in the Blind Canyon and Tank seams respectively.

Monitoring and Sampling Location Maps

The MRP meets the requirements for Monitoring and Sampling Location Maps as provided in R645-301-731.

Plate 7-4, Water Monitoring, depicts the ground and surface water monitoring points. Plate 7-12, Water Rights, depicts the state appropriated water rights that have been identified in the Utah Division of Water Rights Database, as well as water resources identified during field investigations. The water rights plate depicts the points of diversion associated with the specific water rights.

On page 7-61B, Figure 7-0: Forest Service Protected Water Resources depicts the locations of the water resources that have been deemed "protected" by the USDA Forest Service.

During an August 22nd, 2006 site visit, water users/stakeholders identified several hydrologic resource sites of concern. These sites included: Wild Horse Spring (SBC-22) in T16S R7E Sect 13 SE1/4, two springs identified in the field as SBC-16A and SBC-16B (T16S R8E Sect 19 NE1/4 NW1/4) and the spring (SMH-5) located in T16S R7E Sect 12 NW1/4 SE1/4. These sites are depicted on Plate 7-4 as active monitoring sites.

It is the understanding of the Division that the State of Utah Water Rights Division is compiling an addendum to the state appropriated water rights in the area. During field investigations, several water resources have been discovered that did not have a water right associated with them in the Water Rights Division database. Once the addendum process is completed, a more complete list of water rights in the proposed lease expansion may be compiled.

Plates 7-4A, Spring Canyon Potentiometric Surface, 7N-2, Water Sampling Locations and 7-4, Water Monitoring have been submitted as part of the Task ID #2680 application.

Plate 5-3, Subsidence Map depicts subsidence monitoring station locations, escarpment locations, potential subsidence zones, and mine workings for the #1 and #2 Bear Canyon Mines. Mine workings for the #3 and #4 active mines are also shown.

Certification Requirements

All plates that require certification (as required by R645-301-512) have been certified by a Utah registered professional engineer.

Findings:

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

RECLAMATION PLAN

GENERAL REQUIREMENTS

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

Analysis:

Terracing as a reclamation method is described on page 3-75. The areas proposed to be terraced are shown on the reclamation map. Although terracing may be appropriate in some locations it is found to be less effective than simple slope changes in many locations in Utah. Slope form or slope brakes that decrease the gradient and retain the overland flow are best technology available for erosion control. In steep sections, slope faces steepened at the top and concave toward the base integrated with low angle slopes are known to be successful.

The plan says, "Since a cut slope existed along portions of this area prior to mining there may not be enough material to completely eliminate the entire cut. In areas where cuts existed prior to mining, the (fill) material will be placed so as to backfill the cut to the extent possible. These areas are shown on Plates 3-2,". These areas are on the upper side of the roads that were constructed before mining and these same roads will be left after mining. Typically the cuts are 15 to 20 ft high with the maximum at one location of 30 ft. Such cut slopes are typical of early roads constructed in the area. Since the area is exposed bedrock, no impact has been noted nor is any anticipated.

Portals will be sealed with backfill beginning at the Blind Canyon portal and backfilling the cut slope as it is excavated from down slope side. A narrow access road will be retained for topsoil access. Topsoil will be placed on excavated areas and then the access road will be reclaimed (3-117 to 3-118). The amendment clarifies the reclamation for the Wild Horse Ridge Blind Canyon portal is separate from the portal west of Bear Creek. The #4 Mine auxiliary portal will be backfilled from inside the Tank seam workings, as described in APPENDIX 3-Q. [01/09/2006]

Findings:

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

POSTMINING LAND USES

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

Analysis:

The current postmining land use includes grazing, wildlife and recreation. .

Findings:

Information in the MRP 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.

Analysis:

The Permittee designed the reclamation plan to restore wildlife habitat by using plant species that will provide good forage and cover.

Findings:

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

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 requirements for restoring a site to the approximate original contour (AOC) are couched in the backfilling and grading regulations.

Since the Wild Horse Ridge site is a post-SMCRA underground site the Permittee must show that the AOC requirements can be met. Even if an AOC variance is granted, the Permittee must show that the site can be restored to AOC standards.

The Division's technical directive Tech-002 gives additional AOC guidelines. That guideline was also used to evaluate the Wild Horse Ridge site for AOC compliance.

The premining and postmining cross sections for the Wild Horse Ridge project are in Appendix 3 O and are divided into the (1) Lower Conveyor Access Road; (2) Upper Conveyor Access Road; and (3) Mine Portal Area. The Permittee proposes to restore most of the site to the premining contours. However, some cut slopes will be left.

Post-SMCRA cut slopes do not have to be fully reclaimed, because they are not highwalls (portal face up areas). The Division does not have standards or regulations that deal with retention of cut slopes. The Division does allow cut slopes to be left after reclamation if they are stable and do not substantially increase the potential for safety or environmental problems.

The Permittee will backfill the site to the premining elevations whenever possible. In most cases the cut slopes will be in solid rock. The Division's staff reviewed the cross section in Appendix 3 O and found that the reclaimed slopes resemble the slopes in the surrounding area.

Under AOC guidelines all spoil piles shall be eliminated. The Permittee claims that no spoil (excess material) will be generated from the Wild Horse Ridge project.

The Permittee committed to reclaim all highwalls. The premining and postmining contour maps suggest that all highwalls will be eliminated. The cross sections in Appendix 3-O show that all highwalls will be eliminated during final reclamation.

The AOC guidelines suggest that the restored drainages complement the surrounding natural drainages. The Division considers this requirement to be met if all the hydrologic regulations have been satisfied.

The AOC guidelines require that the reclaimed topography be compatible with the postmining land use, alternative postmining land use, or that a variance from the AOC requirements be granted. The Permittee did not ask for an AOC variance. The Division considers those to be met if all postmining regulations have been satisfied.

Findings:

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

BACKFILLING 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:

General

The general backfilling and grading requirements are (1) achieve the approximate original contour; (2) eliminate all highwalls, spoil piles and depressions; (3) achieve a postmining slope that does not exceed the angle of repose or such lesser slopes as is necessary to achieve a minimum long term static safety factor of 1.3 and to prevent slides; (4) minimize erosion and water pollution both on and off site; and (5) support the approved postmining land use. The AOC, highwall elimination, erosion and water pollution, and postmining land use requirements have all been discussed in the AOC section of this technical analysis, refer to that section for more details.

The Permittee does not plan to produce any spoil material at the Bear Canyon Mine including the Wild Horse Ridge project. The postmining contour maps show that no depression will be left after final reclamation.

A Dames and Moore study investigated the slope stability for the reclaimed slopes. The information in the reports shows that all reclaimed slopes will meet or exceed the minimum safety factor requirements. The Division reviewed the report and found that it met the minimum requirements for slope stability studies.

The backfilling and grading requirements relative to the Wild Horse Ridge project require that all coal seams be backfilled and adequately covered. All coal seams at the Wild Horse Ridge site will be covered and backfilled.

No small depressions or impoundments of any kind will be retained after final reclamation.

Findings:

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

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 mine opening closure plan is given in Section 3.6.3.1 of the approved mining and reclamation plan. The plan is adequate for the mine openings at the Wild Horse Ridge. The auxiliary portal associated with the #4 Mine which is located in the left fork of the right fork of Bear Canyon (entries connect the 1st West Bleeder to the surface) will require reclamation from inside the Mine, as there is no machinery access to this portal from the surface. The reclamation procedures are described in APPENDIX 3-Q, #4 Mine Auxiliary Portal. [01/09/2006]

Findings:

The amendment meets the requirements of this section of the regulations.

TOPSOIL AND SUBSOIL

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

Analysis:

Chapter 2, Soil Resources, Sec. R645-301-231 and 242 and Chap 5 Sec. 542.200discuss the soil reclamation plan for the proposed Wild Horse Ridge area.

Redistribution

Table 2-2 provides an estimated topsoil replacement depth for each of the disturbed soil types. Table 2-7 itemizes the total acres to be recontoured by reclamation area (designated TS-1 through TS-17). Table 2-8 provides a summary of soil redistribution volumes by area. The total volume required is approximately 52,000 yd^3 for the 40-acre site. The average topsoil replacement thickness for the Wild Horse Ridge disturbed area should be 18 inches based on the 8700 yd^3 of soil salvage (Table 5J-1) from areas TS-12, TS-13, TS-14, and TS-15.

In Sec. 542.200 the Permittee states that coal fines will be removed from disturbed areas if not covered by grading activity and that coal fines will be removed to "pre-mining levels," which the Division understands to mean uncovering native soil. Methods to be used for coal removal include vacuuming (if justified by large quantities), or by washing down with a high-pressure water hose (effective on rock and rocky slopes). Disposal of the waste is described in R645-301-529.

Soil Nutrients and Amendments

Section 645-301-231.300, Nutrients and Amendments, states that following final grading, each of the reclamation areas will be sampled with composite samples taken from 0 to 2 ft and from 2 to 4 ft at each sample location. (See Table 2-9) The plan states that additional samples will be taken in the event that the initial sample indicates unsuitable material. In addition to analyzing the samples for micronutrients, analyses will also include standard fertility tests for pH, EC, nitrogen, phosphorus, and potassium. All sampling, testing and result interpretation will be done by a qualified soil scientist. Fertilization and chemical treatments will be applied according to the results of the soil sampling and analysis program.

Soil Stabilization

Following backfilling, the regraded surface will be scarified by a ripper to a depth of 14 inches to help reduce surface compaction, provide a roughened surface to help topsoil adherence, and help promote root penetration. Steep slope areas will be roughened by ripping to create ledges, crevices, pockets, and screens (talus slopes at the base of cliffs) to allow better soil retention and vegetation establishment.

To minimize compaction of replaced topsoil, travel on reclaimed areas will not be allowed. The Permittee will guard against erosion by using mulch, tackifier, and erosion control matting. Topsoil will be redistributed in the fall of the year to help promote vegetation establishment. In all cases, a very rough seedbed will be prepared.

Findings:

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

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

In Section 3.6.12 of the Wild Horse Ridge amendment, the Permittee states that the portal pad access road will be backfilled. As fill material is placed on the access road, it will result in narrowing the road width, while backfilling the cut slope. Large diameter rocks will be incorporated into the outslope created by filling to aid in surface stability. This procedure will be followed until most of the cuts are backfilled and the road has been narrowed to a "pilot cut" that will still allow the equipment access to the area. The pilot cut will then be reclaimed in the same manner as the Tank Seam Access Road described in Section 3.6.11.

In Section 3.6.3.3 the MRP says:

> "The mine access road below the No. 3 Mine Access Road will be regraded and fitted with post-mining diversion structures as shown on Plate 3-2. Diversion designs are shown in Appendix 7-H. Asphalt road surfacing material from the scale house pad will be excavated and disposed of at the Nielson Construction Landfill in Emery County. All roads that are to be reclaimed will be closed to traffic during reclamation. The reclaimed road design will be the same as the operational design, and is shown on Plate 3-5."

As backfilling and grading is completed, operational areas will be scarified by gouging to a depth of approximately 8 inches with a trackhoe. This will reduce compaction and prevent topsoil slippage, and improve soil retention and vegetation establishment in the gouges.

The road reclamation plan adequately addresses the requirements to close the roads to the public during reclamation, describes how the culverts will be reclaimed and disposal of road surface materials.

Retention

The Permittee states that those sections of the road that will be retained as part of the post mining land use will have the same design as the roads during operations.

Findings:

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

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:

Ground-water monitoring

The operational ground-water monitoring plan will continue through reclamation to bond release.

Surface-water monitoring

The operational surface-water monitoring plan will continue through reclamation to bond release.

Acid and toxic-forming materials

The acid and toxic-forming materials sampling plan will continue through the operational period.

Transfer of wells

No discussion on transfer of wells in the new permit area is provided. Therefore it is assumed all wells will be properly plugged and abandoned when no longer needed for mining.

Discharges into an underground mine

No discharges into an underground mine are proposed for reclamation purposes.

Gravity discharges

No discussion indicating gravity discharges is expected in relation to the Wild Horse Ridge reclamation.

Water quality standards and effluent limitations

No specific information is presented indicating how water quality standards and effluent limitations will be determined prior to bond release.

Diversions

Roads to be retained in place will be re-graded to the proposed post-mining configuration and fitted with diversions. A typical cross section is in 3.6.4. To maintain the road for post-mining land use, 11 culverts will be retained. The Wild Horse Ridge Access Road is proposed for retention for post-mining land use. Conveyor Access roads No.1 (lower road) and No.2 (upper road) are described in Appendix 3-O and will be reclaimed the same as described in Section 3.6.11 and 3.6.12 (3D-7A). Stream channel reclamation uses a riprapped channel design as presented in Appendix 7H.

Stream buffer zones

Construction in the buffer zone will be necessary during reclamation. The sequence of construction is designed for minimum sediment generation. Silt fences are used to control sediment.

Sediment control measures

All re-graded and top soiled areas will be mulched or otherwise treated to retain moisture and control sediment, page 4-13. Related surfaces will be ripped and scarified using a trackhoe that includes roughening to create 8-12 inch deep pockets. See the section of this analysis discussing sedimentation ponds.

Siltation structures

See sedimentation ponds.

Sedimentation ponds

Sediment pond D is proposed to be removed during reclamation of the portal pad as described in Appendix 7-K, and Section 3.6.12, Wild Horse Reclamation Plan. The reclamation construction sequence describes the methods used during pad area reclamation to minimize sediment contributions to the drainage. These include installation of silt fences on the downstream sides of all construction areas, especially the portal pad area. After highwall removal, the road cut slope will be eliminated. A "pilot cut" will be retained to allow topsoil placement in the area. The pilot cut will then be reclaimed.

Other treatment facilities

No other treatment facilities are proposed in conjunction with the Wild Horse Ridge amendment.

Exemptions for siltation structures

No exemptions for siltation structures are requested in association with the Wild Horse Ridge amendment.

Discharge structures

No discharge structures are proposed for retention in association with the Wild Horse Ridge amendment.

Impoundments

See sedimentation ponds.

Casing and sealing of wells

No changes are made to the existing plan in conjunction with casing and sealing of wells. The existing plan adequately addresses this requirement.

Hydrologic Reclamation Plan

Findings:

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

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

Contemporaneous reclamation is required as a performance standard. Since this is an underground operation, a schedule for contemporaneous reclamation is not required.

Findings:

Information provided in the MRP 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

The MRP includes a three-phase plan: timetable, revegetation species and seed mix MRP rates, planting methods, mulching techniques, and revegetation success standards.

Table 3-5 provides the "Recommended Seed Mix (Seedlings!), Riparian-Creek Bottom", and Table 3-6 provides the "Recommended Seed Mix, Pinyon-Juniper-Grass". The titles of these tables are misleading and the Permittee will correct during the next technical review. [09152005]. As of 04/03/2007 the titles had not been corrected. The author of this section should contact the permittee to ensure the information is updated.

The Permittee will add canyon sweetvetch to the final seed mix (Table 3-6). The Permittee will collect seed from local populations. The topsoil pile will also provide an additional seed source for this species.

The Permittee will cut willows nearby sources and plant in the riparian sites. The planting method will include planting willows at least every foot. The Permittee may need to return after a few years to plant supplemental willows. The Division recommends replanting in sites where sediment builds up over the years in the riprapped channels.

Revegetation: Timing

Table 3-4 provides a revegetation schedule. The Division recommends that the Permittee plant containerized seedlings in the fall and bare-root cuttings in the spring (if the area is accessible and the spring weather is wet).

Revegetation: Mulching and Other Soil Stabilizing Practices

The MRP provides information on backfilling and grading, gouging, and seeding as well as methods for reclaiming steep slopes.

The Permittee may hydroseed and apply wood fiber mulch. The Division cautions the Permittee that the application of too much wood fiber at the time of seeding may reduce seed to

soil contact. This reduction may reduce seeding success. The Division recommends hydroseeding with a wood fiber binder (small amount), followed by applying wood fiber mulch.

Revegetation: Standards For Success

The Permittee will follow sampling requirements identified in the Division's "Vegetation Information And Monitoring Guidelines" (p. 3-15). The Permittee will conduct yearly qualitative vegetation evaluations as well as conduct quantitative vegetation surveys throughout the 10-year responsibility period. Regulations require quantitative vegetation surveys during years nine and ten (refer to R645-301-357.200). However, the Division recommends additional quantitative surveys, within the 10-year period, in order to provide the necessary data to meet Phase II and III bond release standards.

The Division recommends additional quantitative surveys to those stated in the regulation (refer to R645-301-357.200). The Permittee plans to survey many times during the responsibility phase. The Division, however, provides some recommendations that may help the Permittee achieve Phase II and III bond release. The Permittee may consider rearranging some of the monitoring schedules to include monitoring shrub density at years 4 and 8 following the last augmentation. The 4th and 8th year shrub density surveys are for areas designated as wildlife for the PMLU. The 4th year results do not need to meet the 90% requirement, but the survey is needed to demonstrate that at least 80% of the shrubs and trees have been in place for 60% of the responsibility period (refer to R356.232). The 8th year survey is needed to demonstrate that no shrubs or trees have been in place for less than two growing seasons (refer to R356.232). The Permittee's monitoring schedule does not indicate plans to monitor during these recommended years. This is not considered a deficiency, however, since the regulations do not require including these years as part of a monitoring schedule.

The effectiveness of vegetation for approved postmining land use and extent of cover compared to the extent of cover of the reference area determines revegetation success. Any negative impacts to the reference area may confound statistical comparisons and analysis.

The Permittee commits to meet diversity standards with its approved revegetation plan and successful growth of the species in the final seed mix. The Permittee will provide additional plantings of seedlings to contribute to diversity for the riparian areas.

The Division, in consultation with DWR, established the woody plant density at 1010 woody plants per acre. This density should meet the goal of the PMLU even though the reference area had a higher density at the time of the baseline survey.

The husbandry practices approved by the Division will be applied as needed.

Findings:

Information in the MRP 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:

The Permittee plans to gouge the regraded pad area, tank seam, conveyor access road slopes and the Wild Horse Ridge topsoil storage site ASCA to an 8-inch depth on the pad areas (Sec. 542.200 and Appendix 7-K).

The Permittee should investigate the use of deeper gouging, to depths of 18 - 24 inches on the reclaim site. Deep gouging has been used successfully on reclamation sites through out Utah and has been described in The Practical Guide to Reclamation in Utah, page 66. This publication is available on the web at http://www.dogm.nr.utah.gov

Mulching is described in Section R645-301-341 page 3-41 as well as Section 542.200. The Permittee intends to use excelsior blanket on slopes of 2h:1v.

Section 542.200 indicates that rocks will be embedded into the upper surface as described on page 5H-27 (in a May 10, 1994 letter from Dames and Moore). The goal will be to obtain a minimum cover of 32% rock, similar to the reference area. Wind protection through the use of boulders is also described in R645-301-412.110 Method for Achieving Post-Mining Land Use.

Findings:

The information provided meets the requirements of the regulations to provide stabilized surface areas.

CESSATION OF OPERATIONS

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

Analysis:

The plan for cessation of the operation is part of the approved mining and reclamation plan.

Findings:

The information provided meets the requirements of this section.

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:

Affected Area Boundary Maps

The Permittee did not give the Division an affected area boundary map. The Division usually considers the permit area to be equal to the affected area. Plate 1-1 is the permit area map, and the Division found that the map accurately shows the permit boundaries.

Bonded Area Map

The Division usually considers the bonded area to be equal to the permit area. Plate 3-2A, Plate 3-2B and Plate 3-2F show the disturbed area boundaries during reclamation.

Reclamation Backfilling And Grading Maps

The Permittee gave the Division detailed maps that show how the backfilling and grading requirements will be met. [04012007]

Reclamation Facilities Maps

The Permittee gave the Division detailed maps of all reclaimed facilities including the access road.

Final Surface Configuration Maps

The Permittee gave the Division detailed maps and cross sections that show the final surface configuration.

Findings:

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

BONDING AND INSURANCE REQUIREMENTS

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

Analysis:

General

The surety bond on file for the Division covers Exhibit A, the permit area. The Division determined the amount needed for the Division to reclaim the Bear Canyon Mine in the event of bond forfeiture. That amount is $2,187,000 in 2008 dollars. [whw04012007]

Determination of Bond Amount:

Demolition:

The Division calculated the demolition and disposal costs as outlined in the OSM Reclamation Cost Handbook and according to standard Division practices. Those procedures are outlined as follows:

- The Division does not allow salvage value in the reclamation cost estimates.
- The Division will allow the cost of steel disposal to be based on the transportation cost to a scrap dealer.
- Because the disposal fees for landfills are site-specific, the Division will base those fees on local landfills provided the costs can be documented. The Permittee has the obligation to provide that information. The Division assumes that all non-steel and non-concrete demolition will be shipped to the Neilson landfill.
- If the approved mining and reclamation plan states that some type of debris can be disposed of on site then the on-site disposal fees must be included. On site disposal fees, should be included to cover the cost of transporting the debris to a disposal site and backfilling and covering the debris.

The Division and the Permittee reviewed and agreed upon the demolition costs. See the bond cost estimate for more details.

Earthwork:

- Tank Seam Access Road and Portal Pad: No material will be imported or exported from this site. A total of 20,310 yd^3 will be cut and then used as fill. Approximately 9,649 yd^3 of material will be cut and filled in one operation with an excavator. The amount of material to be hauled by truck within the site is 10,661 yd^3. The Permittee assumed that the material to be hauled will be loaded by an excavator onto a 10 yd^3 dump truck. Once the material has been trucked an excavator will place it.

- Upper Storage Pad: The amount of fill needed is 8,083 yd^3. Local cuts will produce 6,447 yd^3, and the remaining fill will be shipped from the coal storage pad. The cut and fill operation is assumed to be a continuous operation with an excavator. Placing the imported fill will also be done with an excavator. The transportation costs for hauling the fill from the coal storage pad will be calculated in the coal storage pad subsection.

- Portal Pad Area & Road: The amount of fill needed is 7,908 yd^3. Local cuts will produce 6,648 yd^3, and the remaining fill will be shipped from the coal storage pad. The cut and fill operation is assumed to be a continuous operation with an excavator. Placing the imported fill will also be done with an excavator. The transportation costs for hauling the fill from the coal storage pad will be calculated in the coal storage pad subsection.

- Portal Pad Area: The amount of fill needed is 7,908 yd^3. The fill material will come from on site and the coal storage area if needed. The cut and fill operation is assumed to be a continuous operation with an excavator. Placing the imported fill will also be done with an excavator. The transportation costs for hauling the fill from the coal storage pad will be calculated in the coal storage pad subsection.

- Portal Access Road: The amount of fill needed is 9,167 yd^3. The fill material will come from on site and the coal storage area if needed. The cut and fill operation is assumed to be a continuous operation with an excavator. Placing the imported fill will also be done with an excavator. The transportation costs for hauling the fill from the coal storage pad will be calculated in the coal storage pad subsection.

- Lower Road to Switchback: The amount of cut and fill material needed is 4,028 yd^3. The cut and fill amounts balance, so no material will be imported or exported from the site. The Permittee assumes that all cut and fill operations can be done with an excavator.

- Tipple Access Road: The amount of cut and fill material needed is 1,167 yd^3. The cut and fill amounts balance, so no material will be imported or exported from the site. The Permittee assumes that all cut and fill operations can be done with an excavator.

- Coal Storage Pad: The site has 19,453 yd^3 of cut material and needs 15,333 yd^3 of fill material. The on site cut and fill operation will be done with a bulldozer. The loading and trucking of material will be done with a front-end loader and dump trucks.

- Scale House: The amount of cut and fill material is 711 yd^3. The cut and fill amounts balance, so no material will be imported or exported from the site. The Permittee assumes that all cut and fill operations can be done with a bulldozer.

- Sediment Pond A: The amount of cut and fill material is 1,556 yd^3. The cut and fill amounts balance, so no material will be imported or exported from the site. The Permittee assumes that all cut and fill operations can be done with a bulldozer.

- Sediment Pond B: The amount of cut and fill material is 1,167 yd^3. The cut and fill amounts balance so no material will be imported or exported from the site. The Permittee assumes that all cut and fill operations can be done with a bulldozer.

- Sediment Pond C: The amount of cut and fill material is 324 yd^3. The cut and fill amounts balance, so no material will be imported or exported from the site. The Permittee assumes that all cut and fill operations can be done with a bulldozer.

- Shower House: The amount of cut and fill material is 3,426 yd^3. The cut and fill amounts balance, so no material will be imported or exported from the site. The Permittee assumes that all cut and fill operations can be done with a bulldozer.

- Wild Horse Ridge Portal Area: The amount of cut and fill material is 10,288 yd^3, with and additional 4,860 yd^3 of topsoil that will be imported. The Permittee

assumes that all cut and fill work will be done with a bulldozer. The topsoil will be loaded with a front-end loader and haul in dump truck to the site. All topsoil will be spread with a bulldozer.

- Wild Horse Ridge Upper Access Road: The amount of cut and fill material is 1,912 yd^3 with 2171 yd^3 of topsoil to be imported. The Permittee assumes that the material can be moved with a bulldozer. The topsoil will be loaded with a front-end loader and haul in dump truck to the site. All topsoil will be spread with an excavator.

- Wild Horse Ridge Upper Access Road: The amount of cut and fill material is 2,947 yd^3. The Permittee assumes that half the material can be moved with a bulldozer and the other half with an excavator.

The Division and the Permittee reviewed and agreed on the earthwork costs. See the bond calculations for more details.

Vegetation Costs:

The vegetation costs were based on the following:

- The approved mining and reclamation plan and the proposed addition of the Wild Horse Ridge area. In addition a Division biologist reviewed the reclamation cost estimate.

- The revegetation rate would be 25%.

- Seeds and seedlings costs were based upon costs for purchasing them from a local dealer. Since these costs can fluctuate on an annual basis the Division will continually review the costs and make adjustments as needed.

Indirect Costs:

The indirect costs that the Division calculates are as follows:

- Startup Costs: The startup costs include mobilization/demobilization, permits, insurance and bonds. **The Division assumes that the startup costs for a reclamation project are 10% of the direct costs**. The 10% amount is based on a flat rate stated on Page 23 of the OSM's *Handbook for Calculation of Reclamation Bond Amount Revised April 2000.* The OSM handbook did not include a reference for the 10%. That amount is verified by AML costs.

- Contingency: The contingency amount is listed in the section entitled "How to Use the Book: The Details" in the R. S. Means Company, Inc. publications. The contingency range is 5% to 10%. **Therefore, the Division will use the low range of 5%.** [04012007]

Note: The contingency fee is for items that will be encountered but have not yet been identified in the permit MRP, Mining and Reclamation Plan, proposed amendments or significant revisions.

- Engineering Redesign Fee: The engineering redesign fee is a line item in the R. S. Means Company, Inc. minimum. **The minimum engineering redesign fee for the year 2000 is 2.5%.** [04012007]

- Main Office Expense: The cost for the main office expense is shown as line items in the R. S. Means Company, Inc. publications. Main office expense cover costs that are not directly incurred for a specific project but are needed by the contractor to operate. Examples of main office expense include, but are not limited to, administrative costs, building rental, equipment storage areas, and certain types of insurance and taxes. The indirect costs are 8% up to $1,000,000, **6.8% up to $4,000,000,** 5.6% up to $7,000,000 and 5.10% up to $10,000,000 and 3.9% for more than $10,000,000. [04012007]

- Project Management Fee: The project management fee is the line item identified in the R. S. Means Company, Inc. The costs are 4.5% for direct costs up to $1,000,000 and **2.5% for direct costs of up to $5,000,000.** [04012007]

Inflation:

The Division uses the three-year average for the escalation factor from the Means Historical Cost Index for Utah. The Division will escalate the demolition and earthwork costs to the end of the permit term (maximum of 5 years).

Terms and Conditions for Liability Insurance

Liability insurance information is located in App. 1-C.

Findings:

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

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

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

Analysis:

The Wildhorse Ridge modification and Bear Canyon Lease Expansion Project are located within the current Gentry Mountain CHIA. The CHIA was updated in March 2007 to include the addition to the permit of approximately 2,740 acres of fee coal and federal coal leases U-46484, U-61048, and U-61049 and the remaining 80 acres of U-024316. [02262007]

Findings:

The current CHIA is sufficient to meet the requirements of the R645 Rules. [02262007]

APPENDICES

SUMMARY OF COMMITMENTS

The summary below presents a list of commitments stated within the mining and reclamation plan (MRP). This list provides the following information for each commitment, when applicable:

- Title.
- Objective.
- Frequency.
- Status.
- Reports.
- Citation.

BEGIN COMMITMENT LIST BELOW

There are stipulations that are included as Attachment A to the permit. The stipulations require the permittee to monitor subsidence annually throughout the life of the mine and survey those areas that have subsided that were not included in previous class three surveys.

"C.W. Mining Company must amend the air quality approval order to allow for the increase in throughput to 2.5 MTPY. This document must be in place before the Permittee exceeds the approved 1.95 MTPY"

Chapter three page 3-68 of the MRP includes a commitment to develop a raptor mitigation plan by July 1, 2007 in consultation with the DWR, DOGM, U. S. F. W. S., U. S. F. S. and BLM to mitigate impacts to nests and or raptors from potential escarpment failure caused by subsidence.

APPENDIX C
FS AND BLM COAL LEASE STIPULATIONS

1. The Regulatory Authority shall mean the State Regulatory Authority pursuant to a cooperative agreement approved under 30 CFR Part 745 or in the absence of a cooperative agreement, Office of Surface Mining. The authorized officer shall mean the State Director, Bureau of Land Management. The authorized officer of the Surface Management Agency shall mean the Forest Supervisor, Forest Service. Surface Management Agency for private surface is the Bureau of Land Management. For adjoining private lands with Federal minerals and which primarily involve

National Forest Service issues, the Forest Service will have the lead for environmental analysis and, when necessary, documentation in an environmental assessment or environmental impact statement.

2. The authorized officers, of the Bureau of Land Management, Office of Surface Mining (Regulatory Authority), and the Surface Management Agency (Forest Service) respectively, shall coordinate, as practical, regulation of mining operations and associated activities on the lease area.

3. In accordance with Sec. 523(b) of the "Surface Mining Control and Reclamation Act of 1977," surface mining and reclamation operations conducted on this lease are to conform with the requirements of this Act and are subject to compliance with the Office of Surface Mining Regulations, or as applicable, a Utah program equivalent approved under cooperative agreement in accordance with Sec. 523(c). The United States Government does not warrant that the entire tract will be susceptible to mining.

4. Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service Manti-La Sal National Forest.

The following stipulations pertain to the lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on the National Forest System lands.

5. Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the lessee prior to disturbance shall, immediately bring them to the attention of the appropriate authorities. Paleontological remains of significant scientific interest do not include leaves, ferns, or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the lessee.

6. If there is reason to believe that threatened or endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area the lessee shall be required to

conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the lessee.

7. The lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data is adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the inter-relationship of the geology, topography, surface hydrology, vegetation, and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

8. Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

9. The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access road, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major modifications to existing developments to examine alternatives and mitigate conflicts.

10. Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternative involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed, to reduce visual impacts, and where possible achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural land forms and vegetative landscape features will be avoided.

11. The lessee shall be required to establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

12. The lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), lessees may perform

their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

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

14. In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specifically approved locations.

15. If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

16. The coal contained within, and authorized for mining under this lease, shall be extracted only by underground mining methods.

17. Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

18. In order to protect big game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other critical wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specific periods of the year.

19. Support facilities, structures, equipment, and similar developments will be removed from the lease area within 2 years after the final termination of use of such facilities. This provision shall apply unless the requirement of Section 10 of the lease form is applicable. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages reestablished, and the areas returned to a pre-mining land use.

20. The lessee at the conclusion of the mining operations, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed, or displaced corner monuments (section corners, quarter corners, etc.) their accessories and appendages (witness trees, bearing trees, etc.) or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the lessee, by a professional land surveyor registered in the State of Utah and to the standards and guidelines found in the manual of surveying instruction, U.S. Department of Interior.

21. The lessee at his expense will be responsible to replace any surface water identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses.

22. The lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of Interior, (2) uses of all existing improvements, such as Forest Development Roads, within and outside the area licensed, permitted or leased by the Secretary of Interior, and (3) use and occupancy of the NFS not authorized by a permit/operation plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to :

Forest Supervisor
Manti-La Sal National Forest
599 West Price River Drive
Price, Utah 84501
Telephone No.: (435) 637-2817

who is the authorized representative of the Secretary of Agriculture.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Utah State Office
P.O. Box 45155
Salt Lake City, UT 84145-0155

In Reply Refer To:
3451
U46484
(UT-932)

MAR 20 1998

CERTIFIED MAIL--Return Receipt Requested

DECISION

C.O.P. Coal Development Company	:	
53 W. Angelo Avenue	:	Coal Lease
Salt Lake City, Utah 84115	:	U-46484

Readjustment of Coal Lease U-46484
Effective May 1, 1998

The regulations under 43 CFR 3451.1(a)(1) and (2) state:

1. All leases issued prior to August 4, 1976, shall be subject to readjustment at the end of the current 20-year period and at the end of each 10-year period thereafter.

2. Any lease subject to readjustment which contains a royalty rate less than the minimum royalty prescribed in 43 CFR 3473.3-2 shall be readjusted to conform to the minimum prescribed in that section.

Coal lease U-46484 was issued effective May 1, 1958. By notice dated April 15, 1996, C.O.P. Coal Development Co. was notified that the terms and conditions of the readjustment would be provided in accordance with the regulations under 43 CFR 3451 no later than 2 years from the date of the notice.

As provided in Section 3d of the lease and in accordance with the regulations under 43 CFR 3451.2, enclosed are the terms and conditions of coal lease U-46484 effective May 1, 1998.

A lease bond in the amount of $8,000 and a drilling bond in the amount of $24,000 are currently on file in the name of C.O.P. Coal Development Co. and are considered to be adequate bond coverage at the present time.

Coal lease U-46484 is held by inclusion in the pending Bear Canyon Logical Mining Unit (LMU). LMU specific diligence requirements supersede, but do not suspend, the lease specific diligence requirements. Information concerning lease specific diligent development requirements is attached to this decision. This information has been determined to be confidential and will not become part of the record.

Coal lease U-46484 is hereby readjusted effective May 1, 1998, in accordance with the regulations at 43 CFR 3451.2.

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4, and the enclosed Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office (at the above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (pursuant to regulation 43 CFR 4.21) (58 FR 4939, January 19, 1993) (request) for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay **must** also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed in this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

(1) The relative harm to the parties if the stay is granted or denied,

(2) The likelihood of the appellant's success of the merits,

(3) The likelihood of immediate and irreparable harm if the stay is not granted, and

(4) Whether the public interest favors granting the stay.

/S/ G. William Lamb

G. William Lamb
State Director

, Dept. of Justice, 325 7th

nerals Leasing Task Force,
/encl.)

Is your RETURN ADDRESS completed on the reverse side?

SENDER: U-022168, U-02431b, [redacted], U-02431S, 438727, U-46484, UT-932 CAAL

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "*Return Receipt Requested*" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
C.O.P. Coal Development Co
53 W. Angelo Avenue
Salt Lake City, Utah 84115

4a. Article Number
Z 230 749 888

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
3/23/98

5. Received By: *(Print Name)*

8. Addressee's Address *(Only if requested and fee is paid)*

6. Signature: *(Addressee or Agent)*
X Karen Anderson

Thank you for using Return Receipt

PS Form 3811, December 1994 Domestic Return Receipt

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT COAL LEASE READJUSTMENT	Serial Number U-46484 Lease Date May 1, 1958

Part I. LEASE RIGHTS GRANTED

This lease, entered into by and between the United States of America, hereinafter called the lessor, through the Bureau of Land Management, and

C.O.P. Coal Development Company
53 W. Angelo Avenue
Salt Lake City, Utah 84115

hereinafter called lessee, is readjusted, effective May 1, 1998, for a period of 10 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of each 10 year lease period.

Sec. 1. This lease readjustment is subject to the terms and provisions of the:

/X/ Mineral Lands Leasing Act of 1920, Act of February 25, 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;

/ / Mineral Leasing Act for Acquired Lands, Act of August 7, 1947, 61 Stat. 913, 30 U.S.C. 351-359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any rents and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants to lessee the exclusive right and privilege to drill for, mine, extract, remove or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

T. 16 S., R. 7 E., SLM, Utah
Sec. 10, N2, N2S2, SESW, S2SE;
Sec. 11, all;
Sec. 12, W2W2.

Emery County

containing 1,400.00 acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE. Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $3.00 for each lease year.

(b) RENTAL CREDITS. Rental shall not be credited against either production or advance royalties for any year.

Sec. 2.(a) PRODUCTION ROYALTIES. The royalty shall be 12½ percent of the value of coal produced by strip or auger mining methods and 8 percent of the value of coal produced by underground mining methods. Royalties are due to lessor the final day of the months succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES. Upon request by the lessee, the authorized officer may accept for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS. Lessee shall maintain in the proper office a lease bond in the amount of $8,000, and a drilling bond of $24,000. The authorized officer may require an adjustment in the amount of the bond to reflect changed conditions.

Sec. 4. DILIGENCE. This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years shall terminate the lease. If not submitted already, lessee shall submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after the effective date of this lease readjustment.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. LOGICAL MINING UNIT (LMU). Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease shall become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all times for the inspection of any duly authorized officer of lessor, the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee shall allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS. Lessee shall comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee shall not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area shall be submitted to the authorized officer.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee shall take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but not limited to modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits, not covered hereunder and approving easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY. Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor.

Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 13. INDEMNIFICATION. Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the lessee's activites and operations under this lease.

Sec. 14. SPECIAL STATUTES. This lease is subject to the Federal Water Pollution Control Act (33 U.S.C. 1151 - 1175); the Clean Air Act (42 U.S.C. 1857 et seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)

Sec. 15. SPECIAL STIPULATIONS.

1. The Regulatory Authority shall mean the State Regulatory Authority pursuant to a cooperative agreement approved under 30 CFR Part 745 or in the absence of a cooperative agreement, Office of Surface Mining. The authorized officer shall mean the State Director, Bureau of Land Management. The authorized officer of the Surface Management Agency shall mean the Forest Supervisor, Forest Service. Surface Management Agency for private surface is the Bureau of Land Management. For adjoining private lands with Federal minerals and which primarily involve National Forest Service issues, the Forest Service will have the lead for environmental analysis and, when necessary, documentation in an environmental assessment or environmental impact statement.

2. The authorized officers, of the Bureau of Land Management, Office of Surface Mining (Regulatory Authority), and the Surface Management Agency (Forest Service) respectively, shall coordinate, as practical, regulation of mining operations and associated activities on the lease area.

3. In accordance with Sec. 523(b) of the "Surface Mining Control and Reclamation Act of 1977," surface mining and reclamation operations conducted on this lease are to conform with the requirements of this Act and are subject to compliance with Office of Surface Mining Regulations, or as applicable, a Utah program equivalent approved under cooperative agreement in accordance with Sec. 523(c). The United States Government does not warrant that the entire tract will be susceptible to mining.

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21. The Lessee, at his expense, will be responsible to replace any surface and/or developed ground water sources identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses (authorized by 36 CFR 251).

22. The Licensee/Permittee/Lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of Interior, (2) uses of all existing improvements, such as Forest Development Roads, within and outside the area licensed, permitted or leased by the Secretary of Interior, and (3) use and occupancy of the NFS not authorized by a permit/operation plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

Forest Supervisor
Manti-LaSal National Forest
599 West Price River Drive
Price, Utah 84501

Telephone No.: 801-637-2817

who is the authorized representative of the Secretary of Agriculture.

23. Notwithstanding the approval of a resource recovery and protection plan by the BLM, lessor reserves the right to seek damages against the operator/lessee in the event (I) the operator/lessee fails to achieve maximum economic recovery [as defined at 43 CFR §3480.0-5(21)] of the recoverable coal reserves or (ii) the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal.

The parties recognize that under an approved R2P2, conditions may require a modification by the operator/lessee of that plan. In the event a coal bed or portion thereof is not to be mined or is rendered unminable by the operation, the operator shall submit appropriate justification to obtain approval by the AO to leave such reserves unmined. Upon approval by the AO, such coal beds or portions thereof shall not be subject to damages as described above. Further, nothing in this section shall prevent the operator/lessee from exercising its right to relinquish all or a portion of the lease as authorized by statute and regulation.

In the event the AO determines that the R2P2 as approved will not attain MER as the result of changed conditions, the AO will give proper notice to the operator/lessee as required under applicable regulations. The AO will order a modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such an ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in the first paragraph under this section.

Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the AO that the coal reserves have been rendered unminable or at such time that the lessee has demonstrated an unwillingness to extract the coal.

The BLM may enforce this provision either by issuing a written decision requiring payment of the MMS demand for such royalties, or by issuing a notice of non-compliance. A decision or notice of non-compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law.

United States Department of the Interior

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

IN REPLY REFER TO:
3451
UTU-61048
(UT-924)

FEB 2 1 2003

CERTIFIED MAIL—Return Receipt Requested

DECISION

C.O.P. Coal Development Co.	:	Coal Lease
53 West Angelo Avenue	:	UTU-61048
Salt Lake City, Utah 84115	:	

Readjustment of Coal Lease UTU-61048
Effective February 8, 2003

The regulations under 43 CFR 3451.1(a)(1) and (2) state:

1. All leases issued prior to August 4, 1976, shall be subject to readjustment at the end of the current 20-year period and at the end of each 10-year period thereafter.

2. Any lease subject to readjustment, which contains a royalty rate less than the minimum royalty prescribed in 43 CFR 3473.3-2 shall be readjusted to conform to the minimum prescribed in that section.

Coal lease UTU-61048 was issued effective February 8, 1923. The lease was segregated out of coal lease UTSL-025431 by assignment, effective October 1, 1986. By notice dated February 1, 2001, C.O.P. Coal Development Co. was notified that the terms and conditions of the readjustment would be provided in accordance with the regulations under 43 CFR 3451 no later than February 8, 2003.

As provided in Section 3(d) of the lease and in accordance with the regulations under 43 CFR 3451.2, enclosed are the terms and conditions of coal lease UTU-61048 effective February 8, 2003.

A lease bond, in the amount of $5,000, conditioned upon compliance with all the terms and conditions of the lease, is currently on file in the name of C.O.P. Coal Development Co. and is considered to be adequate bond coverage at the present time.

Coal lease UTU-61048 is part of the Bear Canyon Logical Mining Unit (LMU) application. The LMU has met its diligent development requirements from production on the fee lands in the application.

Coal lease UTU-61048 is hereby readjusted effective February 8, 2003, in accordance with the regulations at 43 CFR 3451.2.

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4, and the enclosed Form 1842.1. If an appeal is taken, your notice of appeal must be filed in this office (at the above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (pursuant to regulation 43 CFR 4.21)(58 FR 4939, January 19, 1993) (request) for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay **must** also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed in this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards.

(1) The relative harm to the parties if the stay is granted or denied,

(2) The likelihood of the appellant's success on the merits,

(3) The likelihood of immediate and irreparable harm if the stay is not granted, and

(4) Whether the public interest favors granting the stay.

/s/ Joseph J. Incardine

for Kent Hoffman
Deputy State Director
Lands and Minerals

Enclosures
1. Form 1842-1 (1 p)
2. Coal Lease Readjustment (11 pp)

cc: Ms. Jill Ptacek, Department of Justice (w/encl.)
Resource Development Coordinating Committee (w/encl.)
Mr. Lowell Braxton, Director, UDOGM (w/encl.)
Price Coal Office (w/encl.)
MMS, MRM, Solid Minerals Staff (w/encl.)
Forest Service, Ogden, UT (w/encl.)
Manti-LaSal National Forest (w/encl.)

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

C.O.P. COAL DEVELOPMENT CO.
53 WEST ANGELO AVE.
SALT LAKE CITY, UT 84115

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X C. Hilton ☐ Agent ☐ Addressee

B. Received by (*Printed Name*) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

SALT LAKE CITY UT SO SALT LAKE BR 84115 USPS FEB 25 2003

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (*Extra Fee*) ☐ Yes

2. Article Number
(*Transfer from service label*) 7002 0460 0002 9610 1844

PS Form 3811, August 2001 U61048 Domestic Return Receipt 102595-01-M-0381

LAKE BR 84115 USPS 25 2003

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COAL LEASE READJUSTMENT

Serial Number UTU-61048

Lease Date February 8, 1923

Part I. LEASE RIGHTS GRANTED

This lease, entered into by and between the United States of America, hereinafter called the lessor, through the Bureau of Land Management, and

C.O.P. Coal Development Co.
53 West Angelo Avenue
Salt Lake City, Utah 84115

hereinafter called lessee, is readjusted, effective February 8, 2003, for a period of 10 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of each 10 year lease period.

Sec. 1. This lease readjustment is subject to the terms and provisions of the:

/X/ Mineral Lands Leasing Act of 1920, Act of February 25, 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;

/ / Mineral Leasing Act for Acquired Lands, Act of August 7, 1947, 61 Stat. 913, 30 U.S.C. 351-359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any rents and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants to lessee the exclusive right and privilege to drill for, mine, extract, remove or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

T. 16 S., R. 7 E., SLM, UT
Sec. 1, lot 1, SENE, E2SE;
Sec. 12, E2NE.

T. 16 S., R. 8 E., SLM, UT
Sec. 6, lots 11-14,E2SW,W2SE,SESE;
Sec. 7, lots 1, 2, E2NW,W2NE,SENE,SE;
Sec. 8, SWSW.

containing 1,108.27 acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE. Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $3.00 for each lease year.

(b) RENTAL CREDITS. Rental shall not be credited against either production or advance royalties for any year.

Sec. 2.(a) PRODUCTION ROYALTIES. The royalty shall be 12½ percent of the value of coal produced by strip or auger mining methods and 8 percent of the value of coal produced by underground mining methods. Royalties are due to lessor the final day of the months succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES. Upon request by the lessee, the authorized officer may accept for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS. Lessee shall maintain in the proper office a lease bond in the amount of $5,000. The authorized officer may require an adjustment in the amount of the bond to reflect changed conditions.

Sec. 4. DILIGENCE. This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years shall terminate the lease. If not submitted already, lessee shall submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after the effective date of this lease readjustment.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. LOGICAL MINING UNIT (LMU). Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease shall become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all times for the inspection of any duly authorized officer of lessor, the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee shall allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS. Lessee shall comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee shall not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area shall be submitted to the authorized officer.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee shall take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits, not covered hereunder and approving easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY. Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor.

Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 9(a) TRANSFERS

/X/ This lease may be transferred in whole or in part to any person, association, or corporation qualified to hold such lease interest.

/_/ This lease may be transferred in whole or in part to another public body, or to a person who will mine the coal on behalf of, and for the use of, the public body or to a person who for the limited purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.

/_/ This lease may only be transferred in whole or in part to another small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest must be approved in accordance with the regulations.

(b) RELINQUISHMENT. The lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee shall be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC. At such time as all portions of this lease are returned to lessor, lessee shall deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, lessee shall remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, shall become the property of the lessor, but lessee shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is owned by third parties, lessor shall waive the requirement for removal, provided the third parties do not object to such waiver. Lessee shall, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by lessee's activity or activities incidental thereto, and reclaim access roads or trails.

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT. If lessee fails to comply with applicable laws, existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the lessor only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS - IN-INTEREST. Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION. Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the lessee's activities and operations under this lease.

Sec. 14. SPECIAL STATUTES. This lease is subject to the Federal Water Pollution Control Act (33 U.S.C. 1151 - 1175); the Clean Air Act (42 U.S.C. 1857 et seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)

Sec. 15. SPECIAL STIPULATIONS.

SEE ATTACHED STIPULATIONS

FOREST SERVICE

1. The Regulatory Authority shall mean the State Regulatory Authority pursuant to a cooperative agreement approved under 30 CFR Part 745 or in the absence of a cooperative agreement, Office of Surface Mining. The authorized officer (AO) shall mean the State Director, Bureau of Land Management. The AO of the Surface Management Agency shall mean the Forest Supervisor, Forest Service. Surface Management Agency for private surface is the Bureau of Land Management. For adjoining private lands with Federal minerals and which primarily involve National Forest Service issues, the Forest Service will have the lead for environmental analysis and, when necessary, documentation in an environmental assessment or environmental impact statement.

2. The AO, of the Bureau of Land Management, Office of Surface Mining (Regulatory Authority), and the Surface Management Agency (Forest Service) respectively, shall coordinate, as practical, regulation of mining operations and associated activities on the lease area.

3. In accordance with Sec. 523(b) of the "Surface Mining Control and Reclamation Act of 1977," surface mining and reclamation operations conducted on this lease are to conform with the requirements of this Act and are subject to compliance with Office of Surface Mining Regulations, or as applicable, a Utah program equivalent approved under cooperative agreement in accordance with Sec. 523(c). The United States Government does not warrant that the entire tract will be susceptible to mining.

4. Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service Manti-LaSal National Forest.

The following stipulations pertain to the Lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on National Forest System lands.

5. Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the Lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the Lessee prior to disturbance shall immediately bring them to the attention of the appropriate authorities. Paleontological remains of significant scientific interest do not include leaves, ferns, or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

6. If there is reason to believe that Threatened or Endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

7. The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data are adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface and groundwater hydrology, vegetation and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

8. Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

9. The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major modifications to existing developments to examine alternatives and mitigate conflicts.

10. Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternative involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed, to reduce visual impacts and, where possible, achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural landforms and vegetative landscape features will be avoided.

11. The Lessee shall be required to establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

12. The Lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), Lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

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

14. In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specifically approved locations.

15. If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

16. The coal contained within, and authorized for mining under this lease, shall be extracted only by underground mining methods.

17. Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

18. In order to protect big game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other critical wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specific periods of the year.

19. Support facilities, structures, equipment, and similar developments will be removed from the lease area within 2 years after the final termination of use of such facilities. This provision shall apply unless the requirement of Section 10 of the lease form is applicable. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages re-established, and the areas returned to a premining land use.

20. The Lessee at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed, or displaced corner monuments (section corners, quarter corners, etc.) their accessories and appendages (witness trees, bearing trees, etc.), or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professional land surveyor registered in the State of Utah and to the standards and guidelines found in the Manual of Surveying Instructions, U.S. Department of Interior.

21. The Lessee, at his expense, will be responsible to replace any surface and/or developed ground water sources identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses (authorized by 36 CFR 251).

22. The Licensee/Permittee/Lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of Interior, (2) uses of all existing improvements, such as Forest Development Roads, within and outside the area licensed, permitted or leased by the Secretary of Interior, and (3) use and occupancy of the NFS not authorized by a permit/operation plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

Forest Supervisor
Manti-LaSal National Forest
599 West Price River Drive
Price, Utah 84501

Telephone No.: 435-637-2817

who is the authorized representative of the Secretary of Agriculture.

23. Notwithstanding the approval of a resource recovery and protection plan by the BLM, lessor reserves the right to seek damages against the operator/lessee in the event (I) the operator/lessee fails to achieve maximum economic recovery (MER) [as defined at 43 CFR §3480.0-5(21)] of the recoverable coal reserves or (ii) the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal.

The parties recognize that under an approved R2P2, conditions may require a modification by the operator/lessee of that plan. In the event a coal bed or portion thereof is not to be mined or is rendered unminable by the operation, the operator shall submit appropriate justification to obtain approval by the AO to leave such reserves unmined. Upon approval by the AO, such coal beds or portions thereof shall not be subject to damages as described above. Further, nothing in this section shall prevent the operator/lessee from exercising its right to relinquish all or a portion of the lease as authorized by statute and regulation.

In the event the AO determines that the R2P2 as approved will not attain MER as the result of changed conditions, the AO will give proper notice to the operator/lessee as required under applicable regulations. The AO will order a modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such an ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in the first paragraph under this section.

Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the AO that the coal reserves have been rendered unminable or at such time that the lessee has demonstrated an unwillingness to extract the coal.

The BLM may enforce this provision either by issuing a written decision requiring payment of the MMS demand for such royalties, or by issuing a notice of non-compliance. A decision or notice of non-compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law.

24. WASTE CERTIFICATION: The Lessee must provide upon abandonment, transfer of operation, assignment of rights, sealing-off a mined area and prior to lease relinquishment, certification to the lessor that, based upon a complete search of all the records for the lease and its associated mine operation(s), and upon Lessee's and the operator's knowledge of past mining operations associated with the lease, there have been no reportable quantities of hazardous substances per 40 CFR 302.4 or used oil [*as per Utah State Administrative Code R-315-15*], discharged, deposited or released within the lease, either on the surface or underground, and that all remedial actions necessary have been taken to protect human health and the environment with respect to any such substances. Lessee must additionally provide to Lessor a complete list of all hazardous substances and hazardous materials and their Chemical Abstract Services Registry Numbers, and the oil and petroleum products used or stored on, or delivered to, the lease. Such disclosure will be in addition to any other disclosure required by law or agreement.

25. UNDERGROUND INSPECTION: All safe and accessible areas shall be inspected prior to being sealed. The Lessee shall notify the AO in writing 30 days prior to the sealing of any areas in the mine and state the reason for closure. Prior to seals being put into place, the lessee shall inspect the area and document any equipment/machinery, hazardous substances, and used oil that is to be left underground. The AO may participate in this inspection. The purpose of this inspection will be: (1) to provide documentation for compliance with 42 U.S.C. 9620 section 120(h) and Utah State Administrative Code R-315-15, and to assure that certification will be meaningful at the time of lease relinquishment, (2) to document the inspection with a mine map showing location of equipment/machinery (model, type of fluid, amount remaining, batteries etc.) that is proposed to be left underground. In addition, these items will be photographed at the Lessee's expense and shall be submitted to the AO as part of the certification. The abandonment of any equipment/machinery shall be on a case by case basis and shall not be accomplished unless the AO has granted a written approval. Any on-lease disposal of non-coal waste must comply with 30 CFR § 817.89.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Utah State Office
P.O. Box 45155
Salt Lake City, UT 84145-0155

L. Merritt 6/19/02

In Reply Refer To:
3432
UTU-61049
(UT-924)

JUN 19 2002

DECISION

C.O.P. Coal Development Company	:	Coal Lease
53 West Angelo Avenue	:	UTU-61049
Salt Lake City, Utah 84115	:	

Coal Lease UTU-61049 Modified

Coal lease UTU-61049 was modified effective June 19, 2002. All terms and conditions of the original lease were made consistent with the laws, regulations, and lease terms applicable at the time of this modification.

Additional rental of $200.00 to cover the estimated additional rental for the current rental year was submitted June 17, 2002. Rental in the amount of $3.00 per acre, or a total of $6,591 is due on November 1, 2002.

Within 30 days after the effective date of this lease modification, the lessee shall amend its Bear Canyon Logical Mining Unit application to include the 160.00 acres added to coal lease UTU-61049 by this modification. The modified land shall be segregated into another Federal coal lease should the lessee fail to file such amendment.

/s/ Robert Lopez
Robert Lopez
Chief, Branch of
Minerals Adjudication

Enclosures:
1. Copy of Modified Lease (12 pp)

cc: MMS, Solids (w/copy of modification)
Resource Development Coordinating Committee (w/copy of modification)
Price Coal Office (Attn: Steve Falk) (w/copy of modification)
Manti-LaSal National Forest (w/copy of modification)
Lowell Braxton, Director, UDOGM, Box 145801, SLC, UT 84114 (w/copy of modification)
SITLA, Attn: John Blake (w/copy of modification)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial No. UTU-61049

MODIFIED COAL LEASE

Date of Lease: November 1, 1949

PART I.

THIS MODIFIED COAL LEASE is entered into on JUN 1 9 2002, by and between the **UNITED STATES OF AMERICA**, hereinafter called the Lessor, through the Bureau of Land Management, and

C.O.P. Coal Development Company
53 West Angelo Avenue
Salt Lake City, Utah 84115

hereinafter called Lessee.

This modified lease shall retain the effective date of November 1, 1949, of the original **COAL LEASE UTU-61049**, and is effective for a period of 20 years therefrom, and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of the 20th lease year (November 1, 1969), and each 10-year period thereafter.

Sec. 1. This lease is issued pursuant and subject to the terms and provisions of the: (NOTE: Check the appropriate Act or Acts.)

XX Mineral Lands Leasing Act of 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;

_ Mineral Leasing Act for Acquired Lands of 1947, 61 Stat. 913, 30 U.S.C. 351-359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessee as the holder of Coal Lease UTU-61049, issued effective November 1, 1949, was granted the exclusive right and privilege to drill for, mine, extract, remove or otherwise process and dispose of the coal deposits in, upon, or under the lands described below as Tract 1.

The Lessor in consideration of fair market value, rents and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants and leases to Lessee the exclusive right and privilege to drill for, mine, extract, remove, or otherwise process and dispose of the coal deposits in, upon, or under the lands described below as Tract 2.

Tract 1: T. 16 S., R. 7 E., SLM, UT
Sec. 1, lot 2, SWNE,W2SE;
Sec. 12, W2NE,E2W2,SE;
Sec. 13, E2, E2W2.

T. 16 S., R. 8 E., SLM, UT
Sec. 7, lots 3,4,E2SW;
Sec. 18, lots 1-4,E2,E2W2;
Sec. 19, SWNE, NWSE;
Sec. 20, SENW, NESW.

Tract 2: T. 16 S., R. 8 E., SLM, UT
Sec. 19, SENE, NESE;
Sec. 20, SWNW, NWSW.

containing 2196.09 acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

Part II. TERMS AND CONDITIONS

Sec. 1.(a) RENTAL RATE - Lessee shall pay Lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $3.00 per acre for each lease year.

(b) **RENTAL CREDITS** - Rental shall not be credited against either production or advance royalties for any year.

Sec. 2.(a) PRODUCTION ROYALTIES - The royalty shall be 8 percent of the value of the coal as set forth in the regulations. Royalties are due to Lessor the final day of the month succeeding the calendar month in which the royalty obligation accrues.

(b) **ADVANCE ROYALTIES** - Upon request by the Lessee, the authorized officer may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the Lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS - Lessee shall maintain in the proper office a lease bond in the amount of $7,000. The authorized officer may require an increase in this amount when additional coverage is determined appropriate.

Sec. 4. DILIGENCE - This lease is held by inclusion in an amendment to the Bear Canyon LMU.

The Lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. **LOGICAL MINING UNIT (LMU)** - The lands contained in the original lease have been included in the Bear Canyon LMU application UTU-73342 filed April 20, 1990. Within 30 days after the effective date of this lease modification, the Lessee shall amend its application for the Bear Canyon Logical Mining Unit to include the 160.00 acres added to Coal Lease UTU-61049 by this modification. The modified land shall be segregated into another Federal coal lease should the Lessee fail to file such an amendment.

The stipulations established in an LMU approval in effect at the time of LMU approval or modification will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION - At such times and in such form as Lessor may prescribe, Lessee shall furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all reasonable times for the inspection of any duly authorized officer of Lessor, the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee shall allow Lessor access to and copying of documents reasonably necessary to verify Lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Action (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS - Lessee shall comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee shall not conduct exploration operations, other than casual use, without an

approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area shall be submitted to the authorized officer.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee shall take measures deemed necessary by Lessor to accomplish the intent of this lease term. Such measures may include, but not limited to, modification to proposed siting or design of facilities, timing of operations, and specifications of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits not covered hereunder and approving easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of Lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8 **PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY** - Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergences; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor. Neither Lessee nor Lessee's subcontractors shall maintain segregated facilities.

Sec. 9.(a) **TRANSFERS**
(Check the appropriate space)

X This lease may be transferred in whole or in part to any person, association or corporation qualified to hold such lease interest.

___ This lease may be transferred in whole or in part to another public body, or to a person who will mine the coal on behalf of, and for the use of, the public body or to a person who for the limited purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.

___ This lease may only be transferred in whole or in part to another small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest must be approved in accordance with the regulations.

(b) **RELINQUISHMENTS** - The Lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon Lessor's acceptance of the relinquishment, Lessee shall be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. **DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC.** - At such times as all portions of this lease are returned to Lessor, Lessee shall deliver up to Lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, Lessee shall remove from the premises all

other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, shall become the property of the Lessor, but Lessee shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the Lessor. If the surface is owned by third parties, Lessor shall waive the requirement for removal, provided the third parties do not object to such waiver. Lessee shall, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by Lessee's activity or activities incidental thereto, and reclaim access roads or trail.

Sec. 11. **PROCEEDINGS IN CASE OF DEFAULT** - If Lessee fails to comply with applicable laws, existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the Lessor only by judicial proceedings. This provision shall not be construed to prevent the exercise by Lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 12. **HEIRS AND SUCCESSORS - IN-INTEREST** - Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall insure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. **INDEMNIFICATION** - Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the Lessee's activities and operations under this lease.

Sec. 14. **SPECIAL STATUTES** - This lease is subject to the Federal Water Pollution Control Act (33 U.S.C. 1151 - 1175); the Clean Air Act (42 U.S.C. 1857 et seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)

Sec. 15. **SPECIAL STIPULATIONS -**

SEE ATTACHED STIPULATIONS

SPECIAL STIPULATIONS FOR MODIFIED COAL LEASE U-61049

1. The Regulatory Authority shall mean the State Regulatory Authority pursuant to a cooperative agreement approved under 30 CFR Part 745 or in the absence of a cooperative agreement, Office of Surface Mining. The authorized officer shall mean the State Director, Bureau of Land Management. The authorized officer of the Surface Management Agency shall mean the Forest Supervisor, Forest Service. Surface Management Agency for private surface is the Bureau of Land Management. For adjoining private lands with Federal minerals and which primarily involve National Forest Service issues, the Forest Service will have the lead for environmental analysis and, when necessary, documentation in an environmental assessment or environmental impact statement.

2. The authorized officers, of the Bureau of Land Management, Office of Surface Mining (Regulatory Authority), and the Surface Management Agency (Forest Service) respectively, shall coordinate, as practical, regulation of mining operations and associated activities on the lease area.

3. In accordance with Sec. 523(b) of the "Surface Mining Control and Reclamation Act of 1977," surface mining and reclamation operations conducted on this lease are to conform with the requirements of this Act and are subject to compliance with Office of Surface Mining Regulations, or as applicable, a Utah program equivalent approved under cooperative agreement in accordance with Sec. 523(c). The United States Government does not warrant that the entire tract will be susceptible to mining.

4. Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service Manti-LaSal National Forest.

The following stipulations pertain to the lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on National Forest System lands.

5. Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the lessee prior to disturbance shall, immediately bring them to the attention of the appropriate authorities. Paleontological remains of significant scientific interest do not include leaves, ferns, or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

6. If there is reason to believe that Threatened or Endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

7. The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data are adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface and ground water hydrology, vegetation and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

8. Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

9. The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access road, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major modifications to existing developments to examine alternatives and mitigate conflicts.

10. Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternative involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed, to reduce visual impacts, and where possible achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural land forms and vegetative landscape features will be avoided.

11. The lessee shall be required to establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

12. The lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

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

14. In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specifically approved locations.

15. If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

16. The coal contained within, and authorized for mining under this lease, shall be extracted only by underground mining methods.

17. Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

18. In order to protect big game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other critical wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specific periods of the year.

19. Support facilities, structures, equipment, and similar developments will be removed from the lease area within 2 years after the final termination of use of such facilities. This provision shall apply unless the requirement of Section 10 of the lease form is applicable. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages reestablished, and the areas returned to a premining land use.

20. The Lessee at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed, or displaced corner monuments (section corners, quarter corners, etc.) their accessories and appendages (witness trees, bearing trees, etc.), or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professional land surveyor registered in the State of Utah and to the standards and guidelines found in the Manual of Surveying Instructions, U.S. Department of Interior.

21. The Lessee, at his expense, will be responsible to replace any surface and/or developed ground water sources identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses (authorized by 36 CFR 251).

22. The Licensee/Permittee/Lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of Interior, (2) uses of all existing improvements, such as Forest Development Roads, within and outside the area licensed, permitted or leased by the Secretary of Interior, and (3) use and occupancy of the NFS not authorized by a permit/operation plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

Forest Supervisor
Manti-LaSal National Forest
599 West Price River Drive
Price, Utah 84501

Telephone No.: 801-637-2817

who is the authorized representative of the Secretary of Agriculture.

23. Notwithstanding the approval of a resource recovery and protection plan by the BLM, lessor reserves the right to seek damages against the operator/lessee in the event (I) the operator/lessee fails to achieve maximum economic recovery [as defined at 43 CFR §3480.0-5(21)] of the recoverable coal reserves or (ii) the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal.

The parties recognize that under an approved R2P2, conditions may require a modification by the operator/lessee of that plan. In the event a coal bed or portion thereof is not to be mined or is rendered unminable by the operation, the operator shall submit appropriate justification to obtain approval by the AO to leave such reserves unmined. Upon approval by the AO, such coal beds or portions thereof shall not be subject to damages as described above. Further, nothing in this section shall prevent the operator/lessee from exercising its right to relinquish all or a portion of the lease as authorized by statute and regulation.

In the event the AO determines that the R2P2 as approved will not attain MER as the result of changed conditions, the AO will give proper notice to the operator/lessee as required under applicable regulations. The AO will order a modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such an ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in the first paragraph under this section.

Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the AO that the coal reserves have been rendered unminable or at such time that the lessee has demonstrated an unwillingness to extract the coal.

The BLM may enforce this provision either by issuing a written decision requiring payment of the MMS demand for such royalties, or by issuing a notice of non-compliance. A decision or notice of non-compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law.

24. WASTE CERTIFICATION: The lessee shall provide upon abandonment and/or sealing off a mined area and prior to lease termination/relinquishment, certification to the lessor that, based upon a complete search of all the operator's records for the mine and upon their knowledge of past operations, there has been no **hazardous substances** per (40 CFR 302.4) or **used oil** as per Utah State Management Rule R-315-15, deposited within the lease, either on the surface or underground, or that all remedial action necessary has been taken to protect human health and the environment with respect to any such substances remaining on the property. The back-up documentation to be provided shall be described by the lessor prior to the first certification and shall include all documentation applicable to the Emergency Planning and Community Right-to-know Act (EPCRA, Public Law 99-499), Title III of the Superfund Amendments and Reauthorization Act of 1986 or equivalent.

25. UNDERGROUND INSPECTION: All safe and accessible areas shall be inspected prior to being sealed. The lessee shall notify the Authorized Officer in writing 30 days prior to the sealing of any areas in the mine and state the reason for closure. Prior to seals being put into place, the lessee shall inspect the area and document any equipment/machinery, hazardous substances, and used oil that is to be left underground. The Authorized Officer may participate in this inspection. The purpose of this inspection will be: (1) to provide documentation for compliance with 42 U.S.C. 9620 section 120(h) and State Management Rule R-315-15, and to assure that certification will be meaningful at the time of lease relinquishment, (2) to document the inspection with a mine map showing location of equipment/machinery (model, type of fluid, amount remaining, batteries etc.) that is proposed to be left underground. In addition, these items will be photographed at the lessee's expense and shall be submitted to the Authorized Officer as part of the certification. The abandonment of any equipment/machinery shall be on a case by case basis and shall not be accomplished unless the Authorized Officer has granted a written approval. Any on-lease disposal of non-coal waste must comply with 30 CFR § 817.89.

26. Due to the uncertainty of the amount of recoverable coal tons in this modification and the uncertainty in mining conditions, the lessee will pay the fair market value (FMV) for the coal resources mined in the area of Federal Coal Lease Modification (U-61049) at the rate of $0.25 per ton for the actual tonnage mined. Payment of FMV at the specified rate and tonnage mined will be on the schedule required for payment of production royalties to the Minerals Management Service (MMS). The lessee will clearly indicate which portion of the payment is for royalty and what is for lease bonus payment.

The United States of America

C.O.P. COAL DEVELOPMENT COMPANY
Company or Lessee Name

(Signature of Lessee)

PRESIDENT
(Title)

6-8-2002
(Date)

Bureau of Land Management
Utah State Office

By

(Signing Officer)

Chief, Branch of
Minerals Adjudication
Title)

JUN 1 9 2002
(Date)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

United States Department of Agriculture
Forest Service
Manti-La Sal National Forest
Supervisor's Office
599 West Price River Drive
Price, UT 84501
Phone # (435) 637-2817
Fax# (435) 637-4940

UTAH STATE OFFICE
STATE DIRECTOR'S OFFICE

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/	LND MIN		
	SUP SVC		

File Code: 2820-4
Date: July 31, 2001

Sally Wisely
State Director
USDI - Bureau of Land Management, Utah State Office
P. O. Box 45155
Salt Lake City, UT 84145-0155

Dear Sally:

The Manti-La Sal National Forest has evaluated an application for modification of Federal Coal Leases U-38727 and U-61049, submitted to the Utah State Office of the Bureau of Land Management (BLM) by Co-op Mining Company on behalf of COP Coal Development Company. The proposal involves adding 40.0 acres to lease U-38727 and 160.0 acres to lease U-61049. The lease modification areas lie on National Forest System lands administered by the Manti-La Sal National Forest in Emery County, Utah.

I have decided to consent to the modification of Federal Coal Leases U-38727 and U-61049 by the BLM. The modifications areas would be subject to the lease terms, conditions, and stipulations contained in leases U-38727 and U-61049. This decision does not approve mining that would cause subsidence or surface disturbance. A copy of the Decision Memo is enclosed.

Please contact Dale Harber at (435) 637-2817 if you have any questions.

Sincerely,

ELAINE J. ZIEROTH
Forest Supervisor

RECEIVED
AUG 3 2001
Bureau of
Land Management

Decision Memo

COP Coal Development Company
Modification of Federal Coal Leases U-38727 and U-61049
Bear Canyon Mine

USDA-Forest Service, Intermountain Region
Manti-La Sal National Forest
Ferron-Price Ranger District
Emery County, Utah

I. INTRODUCTION

The Manti-La Sal National Forest has evaluated an application for modification of Federal Coal Leases U-38727 and U-61049, submitted to the Utah State Office of the Bureau of Land Management (BLM) by Co-op Mining Company on behalf of COP Coal Development Company. The proposal involves adding 40.0 acres to lease U-38727 and 160.0 acres to lease U-61049. The lease modification areas lie on National Forest System lands administered by the Manti-La Sal National Forest in Emery County, Utah, as follows (see attached map):

Lease U-38727

T. 16 S., R. 7 E., SLM, Emery County, Utah
Section 24, NE4NE4

Lease U-61049

T. 16 S., R. 8 E., SLM, Emery County, Utah
Section 19, SE4NE4, NE4SE4, and
Section 20, SW4NW4, NW4SW4

These areas are completely encompassed by the Logical Mining Unit for the COP Coal Development Company's Bear Canyon Mine. Approval of Co-op's application would involve adding these two parcels to the current leases, subject to lease stipulations already contained in the existing leases, including those to prevent subsidence of escarpments unless specifically approved. Federal Coal Leases U-38727 and U-61049 are included in the permit area for the Bear Canyon Mine and have been approved for mining.

II. Decision

I have decided to consent to the modification of Federal Coal Leases U-38727 and U-61049 by the BLM. The modification area would be subject to the lease terms, conditions, and stipulations contained in leases U-38727 and U-61049. This decision does not approve mining that would cause subsidence or surface disturbance.

III. Decision Rationale

This decision was made after careful consideration of the proposal, public involvement, and the entirety of the supporting record. No one fact or single piece of information led to the decision; a combination of factors contributed to it. The key considerations are discussed in the following sub-parts.

Purpose and Need:

The general purpose and need for this project is to accomplish the following goal of the Forest Plan: "Provide appropriate opportunities for and manage activities related to locating, leasing, development, and production of mineral and energy resources." (Forest Plan, p. III-4.) Another related goal of the Forest Plan is: "Manage geologic resources, common variety minerals, ground water, and underground spaces (surficial deposits, bedrock, structures, and processes) to meet resource needs and minimize adverse effects."

The project-specific purpose and need of the proposed action is to permit mining of coal reserves encompassed by existing leases, while protecting natural resources of the National Forest consistent with Forest Service policy and Forest Plan direction. If these coal reserves are not mined as a part of the current mining operations, they will be uneconomic for future mining and will be lost forever as an energy resource.

This decision wholly meets the project's purpose and need.

Absence of Extraordinary Circumstances:

Existing resource conditions and potential extraordinary circumstances have been considered in making this decision.

Steep slopes or highly erosive slopes. The proposed lease modification would not authorize mining that would cause subsidence of escarpments or surface disturbance.

Threatened and endangered species or their critical habitat. There will be no impact to surface resources, so there will be no impact to either threatened and endangered species or their habitat. The supporting *Biological Evaluation and Assessment* is available for review in the project file.

Floodplains, wetlands, or municipal watersheds. There will be no impact to surface resources, so there will be no impact to floodplains, wetlands, or municipal watersheds.

Congressionally designated areas, such as wilderness, wilderness study areas, or National Recreation Areas. There are no wilderness, wilderness study areas, or National Recreation Areas in or around the proposed lease modification area. The nearest wilderness area is the Nebo Wilderness located on the Uinta National Forest approximately 42 miles to the northwest.

Inventoried roadless areas. The proposed lease modification area is not within an inventoried roadless area or an unroaded area contiguous to an inventoried roadless area.

Research Natural Areas. The proposed lease modification area is not located within any Research Natural Areas (RNAs). The nearest RNAs are Nelson Mountain, west of

Ferron, Utah, and Elk Knoll in Manti Canyon. The Mont Lewis Botanical Area is located approximately 10 miles to the northwest.

Native American religious or cultural sites, archaeological sites, or historic properties or areas. Because there will be no subsidence or surface disturbance, professional archaeological staff have determined that the project does not have the potential to affect cultural or historic sites. A cultural resources survey will be required if surface disturbing activities are proposed in the future.

Relationship to Public Involvement:

Public comments were sought and considered throughout the planning process for this project. One letter was received. The North Emery Water Users Association is concerned that mining around Birch Spring could impact their water sources. They feel that monitoring is necessary and that precautions be taken to protect water quality and quantity, and that it is the responsibility of the mining company to prove that mining will not have a negative impact on the spring.

Baseline data have been collected on surface and ground water in the lease area, and monitoring (including Birch Spring) is conducted quarterly. The lessee is also responsible to replace any surface or developed ground water sources that may be lost or adversely affected by mining.

It is my determination that this decision may be categorically excluded from preparation of an Environmental Assessment or Environmental Impact Statement under Forest Service Handbook 1909.15, Chapter 30, Section 31.1b(7): "Sale or exchange of land or interest in land and resources where resulting land uses remain essentially the same." This category was determined appropriate because no impacts to surface resources or hydrology are anticipated and surface uses would remain essentially the same.

The application, as submitted, and the stipulations in Federal Coal Leases U-38727 and U-61049, would provide adequate protection of Forest resources. There is no need for additional terms and conditions for the protection of Forest resources. The proposal is consistent with all Forest Plan requirements.

IV. Public Involvement

Legal notices describing the proposal and requesting issues or comments were published in the *Sun Advccate* newspaper (Price, Utah) on June 14, 2001, and in the *Emery County Progress* newspaper on June 19, 2001. Letters describing the proposal and requesting issues and comments were mailed to organizations and individuals on the NEPA mailing list who have expressed an interest in this type of proposal on June 22, 2001. One response was received, as described in the Decision Rationale section above. The proposal was also listed in the quarterly Schedule of Proposed Actions on July 9, 2001, which is mailed to organizations and individuals who have expressed an interest, and is also available on the Internet.

V. Findings Required by other Laws and Regulations

To the best of my knowledge, this decision complies with all applicable laws and regulations. In the following, the association of the decision to some pertinent legal requirements are summarized.

National Forest Management Act of 1976:

The Forest Plan was approved November 5, 1986, as required by this Act. This long-range land and resource management plan provides guidance for all resource management activities on the Forest. The National Forest Management Act requires all projects and activities to be consistent with the Forest Plan. The Forest Plan has been reviewed in consideration of this proposal. The decision will be consistent with the Forest Plan.

The proposed lease modification area contains lands defined in the Forest Plan as Range and General Winter Range Management Units. The emphasis in Range units is on forage production for wildlife and livestock, but allows mineral activities as long as livestock access and use is maintained. The emphasis in General Winter Range units is on providing general big-game winter range. The general direction is to "Modify, delay, or deny mineral leasing, exploration, and/or surface occupancy, where applicable, if they cause unacceptable stress on big game or unmitigated damage to their habitat." General direction is to prohibit activities during critical periods of big-game use, and that approved activities must be short-term and prompt reclamation must be assured. Because there will be no surface impacts, there will be no impacts to either big-game or their habitat.

Mineral Leasing Act of 1920, as amended:

The Bureau of Land Management has authority under this act to lease Federal coal reserves and to administer the leases, including issuance of non-competitive lease modifications that do not exceed 160 acres per lease.

Coal Leasing Amendment Act of 1975:

Forest Service consent to approval of mining operations by the Bureau of Land Management (including conditions for the protection of non-coal resources) is required under this act. Approval of this decision memo constitutes my consent to the BLM.

Surface Mining Control and Reclamation Act of 1977 (SMCRA):

This act gives the Department of the Interior, Office of Surface Mining Reclamation and Enforcement (OSM), primary responsibility to administer programs that regulate surface coal mining operations and the surface effects of underground coal mining operations. Pursuant to sections 503 and 523 of SMCRA, under the oversight of the OSM, the Utah Division of Oil, Gas and Mining regulates surface coal mining and the surface effects of underground coal mining on Federal and non-Federal lands within the State of Utah. On National Forest System lands, consent must be obtained from the Forest Service; the surface management agency, prior to approval of mining activities, including exploration drilling. Approval of this decision document and transmittal to the Utah State Director of the BLM constitutes my consent for approval of the mine permit amendment. The BLM is a joint agency, and OSM a cooperating agency, in preparation of this document.

National Historic Preservation Act:

This mine permit amendment will not result in any impacts to cultural or historic resources.

Endangered Species Act:

The Biological Assessment/Biological Evaluation (on file in the project report) has disclosed that this mine permit amendment will not result in impacts to threatened, endangered, or sensitive plant or animal species. Therefore the Forest Biologist determined there is no need to further evaluate threatened, endangered, or sensitive plant or animal species.

National Environmental Policy Act:

The entirety of documentation for this project supports that the project analysis complies with this Act.

Executive Order 12898:

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and Departmental Regulation 5600-2, direct federal agencies to integrate environmental justice considerations into federal programs and activities. Environmental justice means that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by, government programs and activities affecting human health or the environment. My decision is consistent with this Order. My decision sought and incorporated public involvement. My decision will not have a discernible effect on minorities, American Indians, or women, or the civil rights of any United States citizen. Nor will it have a disproportionate adverse impact on minorities or low-income individuals.

VI. Implementation Date and Appeal Opportunity

My decision may be implemented upon transmittal of this Decision Memo and consent letter to the Utah State Director of the BLM.

This decision is not subject to appeal by the public in accordance with the Code of Federal Regulations, Title 36, part 215.

This decision is subject to appeal by the applicant under Code of Federal Regulations, Title 36, part 251.

VII. Contact Person

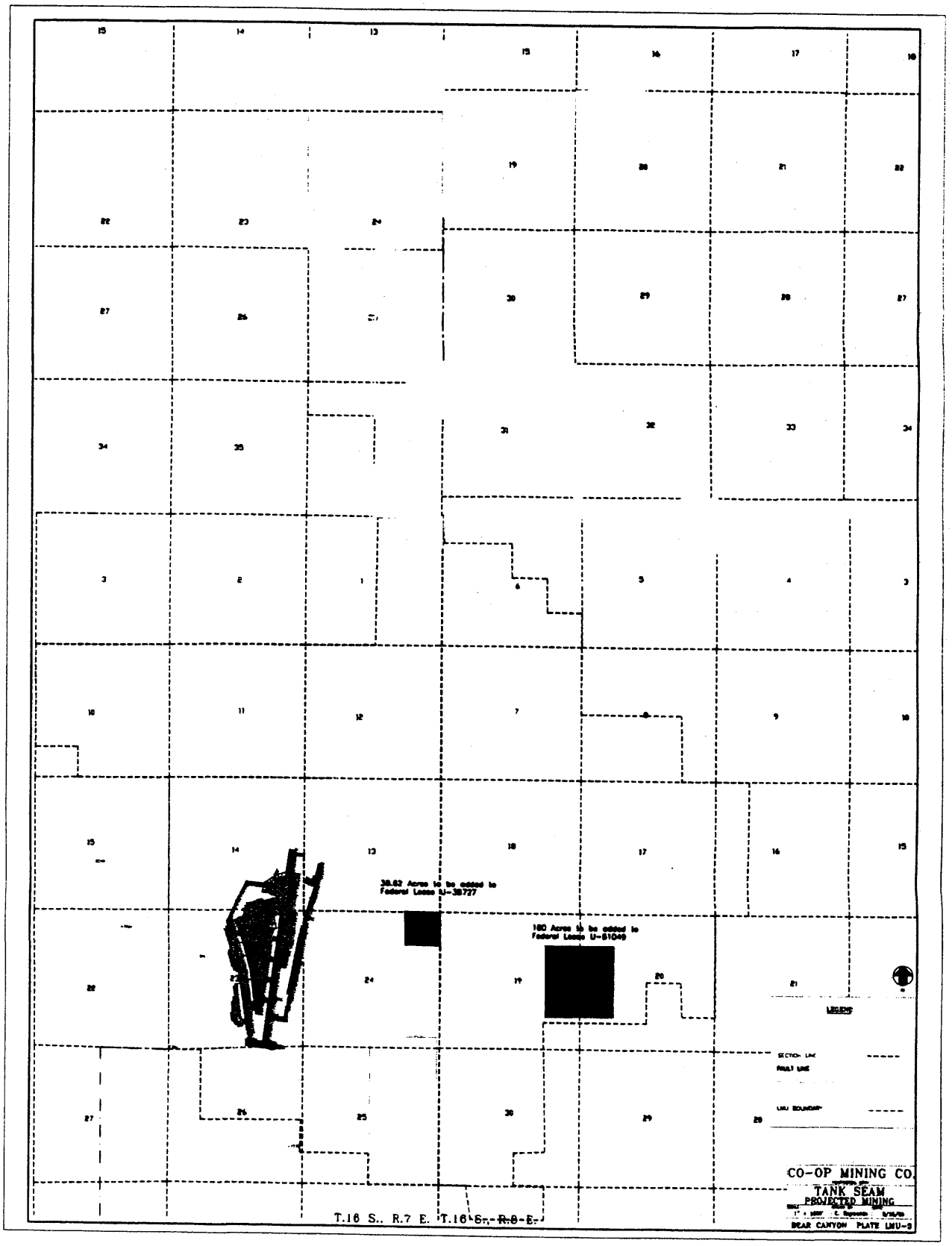
For additional information concerning the Forest Service decision, please contact Dale Harber at the USDA-Forest Service, Manti-La Sal National Forest (address: 599 West Price River Drive, Price, Utah 84501; telephone: 435-637-2817).

VIII. Signature and Date

Elaine J. Zieroth — July 31, 2001

ELAINE J. ZIEROTH
Forest Supervisor
Manti-La Sal National Forest

Date


38.62 Acres to be added to Federal Lease U-38727
160 Acres to be added to Federal Lease U-61049
LEGEND
SECTION LINE
FAULT LINE
LEASE BOUNDARY
T.16 S., R.7 E.
T.16 S., R.8 E.
CO-OP MINING CO.
TANK SEAM
PROJECTED MINING
BEAR CANYON PLATE LMU-3

United States Department of Agriculture

Forest Service

Manti-La Sal National Forest

Supervisor's Office
599 West Price River Drive
Price, UT 84501
Phone # (435) 637-2817
Fax # (435) 637-4940

UTAH STATE OFFICE
STATE DIRECTOR'S OFFICE

RT	OFFICE	INITIAL	DATE
	[redacted]		
	[redacted]		
	[redacted]		
	EA		
	EEO		
	NAT RES		
/	LND MIN		
	SUP SVC		

File Code: 2820-4
Date: July 16, 2002

L-187-LM
due: 8/17

Sally Wisely
Bureau of Land Management
Utah State Office
324 South State Street
P.O. Box 45155
Salt Lake City, UT 84145-0155

Dear Ms. Wisely:

We have received notice from your office that Federal Coal Leases SL-025431, ~~U-61048,~~ and U-06039 are subject to readjustment in 2003.

We reviewed our lease files and have determined that the current NEPA documentation is adequate for readjustment of these leases. The subject leases contain all necessary Forest Service Special Coal Lease Stipulations. The only change needed is to update the stipulations for clarification of intent consistent with post-Forest Plan agreements with local water users, the lessees, and BLM. Enclosed is a copy of the stipulations with the updated wording.

The proposed wording changes would not cause inconsistencies with current Mining and Reclamation Plans.

If you have any questions, contact Carter Reed or Aaron Howe at the Forest Supervisor's Office in Price, Utah.

Sincerely,

for Aaron L Howe

ELAINE J. ZIEROTH
Forest Supervisor

Enclosure

cc:
Regional Forester, Intermountain Region
D-2/3

DECISION NOTICE
AND
FINDING OF NO SIGNIFICANT IMPACT
FOR THE READJUSTMENT OF
FEDERAL COAL LEASE U-61049

PRICE RANGER DISTRICT
MANTI-LASAL NATIONAL FOREST
EMERY COUNTY, UTAH

On Novemver 5, 1987 the Forest Service received notification from the Bureau of Land Management that Federal Coal Lease U-61049 would be subject to readjustment of terms and conditions on November 1, 1989. This notification required conducting an environmental analysis of the proposed action pursuant to the National Environmental Policy Act of 1969. A Forest Service Interdisciplinary (ID) Team met on January 9, 1989 to evaluate the proposal.

Leasing and development will be under the authority of the following authorizing actions: The Mineral Leasing Act of February 25, 1920, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; the Surface Mining Control and Reclamation Act (SMCRA) of 1977; The Multiple Minerals Development Act of August 4, 1977; the National Environmental Policy Act (NEPA) of 1969; the Federal Coal Leasing Amendments Act of 1976, as amended; regulations: Title 43 CFR Group 3400, Group 2800, and Title 30 CFR Group 700; and the Manti-LaSal National Forest Land and Resource Management Plan (Forest Plan) and Final Environmental Impact Statement (FEIS), 1986.

An Environmental Assessment (EA) was prepared under the direction of the Manti-LaSal National Forest Supervisor. Based on the analysis presented in this EA, it is our decision to consent to approval of the proposed readjustment subject to the application of stipulations in Appendix A of the EA for those lands within the lease having federal surface ownership. Alternative Three, as described in the EA, is a viable alternative under existing legislation and Forest Service policy, management decisions, and direction. The No Action Alternative (Alternative 1) was evaluated and determined not to be viable as it would allow continuation of the lease under terms inconsistent with the Forest Plan and FEIS. Alternative Two was evaluated and determined not to be viable as the private surface owner Intermountain Power Agency (I.P.A.) did not indicate that environmental protection stipulations be applied to their land surface.

This is not a major Federal action that would significantly affect the quality of the human environment; therefore, an Environmental Impact Statement is not needed. This determination was made considering the following factors:

1. No new surface disturbing operations or facilities are proposed at this time. If surface disturbing operations or facilities are proposed in the future, a site-specific environmental assessment will be prepared at that time. Additional stipulations may be specified as needed to protect the environment.

2. The identified impacts, including cumulative effects, can be effectively mitigated to an acceptable level.

3. No known prime or unique farmlands, wetlands, timber lands, or rangelands; floodplains; alluvial valley floors; paleontological or cultural resources; nor Threatened, Endangered, or Sensitive floral or faunal species will be impacted by readjustment of this lease.

4. Readjustment of this lease is consistent with the directions and decisions of the Forest Plan and FEIS, dated November 5, 1986.

Based on this assessment and evaluation, Federal Coal Lease U-61049 should be readjusted by the Bureau of Land Management and shall include the stipulations listed in Appendix A of the EA for those lands having federal surface ownership. This decision may be implemented immediately.

This decision is subject to appeal pursuant to 36 CFR 217. A notice of appeal must be filed with the Chief, Forest Service-USDA, P.O. Box 2417, Washington, D.C. 20013, with a simutaneous copy to the Deciding Officer at the address below within 45 days of the date of this decision, and contain specific information as required by 36 CFR 217.9.

J.S. Tixier
Regional Forester
Intermountain Region
Federal Building
324 25th Street
Ogden, Utah 84401

Date

ENVIRONMENTAL ASSESSMENT
FOR THE READJUSTMENT OF
FEDERAL COAL LEASE U-61049

PRICE RANGER DISTRICT
MANTI-LASAL NATIONAL FOREST
EMERY COUNTY, UTAH

Responsible Official: J.S. Tixier
Regional Forester
Intermountain Region (R-4)
USDA - Forest Service
Federal Building
324 25th Street
Ogden, Utah 84401

For Further Information Contact: George Morris
Forest Supervisor
Manti-LaSal National Forest
599 West Price River Dr.
Price, Utah 84501

or: Ira W. Hatch
District Ranger
Price Ranger District
599 West Price River Dr.
Price, Utah 84501

ENVIRONMENTAL ASSESSMENT
FOR THE READJUSTMENT OF
FEDERAL COAL LEASE U-61049

I. INTRODUCTION

A. Purpose and Need for Action

The Bureau of Land Management (BLM) notified the Forest Service on November 5, 1987, that Federal Coal Lease U-61049, currently leased to Intermountain Power Agency, would be subject to readjustment of terms and conditions on November 1, 1989. As the surface managing agency for most of this lease area, the Manti-LaSal National Forest is responsible for conducting an Environmental Assessment (EA) of the proposed action pursuant to the National Environmental Policy Act (NEPA) of 1969. This EA will address the proposed readjustment and identify management requirements for resource protection of lands within Federal Coal Lease U-61049.

B. Authorizing Actions

Leasing and development will be under the authority of the following authorizing actions: The Mineral Leasing Act of February 25, 1920, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; the Surface Mining Control and Reclamation Act (SMCRA) of 1977; the Multiple Minerals Development Act of August 4, 1977; the Federal Coal Leasing Amendments Act of 1976, as amended; regulations: Title 43 CFR Group 3400, Group 2800, and Title 30 CFR Group 700; and the Manti-LaSal National Forest Land and Resource Management Plan (Forest Plan) and Final Environmental Impact Statement (FEIS), 1986.

C. Land Description

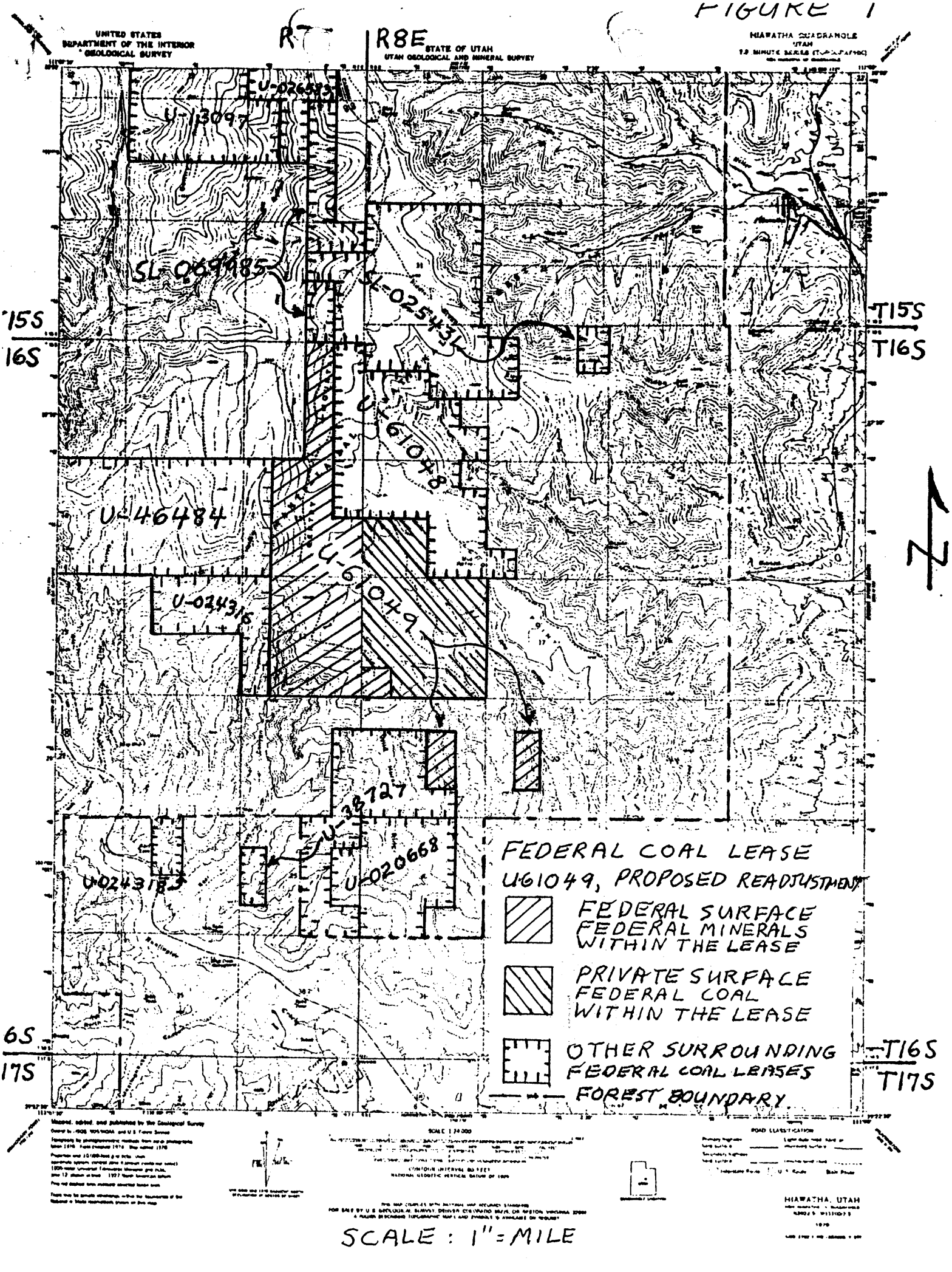
Federal Coal Lease U-61049 is located in Emery County, Utah, within the Manti-LaSal National Forest, Price Ranger District. It lies on Gentry Mountain approximately 3 miles west of Mohrland, Utah (see Figure 1). Except as indicated below, the lease is mostly Federal surface/Federal minerals and is legally described as follows:

T. 16 S., R. 7 E., SLM, Utah
Sec. 1, lot 2, SW/4 NE/4, W/2 SE/4;
Sec. 12, W/2 NE/4, E/2 W/2, SE/4;
Sec. 13, E/2, E/2 W/2.

T. 16 S., R. 8 E., SLM, Utah
Sec. 7, lots 3 and 4, E/2 SW/4; (all private surface-Federal coal)
Sec. 18, lots 1-4, E/2, E/2 W/2;(all except Lot 4, private surface-Federal coal)
Sec. 19, SW/4 NE/4, NW/4 SE/4;
Sec. 20, SE/4 NW/4, NE/4 SW/4.

Containing 2,036.09 acres

FIGURE 1


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
R7
R8E
STATE OF UTAH
UTAH GEOLOGICAL AND MINERAL SURVEY
HIAWATHA QUADRANGLE
UTAH
U-026595
U-13097
SL-069485
U-025435
U-61048
U-46484
U-61049
U-024316
U-38127
U-020668
U-024318
T15S
T16S
T17S
FEDERAL COAL LEASE
U61049, PROPOSED READJUSTMENT
FEDERAL SURFACE
FEDERAL MINERALS
WITHIN THE LEASE
PRIVATE SURFACE
FEDERAL COAL
WITHIN THE LEASE
OTHER SURROUNDING
FEDERAL COAL LEASES
FOREST BOUNDARY
HIAWATHA, UTAH
SCALE : 1" = MILE

D. Background

The coal lands currently encompassed by the subject lease were initially contained within Federal Coal Lease SL-069985 which was issued to United States Fuel Company on November 1, 1949, and originally contained 2,436.9 acres. On September 12, 1958, U.S. Fuels relinquished 80.81 acres in the SE/4 SW/4 Section 1 and the NE/4 NE/4 Section 24, T16S, R7E, SLM, Utah. On October 1, 1986, the BLM approved a partial assignment of all but 320 acres of the leased lands to Intermountain Power Agency. The partial assignment created a new lease containing 2,036.09 acres which the BLM assigned Serial Number U-61049.

E. Mine Development

The coal lands currently within lease U-61049 were originally contained in lease SL-069985 held by U.S. Fuels. Only the "B" Seam (uppermost) has been mined between 1950 and 1979 in the northernmost portion of U-61049. Two other seams (Hiawatha and "A" Seams) are considered to be mineable within the northern portion of the lease but the three seams are thought to merge in the southern portions of U-61049. Under their original mining and reclamation plan application of March, 1981, U.S. Fuels developed a mining scenario for all of the parent lease lands which included room-and-pillar mining methods using the King portals to the east.

Their application was later amended to exclude that portion of SL-069985 assigned as U-61049 to Intermountain Power Agency (I.P.A.), hence the approved permit excludes the subject lease lands. I.P.A. has not yet filed an application for a mining and reclamation plan for the subject lands, but two possible scenarios could be developed according to Bob Eccli, Mine Engineer for U.S. Fuels (personal communication, January 1989). The subject lands could be mined by U.S. Fuels under contract to I.P.A. using King Mine surface facilities to the east or, I.P.A. could mine the subject lease lands from their Mohrland Mine portals to the east. In either case, a new or amended mining permit would be required which would specify future mine development.

F. Issues and Concerns

General public comments were solicited through local newspapers on January 17, 1989. Specific comments on the proposed action were solicited by letter directly to individuals or groups interested in Forest Management (see listing in Section V Part B). Comments were received from the Utah Division of Wildlife Resources (DWR). Issues addressed by DWR have been identified by the Forest Service Interdisciplinary (ID) Team and are stated in item (2) below. DWR's letter to the Forest Service is included in this document as Appendix B. Bill Engles, I.P.A. representative related through personal communications (3/15/89 - to later be followed by letter) that his company would not be interested in the application of Forest Service stipulations to that portion of the lease that was privately owned by IPA.

The Forest Service ID Team identified the following management concerns:

1. Surface disturbing activities and facilities if proposed and approved could adversely affect area resources.

2. Underground mining and subsidence could adversely affect surface and ground water, soils, vegetation, and wildlife.

G. Negative Declaration

The ID Team determined that this action, after mitigation, would cause no impacts on the following: prime or unique rangelands, wetlands, timberlands, or farmlands; floodplains; known cultural or paleontological resources; alluvial valley floors; known Threatened, Endangered, or Sensitive plant or animal species.

II. DESCRIPTION OF ALTERNATIVES

A. No Action Alternative - Alternative One

Consideration of the "No Action" alternative is required by Federal Regulations contained in 43CFR 1502.14(d). Under this alternative, the terms of the lease would not be changed.

Department of Interior Regulation 43 CFR 3451.1(a) (1) Federal Coal Management Regulations require that all leases issued prior to August 4, 1976, be subject to readjustment at the end of the current 20-year period and at the end of each 10-year period (under which this lease qualifies), thereafter. The present lease terms do not minimize the impact to the surface resources to an acceptable level pursuant to the Forest Plan, and new management requirements are needed.

B. Proposed Action with Application of Forest Service Special Stipulations on all Lease Lands - Alternative Two

Department of Interior Regulations 43 CFR 3400.3-1 pertaining to Coal Management make provision for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. Most of the lands contained within this lease are managed by the United States Department of Agriculture, Forest Service, Manti-LaSal National Forest. Other lands as indicated on Map 1 are owned and managed by I.P.A. Under this alternative, readjustment of the lease terms would be conditioned upon the adoption of Forest Service management constraints by the BLM and I.P.A. These constraints are in the form of stipulations included in this document as Appendix A.

C. Proposed Action with Application of Forest Service Special Stipulations on Lease Lands Exclusive of Privately Owned Surface - Alternative Three

This alternative is essentially the same as Alternative Two with the exception that special F.S. stipulations would not be applied to those surface lands owned and managed by I.P.A. Specific comments were solicited by F.S. letter to I.P.A. dated January 11, 1989. Written Agreement by I.P.A. must be granted to apply the surface protection stipulations to surface lands owned by I.P.A. within the subject lease. Bill Engles, I.P.A. representative related through personal communications (3/15/89 - to later be followed by letter) that his company would not be interested in the application of Forest Service stipulations to that portion of the lease that was privately owned by I.P.A.

III. AFFECTED ENVIRONMENT

The affected environment of the subject areas has been generally described in numerous environmental documents and resource reports (especially U.S. Fuels Mining and Reclamation Plan) prepared for coal leasing, exploration and development in this and surrounding areas. These documents are listed for reference in Section VI, Selected Tiering and Reference Documents. There are several resources on the lease for which concern was identified. These resources are essentially unique to the proposal and are under consideration in this document.

A. Topography

The lease area is located in the south central portion of Gentry Mountain. Elevations range from 7,600 feet to 9700 feet above sea level. The lease is largely situated along the flat-lying portion of Gentry Mountain with the southern portion extending to the Wild Horse Ridge area. Slopes in the lease area vary from 50 percent or more in the Wild Horse Ridge area to nearly flat on the mountain top. The area is incised by the Bear Canyon and Fish Creek drainages and other intermittent streams. Local geologic formations exhibit varying degrees of resistance to erosion which result in the characteristic "stair-step" appearance of the slopes especially in the southern portion of the lease.

B. Geology

The lease area is located within the east-central portion of the Wasatch Plateau. The Wasatch Plateau is considered to be a transitional zone between the Basin and Range Physiographic Province to the west and the Colorado Plateau Physiographic Province to the east. The Wasatch Plateau exhibits geologic characteristics of both provinces.

Rock strata in the region are of sedimentary origin and represent deposition in diverse environments during late Cretaceous and early Tertiary time. The strata are nearly horizontal beds of sandstone, shale and limestone which make up the following units (in ascending order): Mancos Shale, Star Point Sandstone, Blackhawk Formation,

Castlegate Sandstone, Price River Formation, North Horn Formation and Flagstaff Limestone. The strata dip about five to eight degrees to the southwest.

There are three coal beds considered to be mineable within the lease, all of which are located in the Blackhawk Formation. These beds, in ascending order are the Hiawatha Seam, the "A" Seam and the "B" Seam. The Hiawatha Seam is situated at or near the contact of the Blackhawk Formation and Starpoint Sandstone. Separation between these seams varies from 0 feet to greater than 50 feet. These seams are thought to merge into one thick seam on the southern portion of the lease area.

Several minor faults associated with the Pleasant Valley and Joes Valley Fault Zones are present in the general area. The Bear Canyon Fault is the only major fault occurring in the vicinity and effectively forms the western boundary of the lease area. Mass movement (rock falls, slumps, soil creep, etc.) is a major consideration on the southwestern and southeastern corners of the lease area. The slumps and slides typically occur in the Price River and North Horn Formations, while rock falls typically occur in the Star Point and Castlegate Sandstones.

C. Ground Water

Ground water within the lease and adjacent areas is generally of good quality. The available data on groundwater occurrence in this area is insufficient to provide definite predictions. Studies by Vaughn Hansen Associates and U.S. Fuels on lease areas in the general vicinity indicate that ground water may exist in two distinct "regimes". (1) Within the Blackhawk Formation ground water is believed to occur in a number of perched aquifers. (2) A regional water table is believed to be associated with the Star Point Sandstone; occurring either at the Blackhawk-Star Point contact or within the Star Point itself.

Aquifers within the Blackhawk and Price River Formations have similar characteristics. Locally these units contain sand lenses or channels which provide good aquifer characteristics. However, regionally these aquifers are discontinuous and recharge is limited to a relatively small area. As a result, low discharge rates are frequently encountered. The Castlegate Sandstone and the North Horn Formation provide a more continuous and widespread aquifer and are known to yield significant amounts of water in the general area.

Generally, ground water movement is controlled by geologic structure and is in the direction of the dip of the rock strata. Faults and fractures may enhance ground water conditions by channeling ground water flow. Many seeps and springs surface along these faults or associated sympathetic joints and others are closely associated with lithologic contacts, where there is a change in permeability. Substantial water flows associated with the Bear Canyon Fault have been encountered in mine workings near the lease.

D. Soils

An order 3 intensity soil survey has been conducted over the lease area. In general this information shows that most of the soils are moderately deep to deep silty clay loams over limestone bedrock. The topsoil characteristics are fairly good for revegetation. Some problems could be expected in the more steeply sloping areas of the lease tract.

Any surface disturbing activity proposed on the lease tract would require an on-site evaluation and EA. Specific mitigations to potential impacts would be addressed at that time. It is not anticipated that any significant effects would occur to the soil resource that could not be reasonably mitigated.

E. Climate

The climate of the lease area is generally cool and dry. Precipitation and temperature may vary with elevation. Storage rain gages at similar elevations in Joes Valley average 14.6 inches at valley stations to 19 inches on ridges. Most of the precipitation, approximately two-thirds, comes in the form of snow during the months of October through April. The maximum snow accumulation occurs about the first of March each year. Snow depths average about 27 inches. Snow accumulation varies considerably with local topography. The eastern sides of ridges and the north-facing slopes accumulate the most snow. South-facing slopes are snow-free for much of the winter.

The thermal characteristics vary with elevation. Mean annual temperatures vary from 43.5 degrees Fahrenheit in the bottom of Bear Canyon to 32 degrees Fahrenheit on Wild Horse Ridge to the south. The annual frost-free periods for these same sites are 100 days and 40 days respectively. Mean maximum and minimum temperatures for January are 28 degrees Fahrenheit and 18 degrees Fahrenheit respectively. Mean maximum and minimum temperatures for July are 84 degrees Fahrenheit and 52 degrees Fahrenheit respectively.

F. Surface Hydrology

Surface drainages from coal lease tract U-61049 all drain to the west to Huntington Creek through three different drainages; McCadden Hollow, Bear Creek and Fish Creek, all three drainages are intermittent within the lease area. Run-off into Fish Creek is primarily from privately owned surface. Surface disturbing activities associated with coal mining could cause an increase in sediment to these drainage systems. The probable effect is not considered significant so long as proper mitigating measures are applied. Subsidence as a result of coal mining could disrupt the surfacewater regime. The issue is addressed under stipulations for leasing and mining.

G. Wildlife and Fish

Deer and Elk utilize the area of Lease U-61049 for summer range. The area may be used for calving and fawning in the Spring.

The diversity of vegetative types on the lease supports a diverse wildlife population. Besides deer and elk, other game and furbearing species may include: black bear, cougar, bobcat, red fox, grey fox, badger, coyote, snowshoe hare, and an occasional moose may be seen. Avifauna of the area may include several species of hawk, owl, eagle, jay and sparrow. Because of the diversity of habitat components, there are probably many small mammals and songbirds found on the lease which are too numerous to list in detail in this report.

There are no fisheries within the lease area. The lease area does drain into Huntington Creek which is considered a valuable fishery.

The American Bald Eagle is the only known Endangered animal species that may inhabit the area. Bald Eagles are known to winter throughout the region.

Some impacts to wildlife could result from the development of this lease due either from subsidence or surface disturbing activities, i.e. drilling, road construction or facilities.

H. Vegetation

Trees are scattered throughout the Lease U-61049. The coniferous species such as douglas-fir, englemann spruce and white fir are found primarily on the wetter sites, the north and east facing slopes. Quaking aspen grow in clones on the wetter sites that occur on the dry, high elevation south and west aspects. Bristlecone pine and limber pine grow on the higher elevations in harsh, dry environments. Further down the slopes in the canyon and escarpment faces there is an abundance of Utah juniper and pinyon pine.

The low-lying and brushy vegetation on the dry sites consists of: sagebrush, rabbitbrush, mountain mohogany, thistle, elk weed, wild daisy and hard grass. The moderate-to-wetter site plant communities are made up of: snowberry, serviceberry, wood rose, yarrow, pearl everlasting, locoweed, dandelion, cinquifoil, lupine, wheatgrasses, brome, needlegrass and bluegrass. These plants grow in large open expanses primarily on the south and west aspects, ridge tops and under the sparse tree stands. The Forest Botanist investigated the lease area for Threatened or Endangered or Sensitive plant species and none were found.

I. Range Management

Lease U-61049 is within the Gentry Mountain Cattle and Horse Allotment. There are 1440 head of cattle that graze this allotment from approximately June 27 to August 1. There are two livestock

driveways that provide access to the allotment. One goes through Trail Canyon and crosses lease U-61049. The other lies in Chris Otteson Hollow to the east of the lease.

Approximately 680 acres of the lease area is classified as either unsuitable or non-rangeland because of steep slopes, stands of heavy timber, barren slopes or rock outcrop. Approximately 1350 acres of sagebrush and the areas under the aspen stands are classified as suitable range. The suitable range offers fair to excellent grazeable vegetation. Range improvement on the subject lease include one unit boundary fence.

Mining and exploration of this lease could have some effect on the range management of the area. Subsidence could affect present water sources. Exploration and/or development could take a portion of the range out of production for a period of time.

IV. ENVIRONMENTAL CONSEQUENCES

A. Effects of Implementation

Mining in the lease area took place when the lease was included in the permit area of the U.S. Fuel Co. King Mines (Hiawatha Complex). No significant impacts have been observed on that portion of the leased surface administered by the Manti-LaSal National Forest. There would be no additional effects to the environment unless coal production is continued from the lease under a new approved mining and reclamation plan and/or surface disturbing operations are conducted.

If mining continues under a new MRP, effects would result from deformation of the overburden and subsidence of the land surface. Additional effects would result from any surface disturbing activities such as coal exploration, construction of surface facilities for mining and the other activity associated with surface operations.

The environmental consequences for all three alternatives will be essentially the same but may differ in magnitude. Under the terms and conditions contained in the existing lease (No Action Alternative), the environmental consequences may not be as thoroughly mitigated.

Under Alternative Two, the stipulations contained in Appendix A would be included on the entire lease and anticipated effects would be mitigated to the maximum degree practical on all lands.

Under Alternative Three, the anticipated effects would be mitigated to an acceptable level on National Forest System lands. If the private surface owner does not agree to the application of surface protection stipulations, then it is not known to what degree the anticipated surface impacts on the private surface lands will be mitigated.

B. Short-Term and Residual Impacts

Surface disturbing operations if proposed and approved would result in some degradation of surface water quality, increased soil erosion, removal of vegetation and the associated disturbance to wildlife from human activities and presence. The duration of the impacts would depend upon the life of operations and time needed for reclamation to be successful.

The lease has been partially mined to date. The area has undergone subsidence to some degree; however, the present extent of subsidence is unknown at this time. If the remaining coal reserves contained within the lease are mined, additional subsidence would occur at the surface. The amount and extent of subsidence would depend on the mining method, mine configuration, number and thickness of seams mined and the geologic factors which control the strength of the overlying rock units. Stresses produced within the rock strata as a result of mining may effect mine safety, recoverability, ground water flow and the surface environment.

Subsidence begins almost immediately upon mining and may continue for many years after the working area is abandoned. The rate, extent and amount of subsidence will vary with the geologic conditions and mining operations.

It is expected that mining and subsidence will have an effect upon the natural ground water flow which may, in turn, result in effects to surface water, soils, vegetation, wildlife habitat and land uses.

C. Short-Term Use vs. Long-Term Productivity

Construction of facilities and operations would involve long-term uses and disturbance. The duration would be dependent on the life of the mining operation and the additional time required for revegetation of the disturbed areas following reclamation.

Underground mining and subsidence could involve long-term alteration of the ground water flow and associated effects to surface resources. The long-term productivity could be altered as drainages, soils and vegetation gradually adjust to any modified ground water conditions. The productivity could decrease or increase depending on the amount of available water.

D. Irreversible and Irretrievable Commitment of Resources

The resources that would be consumed in coal extraction would not be retrievable, and not available to be used elsewhere once expended. After the coal is mined, its' use by future generations would be irreversibly lost, and the coal left in place would not be recovered.

Subsidence may result in the irreversible commitment of some of the discussed resources.

E. Cumulative Effects

Historically, man's activities in the lease area have included livestock grazing, recreation and roads which have resulted in changes in vegetation and erosion. These are no cumulative effects associated with the readjustment of this lease. Cumulative effects resulting from mining coal could include the effects from subsidence, the effects associated with surface disturbing operations such as coal exploration and construction of mining facilities if proposed and approved, and the human activity from continued operations as exists on mines in adjacent areas. Cumulative effects are within the thresholds established in the Manti-LaSal National Forest Land and Resource Management Plan.

V. PERSONNEL AND PUBLIC INVOLVEMENT

A. Forest Service Interdisciplinary Team

Brent Barney, Civil Engineer
Ira Hatch, District Ranger
Dan Larsen, Soil Scientist
Leland Matheson, Range Conservationist
Ted McDougall, Geologist
Walter Nowak, Geologist-Team Leader

B. Other Organizational and Public Involvement

1. Emery County Commissioners 75 E. Main, Castle Dale, Ut 84513
2. Slickrock Outdoor Society, Rt. 1, Box 1444, Price, Utah 84501
3. Slickrock Country Council, P.O. Box 126, Moab, Utah 84532
4. Utah Wilderness Association, 455 E. 400 S. #306, SLC, UT 84111
5. Utah Division of Wildlife Resources, 455 West Railroad Ave. Price, Utah 84501
6. East Carbon Wildlife Federation, 331 Carson Box 904, East Carbon, Utah 84520
7. Huntington Livestock Association, Huntington, Utah 84528
8. Intermountain Power Agency, 5250 S. 300 W. #101, Murray, UT 84107

VI. SELECTED TIERING AND REFERENCE DOCUMENTS

A. Environmental Assessment/Technical Examination for the Readjustment of Federal Coal Lease SL-025431 and 12/10/82.

B. Manti-LaSal National Forest Environmental Impact Statement and Land and Resource Management Plan, 11/86.

C. Environmental Assessments for the Readjustment of Federal Coal Lease SL-025431, 11/19/82; U-024316, 7/6/87; U-46484, 4/28/87; and U-38727, 8/87.

D. United States Fuel Company, King Mines Mining and Reclamation Plan approved on July 16, 1986.

E. Environmental Assessment, U.S. Fuel Company, Hiawatha Mines Complex, King Nos. 4, 5 and 6 Mines, May 1986, Office of Surface Mining.

APPENDIX A

STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF THE DEPARTMENT OF AGRICULTURE

The licensee/permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior of the license/prospecting permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of Interior, (2) uses of all existing improvements, such as Forest development roads, within and outside the area licensed, permitted or leased by the Secretary of Interior, and (3) use and occupancy of the NFS not authorized by a permit/operating plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

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

Telephone No.: 801-637-2817

who is the authorized representative of the Secretary of Agriculture.

_____
Signature of Licensee/Permittee/Lessee

SPECIAL STIPULATIONS

Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service - Manti-LaSal National Forest.

The following stipulations pertain to the Lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on National Forest System lands.

Forest Service Stipulation #1.

Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the Lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the Lessee prior to disturbance shall immediately bring them to the attention of the appropriate authority. Paleontological remains of significant scientific interest do not include leaves, ferns or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

Forest Service Stipulation #2.

If there is reason to believe that threatened or endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports and carrying out mitigating measures shall be borne by the Lessee.

Forest Service Stipulation #3.

The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data is adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the inter-relationship of the geology, topography, surface hydrology, vegetation and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

Forest Service Stipulation #4.

Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

Forest Service Stipulation #5.

The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access road, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts.

Forest Service Stipulation #6.

Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternative involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed to reduce visual impacts and, where possible, achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural landforms and vegetative landscape features will be avoided.

Forest Service Stipulation #7.

The Lessee shall be required to establish a monitoring system to locate, measure and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

Forest Service Stipulation #8.

The Lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), Lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

Forest Service Stipulation #9.

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

Forest Service Stipulation #10.

In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specific approved locations.

Forest Service Stipulation #11.

If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

Forest Service Stipulation #12.

The coal contained within, and authorized for mining under this lease shall be extracted only by underground mining methods.

Forest Service Stipulation #13.

Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

Forest Service Stipulation #14.

In order to protect big game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other critical wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specified periods of the year.

Forest Service Stipulation #15.

Support facilities, structures, equipment, and similar developments will be removed from the lease area within two years after the final termination of use of such facilities. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages re-established, and the areas returned to a premining land use.

Forest Service Stipulation #16.

The Lessee, at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed or displaced corner monuments (section corners, 1/4 corners, etc.) their accessories and appendages (witness trees, bearing trees, etc.) or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professionsl land surveyor registered in the State of Utah, and to the standards and guidelines found in the Manual of Surveying Instructions, United States Department of the Interior.

Forest Service Stipulation #17.

The Lessees, at their expense, will be responsible to replace any surface water identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses.

APPENDIX B

STATE OF UTAH
NATURAL RESOURCES
Wildlife Resources

Southeastern Region • 455 West Railroad Avenue • Price, UT 84501-2829 • 801-637-3310

Norman H. Bangerter, Governor
Dee C. Hansen, Executive Director
William H. Geer, Division Director

MANTI-LASAL N.F.
JAN 20 1989

FOREST SERVICE
MANTI-LASAL NATIONAL FOREST
PRICE RANGER DISTRICT
JAN 23 1989

Alt

CC: D-3
Rod Player
CP

January 18. 1989

Mr. George Morris, Supervisor
Manti LaSal National Forest
599 West Price River Drive
Price, UT 84501

Attn: Rod Player and Walt Nowak

Dear George:

In regard to a readjustment of terms and conditions for coal leases SL-069985 and U-61049, we are concerned about the effects of subsidence from coal mining operations on wildlife. Generally speaking, the effects of subsidence on wildlife lie in two general arenas: hydrologic ecosystems and terrestrial ecosystems. The following is offered for your information.

Subsidence can result in drying up of impounded water bodies or modification to flows at seeps, springs, perennial or even intermittent channels. This can result from the capture in subsidence cracks of water and its resultant migration into other geological strata. Some strata may not allow water to discharge to the surface. Such an impact can have serious consequence to a local area's wildlife in that drinking water may become reduced in value or unavailable to terrestrial animals.

Seeps or springs providing flow during periods when wildlife are present represent a critical valued resource to all of the local area's wildlife. Most wildlife have small and limited home ranges. As a result, when one of these critical valued aquatic resources is lost, the animal does not have the physical capability of "packing his bag" and moving to another area of acceptable habitat. Those few species that have such a physical capability usually find the home ranges in adjoining areas already filled to capacity. It is for that reason that the Division holds firm to the philosophy that each and every seep and spring is a critical resource for wildlife.

In the event that coal mining results in subsidence that impacts the flows at seeps and springs, mitigation is anticipated. An impact would be deemed substantial if the daily flow from a seep or spring was reduced by 50% or more. Mitigation that would be expected is simply the replacement of the water. Unquestionably, there would be many techniques that could achieve this goal; guzzlers are considered to be the most effective technique. They should be fenced with a 3-rail/pole fence having a maximum height of 42 inches. Clearance between the ground and the bottom pole, as well as space between the top two poles, should be at least 14 inches. This will allow passage of wildlife while disallowing domestic livestock.

Aquatic life, particularly hydrophytes, invertebrates, mollusks and fishes could suffer due to reduced or lost flows. It is even possible that subsidence fractures could expose undesirable mineral deposits to aquatic systems. If such situations were to occur, aquatic and terrestrial animals would either perish or be forced to reduce the size of their use areas. Ultimately, the carrying capacity of the area for wildlife would be reduced.

Increased flows resulting from subsidence that may appear as a benefit could in actuality mean that some other aquatic system has lost flows. But benefits are possible if subsidence cracks access an isolated hydrologic basin.

Reduced or lost flows in surface water systems and ground water systems can negatively impact terrestrial habitats. Mesic habitats (riparian, wetland and aspen types) associated with those systems could be degraded by the reduction or loss of water. In all ecological situations (desert, submontane and montane) riparian or wetland ecosystems due to their high level of biological productivity, limited acreage and intense use by wildlife, represent a critical valued habitat. Similar comments can be made for the aspen habitat in the montane ecological situation.

Beyond problems associated with aquatic systems, subsidence impacts to terrestrial wildlife and habitats are primarily associated with surface movement of the earth. However, methane gas has been known to travel along subsidence fractures to the surface. The escaping gas affects rhizobium in the soil and can kill adjacent rhizobium dependent vegetation.

The surface cracks alone have little impact on wildlife. It is possible that individual animals could perish in some of these holes or cracks. It has even been suggested that the movement in the earth could collapse the burrows of small rodents, thus trapping and killing them. At this point in time, I doubt whether that is a valid concern in that small rodents are extremely abundant. Since subsidence occurs over such small and limited areas, impacts to rodents would not be of consequence.

Most rodents probably have trouble with their burrows caving at times anyway. Thus, they are adapted to digging around such cave-ins. It is likely that cracks and surface displacement created by subsidence represent escape cover for small animals, and to some degree, access points for burrowing animals.

Subsidence has caused escarpment failures. When raptor nests exist in the escarpments, such failures would be of negative consequence, since raptors typically return to reuse their nests over the years. Where escarpment failure occurs and there are no raptor nests, such failure could create suitable raptor nesting habitat.

Many surface displacement lines from subsidence in Utah's coal mining areas are utilized extensively by big game as travel corridors. These fracture lines, once they become filled in, represent a flat trail on which the animals can easily walk around the contours of a mountain or across ridge tops.

It is hoped that the aforementioned information will prove useful to you in coal leasing decisions. If the Division can be of any further service, please don't hesitate to call.

Sincerely,

Larry B. Dalton /dd

Larry B. Dalton, Wildlife Program Manager
Resource Analysis/Habitat Protection

LBD/dd

cc: Darrell Nish, DWR
Lowell Braxton, DOGM
Clark Johnson, USFWS
Linda Seibert, BLM

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Moab District
P. O. Box 970
Moab, Utah 84532

3482
U-61049
(U-065c)

APR 8 1992

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
Certified No. P 872 631 185

Rec'd. 4/9/92

Mr. Jack Rogers
Plateau Mining Company
P. O. Box Drawer PMC
Price, Utah 84501

CC: X-3

Dear Mr. Rogers:

The Bureau of Land Management (BLM) is responsible for the administration of exploration activities on Federal coal by authority of the Mineral Leasing Act of 1920 (MLA), as amended, and as described in the regulations found at 43 CFR 3482. The regulations at 43 CFR 3482.2(b) state that, "Approved exploration plans may be required to be revised or supplemented at any time by the authorized officer, after consultation with the operator/lessee and the responsible officer of the surface managing agency as necessary, to adjust to changed conditions, to correct oversights, or to reflect changes in legal requirements".

The operators drilling any future holes drilled under an existing approved coal exploration plan must submit a modification to the exploration plan to incorporate new drilling stipulations or to justify any departure from these new stipulations (enclosed). In particular, 1) all coal exploration drill holes must be cemented from the total depth of the hole to the surface and, 2) the surface and intermediate casing (if used) must be fully pressure grouted in the annulus from the bottom of the string to the surface. This modification must receive prior approval by the authorized officer before any new drilling is allowed to proceed. The BLM must be given ample time to evaluate these modifications to existing exploration plans prior to the commencement of drilling.

Any future coal exploration drill holes must comply with the enclosed new drilling stipulations. Any variance from the above statements and the enclosed stipulations must receive prior approval from the Chief of the Price Coal Office.

If you have any questions please contact Gary Johnson - Chief of the Price Coal Office at 637-4584.

Sincerely,

Gary Johnson
for
Assistant District Manager,
Mineral Resources

Enclosure:
BLM Drilling Stipulations

cc:
SD, Utah (U-921) (w/encl.)
SD, Utah (U-942) (w/encl.)
Manti-La Sal National Forest (w/encl.)
Utah Division of Oil Gas and Mining (w/encl.)

8. The Chief of the Price Coal Office shall be notified 24 hours in advance as to the time when each hole is to be plugged so that a representative of the BLM may arrange to observe the plugging procedure.

9. Upon completion of exploration activities, <u>two copies of each report</u> as required by 43 CFR 3485.1, shall be submitted to the Chief of the Price Coal Office. The reports at a minimum must contain the following:

A. Location(s) and serial number(s) of lands under Federal lease or license on which exploration was completed.

B. A description of the completed exploration operations that includes the number of holes drilled, total depth of each hole, and completion date of each hole.

C. A map showing the locations of all holes drilled, other excavations, and the coal outcrop lines as appropriate. The scale of the map shall not be less than 1 inch equals 1 mile.

D. Analysis of coal samples and other pertinent tests obtained from exploration operations.

E. Copies of all in-hole mechanical or geophysical stratigraphic surveys or logs, such as electric logs, gamma ray-neutron logs, sonic logs, or any other logs. The records shall include a lithologic log of all strata penetrated and conditions encountered such as water, gas, or any unusual conditions.

F. Status of reclamation of the disturbed areas.

G. Any other information requested by the Assistant District Manager for Mineral Resources.

H. Hydrologic reports using the attached form.

Intermountain Power Agency

MESSAGE DISPLAY

TO I.Hatch
CC A.Howe
CC S.Robison:R04A
CC W.Nowak
CC C.Reed

From: C.REED
Postmark: Aug 23,88 1:34 PM
Status: Certified
Subject: Readjustment of Coal Leases U.S. Fuel SL-069985 and Intermountain Power Agency U-61049

Message:
This is a reminder. Our EA's for these leases are due at the RO on March 1, 1989. The draft EA's need to be received in the SO by January 15, 1989 to allow for the needed time for staff review and for potential revisions. If field reviews will be needed, they need to be conducted this field season. If a field ID team meeting is needed, it will be necessary to get the scoping document out this field season on time to organize the team and conduct the field review.

----------X----------

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Utah State Office
P.O. Box 45155
Salt Lake City, UT 84145-0155

C. Merritt 3/19/98

In Reply Refer To:
3451
U-024316
(UT-932)

MAR 20 1998

CERTIFIED MAIL--Return Receipt Requested

DECISION

C.O.P. Coal Development Company	:	
53 W. Angelo Avenue	:	Coal Lease
Salt Lake City, Utah 84115	:	U-024316

Readjustment of Coal Lease U-024316
Effective May 1, 1998

The regulations under 43 CFR 3451.1(a)(1) and (2) state:

1. All leases issued prior to August 4, 1976, shall be subject to readjustment at the end of the current 20-year period and at the end of each 10-year period thereafter.

2. Any lease subject to readjustment which contains a royalty rate less than the minimum royalty prescribed in 43 CFR 3473.3-2 shall be readjusted to conform to the minimum prescribed in that section.

Coal lease U-024316 was issued effective May 1, 1958. By notice dated April 15, 1996, C.O.P. Coal Development Co. was notified that the terms and conditions of the readjustment would be provided in accordance with the regulations under 43 CFR 3451 no later than 2 years from the date of the notice.

As provided in Section 3d of the lease and in accordance with the regulations under 43 CFR 3451.2, enclosed are the terms and conditions of coal lease U-024316 effective May 1, 1998.

A lease bond in the amount of $5,000 and a drilling bond in the amount of $12,000, conditioned upon compliance with all terms and conditions of the lease, are currently on file in the name of C.O.P. Coal Development Co. and are considered to be adequate bond coverage at the present time.

Coal lease U-024316 is held by inclusion in the pending Bear Canyon Logical Mining Unit (LMU). LMU specific diligence requirements supersede, but do not suspend, the lease specific diligence requirements. Information concerning lease specific diligent development requirements is attached to this decision. This information has been determined to be confidential and will not become part of the record.

Coal lease U-024316 is hereby readjusted effective May 1, 1998, in accordance with the regulations at 43 CFR 3451.2.

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4, and the enclosed Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office (at the above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (pursuant to regulation 43 CFR 4.21) (58 FR 4939, January 19, 1993) (request) for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay **must** also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed in this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

(1) The relative harm to the parties if the stay is granted or denied,

(2) The likelihood of the appellant's success of the merits,

(3) The likelihood of immediate and irreparable harm if the stay is not granted, and

(4) Whether the public interest favors granting the stay.

/s/ G. William Lamb

G. William Lamb
State Director

SENDER: U-022668, U-024316, [redacted], U-024318, U-38727, U-46484, UM-UT-432 LBAL
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
C/O.P. Coal Development Co
53 W. Angelo Avenue
Salt Lake City, Utah 84115

4a. Article Number
Z 230 749 888

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
3/23/98

5. Received By: (Print Name)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature: (Addressee or Agent)
X Karen Anderson

PS Form 3811, December 1994 Domestic Return Receipt

Is your RETURN ADDRESS completed on the reverse side?

Thank you for using Return Receipt Service.

n, Dept. of Justice, 325 7th

inerals Leasing Task Force,
v/encl.)

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT COAL LEASE READJUSTMENT	Serial Number U-024316 Lease Date May 1, 1958

Part I. LEASE RIGHTS GRANTED

This lease, entered into by and between the United States of America, hereinafter called the lessor, through the Bureau of Land Management, and

C.O.P. Coal Development Company
53 W. Angelo Avenue
Salt Lake City, Utah 84115

hereinafter called lessee, is readjusted, effective May 1, 1998, for a period of 10 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of each 10 year lease period.

Sec. 1. This lease readjustment is subject to the terms and provisions of the:

/X/ Mineral Lands Leasing Act of 1920, Act of February 25, 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;

/ / Mineral Leasing Act for Acquired Lands, Act of August 7, 1947, 61 Stat. 913, 30 U.S.C. 351-359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any rents and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants to lessee the exclusive right and privilege to drill for, mine, extract, remove or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

T. 16 S., R. 7 E., SLM, Utah
Sec. 13, W2W2;
Sec. 14, NE, E2NW.

Emery County

containing 400.00 acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE. Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $3.00 for each lease year.

(b) RENTAL CREDITS. Rental shall not be credited against either production or advance royalties for any year.

Sec. 2.(a) PRODUCTION ROYALTIES. The royalty shall be 12½ percent of the value of coal produced by strip or auger mining methods and 8 percent of the value of coal produced by underground mining methods. Royalties are due to lessor the final day of the months succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES. Upon request by the lessee, the authorized officer may accept for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS. Lessee shall maintain in the proper office a lease bond in the amount of $5,000 and a drilling bond of $12,000. The authorized officer may require an adjustment in the amount of the bond to reflect changed conditions.

Sec. 4. DILIGENCE. This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years shall terminate the lease. If not submitted already, lessee shall submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after the effective date of this lease readjustment.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. LOGICAL MINING UNIT (LMU). Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease shall become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE. Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $3.00 for each lease year.

(b) RENTAL CREDITS. Rental shall not be credited against either production or advance royalties for any year.

Sec. 2.(a) PRODUCTION ROYALTIES. The royalty shall be 12½ percent of the value of coal produced by strip or auger mining methods and 8 percent of the value of coal produced by underground mining methods. Royalties are due to lessor the final day of the months succeeding the calendar month in which the royalty obligation accrues.

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Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Sec. 9(a) TRANSFERS

/X/ This lease may be transferred in whole or in part to any person, association, or corporation qualified to hold such lease interest.

/ / This lease may be transferred in whole or in part to another public body, or to a person who will mine the coal on behalf of, and for the use of, the public body or to a person who for the limited purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.

/ / This lease may only be transferred in whole or in pat to another small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest must be approved in accordance with the regulations.

(b) RELINQUISHMENT. The lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee shall be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC. At such time as all portions of this lease are returned to lessor, lessee shall deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, lessee shall remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, shall become the property of the lessor, but lessee shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is owned by third parties, lessor shall waive the requirement for removal, provided the third parties do not object to such waiver. Lessee shall, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by lessee's activity or activities incidental thereto, and reclaim access roads or trails.

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT. If lessee fails to comply with applicable laws, existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the lessor only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS - IN-INTEREST. Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION. Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the lessee's activites and operations under this lease.

Sec. 14. SPECIAL STATUTES. This lease is subject to the Federal Water Pollution Control Act (33 U.S.C. 1151 - 1175); the Clean Air Act (42 U.S.C. 1857 et seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)

Sec. 15. SPECIAL STIPULATIONS.

1. The Regulatory Authority shall mean the State Regulatory Authority pursuant to a cooperative agreement approved under 30 CFR Part 745 or in the absence of a cooperative agreement, Office of Surface Mining. The authorized officer shall mean the State Director, Bureau of Land Management. The authorized officer of the Surface Management Agency shall mean the Forest Supervisor, Forest Service. Surface Management Agency for private surface is the Bureau of Land Management. For adjoining private lands with Federal minerals and which primarily involve National Forest Service issues, the Forest Service will have the lead for environmental analysis and, when necessary, documentation in an environmental assessment or environmental impact statement.

2. The authorized officers, of the Bureau of Land Management, Office of Surface Mining (Regulatory Authority), and the Surface Management Agency (Forest Service) respectively, shall coordinate, as practical, regulation of mining operations and associated activities on the lease area.

3. In accordance with Sec. 523(b) of the "Surface Mining Control and Reclamation Act of 1977," surface mining and reclamation operations conducted on this lease are to conform with the requirements of this Act and are subject to compliance with Office of Surface Mining Regulations, or as applicable, a Utah program equivalent approved under cooperative agreement in accordance with Sec. 523(c). The United States Government does not warrant that the entire tract will be susceptible to mining.

4. Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service Manti-LaSal National Forest.

The following stipulations pertain to the lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on National Forest System lands.

5. Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the lessee prior to disturbance shall, immediately bring them to the attention of the appropriate authorities. Paleontological remains of significant scientific interest do not include leaves, ferns, or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the lessee.

6. If there is reason to believe that Threatened or Endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the lessee.

7. The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data are adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface and ground water hydrology, vegetation and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

8. Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

9. The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access road, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major modifications to existing developments to examine alternatives and mitigate conflicts.

10. Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternative involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed, to reduce visual impacts, and where possible achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural land forms and vegetative landscape features will be avoided.

11. The lessee shall be required to establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

12. The lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

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

14. In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specifically approved locations.

15. If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

16. The coal contained within, and authorized for mining under this lease, shall be extracted only by underground mining methods.

17. Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

18. In order to protect big game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other critical wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specific periods of the year.

19. Support facilities, structures, equipment, and similar developments will be removed from the lease area within 2 years after the final termination of use of such facilities. This provision shall apply unless the requirement of Section 10 of the lease form is applicable. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages reestablished, and the areas returned to a premining land use.

20. The Lessee at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed, or displaced corner monuments (section corners, quarter corners, etc.) their accessories and appendages (witness trees, bearing trees, etc.), or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professional land surveyor registered in the State of Utah and to the standards and guidelines found in the Manual of Surveying Instructions, U.S. Department of Interior.

21. The Lessee, at his expense, will be responsible to replace any surface and/or developed ground water sources identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses (authorized by 36 CFR 251).

22. The Licensee/Permittee/Lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of Interior, (2) uses of all existing improvements, such as Forest Development Roads, within and outside the area licensed, permitted or leased by the Secretary of Interior, and (3) use and occupancy of the NFS not authorized by a permit/operation plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

Forest Supervisor
Manti-LaSal National Forest
599 West Price River Drive
Price, Utah 84501

Telephone No.: 801-637-2817

who is the authorized representative of the Secretary of Agriculture.

23. Notwithstanding the approval of a resource recovery and protection plan by the BLM, lessor reserves the right to seek damages against the operator/lessee in the event (I) the operator/lessee fails to achieve maximum economic recovery [as defined at 43 CFR §3480.0-5(21)] of the recoverable coal reserves or (ii) the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal.

The parties recognize that under an approved R2P2, conditions may require a modification by the operator/lessee of that plan. In the event a coal bed or portion thereof is not to be mined or is rendered unminable by the operation, the operator shall submit appropriate justification to obtain approval by the AO to leave such reserves unmined. Upon approval by the AO, such coal beds or portions thereof shall not be subject to damages as described above. Further, nothing in this section shall prevent the operator/lessee from exercising its right to relinquish all or a portion of the lease as authorized by statute and regulation.

In the event the AO determines that the R2P2 as approved will not attain MER as the result of changed conditions, the AO will give proper notice to the operator/lessee as required under applicable regulations. The AO will order a modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such an ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in the first paragraph under this section.

Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the AO that the coal reserves have been rendered unminable or at such time that the lessee has demonstrated an unwillingness to extract the coal.

The BLM may enforce this provision either by issuing a written decision requiring payment of the MMS demand for such royalties, or by issuing a notice of non-compliance. A decision or notice of non-compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law.

United States
Department of
Agriculture

Forest
Service

Manti-LaSal
National Forest

599 West Price River Dr.
Price, Utah 84501

Reply to:2820

Date: September 29, 1997

Douglas M. Koza
Deputy State Director, Mineral Resources
Bureau of Land Management
Utah State Office
324 South State St.
Salt Lake City, Utah 84111-2303

RECEIVED

OCT 3 1997

Bureau of
Land Management

Dear Mr. Koza,

The Forest Service has reviewed Federal Coal Lease U-24317 held by PacifiCorp and Federal Coal Leases U-020668, U-024316, U-38727, and U-46484 held by C.O.P. Coal Development Co, relative to readjustment of the terms and conditions. We have found that the Forest Service stipulations currently included in the lease are consistant with our Forest Plan. The readjustment of the referenced leases may be categorically excluded from an EA or EIS under FSH 1909.15, Chapter 31.1b, Category 2d; proposing changes in contract terms or conditions and conditions of special use authorizations.

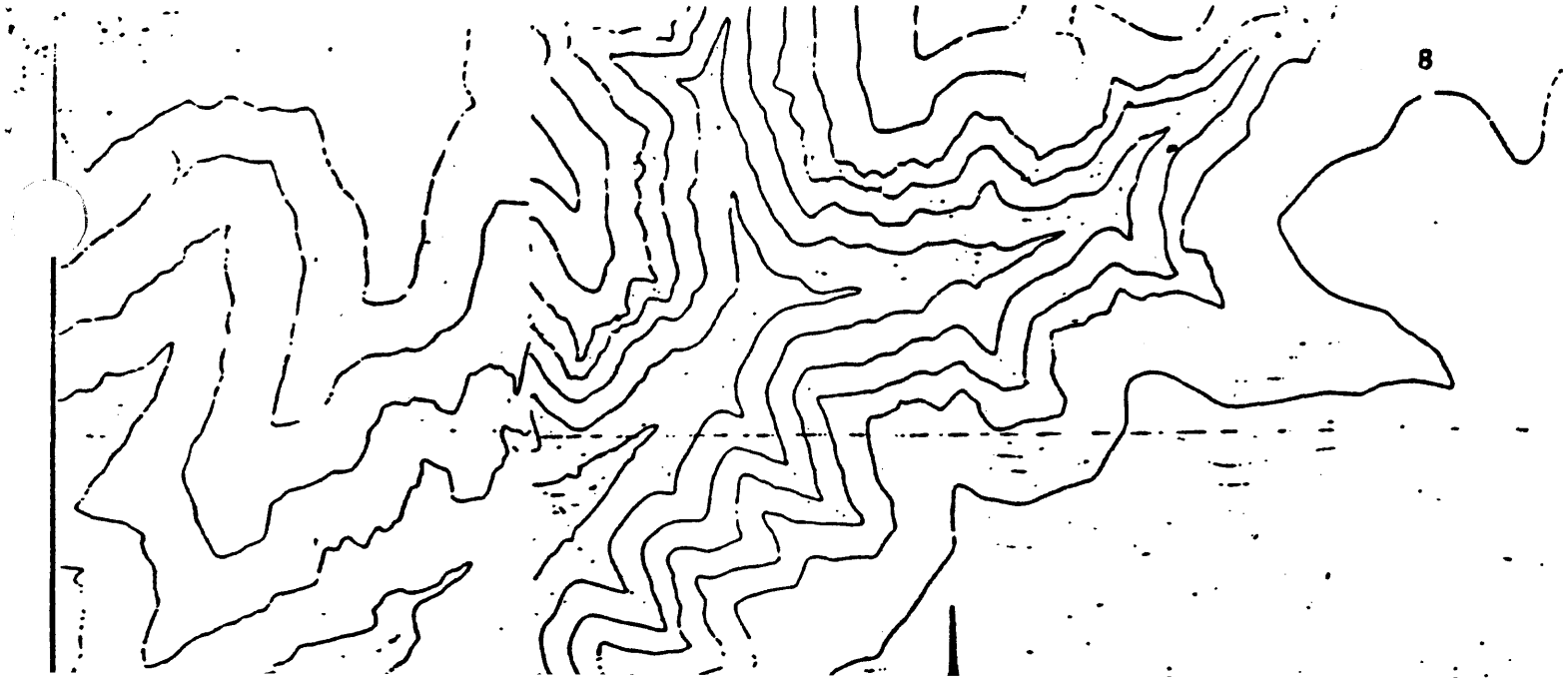
We recommend that the lease be readjusted with the Forest Service stipulations as attached. Please note the minor wording changes in Stipulations 2, 3, 16, 17 and 18 (the USDA stipulation).

If you have any questions or concerns relative to this action, please contact Jeff DeFreest, Ferron-Price District geologist, or Carter Reed, Forest Geologist at 599 West Price River Dr. Price, Utah 84501, or call 801-637-2817.

Sincerely,

Kim L Hone
for
JANETTE S. KAISER
FOREST SUPERVISOR

cc: Regional Forester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DECISION NOTICE
AND
FINDING OF NO SIGNIFICANT IMPACT
FOR THE READJUSTMENT OF
FEDERAL COAL LEASE U-024316

PRICE RANGER DISTRICT
MANTI-LASAL NATIONAL FOREST
CARBON AND EMERY COUNTIES, UTAH

On January 13, 1986, the Forest Service received notification from the Bureau of Land Management that Federal Coal Lease U-024316 would be subject to readjustment of terms and conditions on May 1, 1988. This notification required conducting an environmental analysis of the proposed action according to the National Environmental Policy Act of 1969. A Forest Service I.D. Team met on September 3, 1986 to evaluate the proposal.

An Environmental Assessment (EA) was prepared under the direction of the Manti-LaSal National Forest Supervisor. Based on the analysis presented in this Environmental Assessment it is our decision to consent to approval of the proposed readjustment subject to the addition of Stipulations in Appendix A of the E.A. Alternative Two, as described in the E.A. is a viable alternative under the existing legislation and Forest Service policy, management decisions and direction. The No Action Alternative was evaluated and determined not to be viable as it would allow continuation of the lease under terms inconsistent with the Manti-LaSal National Forest final Environmental Statement and Land and Resource Management Plan.

This is not a major Federal action that would significantly affect the quality of the human environment; therefore, an Environmental Impact Statement is not needed. This determination was made considering the following factors:

1. No surface disturbing operations or facilities are proposed at this time. If surface disturbing operations or facilities are required in the future, a site specific environmental analysis will be prepared at that time. Additional stipulations may be specified as needed to protect the environment.

2. The identified impacts, including cumulative effects, can be effectively mitigated to an acceptable level.

3. No known prime or unique farmlands, wetlands timberland and rangelands; floodplains; alluvial valley floors; paleontological or cultural resources; nor threatened, endangered, or sensitive floral or faunal species will be impacted by readjustment of this lease.

4. Readjustment of this lease is consistent with the directions and decisions of the Manti-LaSal National Forest Final Environmental Impact Statement and the Manti-LaSal National Forest Land and Resource Management Plan 1986.

Based on this assessment and evaluation, Federal Coal Lease U-024316 should be readjusted By the Bureau of Land Management and shall include the attached stipulations. This decision is subject to administrative review (appeal) pursuant to 36 CFR 211.18, Secretary of Agriculture Appeal Regulation.

E. R. Drummy
Regional Forester

8/6/87
Date

ENVIRONMENTAL ASSESSMENT
FOR THE READJUSTMENT
FEDERAL COAL LEASE U-024316

PRICE RANGER DISTRICT
MANTI-LASAL NATIONAL FOREST
CARBON AND EMERY COUNTIES, UTAH

RESPONSIBLE OFFICIAL:

J. S. Tixier
Regional Forester
Intermountain Region (R-4)
USDA Forest Service
Federal Building
324 25th Street
Ogden, Utah 84401

FOR FURTHER INFORMATIONS CONTACT:

Reed C. Christensen
Forest Supervisor
Manti-LaSal National Forest
U.S. Department of Agriculture

Ira W. Hatch
Price Ranger District
599 West Price River Drive
Price, Utah 84501

Prepared by: L. Jo Ellis, Geologist

RECOMMEND APPROVAL

Ira W Hatch
District Ranger

May 26, 1987
Date

APPROVED

A J Frandsen
Acting Forest Supervisor

7/6/87
Date

ENVIRONMENTAL ASSESSMENT

COAL LEASE READJUSTMENT

LEASE U-024316

I. PURPOSE OR NEED FOR ACTION

A. Introduction

Federal Coal Lease U-024316, issued to the Huntington Corporation in 1958, is presently owned by C.O.P. Coal Development Company. This lease originally contained 1,800 acres, but a partial assignment of 1,400 acres was segregated on August 1, 1980. The remaining 400 arcres of Federal Coal Lease U-024316 will be subject to readjustment on May 1, 1988. Coal leases issued prior to August 4, 1976 are subject to readjustment according to 43 CFR Part 3450. The initial adjustment period is at the end of the first 20 year period, and at the end of each ten year period thereafter. The subject lease is being readjusted at the end of the first ten year period in accordance with this direction.

The Bureau of Land Management (BLM) notified the Forest Service in a letter dated January 13, 1986, that the terms and conditions of Federal Coal Lease U-024316 will be subject to readjustment on May 1, 1988. As the surface land management agency for Federal Coal lease U-024316, the Manti-LaSal National Forest is responsible for conducting an environmental analysis according to the National Environmental Policy Act of 1969. The analysis will be addressed in this environmental assessment with applicable stipulations for condition of the lease readjustment.

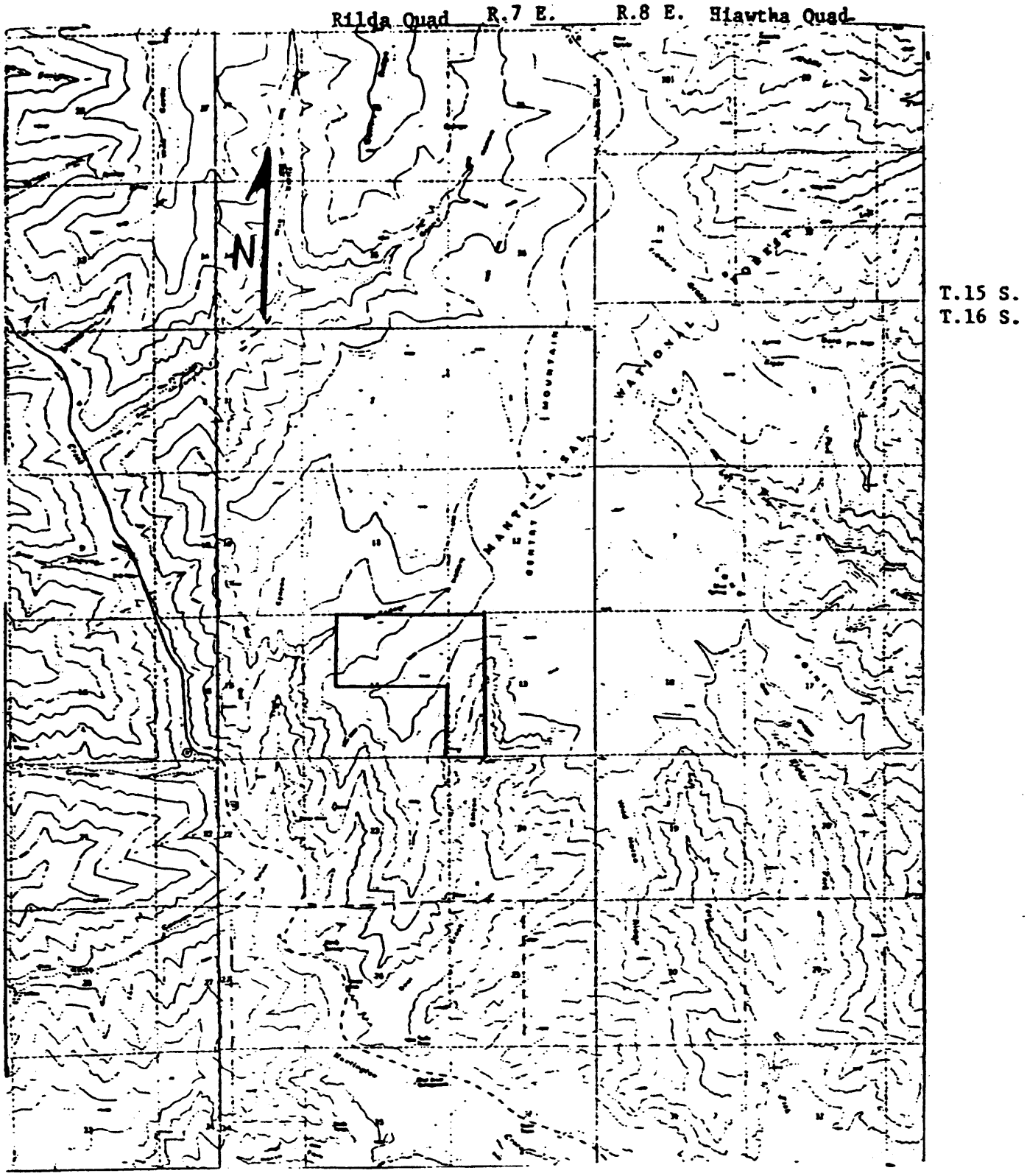
Federal Coal Lease U-024316 encompasses 400 acres on the Price Ranger District of the Manti-LaSal National Forest. It is not presently a producing lease. The legal description is as follows (Map 1 and 2):

T.16S., R.7E., SLM, Emery County, Utah
Section 13, W1/2W1/2
Section 14, NE1/4, E1/2NW1/4

Federal Coal Lease U-024316 is located within the area covered by the Manti-LaSal National Forest Land and Resource Management Plan. The Forest Service Interdisciplinary (I.D.) Team met on September 3, 1986 to evaluate the proposal.

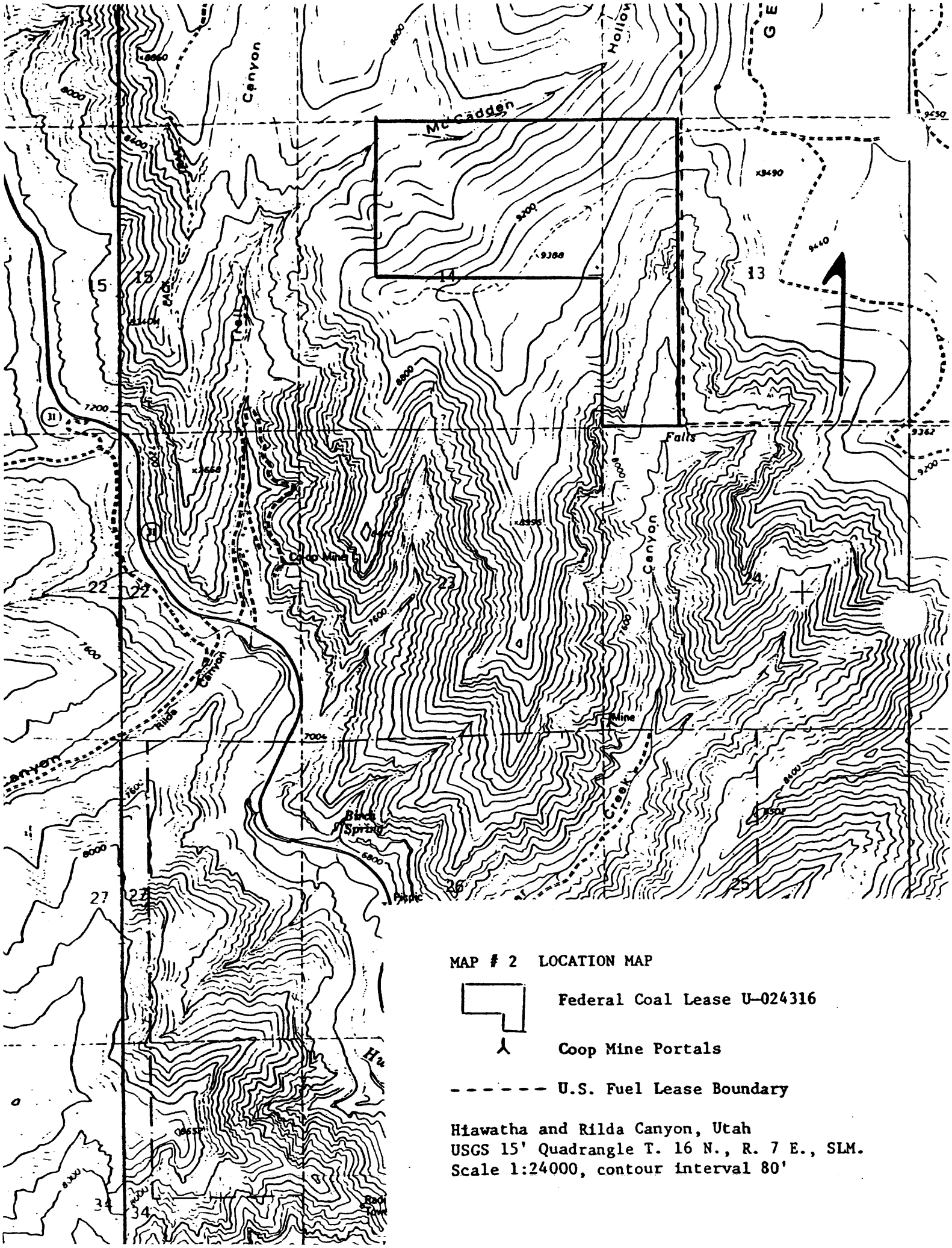
B. Authorizing Action

Leasing and development will be under the authority of the following authorizing actions: The Mineral Leasing Act of February 25, 1920, as amended: the Federal Land Policy and Management Act (FLPMA) of 1976; the Surface Mining Control and Reclamation Act (SMCRA) of 1977; the Multiple Minerals Development Act of August



Map #1 VICINITY MAP

Federal Coal Lease U-024316
State Highway
Scale 1:24000
USGS 7.5 minute series



MAP # 2 LOCATION MAP

Federal Coal Lease U-024316

Coop Mine Portals

- - - - - - - U.S. Fuel Lease Boundary

Hiawatha and Rilda Canyon, Utah
USGS 15' Quadrangle T. 16 N., R. 7 E., SLM.
Scale 1:24000, contour interval 80'

4, 1977; the National Environmental Policy Act (NEPA) of 1969; the Federal Coal Leasing Amendments Act of 1976, as amended; the Act of October 30, 1978 that further amended the Mineral Leasing Act of 1920; regulations; Title 43 CFR Group 3400, Group 2800; and Title 30 CFR 700; and the Manti-LaSal National Forest Land and Resource Management Plan and Final Environmental Impact Statement, 1986.

C. Mine Development

No known development is proposed for Lease U-024316. The most logical approach to mining the coal in this lease appears to be through existing facilities at the Co-op Bear Canyon Mine, which are located on private land, see Map #2.

D. Issues, Concerns and Opportunities

The Forest Service ID Team identified the following concerns associated with the proposed coal lease readjustment;

1. Effects to surface and hydrologic resources due to subsidence created by underground mining of coal.

2. Effects to surface resources resulting from surface disturbing activities and facilities.

The public was informed of the proposed Federal Coal Lease readjustment in a news release October 10, 1986. The Southeastern Utah Association of Governments, the Utah State Division of Wildlife Resources and Emery County Planning and Zoning were notified by letters dated October 30, 1986 of the proposed action. No response was received from any of the parties addressed. Therefore no public issues have been identified.

An opportunity was identified by the Forest Service to readjust the terms and conditions of the existing lease to terms and conditions which would be consistent with the current laws, regulations and Manti-LaSal National Forest Land and Resource Management Plan. Stipulations in Appendix A will help mitigate the presently recognized environmental concerns.

C. Negative Declaration

The Forest Service ID Team did not identify any prime or unique farmlands, wetlands, timberlands and rangelands; floodplains; alluvial valley floors; nor threatened, endangered or sensitive floral or faunal species.

II. PROPOSED ACTION AND ALTERNATIVES

The proposed action is to adjust the terms and conditions of Federal Coal Lease U-024316.

A. ALTERNATIVE ONE - NO ACTION - This alternative is to take no further action to adjust the terms and conditions of coal lease U-024316. This would constitute a waiver of the right to readjust the existing coal lease. The existing lease terms and conditions would remain in effect for the next ten years.

B. ALTERNATIVE TWO - NEW TERMS AND CONDITIONS - This alternative is to eliminate the old terms and conditions of the existing coal lease and institute new terms and conditions to be in effect for the next 10 years. Applicable Forest Service stipulations are listed in Appendix A.

III. DESCRIPTION OF THE AFFECTED ENVIRONMENT

Coal lease U-024316 is located in Emery County, Utah within the Manti-LaSal National Forest.

A. Topography

Lease U-024316 is located on Gentry Mountain overlooking Huntington Canyon on the west. McCadden Hollow lies to the north. Elevations on the tract ranges from approximately 7,700 to 9,400 feet. The terrain on the slopes of Gentry Mountain is characterized by steep cliffs and deeply incised drainages. Gentry Mountain has a fairly gentle topography at the upper elevations. The majority of the lease lies on the plateau top.

Slopes within the lease range from nearly flat on the ridge top to vertical on the canyon walls. A stair-step appearance is a result of the resistant sandstone. These steps are often mantled by rock talus. The northern bock of the lease lies along the plateau top, while the southeastern block lies within the steep cliff section.

Undermining the lease near areas of thin overburden, especially at outcrops, may result ~~in escarpment failure~~.

B. Geology

Lease U-024316 is located on the Wasatch Plateau, a transitional zone between the complex Basin and Range Province to the west, and the Colorado Plateau to the east. The plateau has characteristics of both geological provinces.

The rock formations exposed on the lease, from oldest to youngest, are the Blackhawk Formation, Castlegate Sandstone, Price River Formation and North Horn Formation. These are essentially flat lying sedimentary rocks consisting of sandstone, limestone and shale. These formations display interbedding and crossbedding structures and contain lenticular sandstone lenses.

Generally the strata dip approximately 5 to 8 degrees to the west. The major regional structural feature is a horst (or

upthrown block) formed between the Joe's Valley and Pleasant Valley Fault zones. Lease U-024316 is dissected by several large faults which trend parallel to the horst boundaries N 14°W. Maximum displacement along these faults, as noted in the field, does not exceed 200 feet. Smaller faults trending parallel or perpendicular (sympathetic) to these faults also exist. Jointing patterns and topographic features, i.e., ridges, canyons, hollows, also follow the faulting patterns.

Commercial coal beds on Lease U-024316 are in the Blackhawk Formation. These beds outcrop in Bear Canyon, just south of the lease, between 7,500 and 7,700 feet above sea level. The Blackhawk has an average thickness of 900 feet on the lease. Its composition varies from sandstone, shale and coal. It contains sandstone lenses, with common fluctuation in bed thickness.

Overburden at the top of Gentry Mountain is approximately 1,600 feet thick.

Two coal seams of economic importance occur on Lease U-024316. The lower seam is the Hiawatha, lying directly above the contact of the Blackhawk and the Star Point Sandstone. According to Doelling (1972), it ranges in thickness from 6 to 8 feet. The upper seam is the Blind Canyon, which lies 90 to 100 feet above the Hiawatha. This seam varies in thickness from 6 to 10 feet.

C. Groundwater

Ground water surfaces as springs and seeps at elevations ranging from 7,300 to 9,200 feet. The majority of the springs and seeps occur within the Blackhawk Formation between 7,600 and 8,400 feet. Many of the springs are closely associated with lithologic contacts, where there is a change in permeability.

The Price River Formation is found between the older Castlegate Sandstone and the younger North Horn Formation. While some of the contact areas do not display any flow of water, there is notable change in soil moisture content along the upper and lower contacts of the formation which is observable by the growth of riparian vegetation.

Within the North Horn Formation there are four sizeable springs north of the lease. These occur in intermittent streams and may be related to the flow of groundwater intersecting the profile of the flow of surface water.

Faults and associated sympathetic joints may play a part in the channelization of groundwater flow. Canyons and ridges follow the trend of these faults and few springs are found along them. More frequently seep areas that are intermittent occur along these faults.

Recharge to groundwater aquifers is through precipitation mostly as snow. Due to the configuration of the ridges and canyons, the

leeward side of the ridges seem to receive the greater amounts of snow, and are more protected from melting. This increase in recharge is evidenced by the occurrence of many of the springs and seeps on the leeward side of the ridge in the general area.

Interruption, relocation or alteration of groundwater may occur as a result of development, underground mining and the subsequent subsidence if the lease is mined.

D. Soils

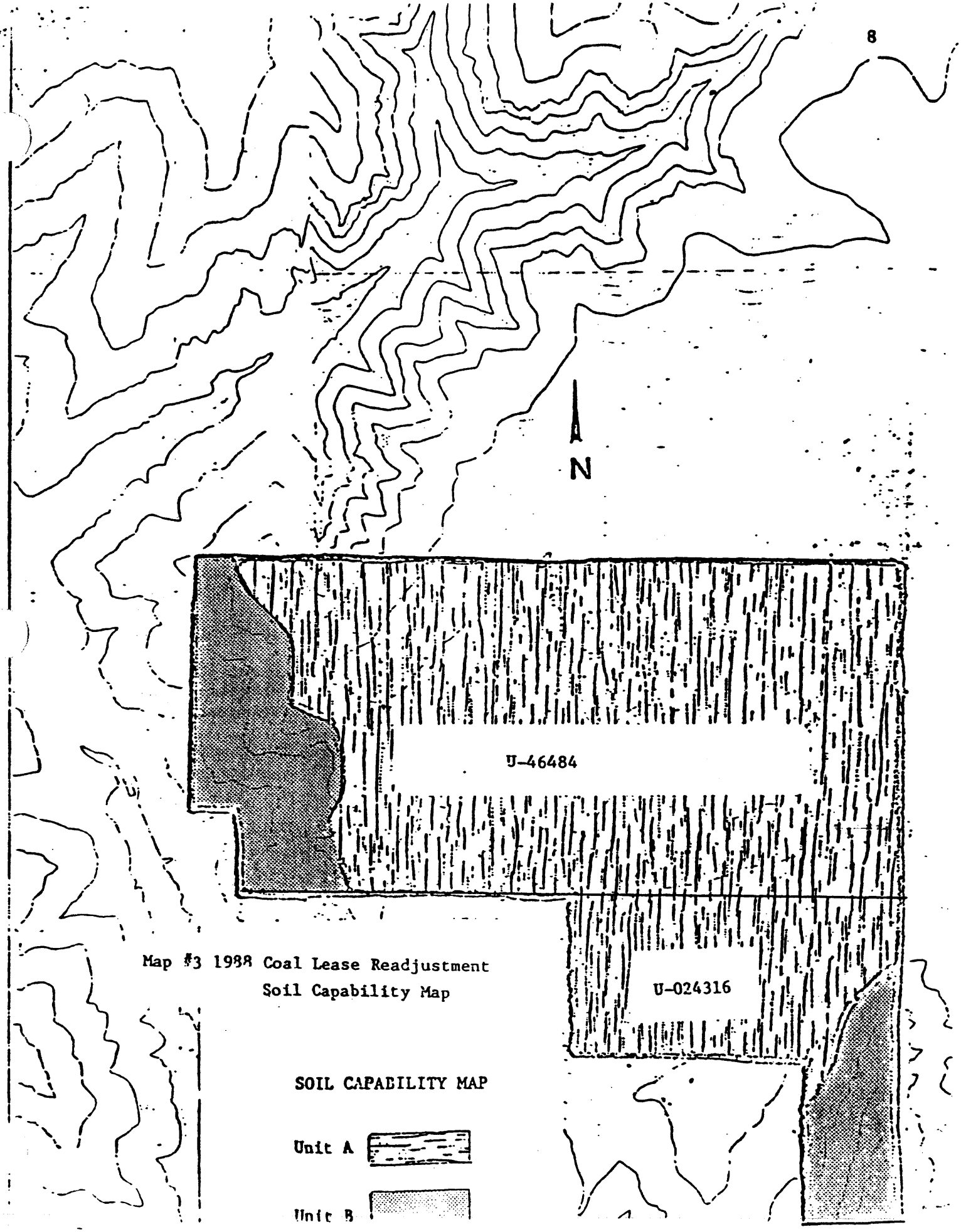
Two broad capability units were formed from the consolidation of mapping units (Map #3). This was based on their inherent characteristics and their response to management activities. Interpretations address sediment production, fertility and soil stability.

1. Capability Unit A - This unit takes in the steep canyon walls and ridges of Lease U-024316. Soils have developed from colluvial and residual parent material. Slopes face all aspects.

   Soils are generally less than 20 inches deep. Textures for surface and subsurface soils are very gravelly and cobbly loams and clay loams. Coarse fragments range from 35 to 60 percent. The color of the surface soil is dark brown.

   With existing use, the erosion from these soils is estimated to be one ton/ acre/ year. Using sediment yield and loss of soil productivity as criteria, this rate is considered low. Disturbance of the soils by activities that completely remove the natural protective surface cover and disrupt the natural physical condition of the soil, is estimated to increase the erosion to between 4 to 7 tons per acre. This rate is considered high. Accelerated erosion will continue at a decreasing rate over time as a protective soil cover becomes established. Since these soils have a low fertility level (due to high coarse fragments, low available water, shallow soils and low organic matter), naturally revegetating to the present vegetative state, will take many years. Special revegetative measures (topsoiling, mulching, seeding, fertilizing etc.), will decrease the time establishment. Revegetation under these practices will be expensive and still take many years. Rock fall occurs in this unit in areas where the slope is greater than 80 percent: the source being the natural disintegration of the sandstone cliffs. Soil creep occurs mainly on slopes greater than 55 percent. These are generally fine textured soils underlain by decomposed shales. Slump failures are located near the upper slopes of the units.

2. Capability Unit B - This unit consists of the plateau portion of Gentry Mountain and the gentle slopes surrounding it. The slopes generally face south. Soils were formed from



Map #3 1988 Coal Lease Readjustment
Soil Capability Map

sandstone, shale and limestone parent material. These rock types are residual and colluvial products of the North Horn Formation.

Depth of soil ranges from 20 inches to greater than 40 inches. Surface soils are loams and clay loams. Subsurface soils are clay loams and gravelly clay loams. Coarse fragment content increases to about 50 percent at the lower portion of the soil profile. The surface soil has a very dark brown color.

These soils are considered to have a moderate to high fertility. This quality means that under minimal revegetative practices (disseminating seed with no seedbed preparation), a disturbed site should have a protective cover of vegetation established within several years after a disturbance. In units where the coarse fragment content is high, more than several years should be expected for revegetation. This capability unit in its natural state, shows little sign of surface and subsurface instability. Deep disturbance will create potentially unstable slope conditions on steep slopes (greater than 55 percent), and slopes with springs or a high water table. Soil erosion at present is estimated at less than one ton per acre per year (low erosion rate). Disturbance which would result in the complete removal of the natural protective surface cover and physically disturb the soil would increase the soil loss rate to between 3 and 5 tons per/acre per/year rate. This is considered a moderate erosion rate. Accelerated erosion would continue at a declining rate for several years as a protective ground cover slowly becomes re-established. Specialized revegetation practices (fertilizing, mulching, topsoiling, seeding, seedbed preparation), would hasten the development of vegetative ground cover.

E. Climate

The climate of the lease tracts is generally cool and dry. Precipitation and temperature vary with elevation. Storage rain gages at similar elevations in nearby Joe's Valley average 14.6 inches per year at valley stations to 19 inches per year on ridges. Most of the precipitation, approximately two-thirds, comes in the form of snow during the months of October through April. The maximum snow accumulation occurs about the first of March each year. Snow depths average 27 inches. Snow accumulation varies considerably with local topography. The eastern sides of ridges and the north-facing slopes accumulate the most snow. South-facing slopes are snow-free for much of the winter.

The thermal characteristics vary with elevation. Mean annual temperatures vary from 43.5 degrees Fahrenheit in the bottom of Bear Canyon to 32 degrees Fahrenheit on Wild Horse Ridge. The

annual frost-free periods for these same sites are 100 days and 40 days respectively. Mean maximum and minimum temperatures for January are 28 degrees Fahrenheit and 18 degrees Fahrenheit respectively. July mean maximum and minimum temperatures are 84 degrees Fahrenheit and 52 degrees Fahrenheit respectively.

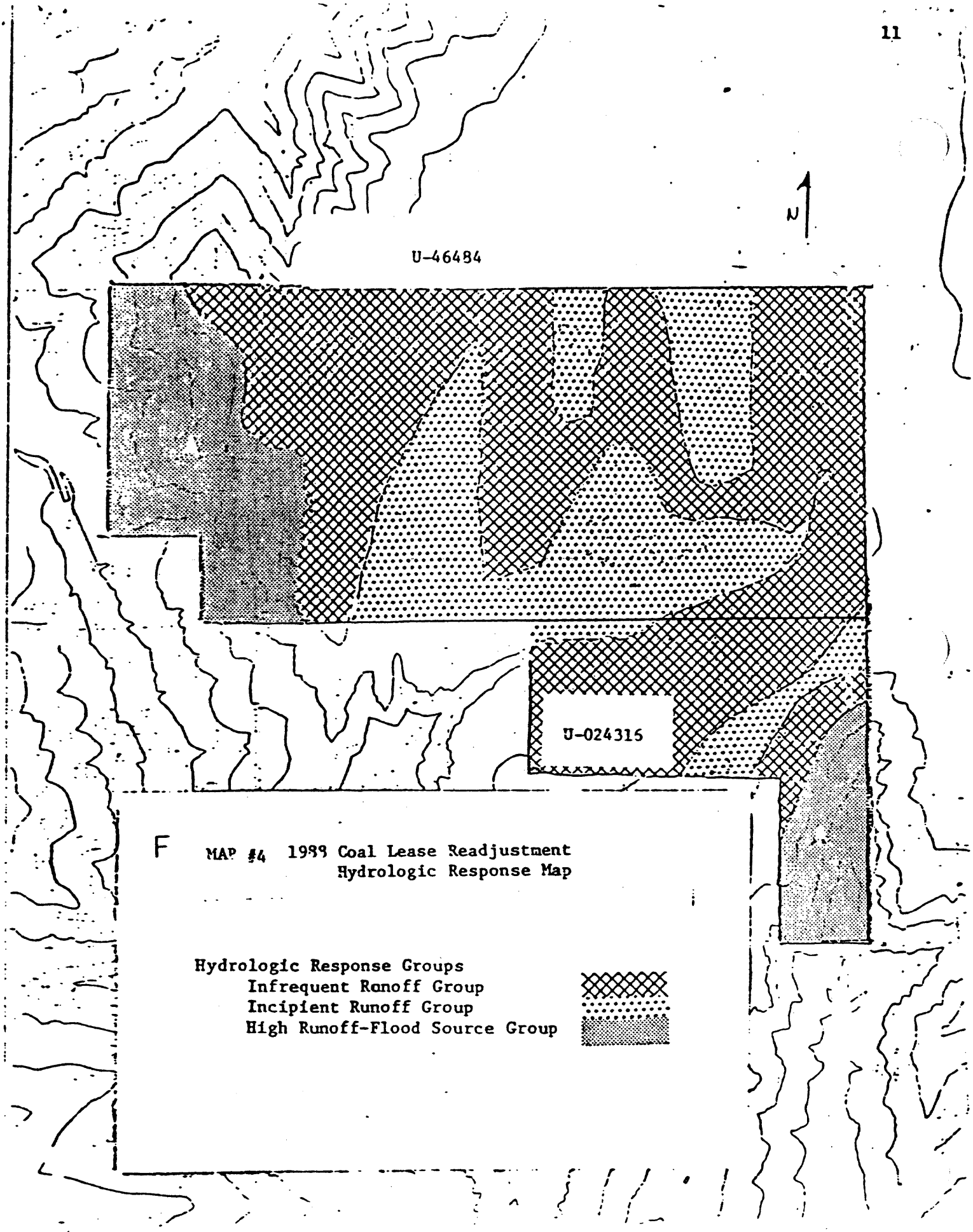
F. Surface Hydrology

The hydrologic properties of Lease U-024316 are highly variable. Runoff drains to the west into Huntington Canyon via Trail Canyon, McCadden Hollow, Bear Creek Canyon and west slopes of Gentry Mountain. The source and magnitude of surface runoff vary with land condition, elevation, geology, and soils. Using aerial photography to denote this variation, areas were delineated by hydrologic response groups (see Map #4). Runoff sources and potential, drainage patterns, and sediment delivery potential were evaluated. Where groups were observed to be particularly sensitive to disturbance, additional data was collected to further describe that sensitivity. The hydrologic response groups are summarized as the following:

1. Infrequent Runoff Group - This group has good to excellent ground cover. The high infiltration rates preclude surface runoff from high intensity storms. Subsurface water movement is substantial. Sediment production and transport are inhibited by the dense ground cover. Drainage patterns are weakly formed or deranged. Surface runoff that does occur is a result of snowmelt.

2. Incipient Runoff Group - This group produces small amounts of surface runoff nearly every year. High intensity storms produce overland flow. Snowmelt also produces runoff. Drainage patterns are weakly incised on side slopes, but may have deep cross-sections where rills empty into stream channels. Valley bottoms have good potential for mitigating short-term impacts, but can produce very large amounts of sediment if disturbed for a sustained period of several seasons. Sediment delivery from this group is generally high if not buffered by more restrictive conditions below it. For example, in some instances this group produces sediment that is buffered from sediment delivery by the Infrequent Runoff Group which traps most of the off-site sediment.

3. High Runoff-Flood Source Group - This group has a high runoff potential. It is further subdivided into sections A and B. Section A presents the greatest problems due to steep slopes, and sparse vegetation. Soil cover is minimal. Summer runoff may generate high flow rates. In 1976, the left fork of Bear Canyon was the source area for a mud-rock flow which caused considerable damage to the bridge below the old mine site. Much of section A has the potential to create this type of flow, and severely increase sediment production and transportation with high intensity runoff.


N
U-46484
U-024316
F
MAP #4 1989 Coal Lease Readjustment
Hydrologic Response Map
Hydrologic Response Groups
Infrequent Runoff Group
Incipient Runoff Group
High Runoff-Flood Source Group

Section B has more soil and vegetation than A. Slopes are generally more stable. Runoff potential is high, but tempered by the coarser nature of the surface deposits. This material is infrequently displaced during high runoff events.

G. Fire

The occurrence of wildfire, either man or lightning caused, within Lease U-024316 is low. According to records kept for the last nine years, 1977 to 1986, there has been only one recorded fire in the lease area. The lease is therefore classified as low risk occurrence.

The development of portal facilities, road construction and drilling operations on the lease would increase the man-caused hazard.

H. Wildlife and Fish

Deer use the area of Lease U-024316 for summer and some winter range. Elk use the southern ridges for winter range.

The diversity of vegetative types on the lease supports a diverse wildlife population. Besides deer and elk, other game and furbearing species may include: black bear, cougar, bobcat, red fox, grey fox, badger, coyote, snowshoe hare, and mink. Avifauna of the area may include several species of hawk, owl, eagle, jay and sparrow. Because of the diversity of habitat components, there are probably many small mammals and songbirds found on the lease which are too numerous to list in detail in this report.

There are no fisheries within the lease area. The lease area does drain into Huntington Creek which is considered a valuable fishery.

The American Bald Eagle is the only known endangered animal species that may inhabit the area. Bald Eagles are known to winter throughout the region.

Some impacts to wildlife could result from the development of this lease due either from subsidence, from underground mining or surface activities, i.e. drilling, road construction or facilities.

I. Vegetation

Trees are scattered throughout Lease U-024316. The coniferous species such as Douglas fir, Englemann spruce and white fir are found primarily on the wetter sites, the north and east facing slopes. Quaking aspen grow in clones on the wetter sites that occur on the dry, high elevation south and west aspects. Bristlecone pine and limber pine grow on the higher elevations in

harsh, dry environments. Further down the slopes in the canyon and escarpment faces there is an abundance of Utah juniper and pinyon pine.

The low-laying and brushy vegetation on the dry sites consists of: sagebrush, rabbitbrush, mountain mohogany, nail wort, thistle, elk weed, wild daisy and hard grass. The moderate-to-wetter site plant communities are made up of: serviceberry, snowberry, woods rose, yarrow, pearl everlasting, locoweed, dandelion, cinquifoil, lupine, wheatgrasses, brome, needlegrass and bluegrass. These plants grow in large open expenses primarily on the south and west aspects, ridge tops and under the sparse tree stands. The Forest Botanist investigated the lease area for threatened or endangered plant species and none were found.

J. Socio-Economic

Demand for coal has decreased in the last year or two and the prediction now is for only a moderate increase over the next 10 years. Unless there is a drastic change in this situation the present conditions should remain fairly constant.

K. Historical, Archeological and Paleontological

The general area contains only a small number of known sites. There is evidence of the Fremont Culture and early Ute usage to the south and east of the lease area. Generally, the settlements were established at the lower elevations in lower Huntington Canyon.

Lease U-024316 is considered to be an unsuitable location for archeological sites, although some of the major ridges and drainages were probably used for travelways.

Data is not available on the presence or absence of artifacts within the leasehold. Before any surface disturbing activity can be approved, site specific examination by qualified and designated individuals will be necessary.

Fossils occur on the lease, but none are found to be of significant paleontologic value.

L. Timber Management

There has been timber sale activity on the lease area in the past and some recent cutting of timber and poles. There are plans for harvesting more timber from the area covered by the lease. Merchantable timber includes Douglas fir, Engelmann spruce and white fir.

M. Range Management

Coal lease U-024317 is located within the Gentry Mountain Cattle and Horse Allotment. There are 1440 head of cattle that graze this area of the allotment. Use in the lease area is generally very low (0% - 5%).

Nearly all of the range within the lease is classified as unsuitable or non-rangeland due to steep sideslopes, stands of heavy timber, barren slopes and rock outcrops. Approximatley 25 acres in the lease is classified as suitable sagebrush range. This is the only suitable range within the lease area, see Map #5.

There are no range improvements located within the lease area.

Mining and exploration of these leases should have little effect on range management of the area. Subsidence could affect springs in the surrounding area.

IV. ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences of each alternative.

A. ALTERNATIVE ONE - NO ACTION

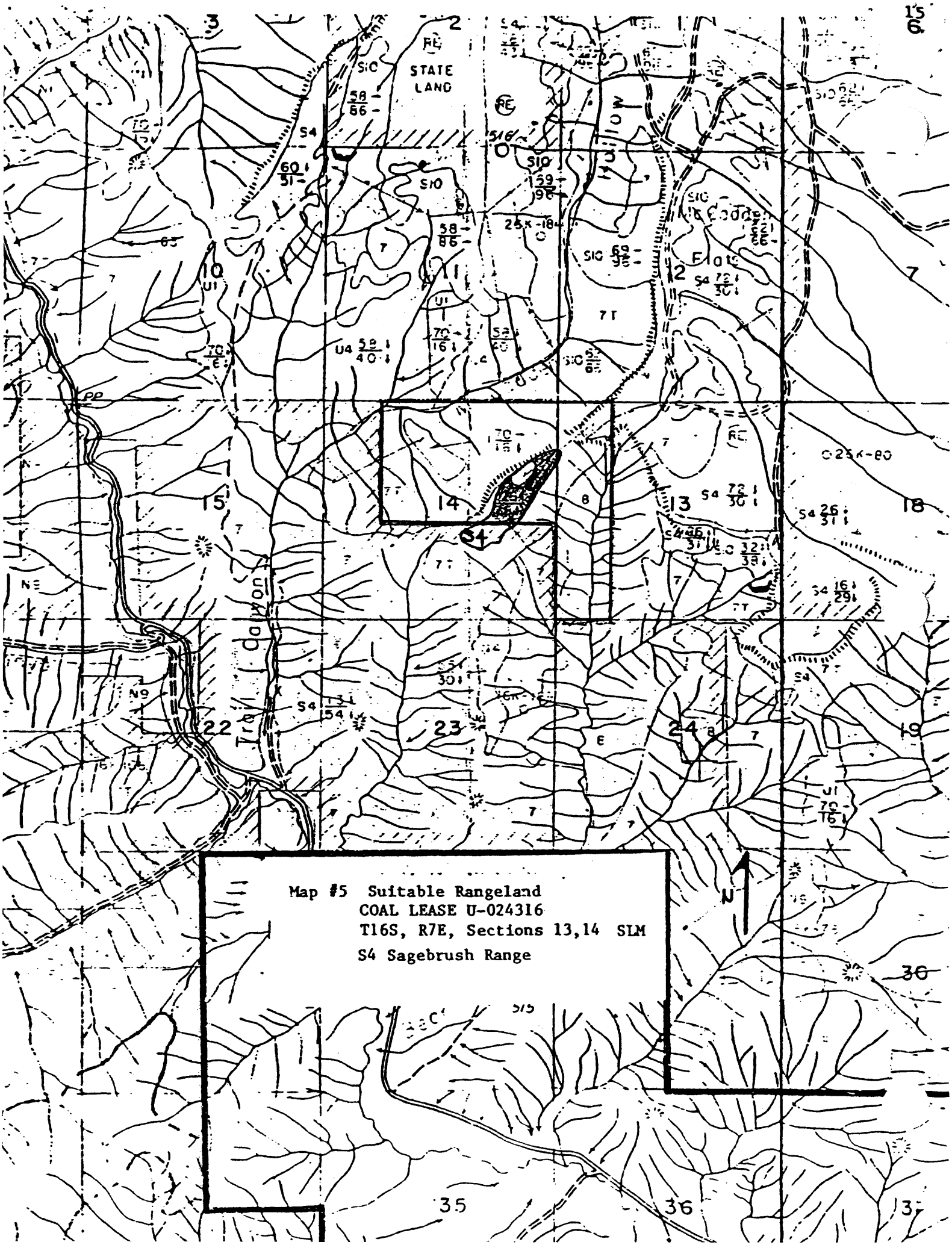
This is not considered a viable alternative due to the decisions made in the Manti-LaSal National Forest Land and Resource Management Plan. The Forest Plan ~~has made~~ provides the ~~determination~~ directions as to the stipulations which are necessary for coal leases. The present lease terms are not consistent with the Plan.

B. ALTERNATIVE TWO - NEW TERMS AND CONDITIONS

Short-Term and Residual Impacts

There should be no short-term and residual impacts related to the readjustment of coal lease U-024316. Terms and conditions listed in Appendix A should help mitigate short-term impacts and minimize residual impacts if coal is mined from this lease. If surface facilities are required for coal production, a site specific analysis and environmental assessment or environmental impact statement would be prepared. Additional stipulations would be required at that time.

Residual impacts which will occur are related to subsidence due to underground mining of coal. There will be changes to the topography and hydrology of the area. Subsidence may decrease surface water or change the location of springs and seeps. These changes will effect the vegetation and therefore the wildlife habitat and range.


STATE LAND
Map #5 Suitable Rangeland
COAL LEASE U-024316
T16S, R7E, Sections 13,14 SLM
S4 Sagebrush Range
N

Short-Term and Long-Term Productivity

There will be no long-term changes to the productivity of the area due to the readjustment of this lease. If coal is mined from the lease there will be some impacts to the productivity as a result of subsidence and changes to the hydrology. Changes may include a shift in plant communities as surface water decreases or is relocated.

Irreversible and Irretrievable Commitments

There are no irreversible or irretrievable commitments of resources associated with the readjustment of coal lease U-024316. Mining of the coal would be an irreversible commitment of a mineral resource. Subsidence is also an irreversible commitment. Irreversible and irretrievable commitments associated with construction of surface facilities would be evaluated at the time such a proposal was presented.

V. CUMULATIVE EFFECTS

There are no cumulative effects associated with the readjustment of this lease. Cumulative effects resulting from mining coal would include; increased subsidence which is effecting surrounding mined areas; changes in the area water quality; and changes to the hydrologic character of the area already impacted by mining, and additional mine and transportation facilities.

VI. PERSONNEL AND ORGANIZATIONS CONTACTED

A. Forest Service I.D. Team and Consultants

Jo Ellis	Geologist	Team Leader
Ira W. Hatch	District Ranger	Team Member
Leland Matheson	Range Conservation	" "
Gary Say	Timber/Recreation	" "
Walt Nowak	Geologist	Consultant
W.H. Boley	Forest Engineer	Team Member
Dan Larsen	Soil Scientist	" "
Dennis Kelly	Hydrologist	" "
Jim Jensen	Landscape Architect	" "
Bob Thompson	T. & E. Specialist	" "
Lee Foster	NEPA Coordinator	" "
Carter Reed	Geologist(SO Coordinator)	Consultant

B. Other Organizations Contacted

Southeastern Association of Governments

Utah Division of Wildlife Resources

Emery County Planning and Zoning

VII SELECTED REFERENCES

#1 Manti-LaSal National Forest Environmental Impact Statement and Manti-LaSal National Forest Land and Resource Management Plan.

#2 Environmental Assessment/ Technical Examination, Readjustment of Federal Coal Lease U-024316, U-024318, U-020668, 1979.

APPENDIX A

SPECIAL STIPULATIONS

Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service - Manti-LaSal National Forest.

The following stipulations pertain to the Lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on National Forest System lands.

Forest Service Stipulation #1.

Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the Lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the Lessee prior to disturbance shall immediately bring them to the attention of the appropriate authority. Paleontological remains of significant scientific interest do not include leaves, ferns or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

Forest Service Stipulation #2.

If there is reason to believe that threatened or endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports and carrying out mitigating measures shall be borne by the Lessee.

Forest Service Stipulation #3.

The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data is adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the inter-relationship of the geology, topography, surface hydrology, vegetation and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

Forest Service Stipulation #4.

Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

Forest Service Stipulation #5.

The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access road, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts.

Forest Service Stipulation #6.

The Lessee shall be required to establish a monitoring system to locate, measure and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

Forest Service Stipulation #7.

The Lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), Lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

Forest Service Stipulation #8.

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

Forest Service Stipulation #9.

In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specific approved locations.

Forest Service Stipulation #10.

The coal contained within, and authorized for mining under this lease shall be extracted only by underground mining methods.

Forest Service Stipulation #11.

Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

Forest Service Stipulation #12.

In order to protect big game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other critical wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specified periods of the year.

Forest Service Stipulation #13.

Support facilities, structures, equipment, and similar developments will be removed from the lease area within two years after the final termination of use of such facilities. This provision shall apply unless the requirement of Section 10 of the lease is applicable. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages re-established, and the areas returned to a premining land use.

Forest Service Stipulation #14.

The Lessee, at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed or displaced corner monuments (section corners, 1/4 corners, etc.) their accessories and appendages (witness trees, bearing trees, etc.) or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professionsl land surveyor registered in the State of Utah, and to the standards and guidelines found in the Manual of Surveying Instructions, United States Department of the Interior.

Forest Service Stipulation #15.

The Lessees, at their expense, will be responsible to replace any surface water identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses.

rest Service Stipulation #16

STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM
UNDER JURISDICTION OF
DEPARTMENT OF AGRICULTURE

e licensee/permittee/lessee must comply with all the rules and regulations of e Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of deral Regulations governing the use and management of the National Forest stem (NFS) when not inconsistent with the rights granted by the Secretary of e Interior in the license/prospecting permit/lease. The Secretary of riculture's rules and regulations must be complied with for (1) all use and cupancy of the NFS prior to approval of a permit/operation plan by the cretary of the Interior, (2) uses of all existing improvements, such as rest development roads, within and outside the area licensed, permitted or ased by the Secretary of the Interior, and (3) use and occupancy of the NFS t authorized by a permit/operating plan approved by the Secretary of the terior.

ll matters related to this stipulation are to be addressed

o Manti-LaSal National Forest
Price Ranger District
t 599 W. Price River Drive
Price, Utah 84501
elephone No.: 801-637-2817

ho is authorized representative of the Secretary of Agriculture.

State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

Department of Community and Culture

PALMER DePAULIS
Executive Director

State History

PHILIP F. NOTARIANNI
Division Director

RECEIVED
FEB 2 6 2007
DIV. OF OIL, GAS & MINING

February 21, 2007

Alice B. Carlton
Manti-La Sal National Forest
599 West Price River Drive
Price, UT 84501

RE: Bear Creek Canyon Area Mine (U-06-SJ-1411)

In reply, please refer to Case No. 06-2150

Dear Ms. Carlton:

The Utah State Historic Preservation Office received your request for comment on the above referenced project on January 31, 2006. You note the attachment of permit stipulations for the project and have reached a determination of No Adverse Effect.

Based on the attachment of the permit stipulations, we concur with the determination of No Adverse Effect.

This letter serves as our comment on the determinations you have made, within the consultation process specified in §36CFR800.4. If you have questions, please contact me at (801) 533-3555 or mseddon@utah.gov.

Sincerely,

Matthew T. Seddon, Ph.D., RPA
Deputy State Historic Preservation Officer – Archaeology

cc. Wayne Hedberg, UDOGM; P.O. Box 145801; Salt Lake City, UT 84114-5801

State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

Department of Community and Culture

PALMER DePAULIS
Executive Director

State History

PHILIP F. NOTARIANNI
Division Director

March 30, 2007

D. Wayne Hedberg
Utah Division of Oil, Gas, & Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

RE: Consultation on Bear Canyon Lease Expansion Area, CO-OP Mining Company, C/015/0025

In reply, please refer to Case No. 06-2150

Dear Mr. Hedberg:

The Utah State Historic Preservation Office received your request for comment on the above referenced project on March 30, 2007.

We **concur** with your determination of **No Adverse Effect**.

Utah Code 9-8-404(1)(a) denotes that your agency is responsible for all final decisions regarding cultural resources for this undertaking. Our comments here are provided as specified in U.C.A. 9-8-404(3)(a)(i). Additionally, this letter serves as our comment on the determinations you have made, within the consultation process specified in §36CFR800.4. If you have questions, please contact me at (801) 533-3555 or mseddon@utah.gov.

Sincerely,

Matthew T. Seddon, Ph.D., RPA
Deputy State Historic Preservation Officer - Archaeology

RECEIVED
MAR 30 2007
DIV. OF OIL, GAS & MINING

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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 & Mining

JOHN R. BAZA
Division Director

December 1, 2006

Carl Johnston, Federal Lands Coordinator
Office of Surface Mining
P. O. Box 46667
Denver, Colorado 80201-6667

Subject: Formal Consultation USFWS, Colorado Fish Recovery Program, Underground Water Consumption Projections and T&E Species, Co-Op Mining Company, Bear Canyon Mine, C/015/0025, Task ID #2680, Outgoing File

Dear Mr. Johnston:

The Utah State Division of Oil, Gas and Mining is currently reviewing federal and private lease additions for Co-Op Mining Company's Bear Canyon Mine. The proposed expansion area includes the addition of 80 acres to lease U-024316, 2,196 acres to lease U-61049, 1400 acres to lease U 46484, 1,108.27 acres to lease 61048 and 2,740 acres of private property to the current permit area for a total acreage of 7,524,36 acres.

The expansion project is located in Emery County, Utah. The 7.5 Minute Quadrangle map that covers the permit area expansion is the Hiawatha Quadrangle, (Geological Survey of the U.S. Department of the Interior). The legal description for the project area is as follows: T16S R7E, SLBM, sections 1, 10 all except SW1/4SW1/4, sections 11 and 12 all, section 13 - E1/2, E1/2W1/2, and 14 - E1/2NW1/4, and T16S R8E, SLBM, section 6 - S1/2NW1/4, SW1/4, S1/2SE1/4, W1/2N1/2SE1/4, section 7 all, section 8 - W1/2W1/2E1/2, sections 16, 17 and 18 all, section 19 - N1/2W1/4, NE1/4, N1/2SE1/4, section 20 - N1/2, N1/2SW1/4, NE1/4SE1/4 and section 21 all except the SW1/4SW1/4.

The Division, acting through the authority of the Office of Surface Mining (OSM), has notified the United States Fish & Wildlife Service (USFWS) and Utah Division of Wildlife Resources (DWR) of their analysis and findings regarding threatened and endangered species and potential impacts to the Colorado Fish Recovery Program.

During subsequent and informal communications with the USFWS, the USFWS clarified the action points of the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin".

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*

Bald and Golden Eagles

According to the 2006 raptor survey and DWR data, bald eagles are not known to nest in the proposed lease area but may pass through the area during the winter months or periods of migration. The applicant has committed to conducting raptor surveys yearly during the life of the mine.

The application also includes a commitment to develop a mitigation plan by July 1, 2007 in consultation with the DOGM, USFWS, BLM, USFS and DWR to mitigate impacts to golden eagle nests and or other raptors from potential escarpment failure caused by subsidence. A map of the 2006 DWR raptor survey with the nest site locations is included in the application as plate 5-3A (confidential). Plate 5-3A also shows that nests 902, 903, 904, 907, 908, 920 and 921, are located within the projected limits of predicted subsidence. The mitigation plan will include site-specific analysis of these nest sites and possibly others for potential loss due to escarpment failure and or mined panel subsidence. The applicant has also proposed to avoid mining activities in those panels during nesting periods. If unavoidable, physical obstructions such as fencing will be placed over the nest sites to prevent nesting. Additional alternatives/options will be included in the mitigation plan.

The Division requests OSM's participation in the formal consultation process with the USFWS for the Colorado River endangered fish. The USFWS field office contact information is:

Henry Maddux, Field Supervisor
or Diana Whittington
U. S. Fish and Wildlife Service
2369 West Orton Circle
West Valley City, Utah 84119
(801) 975-3330

Thank you for your assistance in this regard, please provide our office with a copy of your consultation correspondence to the USFWS.

Sincerely,

D. Wayne Hedberg

D. Wayne Hedberg,
Permit Supervisor

an
cc: Dale Harber, USFS, Manti-La Sal
Ranvir Singh, OSM, Denver
Diana Whittington, USFWS
James Kohler, BLM, State Office
Pete Hess, PFO
O:\015025.BCN\FINAL\WG2680Sec7OSM Request.doc

United States Department of the Interior
FISH AND WILDLIFE SERVICE
UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To

FWS/R6
ES/UT
7-F-0062
6-UT-07-F-009

07-01-25-01

January 22, 2007

Memorandum

To: Carl Johnston, Natural Resource Specialist, Office of Surface Mining, Denver, Colorado

From: Utah Field Supervisor, Ecological Services, U.S. Fish and Wildlife Service, West Valley City, Utah

Subject: Formal Section 7 Consultation for Co-Op Mining Company, Bear Canyon Mine, Utah State Permit C/015/0025

We received your letter of December 7, 2006, requesting concurrence that a net annual depletion of 68.72 acre-feet of water from the Price River drainage associated with the expansion of coal mining operations may affect / likely to adversely affect the federally endangered Colorado pikeminnow (*Ptychocheilus lucius*); humpback chub (*Gila cypha*); bonytail (*Gila elegans*); and razorback sucker (*Xyrauchen texanus*).

In accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*), and the Interagency Cooperation Regulations (50 CFR 402), this document transmits the Fish and Wildlife Service's (Service) biological opinion for these four fish species.

Because water depletions from the Upper Colorado River Basin are a major factor in the decline of the endangered fishes (Colorado pikeminnow, bonytail, humpback chub, and razorback sucker), the Service determined that any depletion will jeopardize their continued existence and will likely contribute to the destruction or adverse modification of their critical habitat (USDI, Fish and Wildlife Service, Region 6 Memorandum, dated July 8, 1997). To address depletion issues, the Department of the Interior; the states of Wyoming, Colorado and Utah; and the Western Area Power Administration established the Recovery Implementation Program for Endangered Fish Species in 1988. The Recovery Program acts as the reasonable and prudent alternative to avoid jeopardy to the endangered fishes by depletions from the Upper Colorado River Basin.

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DIV. OF OIL, GAS & MINING

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Utah State Office
P.O. Box 45155
Salt Lake City, UT 84145-0155
http://www.blm.gov

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SEP 22 2006

IN REPLY PLEASE REFER TO:
3482
U-61048, U-61049, U-020668
(UT-923)

Certified Mail--Return Receipt Requested

Mr. Pete Rutledge
Office of Surface Mining
P. O. Box 46667
Denver, Colorado 80201-6667

Re: Resource Recovery and Protection Plan (R2P2) Modification, Federal Coal Leases U-61048, U-61049, and U-46484, Co-Op Mining Company, Bear Canyon Mine, C/015/025

Dear Mr. Rutledge:

On July 29, 2006, the Bureau of Land Management (BLM) received a request from Co-Op Mining Company to modify the Bear Canyon R2P2 to include the Mohrland lease area, comprised of the three listed Federal coal leases. A request to modify the July 29, 2006 R2P2 modification submittal was received on September 5, 2006. These leases are included in the Bear Canyon LMU application, and will be added to the LMU R2P2 as an R2P2 modification. This letter documents the BLM's evaluation of the up-to-date R2P2 modification.

On September 2, 2005, the Office of Surface Mining determined that mining on these leases would require Federal Mining Plan approval. This R2P2 modification is included in the permit application package (PAP) for adding the listed Federal coal leases to the approved Bear Canyon Mine Permit.

The addition of the lands held in these Federal leases to the permit area would add approximately 7,500 acres of federal and private coal lands. The surface lands associated with these coal leases are either owned privately or are governed by the National Forest. This permitting action would allow CW Mining Company's wholly-owned subsidiary, Co-Op Mining, to mine, by exclusively underground methods, approximately 25 million tons of recoverable coal. Coal mining has been conducted previous to the passing of the Surface Coal Mining and Reclamation Act of 1977 on Federal leases U-61048, U-61049, and U-46484.

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The BLM found the submitted R2P2 to be acceptable. The proposed coal extraction areas of the R2P2 were determined by the BLM to comply with the lease terms, including special lease stipulation 13, which addresses subsidence damage to escarpments and perennial streams. Any additional restrictions placed on the coal recovery as depicted in this R2P2 would require consultation with the authorized officer of the BLM in order to properly address Mineral Leasing Act (MLA) requirements.

The R2P2 addresses all the required items per 43 CFR 3482.1 (b), and shows that mining is planned for all areas where potential minable coal is currently known to be located. All minable coal in two seams will either be accessed from existing mine workings, or from in-mine rock slopes of the Bear Canyon #3 and #4 Mines (located on adjacent leases). No new surface facilities are currently planned on this permit extension.

The BLM finds the R2P2 to comply with the Mineral Leasing Act of 1920, as amended, the lease terms and conditions, and the regulations in 43 CFR 3480. The BLM has also determined that the current modification will enable Maximum Economic Recovery (MER) of Federal coal. We therefore recommend that the Secretary approve the R2P2 modification as part of the Federal mine plan approval.

If the permit authorized by the Division of Oil Gas and Mining results in changes to the mining plan that would effect the coal recovery outlined in this R2P2, the BLM will need to review these changes to ensure that the mining plan is still in conformance with the Mineral Leasing Act of 1920 as amended, the lease terms and conditions and achieves MER of the Federal coal.

If you have any questions, please contact Jeff McKenzie of my staff at 801-539-4038 or Stephen Falk at the Price Field Office at 435-636-3605.

In order to further define and clarify the process in the Recovery Program, a section 7 agreement was implemented on October 15, 1993, by the Recovery Program participants. Incorporated into this agreement is a Recovery Implementation Program Recovery Action Plan (Plan) which identifies actions currently believed to be required to recover the endangered fishes in the most expeditious manner.

Included in the Recovery Program was the requirement that a depletion fee would be paid to help support the Recovery Program. On July 8, 1997, the Service issued an intra-Service biological opinion determining that the depletion fee for average annual depletions of 100 acre-feet or less are no longer required because the Recovery Program has made sufficient progress to be the reasonable and prudent alternative to avoid the likelihood of jeopardy to the endangered fishes and to avoid destruction or adverse modification of their critical habitat by depletions of 100 acre-feet of less. The average annual water depletion for this project is estimated to be 68.72 acre-feet. Therefore, the depletion fee for this project is waived.

In response to concerns regarding potential impacts to golden eagle nests located within the zone of subsidence risk, a commitment has been made by the Co-op Mine, with the assistance of participating agencies (including UDOGM, OSM, BLM, FS, UDWR, and FWS) to develop and implement a raptor Mitigation Plan. This plan will provide guidance and specific measures such that impacts to golden eagles will be avoided and minimized to the extent possible. We look forward to working with you and the other participating agencies toward the completion and implementation of this plan.

In addition to the federally listed species, three conservation agreement species (flannelmouth sucker (Catostomus latipinnis); bluehead sucker (Catostomus discobolus); and roundtail chub (Gila robusta)) occur in the Price River and other tributaries to the Green River. We encourage OSM and the participating agencies to work with the Utah Division of Wildlife Resources to minimize impacts to native fish populations in the Price River and assist in the conservation of these species and their habitat throughout their range.

We appreciate your commitment in conserving endangered species. If further assistance is needed or you have any questions, please contact Tom Chart, at (801) 975-3330 extension 144.

T. Chart

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MAR 3 0 2007
DIV. OF OIL, GAS & MINING

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

April 4, 2007

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

FROM: Joe Helfrich, Environmental Scientist, Biology

RE: DOGM's Informal Consultation with USFWS and Informal Decision for the Bear Canyon Mine Lease Additions, Co-op Mining Company, Bear Canyon Mine, C/015/0025, Task ID #2734

DOGM TECHNICAL ANALYSIS SUMMARY:

SUMMARY:

On July 22, 2005 Co-Op Mining Company, (aka C. W. Mining Company) submitted an amendment to add 80 acres to lease U-024316, 2,196 acres to lease U-61049, 1400 acres to lease U- 46484, 1,108.27 acres to lease U-61048 and 2,740 acres of private property to the current permit area. On May 21, 2006, Co-Op Mining Company submitted a response to the deficiencies enumerated in the Divisions first technical review. On August 9, 2006, Co-Op Mining Company hand delivered a response to the deficiencies enumerated in the Divisions second technical review. On October 30, 2006, Co-Op Mining Company hand delivered a response to the deficiencies enumerated in the Divisions third technical review. On January 22, 2007, Co-Op Mining Company hand delivered a response to the deficiencies enumerated in the Divisions fourth technical review. The lease additions are extensions of existing leases for the Bear Canyon mine located in Huntington Canyon. This memo will include a review of the regulations that include the requirements of the endangered species act and consultation with the U. S. Fish & Wildlife Service (USFWS).

THREATENED, ENDANGERED, AND SENSITIVE ANIMAL/PLANT SPECIES

The Emery County TES list includes Bald Eagle, (*Haliaeetus leucocephalus*), Barneby Reed-mustard, (*Schoenocrambe barnebyi*), Black-footed Ferret (*Mustela nigripes*), Bonytail, (*Gila elegans*), Colorado Pikeminnow, (*Ptychocheilus lucius*), Humpback Chub, (*Gila cypha*), Jones Cycladenia, (*Cycladenia humilis var. jonesii*), Last Chance Townsendia, (*Townsendia aprica*), Maguire Daisy, (*Erigeron maguirei*), Mexican Spotted Owl, (*Strix occidentalis*), Razorback Sucker,

(*Xyrauchen texanus*), San Rafael Cactus, (*Pediocactus despainii*), Winkler Cactus, (*Pediocactus winkleri*), Wright Fishhook Cactus, (*Sclerocactus wrightiae*), Southwestern Willow Flycatcher, (*Empidonax traillii extimus*) and Yellow-billed Cuckoo, (*Coccyzus americanus*).

Additional species in Utah's Sensitive species list include the following;

Conservation Agreement Species

Northern Goshawk	*Accipiter gentilis*

Wildlife Species of Concern

Grasshopper Sparrow	*Ammodramus savannarum*
Short-eared Owl	*Asio flammeus*
Burrowing Owl	*Athene cunicularia*
Ferruginous Hawk	*Buteo regalis*
Greater Sage-grouse	*Centrocercus urophasianus*
Black Swift	*Cypseloides niger*
Bobolink	*Dolichonyx oryzivorus*
Lewis's Woodpecker	*Melanerpes lewis*
Long-billed Curlew	*Numenius americanus*
American White Pelican	*Pelecanus erythrorhynchos*
Three-toed Woodpecker	*Picoides tridactylus*
Sharp-tailed Grouse	*Tympanuchus phasianellus*

The Application meets the requirements of R645-301-322 because the Application or Mining and Reclamation Plan (MRP) provides supporting documentation, and maps on threatened, endangered, and sensitive (TES) species that could occur within or adjacent to the proposed lease area additions. According to the Division of Wildlife Resources (DWR) the only species of concern because of the relatively high elevation were the Townsend's Big Eared Bat and the Flamulated Owl for which a study was completed. The results of the study revealed that neither of the species occurred in the area.

Bald and Golden Eagles

According to the 2006, raptor survey and data with the DWR bald eagles are not known to nest in the proposed lease area but may pass through during the winter months or periods of migration. The Applicant has committed to conducting Raptor surveys yearly during the life of the mine.

Chapter three page 3-68 of the application includes a commitment to develop a raptor mitigation plan by July 1, 2007 in consultation with the DWR, DOGM, USFWS, U.S. Forest Sercice (USFS). and the Bureau of Land Management (BLM) to mitigate impacts to nests and or raptors from potential escarpment failure caused

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Salt Lake City, UT 84145-0155
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IN REPLY PLEASE REFER TO:
3482
U-61048, U-61049, U-020668
(UT-923)

Certified Mail--Return Receipt Requested

Mr. Pete Rutledge
Office of Surface Mining
P. O. Box 46667
Denver, Colorado 80201-6667

Re: Resource Recovery and Protection Plan (R2P2) Modification, Federal Coal Leases U-61048, U-61049, and U-46484, Co-Op Mining Company, Bear Canyon Mine, C/015/025

Dear Mr. Rutledge:

On July 29, 2006, the Bureau of Land Management (BLM) received a request from Co-Op Mining Company to modify the Bear Canyon R2P2 to include the Mohrland lease area, comprised of the three listed Federal coal leases. A request to modify the July 29, 2006 R2P2 modification submittal was received on September 5, 2006. These leases are included in the Bear Canyon LMU application, and will be added to the LMU R2P2 as an R2P2 modification. This letter documents the BLM's evaluation of the up-to-date R2P2 modification.

On September 2, 2005, the Office of Surface Mining determined that mining on these leases would require Federal Mining Plan approval. This R2P2 modification is included in the permit application package (PAP) for adding the listed Federal coal leases to the approved Bear Canyon Mine Permit.

The addition of the lands held in these Federal leases to the permit area would add approximately 7,500 acres of federal and private coal lands. The surface lands associated with these coal leases are either owned privately or are governed by the National Forest. This permitting action would allow CW Mining Company's wholly-owned subsidiary, Co-Op Mining, to mine, by exclusively underground methods, approximately 25 million tons of recoverable coal. Coal mining has been conducted previous to the passing of the Surface Coal Mining and Reclamation Act of 1977 on Federal leases U-61048, U-61049, and U-46484.

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The BLM found the submitted R2P2 to be acceptable. The proposed coal extraction areas of the R2P2 were determined by the BLM to comply with the lease terms, including special lease stipulation 13, which addresses subsidence damage to escarpments and perennial streams. Any additional restrictions placed on the coal recovery as depicted in this R2P2 would require consultation with the authorized officer of the BLM in order to properly address Mineral Leasing Act (MLA) requirements.

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The BLM finds the R2P2 to comply with the Mineral Leasing Act of 1920, as amended, the lease terms and conditions, and the regulations in 43 CFR 3480. The BLM has also determined that the current modification will enable Maximum Economic Recovery (MER) of Federal coal. We therefore recommend that the Secretary approve the R2P2 modification as part of the Federal mine plan approval.

If the permit authorized by the Division of Oil Gas and Mining results in changes to the mining plan that would effect the coal recovery outlined in this R2P2, the BLM will need to review these changes to ensure that the mining plan is still in conformance with the Mineral Leasing Act of 1920 as amended, the lease terms and conditions and achieves MER of the Federal coal.

If you have any questions, please contact Jeff McKenzie of my staff at 801-539-4038 or Stephen Falk at the Price Field Office at 435-636-3605.

Sincerely,

JAMES F KOHLER

James F. Kohler
Chief, Solid Minerals Branch

Enclosure
Approved Mine Maps

cc: Division of Oil Gas and Mining, State of Utah
1594 West North Temple Street, Suite 1210
Salt Lake City, Utah 84114-5801

Price Field Office, UT-070

C. W. Mining Company
P. O. Box 1202
Huntington, Utah 84528

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DIV. OF OIL, GAS & MINING

0040

United States Department of the Interior

OFFICE OF SURFACE MINING
Reclamation and Enforcement
P.O. Box 46667
Denver, Colorado 80201-6667

IN REPLY REFER TO:

UT-0053
C/015/0028

September 2, 2005

Utah Division of Oil, Gas, & Mining
Coal Regulatory Program
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

RECEIVED
SEP 0 6 2005
DIV. OF OIL, GAS & MINING

RE: CO-OP Mining Company - "Bear Canyon" Mine - Application for a Permit Revision, Lease Addition, Task Id No. 2292

Dear Sir or Madam:

This is in response to the Utah Division of Oil, Gas, & Mining's (UT-DOGM) August 3, 2005, request for a decision, under 30 CFR 944.30, whether the above subject permit revision constitutes a mining plan modification.

Mining plan approvals by the Secretary of the Interior are required under the Mineral Leasing Act of 1920, 30 U.S.C. 181, *et seq.* before coal mining can occur on Federal lands. This letter serves to document OSM's determination whether or not a mining plan approval from the Secretary is required for the above permitting action.

OSM's review of the Application for a Permit Revision, Lease Addition, has determined that it proposes to add approximately sixty (60) acres to Federal lease U-024316, add 2,196 acres in new Federal lease U-61049, add 1,400 acres of new Federal lease U-46484, add 1,102 acres of new Federal lease U-61048, and add 2,740 acres of fee coal to the Bear Canyon mine, Utah State permit C/015/025.

Based on a review of the activities associated with the permit revision, OSM has determined that the proposal does meet the requirements of 30 CFR 746.18(d)(3) and 746.18(d)(4). Therefore, the proposed Significant Permit Revision does constitute a mining plan action requiring Secretarial approval.

OSM's decision was based solely upon the Federal regulations under 30 CFR PART 746 and not the technical aspects of the revision application itself. Consequently, OSM's decision does not relieve UT-DOGM from coordinating the review and approval of the Application for a Permit Revision, Lease Addition, with other Federal agencies for compliance with other Federal regulations.

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OSM also electronically transmitted the August 3, 2005, request to the Bureau of Land Management and the U.S. Forest Service for their review and comment.

In an electronic transmittal dated August 15, 2005, the U.S. Forest service stated in its opinion the permit revision did constitute a mining plan action requiring Secretarial approval.

The Bureau of Land Management did not provide any comments in the thirty day time frame established by the Federal regulations under 30 CFR 944.30, Article VI. D.

Please notify the applicant of our decision on this matter.

Should you have any questions regarding this letter or approval, please contact Carl R. Johnston, Utah Federal Lands coordinator, at (303) 844-1400, extension 1500.

Sincerely,

Ranvir Singh

Ranvir Singh
Manager, Northwest Branch

cc: BLM - Utah State Office
BLM - Price Field Office
USFS - Manti-La Sal NF
Denver Field Division

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

March 23, 2007

To: Compliance File

From: Pamela Grubaugh-Littig, Permit Supervisor

Re: 510 (c) Recommendation for Co-Op Mining Company, Bear Canyon Mine, C/015/0025

As of this writing of this memo, there are no NOVs or COs which are not corrected or in the process of being corrected for the Bear Canyon Mine. There are no finalized civil penalties, which are outstanding and overdue in the name of Co-Op Mining Company. Co-Op Mining Company does not have a demonstrated pattern of willful violations, nor have they been subject to any bond forfeitures for any operation in the state of Utah.

Attached is a recommendation from the OSM Applicant Violator System for the Bear Canyon Mine that states there are no outstanding violations.

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United States Department of the Interior

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

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SEP 22 2006

IN REPLY PLEASE REFER TO:
3482
U-61048, U-61049, U-020668
(UT-923)

Certified Mail--Return Receipt Requested

Mr. Pete Rutledge
Office of Surface Mining
P. O. Box 46667
Denver, Colorado 80201-6667

Re: Resource Recovery and Protection Plan (R2P2) Modification, Federal Coal Leases U-61048, U-61049, and U-46484, Co-Op Mining Company, Bear Canyon Mine, C/015/025

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DIV. OF OIL, GAS & MINING

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If you have any questions, please contact Jeff McKenzie of my staff at 801-539-4038 or Stephen Falk at the Price Field Office at 435-636-3605.

Sincerely,

JAMES F KOHLER

James F. Kohler
Chief, Solid Minerals Branch

Enclosure
Approved Mine Maps

cc: Division of Oil Gas and Mining, State of Utah
1594 West North Temple Street, Suite 1210
Salt Lake City, Utah 84114-5801

Price Field Office, UT-070

C. W. Mining Company
P. O. Box 1202
Huntington, Utah 84528

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DIV. OF OIL, GAS & MINING

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

March 23, 2007

To: Compliance File

From: Pamela Grubaugh-Littig, Permit Supervisor

Re: 510 (c) Recommendation for Co-Op Mining Company, Bear Canyon Mine, C/015/0025

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O:\015025.BCN\FINAL\PERMIT\Bear Canyon Extension 2007\AVSmemo03232007.doc

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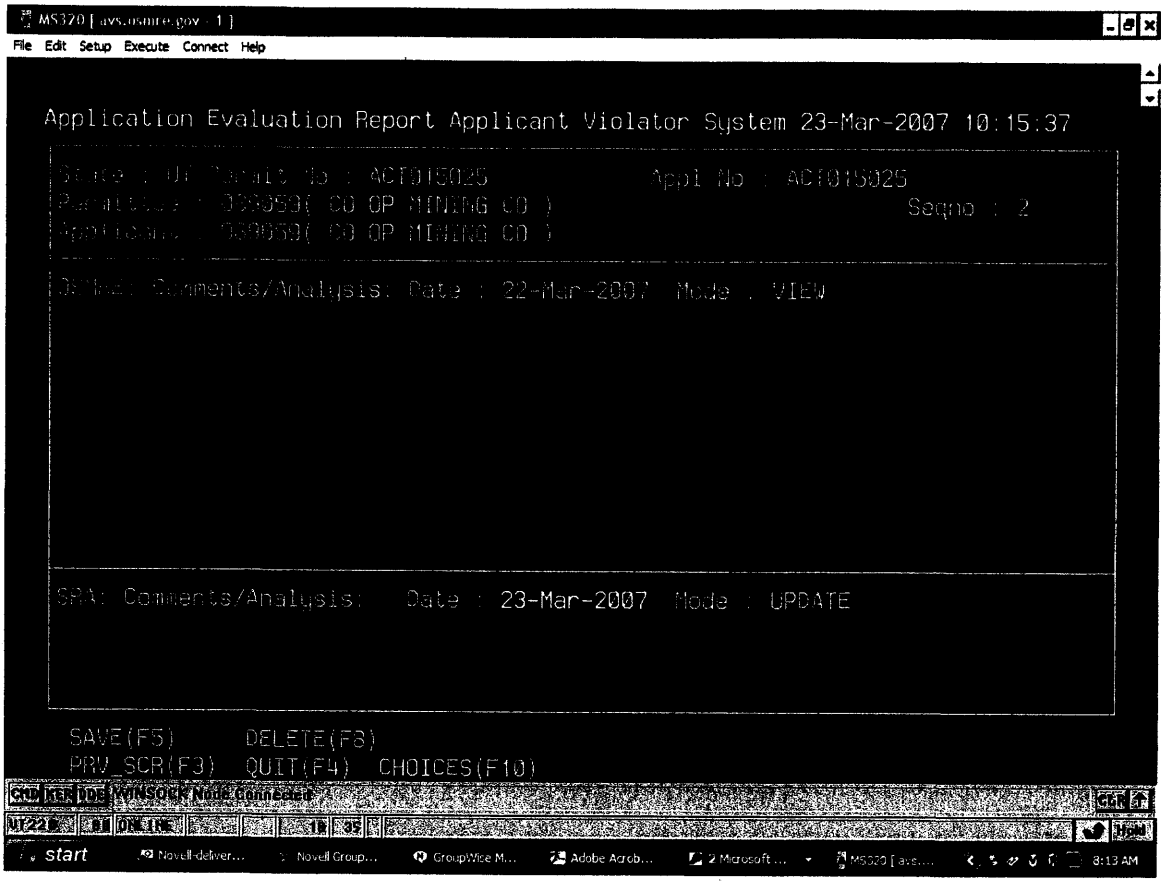
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*


MS320 [avs.osmre.gov - 1]
File Edit Setup Execute Connect Help
Application Evaluation Report Applicant Violator System 23-Mar-2007 10:15:37
State : UT Permit No : ACT015025
Appl No : ACT015025
Seqno : 2
Comments/Analysis: Date : 22-Mar-2007 Mode : VIEW
SRA: Comments/Analysis: Date : 23-Mar-2007 Mode : UPDATE
SAVE(F5) DELETE(F8)
PRV_SCR(F3) QUIT(F4) CHOICES(F10)
WINSOCK Node Connected
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8:13 AM

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

April 4, 2007

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

FROM: Joe Helfrich, Environmental Scientist, Biology

RE: DOGM's Informal Consultation with USFWS and Informal Decision for the Bear Canyon Mine Lease Additions, Co-op Mining Company, Bear Canyon Mine, C/015/0025, Task ID #2734

DOGM TECHNICAL ANALYSIS SUMMARY:

SUMMARY:

On July 22, 2005 Co-Op Mining Company, (aka C. W. Mining Company) submitted an amendment to add 80 acres to lease U-024316, 2,196 acres to lease U-61049, 1400 acres to lease U- 46484, 1,108.27 acres to lease U-61048 and 2,740 acres of private property to the current permit area. On May 21, 2006, Co-Op Mining Company submitted a response to the deficiencies enumerated in the Divisions first technical review. On August 9, 2006, Co-Op Mining Company hand delivered a response to the deficiencies enumerated in the Divisions second technical review. On October 30, 2006, Co-Op Mining Company hand delivered a response to the deficiencies enumerated in the Divisions third technical review. On January 22, 2007, Co-Op Mining Company hand delivered a response to the deficiencies enumerated in the Divisions fourth technical review. The lease additions are extensions of existing leases for the Bear Canyon mine located in Huntington Canyon. This memo will include a review of the regulations that include the requirements of the endangered species act and consultation with the U. S. Fish & Wildlife Service (USFWS).

THREATENED, ENDANGERED, AND SENSITIVE ANIMAL/PLANT SPECIES

The Emery County TES list includes Bald Eagle, (*Haliaeetus leucocephalus*), Barneby Reed-mustard, (*Schoenocrambe barnebyi*), Black-footed Ferret (*Mustela nigripes*), Bonytail, (*Gila elegans*), Colorado Pikeminnow, (*Ptychocheilus lucius*), Humpback Chub, (*Gila cypha*), Jones Cycladenia, (*Cycladenia humilis var. jonesii*), Last Chance Townsendia, (*Townsendia aprica*), Maguire Daisy, (*Erigeron maguirei*), Mexican Spotted Owl, (*Strix occidentalis*), Razorback Sucker,

(*Xyrauchen texanus*), San Rafael Cactus, (*Pediocactus despainii*), Winkler Cactus, (*Pediocactus winkleri*), Wright Fishhook Cactus, (*Sclerocactus wrightiae*), Southwestern Willow Flycatcher, (*Empidonax traillii extimus*) and Yellow-billed Cuckoo, (*Coccyzus americanus*).

Additional species in Utah's Sensitive species list include the following;

Conservation Agreement Species

Northern Goshawk	*Accipiter gentilis*

Wildlife Species of Concern

Grasshopper Sparrow	*Ammodramus savannarum*
Short-eared Owl	*Asio flammeus*
Burrowing Owl	*Athene cunicularia*
Ferruginous Hawk	*Buteo regalis*
Greater Sage-grouse	*Centrocercus urophasianus*
Black Swift	*Cypseloides niger*
Bobolink	*Dolichonyx oryzivorus*
Lewis's Woodpecker	*Melanerpes lewis*
Long-billed Curlew	*Numenius americanus*
American White Pelican	*Pelecanus erythrorhynchos*
Three-toed Woodpecker	*Picoides tridactylus*
Sharp-tailed Grouse	*Tympanuchus phasianellus*

The Application meets the requirements of R645-301-322 because the Application or Mining and Reclamation Plan (MRP) provides supporting documentation, and maps on threatened, endangered, and sensitive (TES) species that could occur within or adjacent to the proposed lease area additions. According to the Division of Wildlife Resources (DWR) the only species of concern because of the relatively high elevation were the Townsend's Big Eared Bat and the Flamulated Owl for which a study was completed. The results of the study revealed that neither of the species occurred in the area.

Bald and Golden Eagles

According to the 2006, raptor survey and data with the DWR bald eagles are not known to nest in the proposed lease area but may pass through during the winter months or periods of migration. The Applicant has committed to conducting Raptor surveys yearly during the life of the mine.

Chapter three page 3-68 of the application includes a commitment to develop a raptor mitigation plan by July 1, 2007 in consultation with the DWR, DOGM, USFWS, U.S. Forest Sercice (USFS). and the Bureau of Land Management (BLM) to mitigate impacts to nests and or raptors from potential escarpment failure caused

by subsidence. A map of the 2006, DWR raptor survey with the nest site locations is included in the application as plate 5-3A. Plate 5-3A also shows that nests 902, 903, 904, 907, 908, 920 and 921, are within the limits of predicted subsidence. The mitigation plan needs to include site-specific analysis of these nest sites and possibly others for potential loss due to escarpment failure. It should also be noted that C. W. Mining Company would need authorization from the USFS to mine under escarpment areas, (Federal Lease Stipulation #13). The applicant has also proposed to avoid mining activities in the panels during nesting periods. If unavoidable obstructions such as fencing will be placed over the nest sites to prevent nesting. Additional alternatives will be included in the mitigation plan.

All supporting surveys (MRP) on TES plant and animal species show that there were no observations of threatened or endangered species in the areas surveyed. There have been no confirmed sightings of black-footed ferrets within Carbon County during 1995, 1996, and the first quarter of 1997 (DWR, Section 322.200).

DOGM INFORMAL, CONSULTATION WITH USFWS SUMMARY:

The Division initiated informal consultation with the USFWS (Betsy Herrmann) on January 22, 2007 for this application. Joe Helfrich and Wayne Hedberg informed Betsy that there was no surface disturbance for the extension area and no known TES species according to the survey performed by Dr. Collins. Joe also discussed with Betsy the mine water consumption calculations for the mine that resulted in an estimated consumption of 69 acre-feet per year which constitutes a "May affect, is likely to adversely affect" determination. Because the mine water consumption was greater than zero and constituted a may affect determination, the information on the four endangered fish species was forwarded to the Office of Surface Mining Reclamation and Enforcement (OSM). On December 6, 2006, OSM initiated formal consultation with the USFWS. Copies of the correspondence between the two agencies are included in the Division's application package to OSM for Federal mining plan approval.

DOGM INFORMAL DECISION

The Division has determined that the proposed Bear Canyon Mine lease additions will have "no effect" on the Bald eagle, Barneby Reed-mustard, Black-footed Ferret, Jones Cycladenia, Last Chance Townsendia, Maguire Daisy, Mexican Spotted Owl, San Rafael Cactus, Winkler Cactus, Wright Fishhook Cactus, Southwestern Willow Flycatcher, and Yellow-billed Cuckoo, since there will be no surface disturbance and there are no observations that support the presence of the listed threatened and endangered species.

State of Utah

Department of Natural Resources

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas & Mining

JOHN R. BAZA
Division Director

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

April 4, 2007

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

FROM: Joe Helfrich, Environmental Scientist, Biology

RE: DOGM's Informal Consultation with USFWS and Informal Decision for the Bear Canyon Mine Lease Additions, Co-op Mining Company, Bear Canyon Mine, C/015/0025, Task ID #2734

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