State Decision Document

Mill Fork West Lease Addition
Incidental Boundary Change
Deer Creek Mine
C/015/0018

January 19, 2007

File in:
- ☐ Confidential
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- ☒ Expandable

Refer to Record No. 0004 Date 01192007
In C/0150018 Outgoing
For additional information

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

PacifiCorp
Mill Fork West Lease Addition
Incidental Boundary Change
Deer Creek Mine
C/015/0018
Emery County, Utah

January 19, 2007

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  - BLM R2P2, dated September 22, 2006
  - OSM determination that this action does constitute a mining plan modification, dated July 11, 2006

ADMINISTRATIVE OVERVIEW

PacifiCorp
Mill Fork West Lease Addition
Incidental Boundary Change
Deer Creek Mine
C/015/0018
Emery County, Utah

January 19, 2007

PROPOSAL:

In 1997 the Permittee, PacifiCorp, received approval to expand its mining operations into the North Rilda Area in and adjacent to Rilda Canyon. In 1999, the Mill Fork Tract added 5,562.82 acres to the Deer Creek Mine permit. On June 1, 2006 PacifiCorp submitted an amendment to include the Mill Fork West Extension Tract LBA/Federal Lease UTU-84285 to the Deer Creek Mine permit boundary. This lease tract for 213.57 acres was issued by the Bureau of Land Management on November 1, 2006.

This proposal to add 213.57 acres is an incidental boundary change (9.6% additional acreage) and does not require publication. This proposal, however, is a mining plan modification as determined by the Office of Surface Mining and requires mining plan approval.

BACKGROUND:

The original permit for the Deer Creek Mine was issued February 7, 1986 for approximately 14,620 acres. The mining plan for Federal leases SL-064607-064621, SL-064900, SL-070645, U-1358, U-02292, U-084923, U-084924, U-083066, U-040151, U-044025, U-014275, U-024319, and U-47979 was approved on October 11, 1985 for the Deer Creek Mine. A Waste Rock Storage Facility was added September 1988. The permit was renewed on February 7, 1991.

The January 8, 1993 mining plan approval (IBC-1) added 120 acres of coal (80 acres in a portion of Lease No. U-47977 and 40 acres in a portion of Lease No. SL-050862). The July 22, 1993 mining plan approval (IBC-2) added 160 acres (80 acres in a portion of Lease U-47977 and 80 acres in a portion of Lease SL-050862).

PacifiCorp submitted an application for the Rilda Canyon Lease Extension, which included Leases U-7653, U-47977, U-06039, and SL-050862 on February 12, 1990 and resubmitted an application on February 8, 1994. This submittal was revised on June 27, 1994, as an incidental boundary change (IBC-3) to include development mining only in U-06039, U-47977, and SL-050862 (approximately 100,000 tons). Included in the revised application was

longwall mining the Second, Third and Fourth East panels and development mining in the Third North Mains and the Sixth East Gate. Longwall mining would proceed in areas that were previously approved as incidental boundary changes with mining plan approval dates of January 8, 1993 (IBC-1) and July 22, 1993 (IBC-2). Entry development mining in the Third North Mains and the Sixth East Gates entailed about 40 acres beyond the the approved permit boundary in Leases U-06039, U-47977 and SL-050862. IBC-3 was approved July 28, 1994.

The Rilda Canyon Lease Extension to mine in federal leases U-7653, U-47977, SL-050862, part of U-06039, and state lease ML-22509 was approved on December 13, 1994.

A modification to lease U-06039 (not requiring mining plan approval) to mine 42.97 acres (or approximately 100,000 tons) was submitted on May 26, 1995 and approved on June 13, 1995.

Construction of the original surface facilities (Left Fork Fan Portal) in Rilda Canyon was a significant revision to the Deer Creek Mine permit and was submitted on March 29, 1994. The approval to construct surface facilities in Rilda Canyon was granted on July 31, 1995, with nine conditions. All of the conditions were met on November 8, 1995.

PacifiCorp submitted an application for the North Rilda Area (which included Federal Leases U-24317, U-2810, U-06039, SL-051221 and fee coal), for a total of 1960 acres on February 4, 1997. This application was approved on July 15, 1997, which brought the total permitted area of the Deer Creek Mine to approximately 18,706 acres.

In order to access the Mill Fork lease, PacifiCorp acquired a lease modification to lease U-06039. This modification, consisting of 65.7 acres, was added to the Deer Creek permit on August 14, 2002 as an incidental boundary change.

PacifiCorp submitted an application for the Mill Fork Lease (State Lease ML-48258), to the Division of Oil, Gas and Mining on October 29, 2001. The coal tract as described in the lease contains 5,562.82 acres, more or less. This represented about 64 million tons of minable coal to be produced over the life of the mine in this area. Approval on March 5, 2003 for mining in the SITLA Mill Fork lease added 5, 562.82 acres to the Deer Creek Mine. This mining is conducted in the Blind Canyon and Hiawatha seams.

The North Rilda Canyon Facilities were approved in December 21, 2005 primarily for ventilation and to move materials into the mine closer to the active workings.

ANALYSIS:

The Division of Oil Gas and Mining has conducted an Administrative and Technical Analysis (TA) of the proposed mine Permit Application Package (PAP) for the proposed Mill Fork West Extension/Federal Lease IBC. All appropriate State and Federal agencies have been consulted regarding this proposal. The probable hydrologic consequences of the action have

been analyzed and a Cumulative Hydrologic Impact Assessment (CHIA) has been prepared. This proposal was an incidental boundary change and did not require public participation according to the Utah Coal Regulatory Program. The application meets the requirements of the Utah Coal Regulatory Program.

RECOMMENDATION:

This recommendation is based on the complete PAP, the TA conducted by the Division, the CHIA also prepared by the Division, and the administrative record. PacifiCorp has demonstrated that mining can be done in conformance with the Surface Mining Control and Reclamation Act, and the corresponding Utah Act and performance standards. The 510 (c) report on the Applicant Violator System was verified for this mine on January 9, 2007 and there are no violations.

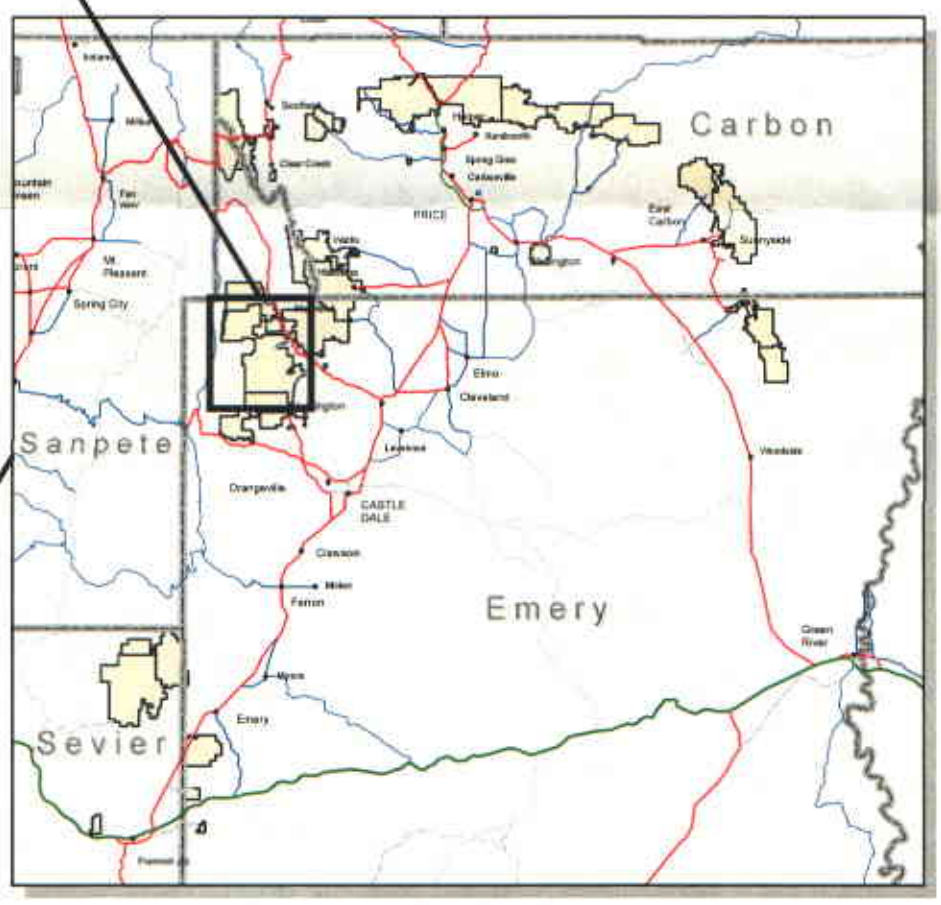
Proposed Mine Plan Modification

Deer Creek Mine and Waste Rock Site

C0150018
Carbon County, Utah
January 2007

Township 16 South Range 6 & 7 East
Township 16 South Range 6 & 7 East

Permit Area
Proposed Mining Plan Modification UTU-84285
Previous Mining Plan Approval



Locator Map

File: N:/gis/coal/coalareamaps/C0150018-MiningPlan.pdf

PERMITTING CHRONOLOGY

PacifiCorp
Mill Fork West Lease Addition
Incidental Boundary Change
Deer Creek Mine
C/015/0018
Emery County, Utah

January 19, 2007

May 8, 2006	SHPO clearance for the Mill Fork West lease addition (as part of the EA).
June 1, 2006	PacifiCorp submits an application for the Mill Fork West Lease Addition. This is determined to be an Incidental Boundary Change and does not require public notice
July 11, 2006	OSM determination that the addition of the Mill Fork West Lease addition will require mining plan modification.
September 6, 2006	Informal consultation with U.S. Fish and Wildlife Service and the Division.
September 22, 2006	BLM issues approval of a modification of the R2P2.
September 22, 2006	R2P2 Approved by BLM.
November 1, 2006	Federal Lease UTU – 84285 issued by BLM.
January 9, 2007	AVS check completed with issue recommendation.
January 19, 2007	Technical Analysis completed, all regulatory requirements have been met. CHIA completed.
January 19, 2007	Decision Document completed and Permit issued.

MINING PLAN AND MINING PLAN MODIFICATION INFORMATION
BACKGROUND INFORMATION

New Federal lease UTU-84285, 213.57 acres.

USGS 7.5 minute Quadrangle location map(s): **Rilda Canyon**

Year mine began production: **1969**

Current permit acreage: **19722.21 Current/19,935.78 with LBA**
Current surface disturbed acres: **98.05 Current/98.05 with LBA**
Total acres of Federal coal within the current permit: **12,980.95 Current/13,194.52 with LBA**
Total acres of Federal surface land within the current permit: **14,836.21 Current/15,049.78 with LBA**
Recoverable tons of Federal coal remaining in the current permit: **6.0 mm Current/6.3 mm with LBA**

Average annual production rate: **3.5 mm tpy**
Maximum production rate: **4.5 mm tpy**
Coal seam(s) mined: **Hiawatha, Blind Canyon**
Average annual employment: **360**
Life-of-Mine in current permit: **15 years**

Current Post mining land use: **Grazing, Wildlife Habitat, Recreation**

PROPOSED ACTION INFORMATION

Total change in permit acreage: **213.57**
Change in surface disturbed acres: **0**
Change in acres of Federal coal: **213.57**
Change in Federal surface land acres: **213.57**
Change in recoverable tons of Federal coal: **0.3 mm**

Change in average annual production: **0**
Coal seam(s) to be mined: **Hiawatha, Blind Canyon**
Change in annual employment: **0**
Change in Life-of-Mine: **0**

Reclamation bond amount: **No Change**

Change in post mining land use: **None**

FINDINGS

PacifiCorp
Mill Fork West Lease Addition
Incidental Boundary Change
Deer Creek Mine
C/015/0018
Emery County, Utah

January 19, 2007

1. The permit application for the extraction of coal from the Mill Fork West Lease at the Deer Creek Mine is accurate and complete and all requirements of the Surface Mining Control and Reclamation Act, and the approved Utah State Program (the "Act") are in compliance. See Technical Analysis dated January 19, 2007 (R645-300-133.100)

2. The applicant does not propose any disturbance associated with this permitting action. See Technical Analysis dated January 19, 2007 (R645-300-133.710)

3. An assessment of the probable cumulative impacts of all anticipated coal mining and reclamation activities on the hydrologic balance in the general area has been conducted by the Division and no significant impacts were identified. See CHIA dated January 19, 2007. The Mining and Reclamation Plan (MRP) proposed under the revised application has been designed to prevent damage to the hydrologic balance in the permit area and in associated off-site area (R645-300-133.400 and UCA 40-10-11 (2)(c)).

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

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

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

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

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

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

5. The operation would not affect the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats as determined under the Endangered Species Act of 1973. See Technical Analysis dated,

January 19, 2007 and memo dated December 12, 2006 for informal consultation with U.S. Fish and Wildlife Services dated September 6, 2006 (16 USC 1531 et seq.) (R645-300-133.500).

6. The Division's issuance of a permit is in compliance with the National Historic Preservation Act and implementing regulations (36 CFR 800). See Technical Analysis, dated January 19, 2007. See State Historic Preservation Office concurrence, dated May 8, 2006. (R645-300-133.600)

7. The applicant has the legal right to enter and conduct coal mining activities through coal lease issued by the BLM on November 1, 2006 (Federal Coal lease – UTU-84285) (645-300-133.300)

8. A 510 (c) report has been run on the Applicant Violator System (AVS), which shows that: prior violations of applicable laws and regulations have been corrected; neither PacifiCorp nor any affiliated company, are delinquent in payment of fees for the Abandoned Mine Reclamation Fund; and the applicant does not control and has not controlled mining operations with demonstrated pattern of willful violations of the Act of such nature, duration, and with such resulting irreparable damage to the environment as to indicate an intent not to comply with the provisions of the Act (A 510 (c) report was run on, January 9, 2007, see memo to file dated January 9, 2007). (R645-300-133.730)

9. Coal mining and reclamation operations to be performed under the permit will not be inconsistent with other operations anticipated to be performed in areas adjacent to the proposed permit area.

10. The applicant has posted a surety bond for the Deer Creek Mine in the amount of $4,113,000 issued by Travelers Casualty and Surety Company of America (Surety Number 103908970) (R645-300-134).

11. No lands designated as prime farmlands or alluvial valley floors occur on the permit area. See Technical Analysis dated January 19, 2007 (R645-302-313.100 and R645-302-321.100).

12. The proposed postmining land-use is the same as the pre-mining land use (wildlife habitat) and has been approved by the Division and the surface land management agency, the Forest Service. No surface disturbances are associated with this lease extension to the permit area and no postmining land-use change has been proposed.

13. The Division has made all specific approvals required by the Act, the Cooperative Agreement, and the Federal Lands Program. This action does constitute a Federal Mine Plan Modification. See OSM determination letters dated July 11, 2006.

14. This permitting action was determined to be an incidental boundary change and does not require public participation. (R645-300-120)

15. No existing structures will be used in conjunction with this application. These are new surface facilities being proposed at this time (R645-300-133.720).

Permit Supervisor

D. Wayne Hedberg

Permit Supervisor

Associate Director of Mining

John R. Baza

Director

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FEDERAL **PERMIT C/015/0018** **January 19, 2007**

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

This permit, C/015/0018, is issued for the state of Utah by the Utah Division of Oil, Gas and Mining (Division) to:

PacifiCorp
1407 West North Temple
Salt Lake City, Utah 84116
(801) 220-4618

for the Deer Creek Mine. A Surety Bond is filed with the Division in the amount of $4,113,000, 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 (OSM). 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 and the R645 regulations.

Sec. 2 **PERMIT AREA** - The permittee is authorized to conduct coal mining and reclamation operations, on the following lands as described in the approved application, situated in the state of Utah, Emery County:

Township 16 South, Range 6 East, SLB&M Emery County, Utah

Section 1: SE¼.
Section 10: E½E½SE¼; W1/2E1/2SE1/4, SE1/4NE1/4, S1/2NE1/4NE1/4
Section 11: All.
Section 12: All.
Section 13: All.
Section 14: All.
Section 15: E½E½; E1/2W1/2E1/2.
Section 22: Lots 1, 2, 3, 4, 5, 6, 7, E½NE¼, SW¼NE¼, N½SE¼.
Section 23: N½, N½S½.
Section 24: N½.
Section 25: E½ SE¼ SE¼, S½ SE¼ NE¼ SE¼.

Township 16 South, Range 7 East, SLB&M Emery County, Utah

Section 6: Lots 5, 6, 7, 8, S½SE¼.
Section 7: All.
Section 8: NW¼NW¼.
Section 18: Lots 1, 2, NE¼.
Section 19: Lots 2-3, W½SW¼NE¼, SE¼.
Section 20: E½ SW¼ NW¼, SE¼ NW¼, S½ NE¼, S½.
Section 21: S½N½, S½.
Section 22: SW¼ NW¼, SW¼.
Section 27: SW¼.
Section 28: W½, N½ NE¼, SE¼.
Section 29: All.
Section 30: E½, Lot 4.
Section 33: All.
Section 34: W1/2W$^1/_2$, W$^1/_2$E$^1/_{2W}$, NW$^1/_4$W$^1/_4$, W$^1/_2$NE$^1/_4$W$^1/_4$, S$^1/_2$S$^1/_2$.

Township 17 South, Range 6 East, SLB&M Emery County, Utah

Section 1: Lots 1, 2, 3, SE¼ NW¼, S½ NE¼, E½ SW¼, SE¼.
Section 12: E½ W½, E½.
Section 13: E½ W½, E½.
Section 24: E½ W½, E½.
Section 25: N½ NE¼,
Beginning at the SE corner of the NE¼ SE¼ Section 25, T17S, R6E, SLB&M; Thence, north 160 rods, west 116 rods to the center line of the Cottonwood Creek; thence southerly along centerline of said creek to a point 84 rods west of the beginning; thence, east 84 rods to the beginning.

Township 17 South, Range 7 East, SLB&M Emery County, Utah

Section 2: Lot 12, W$^1/_2$SW$^1/_4$, [SE$^1/_4$(SULA #284)].
Section 3: W½, N½ NE¼, SW¼ NE¼,S½ SE¼.
Section 4: All.
Section 5: All.
Section 6: All.
Section 7: All.
Section 8: All.
Section 9: All.
Section 10: All.
Section 11: N½ NW¼, SW¼ NW¼, Portions of the SE¼ NW¼ west of the Deer Creek fault, W½ W½ SW¼, Portions of the E½W½ SW¼ west of the Deer Creek fault.
Section 14: Portions of the NW¼ NW¼ west of the Deer Creek fault, Portions of the SW¼ NW¼ west of the Deer Creek fault,

Section 15: N1/2, SW1/4.
Section 16: All.
Section 17: All.
Section 18: All.
Section 19: All.
Section 20: All.
Section 21: All.
Section 22: W½, W1/2 SE¼, W½ E½ SE¼, Portions of the E½ SE¼ SE¼ west of the Deer Creek fault, Portions of the SE¼ NE¼ SE¼ west of the Deer Creek fault.
Section 27: N½ NW¼, NW¼ NE¼, W½ E½ NE¼, Portions of the E½ E½ NE¼ west of the Deer Creek fault.
Section 28: N½ N½.
Section 29: N½ N½.
Section 30: Lots 1, 5, 6, N½ NE¼, SW¼ NE¼, NW¼ SE¼.

Beltline Corridor

Beginning at a point S 0° 22' E, 142.4 feet from the SW corner of NW¼ of Section 1, T17S, R7E, SLB&M; thence, N 49° 53' 23" E, 2395.4 feet; thence, S 40° 10' 42" E, 101.94 feet; thence, S 49° 52' 03" W, 2481.12 feet; thence, N 0° 22' W, 276.25 feet to the point of beginning.

Waste Rock Site

Beginning 10 feet South of the NE corner of Section 6, T17S, R8E, SLB&M; thence, S 89° 52' 00" W, 1272.000 feet; thence S 0° 08' 00" E, 600.000 feet; thence, S 83° 28' 43" E, 302.035 feet; thence, S 72° 54' 35" E, 314.083 feet; thence, S 63° 06' 41" E, 224.508 feet; thence, S 48° 18' 17" E, 268.404 feet; thence, S 20° 06' 29" W, 1066.848 feet; thence, S 39° 24' 03" W, 855.358 feet; thence, S 41° 10' 40" E, 100 feet; thence N 43° 39' 42" E, 1635.000 feet; thence, N 31° 02' 18" E, 412.959 feet; thence N 22° 58' 45" E, 1310.908 feet; thence, N 89° 40' 41", 740.000 feet; to the point of beginning.

The permittee is authorized to conduct coal mining and reclamation operations on the foregoing described property subject to the conditions of all applicable conditions, laws and regulations.

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

Sec. 4 **PERMIT TERM** - This permit expires on February 7, 2011.

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 R645-303-300.

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 Office of Surface Mining Reclamation and Enforcement (OSM), 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, R645-400-220, 30 CFR 842.13 and R645-400-110;

(b) be accompanied by private persons for the purpose of conducting an inspection in accordance with R645-400-100 and R645-400-200 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 coal mining and reclamation operations 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 take all possible steps to minimize any adverse impact to the environment or public health and safety resulting from noncompliance with any term or condition of the permit, including, but not limited to:

(a) Any accelerated or additional monitoring necessary 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.

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

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

Sec. 13 **AUTHORIZED AGENT** - The permittee shall provide the names, addresses and telephone numbers of persons responsible for operations under the permit to whom notices and orders are to be delivered.

Sec. 14 **COMPLIANCE WITH OTHER LAWS** - The permittee shall comply with the provisions of the Water Pollution Control Act (33 USC 1151 et seq,) and the Clean Air Act (42 USC 7401 et seq), UCA 26-11-1 et seq, and UCA 26-13-1 et seq.

Sec. 15 **PERMIT RENEWAL** - Upon expiration, this permit may be renewed for areas within the boundaries of the existing permit area in accordance with the Act, the approved Utah State Program and the Federal Lands Program.

Sec. 16 **CULTURAL RESOURCES** - If during the course of mining operations, previously unidentified cultural resources are discovered, the permittee shall ensure that the site(s) is not disturbed and shall notify the Division of Oil, Gas, and Mining. The Division, after coordination with OSM, shall inform the permittee of necessary actions required. The permittee shall implement the mitigation measures required by the Division within the time frame specified by the Division.

Sec. 17 **APPEALS** - The permittee shall have the right to appeal as provided for under R645-300-200.

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

The above conditions (Secs. 1-18) are also imposed upon the permittee's agents and employees. The failure or refusal of any of these persons to comply with these conditions shall be deemed a failure of the permittee to comply with the terms of this permit and the lease. The permittee shall require his agents, contractors and subcontractors involved in activities concerning this permit to include these conditions in the contracts between and among them.

These conditions may be revised or amended, in writing, by the mutual consent of the Division and the permittee at any time to adjust to changed conditions or to correct an oversight. The Division may amend these conditions at any time without the consent of the permittee in order to make them consistent with any federal or state statutes and any regulations.

THE STATE OF UTAH

By: John R. Baza

Date: 1/19/2007

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

_____

Authorized Representative of the Permittee

Date: _____

Attachment A

SPECIAL CONDITIONS

1. If during entry development, sustained quantities of groundwater are encountered which are greater than 5 gpm from a single source in an individual entry, and which continue after operational activities progress beyond the area of groundwater production, PacifiCorp must monitor these flows for quality and quantity under the approved baseline parameters. PacifiCorp will notify the Division within 24 hours prior to initiation of monitoring.

2. PacifiCorp will submit water quality data for the Deer Creek Mine in an electronic format through the Electronic Data Input web site, http://linux1.ogm.utah.gov/cgi-bin/appx-ogm.cgi.

3. PacifiCorp will not mine federal lease UTU-84285 (Mill Fork West) until the mining plan approval is signed the Assistant Secretary of Land and Minerals.

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State of Utah

Utah Oil Gas and Mining

Coal Regulatory Program

Deer Creek Mine
PacifiCorp
Technical Analysis
January 19, 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 application for permit change, renewal, transfer, assignment, or sale of permit right for conformance to the R645-Coal Mining Rules. The Applicant/Permittee must comply with all the minimum regulatory requirements as established by the R645 Coal Mining Rules.

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

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

GENERAL CONTENTS

In 1999, the Mill Fork Tract added 5,562 .82 acres to the Deer Creek Mine permit. The Rilda Canyon facilities, added to the permit in 2005, cover approximately 12.1 acres: 9.0 acres at the portal area and 3.1 acres for soil storage further down the canyon. Mill Fork West lease UTU-84285 added 213.75 acres in 2006, bringing total acreage to approximately 19,727.52. [11092006]

Mining expansion into the North Rilda and Mill Fork tracts Area was anticipated early in the permitting process, and because of this, the North Rilda and Mill Fork Areas were included in many of the baseline studies and on many of the mine permit maps prior to the incorporation of these two areas into the MRP. Because of its location and size, the Mill Fork West Extension was also covered by most of these studies. [11092006]

Except for Maps MFU1837D – Coal Ownership and MFS1838D – Surface Ownership, all legal and financial information for the Mill Fork Lease was moved from Volume 12 to Volume 1 of the Deer Creek Mine MRP, effective March 5, 2003. Legal and financial information was subsequently incorporated in the Legal and Financial Volume, which contains information for all four of PacifiCorp's Utah mines, on April 20, 2004. (MFS1838D and MFU1837D, which show ownership information for the Mill Fork and Rilda Canyon areas only, remain in Volume 12). [03292005]

IDENTIFICATION OF INTERESTS

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

Analysis:

MidAmerican Energy Holdings Company announced the purchase of PacifiCorp from ScottishPower on Mar 21, 2006. An amendment updating Identification of Interests information is being prepared but has not been submitted to the Division yet. [04282006]

{*The Permittee is PacifiCorp, an Oregon corporation. NA General Partnership, a Nevada General Partnership, owns all stock of PacifiCorp. Scottish Power NA1 Limited and Scottish Power NA2 Limited make up NA General Partnership, and Scottish Power plc owns both of these entities. Energy West Mining Company, a wholly owned subsidiary of PacifiCorp, is the operator. The Legal and Financial Volume, which is common to PacifiCorp's four Utah mines, contains ownership and control information, names of officers and directors, the name, address and telephone number of the Permittee and operator, Employer I.D. Numbers, and MSHA numbers, together with dates of issuance for coal mining and reclamation operations*

owned or controlled by the Permittee. The Officer and Director List in Appendix A of the Legal and Financial Volume has been updated to November 4, 2004. [04192005]

Information on pp. 1-1 through 1-12 in the Legal and Financial Volume has been updated to clarify that PacifiCorp is the Permittee and owner of the coal leases, rather than Utah Power and Light. Centralia Mining LLC is no longer listed as a PacifiCorp coal-mining interest. [04192005]

Appendix B of the Legal and Financial Volume has information on Miscellaneous Licenses, Permits, and Approvals, which includes rights-of-way and Special Use Permits. Surface ownership and subsurface coal rights for the Deer Creek Mine are shown, respectively, on maps 1-2 (CE-10521-DR) and 1-1 (CE-10522-DR) in Volume 4 of the Deer Creek Mine MRP. The only lease interests in the permit area besides coal are oil and gas leases and grazing permits (Section 112.800). [04192005]}

Findings:

Information provided in the plan meets the Identification of Interests requirements 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:

MidAmerican Energy Holdings Company announced the purchase of PacifiCorp from ScottishPower on Mar 21, 2006. An amendment updating Violation Information is being prepared but has not been submitted to the Division yet. [04282006]

{NOV Information is in Appendix D of the Legal and Financial Volume. The Permittee has provided a list of all violation notices received by any coal mining and reclamation operation owned or controlled by either the applicant or by any person who owns or controls the applicant. NOV information in Appendix D covers the three-year period preceding April 12, 2005. [04192005]}

Findings:

Information provided in the plan meets the Violation Information requirements of the regulations. [04192005]

RIGHT OF ENTRY

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

Analysis:

Total acreage in the permit area is 19,737.52 acres: 13, 194.70acres in federal leases, 1,020.00 acres in private leases, and 5,522.82 acres in State leases. [11092006]

The table titled Deer Creek Mine – Underground Right-of-Entry Information with Cited Surface and Subsurface Ownership in Appendix C of the Legal and Financial Volume provides the required information on surface and subsurface ownership for coal leased or owned by the Permittee in and adjacent to the Deer Creek Mine permit area. Section R645-301-112.600 lists the name and address of each owner of record of surface and subsurface property contiguous to the permit area. Maps 1-1 (CE-10522-DR) and 1-2 (CE-10521-DR) in Volume 4 of the Deer Creek Mine MRP show surface and subsurface ownership in and adjacent to the permit area. Surface right-of-entry information is tabulated in Section R645-301-114 (Surface). [04192005]

Copies of BLM lease relinquishment Decision Documents, with descriptions of the lands and rights being relinquished, are in the Supplemental Volume 1, Phase I, II, and III Lease Relinquishment Information, which is a confidential volume shared by the MRPs of the Deer Creek, Cottonwood/Wilberg, and Des Bee Dove Mines. [04192005]

Findings:

Information provided in the plan 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:

Permit Boundary Descriptions in Appendix G of the Legal and Financial Volume have been updated to incorporate the BLM lease relinquishments. [04192005]

Surface ownership and subsurface coal rights for the Deer Creek Mine are shown, respectively, on maps 1-2 (CE-10521-DR) and 1-1 (CE-10522-DR) in Volume 4 of the Deer Creek Mine (larger scale maps MFS1838D and MFU1837D in Volume 12 show this same

information for the Mill Fork and Rilda Canyon areas). Legal descriptions are found in Appendix C of the Legal and Financial Volume. [03292005]

The Legal and Financial Volume, Section R645-302-115, contains a statement that no lands within or adjacent to the permit area have been identified as qualifying under R645-103-300 as areas unsuitable for surface effects of underground mining. [07012005]

Findings:

Information provided in the plan meets the Legal Description and Status of Unsuitability Claims requirements of the regulations.

PERMIT TERM

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

Analysis:

Deer Creek Mine permit was renewed effective February 7, 2006 and will be up for renewal again on February 7, 2011. [03292005, 04182006]

Drawings MFU1840D and MFU1841D in Volume 12 and CM 10899-DR and CM-10900-DR in Volume 5 identify the lands subject to coal mining over the life of the operation, including the size, sequence, and timing of the mining anticipated and permit boundaries with yearly projections of mining through 2021. [03292005]

See the following section for information on the public notice.

Findings:

Information provided in the plan meets the Permit Term requirements 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:

Appendix F of the Legal and Financial Volume contains copies of the Affidavits of Publication for the permit renewals of the four PacifiCorp mines. The Public Notices contained:

1. Name and business address of Permittee
2. Map or description of the permit area
3. Location of where permit application is available for public review
4. Name and address of Division for comments. [03292005]

Findings:

Information provided in the plan meets the Public Notice and Comment requirements of the regulations.

FILING FEE

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

Analysis:

The filing fee was paid with the initial permit. [07012005]

Findings:

Information provided in the plan meets the Filing Fee requirements of the regulations.

PERMIT APPLICATION FORMAT AND CONTENTS

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

Analysis:

Some baseline hydrologic data are included in Volume 12, and additional data are in Annual and Quarterly reports.

The Table of Contents of Volume 9 has been updated to show the removal of Map HM-11. The information from HM-11 is now included on the revised Map HM-10. The only reference to HM-11 in Volume 9 has been removed. [03292005]

The Mine and Reclamation Plan (MRP) meets R645-301-121.100 and R645-301-121.200 for the Biology and Land Use chapters because the Permittee presents current, clear, and concise information.

Findings:

Information provided in the plan meets the Permit Application Format and Contents requirements of the regulations.

REPORTING OF TECHNICAL DATA

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

Analysis:

References cited are listed at the end of the Table of Contents for the Geology section and at the end of the Hydrology section. [03292005]

The MRP meets R645-301-130 because qualified professionals conducted or directed the surveys and analysis for the supporting biological and archeological related documents. The MRP meets R645-300-124.330 because the historic resource documents for the Rilda portal project are in the Confidential File (Division PIC room).

The methods and descriptions of the soil surveys and analytical work are in the reports provided by the Professional soil scientists who conducted the soil surveys of Rilda Canyon (Volume 11 Appendix – Soils A and B.

Findings:

Information provided in the plan meets the Reporting of Technical Data requirements of the regulations.

MAPS AND PLANS

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

Analysis:

Maps submitted are in the formats required by the Division. [03292005]

Findings:

Information provided in the plan meets the Maps and Plans requirements of the regulations.

COMPLETENESS

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

Analysis:

The Division determined the Mill Fork Lease Extension significant revision administratively complete on December 18, 2001. On February 1, 2005 the Division notified the Permittee that the proposed Replacement of Volume 11 (RILDA Canyon Facilities), Task ID #2093, was administratively complete. The amendment refers to data in Annual Reports and other sources for some information required for adequate and complete baseline water-quantity and water-quality data. [03292005]

Findings:

Information provided in the plan meets the Completeness requirements of the regulations.

GENERAL CONTENTS

ENVIRONMENTAL RESOURCE INFORMATION

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

GENERAL

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

Analysis:

The Permittee provides environmental resource information in Volumes 1-3 and 8-12, with maps and plans in Volumes 4-7. All proposed mining activity is underground, but new portals being proposed to be built in Rilda Canyon will provide ventilation and faster and safer access to the working face: these portals will not be used for coal transportation. [03292005]

The Deer Creek Mine is in East Mountain, part of the Wasatch Plateau. Its extent is shown on several maps in the MRP. Map 1-2 (CE-10521-DR) shows the permit area in relationship to surface ownership and map 1-1 (CE-10522-DR) identifies the owners of adjacent coal. The Deer Creek Mine lies between Huntington Canyon on the east and Joes Valley, a Graben valley, on the west. Genwal Resources, Inc. controls leases to the north associated with the Crandall Canyon Mine. The Huntington #4 Mine, now reclaimed, lies east of the southeastern section of the Deer Creek Mine. Coal is mined from the Hiawatha (lower) and Blind Canyon (upper) coal seams. The extracted coal is transported through mains to the Deer Creek Mine surface facilities in Deer Creek Canyon. [03292005]

The topographic features are presented on several maps and overburden Isopach maps. Rilda Canyon, Mill Fork Canyon and Little Bear Canyon intersect the permit area on the east, two tributary canyons to Crandall Canyon intersect from the north, and at least five small canyons intersect the lease on the west. The canyons are steep. The East Mountain ridgeline runs north to south down the western third of the property. [03292005]

Numerous springs occur on the permit area. The majority of springs appear above the Castlegate Sandstone. Little Bear Spring, an important source of drinking water, emanates east of the lease area. Tracer dye studies indicate that water from the Mill Fork drainage flows through fractures associated with the Mill Fork Graben to supply much, perhaps all, of the flow at Little Bear Spring. [03292005]

The Permittee accesses the Mill Fork leases through mains from the Deer Creek Mine, and the entries cross the Mill Fork Graben. The plans for developing entries from the Deer Creek Mine to the Mill Fork Lease were submitted and reviewed as a separate permit

amendment that added 65.7 acres to the permit (approved October 2, 2002). The Permittee addressed concerns related to ground-water interception and subsidence under that permit amendment. [11092006]

Findings:

Information provided in the plan meets the General Environmental Resource Information requirements of the regulations.

PERMIT AREA

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

Analysis:

Maps 1-2 (CE-10521-DR) and 1-1 (CE-10522-DR) identify the permit boundary, which is also identified as the lease area. The Mill Fork leases are accessed from the Deer Creek Mine through a 65.7-acre modification to lease U-06039. [03292005]

Drawing MFS1866D in Volume 12 shows that subsidence from mining in the Mill Fork Extension might occur outside the permit boundary but be confined to the Genwal #1 Mine area. The Division is allowing subsidence to occur outside the permit boundary in this case because all subsidence will be confined to permitted lands. [03292005]

The disturbed area at the North Rilda Canyon Portal Facilities contains:

- Mine facilities 9.0 acres.
- Topsoil disturbed area 1.1 acres.
- Subsoil/construction soil disturbed area 3.0 acres.
  Total of 13.1 acres of new disturbance.

The existing Rilda fan portals occupy 2.33 acres (v 1, chap 1, appendix E). The proposed North Rilda facilities will add 13.1 acres, bringing the total disturbed area for Rilda Canyon to 15.43 acres and for the Deer Creek Mine to 97.44 acres (Supplemental Volume, Appendix G).

Supplement Volume, Legal and Financial Information Appendix C (incorporated 4/21/2005) provides the following information for the Deer Creek Mine:

Total Federal Lease Acres	12,980.95
Total Private Fee Acres	1,020.00
Total State Lease Acres	5,522.82
Total	19,523.77

These numbers do not include the 213.75-acre Mill Fork West extension, which brings total federal acres to 13,194.70 and total acres to 19,737.52. [11092006]

Findings:

Information provided in the plan meets the Permit Area requirements of the regulations.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

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

Analysis:

The MRP meets R645-301-411 regulations pertaining to historic resources. The MRP (Confidential Files) includes evaluations of historic resources that focus on the permit area. It also includes narratives and maps, which describe and show locations within or adjacent to specific projects, of historic resources that may be included in or eligible for inclusion in the National Register. There is proof of coordination efforts and clearances from the SHPO. [06292005]

There are no cemeteries, parks, trails designated by National Systems of Trails, or rivers designated as Wild and Scenic Rivers. There are old mine developments within the lease area that include the Tip Top, Old Leamaster, Johnson, Comfort, Rominger, and Helco mines. There is also an old gas field southwest of the lease area that was developed in the 1950's. [06292005]

The MRP includes two historical resource documents that cover the Rilda Canyon area. The Division, in consultation with SHPO, supports a finding of "no effect" to historic resources within or adjacent to the facilities area. [06292005]

It is important that employees avoid all historic properties during the life of the project. In the event that construction or operations uncover historic properties, Section 106 of the National Historic Preservation Act and 36 CFR 800.13 require that the Permittee stop all work in the vicinity and notify the Division. The Permittee, Division, and other appropriate parties will develop a strategy to avoid the site or mitigate the impacts at that time.

Findings:

Information provided in the plan meets the Environmental -Historic and Archeological Resource Information requirements of the regulations.

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

Information on precipitation, winds, and temperature is discussed in Section R645-301-724.400. Baseline climatological information is in Volume 9. The Annual Reports contain updated information from weather stations at the Hunter and Huntington power plants, Electric Lake, and East Mountain. Additional data have not been deemed necessary to ensure compliance with other regulatory requirements. [03292005]

Findings:

Information provided in the plan meets the Climatological Resource Information requirements of the regulations.

VEGETATION RESOURCE INFORMATION

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

Analysis:

The biology section of the application uses resource information taken from the Data Adequacy document and the EA.

The MRP meets R645-301-321 because there is adequate discussion of plant communities observed within the permit area. Vegetation surveys and maps for the permit area are in different volumes of the MRP. Volume 11, Sec. 300, App. A provides vegetation surveys of the Rilda portal and adjacent areas. Volume 11, Maps 300-1 and 300-2 and Vol. 11, Sec. 300, App. A provide the vegetation and reference area maps for the Rilda portal project. [06292005]

The MRP describes the permit area as having a diversified topography with conifer, aspen, transitional, and pinyon-juniper ecosystems. The major plant communities within the permit area include white fir/aspen, sagebrush/grass, and pinyon juniper/mountain brush. Drawing #: MFS1821B illustrates vegetation types in the Mill Fork lease area.

The MRP describes the transitional ecosystem as various vegetation types that resulted after a fire about 25 years ago. The fire covered a large portion of the Mill Fork area. This area probably experienced cyclic fires prior to human intervention. Transitional ecosystem instead of climax communities, therefore, defines the area.

The MRP defines the community types for the Rilda Canyon area as mixed coniferous forests, pinyon-juniper woodlands, mountain brush lands, and riparian areas. The USFS-derived vegetation map (300-1) illustrates these community types with the riparian area as a narrow strip near the facilities area. This map also illustrates aspen forestlands to the west and north of the facilities area. The MRP includes NRCS evaluations for the Rilda facilities and reference areas. [06292005]

Findings:

Information provided in the plan meets the Environmental - Vegetation Resource Information requirements of the regulations.

FISH AND WILDLIFE RESOURCE INFORMATION

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

Analysis:

GENERAL WILDLIFE

The MRP meets R645-301-322 because there is adequate discussion, supporting documentation, and maps on fish and wildlife resource for the permit and adjacent areas. [06292005]

The Division, in consultation with DWR and USFWS, considers that the Rilda mining operations will likely impact elk and deer habitat. The Permittee provides a list of commitments that may help offset the impact to elk and other wildlife (see discussion in Operations of the TA). In addition, the Permittee will conduct monitoring surveys for aquatics and raptors throughout the life of operations in Mill Fork lease area and Rilda Canyon. [06292005]

Ungulates and other large mammals

A large portion of the permit area contains deer and elk habitat. Deer and elk are shown to have summer range and high value winter range within the permit area (MFS1849Band MSF1822B). Population numbers and trends of deer and elk herd unit 16B can be derived from DWR annul reports dating from 1998 (www.wildlife.utah.gov/hunting/biggame.html). Herd unit 16B, however, covers an area from about Scofield to Ferron and does not focus on the Mill Fork Lease expansion area. DWR cautions against using projections from the herd unit 16B population numbers and trends for such a large area to the smaller area of the Mill Fork Lease. The Manti-LaSal National Forest requested that this information be put in the MRP knowing that

only regional numbers are available. The intent is to look at trends for the area and the trend for deer is a decreasing population.

Bats

Richard Sherwin, Dr. Duke Rogers, and Carl Johansson conducted (1997; Vol. 12, App. A) a bat survey for the spotted bat and Townsend's big-eared bat within Huntington, Straight, and Cottonwood canyons. Results showed no Townsend's big-eared bats. Observations of spotted bats were solitary and evenly spaced over foraging habitat (lower elevations off the lease area). There are roosting sites in suitable cliffs within lease area and throughout the Huntington drainage. The surveyors hypothesized that, because of the number of individuals, current mining operations or cliff failure did not seem to have long-term impacts to the spotted bat population. These surveyors recommended further surveys to verify their hypothesis (Vol. 12, App. A, p. 11).

The coal lease is stipulated that SITLA in cooperation with the USFS may impose mitigation on the loss of spotted bats. The mitigation may include avoidance during specific times and /or the prevention of bat occupancy during periods of subsidence, such as by netting or screening (Stipulation #20).

Joel and Gabrielle Diamond conducted (October 2004; Vol. 11, Sec. 300, App. G) acoustic, capture, and habitat bat surveys with the focus on the portal facilities project in Rilda Canyon. Their results showed no observations of individual bats, but supported comments from previous surveys that Rilda and Huntington Canyon areas have watering, foraging, and roosting bat habitat. The negative results for individuals were most likely due to the lateness of the season. [06292005]

The Diamonds warned that further disturbances in the area, including road improvements for the Rilda portal project, could impact these habitats and reduce the possibility of mitigation. The Diamonds recommended maintaining the quality of alternative habitats within the area where displaced bats may relocate.

The 2004 results showed the reclaimed mine adit up slope from the "powder house" provides a large cavern for bat habitat. The Diamonds described this cavern as the largest in the area and recommend maintaining this site in good condition for bat use.

Bats use echolocating for hunting and each species may echolocate at different frequencies. The MPR provides engineering specs that include frequency ranges for the exhaust and intake fans in Rilda Canyon. Some of the bats that inhabit this area of Utah echolocate within the same frequency range as the fans. The Division, in consultation with DWR, considers that the fans may not have a significant impact to some of the bat species, but may impact noise-sensitive species. These species may relocate to alternative sites. [06292005]

Macroinvertebrates and fish

The Mill Fork area contains portions of Crandall Creek and is a watershed for Little Bear, Mill Fork, and Right Fork of Rilda Creek. These are all tributaries to Huntington Creek. The western portion of the area is a watershed to Indian Creek. All of these creeks are important fisheries. Macroinvertebrate data may be used to determine water quality for fish.

The Permittee provides a copy of a report on aquatics- USGS Open-File 81-539 (see Incoming folder, dated February 13, 2003). The report was the result of a collaborative effort among staff from USGS, Utah Department of Natural Resources, and the Division. Data was collected from years 1977 (Oct.), 1978 (July and Oct.), and 1979 (Oct.). The Permittee plans to use the data in this report for the macroinvertebrate baseline data for the Mill Fork Creek below the confluence of the Left and Right Forks.

The Permittee summarizes the report and states that the results show significant differences between seasons. The macroinvertebrates were at "maximum numbers" for the July sample, but were "not present in any of the October samples" (p. 3-8). The Shannon-Weiner diversity index for Crandall and Mill Fork canyons were 2.38 and 2.09, respectively.

The Permittee will use 2004 and 2005 macroinvertebrate surveys for baseline for the Rilda 2005 portal project. The Permittee will also use the same 20-year-old USGS report (USGS Open-File Report 81-539) as supplemental historic information on macroinvertebrate. [06292005]

The Division, USFS, and DWR support conducting macroinvertebrate surveys during the life of the mine. The Permittee will conduct spring and fall surveys for two consecutive years as the protocol for obtaining aquatic baseline data for the Rilda portal project (Vol. 11, p. 300-11). The Permittee will conduct the spring and fall aquatic post-disturbance surveys the first spring and fall after construction begins for the Rilda facilities site. The Permittee will conduct macroinvertebrate post-disturbance monitoring surveys in the spring every three years following construction. (Vol. 11, Sec. 330, p. 19). [06292005]

The Division considers that macroinvertebrate monitoring surveys should provide enough information to track changes to Rilda Creek. The Division may require a protection, enhancement, or mitigation plan if the post-disturbance or monitoring surveys indicate negative impacts to the macroinvertebrates or fish adjacent to the Rilda portal project. [06292005]

DWR will conduct fish surveys in the Huntington drainage as part of their annual monitoring, starting in 2004, and will most likely include Rilda Creek as part of their wildlife management plan. [06292005]

All surveyors must use the same protocol and sampling locations for macroinvertebrate and fish surveys as those provided in the 2004 Walker document. The Permittee must include the baseline and post-disturbance survey commitments in section R645-301-322 and incorporate all reports and follow-up analysis into Volume 11 Appendix Volume upon compilation. [06292005]

The Permittee addresses the Colorado River cutthroat trout and its habitat within or adjacent to the Rilda Canyon permit area. The 2004 fish surveys reported observations of cutthroat, but DWR considers that the observed fish were most likely Yellowstone cutthroat. [06292005]

Migratory and Game Birds, and Raptors

The Permittee will conduct yearly raptor fly-over surveys of the permit area. The Permittee will provide the results in their Annual Reports (see Confidential Files). [06292005]

There are three golden eagle nests within the Mill Fork lease area. Two red tail hawk nests and several eagle nests are adjacent to the lease area but not within the subsidence zone. The Permittee will undermine nest 1210 and 1211.

The Division, in consultation with DWR and USFWS, requires the Permittee to survey the western side of the lease area along the Joes Valley Fault prior to longwall mining. The presubsidence survey map (MFS1839D) shows outcrops in the first long wall panel that could potentially provide raptor habitat. The 2003 and 2004 raptor survey results show no sitings of nests within this area.

There is an active raptor nest within the 0.5-buffer zone to one of the topsoil stockpiles for the Rilda portal project (USFS, 2005). The Permittee will adhere to exclusionary periods (Vol. 11, p. 300-10) when birds are tending or nesting at this nest site. [06292005]

The Permittee provides information concerning migratory and other sensitive bird species within the Rilda portal project area. Table 300-4 (Vol. 11) provides species-specific habitat and specifies whether the habitat is within the Rilda Canyon area. [06292005]

THREATENED, ENDANGERED, AND SENSITIVE (TES) ANIMAL/PLANT SPECIES

The MRP meets R645-301-322 because there is adequate discussion, supporting documentation, and maps on TES species that could occur within or adjacent to the permit area. The Division, in consultation with USFWS, support that mining operations will likely have no impact on TES species or their habitat. [06292005]

The MRP includes current TES lists and an overview of habitat and occurrence data for all the TE species in Emery County, the Manti-Lasal National Forest sensitive species, and other state listed sensitive species (Vol. 11, Sec. 300, App. C, and Tabs. 300-1 through 300-4). Of the TE species listed for the area, the only TE species that may be present is the Mexican spotted owl (although recognized as highly unlikely). The Utah Conservation Data Center (DWR) has no record of occurrence for federally listed TE species within the Rilda project area. [06292005]

Plants

The MRP states that no threatened or endangered plant (or animal) species inhabit the Mill Fork or Rilda Canyon areas. There are, however, sensitive species within the permit area. The MRP discusses the potential presence of Monti's milkvetch, Canyon sweetvetch, Peterson catchfly, and Link trail columbine. A query to the Utah Natural Heritage program identified Carrington daisy, USFS sensitive species, occurring in the permit area. The MRP describes the potential of this species occurring primarily within the southern region of the mine permit area. USFS considers that subsidence will not impact this species. The Utah Natural Heritage program identified the Link Canyon columbine and Canyon sweetvetch, both USFS sensitive species, occurring adjacent to the permit area in Little Bear Canyon.

Mexican Spotted Owl

The Permittee discusses the habitat requirements for the Mexican spotted owl (MSO) and provides a summary of research (Dr. Howe (UDWR); Dr. Willey (U of M) on potential habitat within the permit area and the adjacent lands. Dr. Willey modeled the Mill Fork least tract area for MSO foraging and nesting habitat.

Figure 1 (MRP, p. 3-12) shows potential nesting habitat is not within the Mill Fork permit area, but exists north and east of the permit area. This map does not include a distance scale; therefore, it is difficult to determine distances between permit area and the modeled nesting habitat sites. Figure 1 also shows discrete parcels of foraging habitat located in the far southwestern corner, and along the mid-eastern and northeastern boundaries of the permit area.

The MRP addresses the presence or absence of four habitat factors within the Mill Fork Lease permit area. The Permittee states that there is no potential MSO habitat within the lease area, including the 1.6 acres of potential foraging habitat near the far southwestern corner, that could be impacted by subsidence (Fig. 2; p. 3-13). USFWS states that Rod Player supports the Willey-Spotskey model predicting "no potential MSO nesting habitat within the Mill Fork permit area". Furthermore, USFWS supports there "will be negligible impact from mining subsidence to 1.6 of 182 acres of predicted potential foraging habitat within this expansion". USFWS agrees with the Division that because there is no nesting habitat for the MSO and mining operation will be below ground, mining operations are "not likely to adversely affect" the MSO (letter, February 11, 2003).

Mel Coonrod (October 2004) evaluated the Willey 1997 and 2000 models and conducted a ground-truthing survey for the Rilda facilities project (Vol. 11, Sec. 300, App. F). The results of the ground-truthing survey supported the Willey models that there is suitable habitat within Rilda Canyon or adjacent areas. Mr. Coonrod, however, stated that previous calling survey results from other locations within the Manti-Lasal Forest were negative, and considered that the MSO habitat in this area is marginal. He, therefore, concluded that the project does not warrant a MSO calling survey. The Division, in consultation with DWR and USFWS, support that the Rilda mining operations will likely have no impact on MSO species or MSO habitat. [06292005]

Findings:

Information provided in the plan meets the Environmental - Fish and Wildlife Resource Information requirements 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:

The MRP meets the requirements of R645-301-200 because baseline soils information has been documented.

Exploration/Sampling Program - Substitute Topsoil

The Deer Creek Mine was developed prior to enactment of the Surface Mining Control and Reclamation Act (SMRCA), and topsoil was not salvaged or stockpiled during construction and mine development activities. The applicant intends to use construction fills within the disturbance area as substitute topsoil. Much of this fill material came from the terraced area on the south side of Deer Creek Canyon.

In 1999, eighteen samples were taken from the terraces from which much of the fill originated, and these were analyzed for the parameters in the Division's soils guidelines. Sample locations are shown on DS-1810-D and results are in Appendix R645-301-200-C. There is no information about the depth of sampling or whether these samples were composites. Clay percentages are high (averaging 32% in the upper two terraces) and textures are listed mostly as clay loam. The pH is just above neutral. The Electrical Conductivity is less than 0.7 mmhos/cm.

Total Organic Carbon content was on the average 5.3%, whereas total Nitrate Nitrogen averaged 0.39 ppm.

Most of the samples from 1980 and 1983 show few problems with EC or SAR values; however, two samples from the parking lot fill slope had EC values of 9.0 (assumed to be mmhos·cm-1). This could be a result of using salt as discussed above, and the problem may have grown progressively worse to where some of these soils are now unusable.

The Permittee commits in this application to conduct a soils sampling program during in June through October of 2001 and 2002. The areas to be sampled will be at accessible sites between 9+00 - 15+00 and 24+00 - 30+00 shown on map DS-1782-D (as stated in Appendix R645-301-200-A). As stated on page 2-2 and in Appendix A, testing will be done according to the Division's soils guidelines. The timetable commitment is acceptable, and it is important that the Permittee and the Division ensure that the mining and reclamation plan is amended when the analyses are completed.

Fill materials, which have been seeded for 15 to 20 years, may also be a source of cover material to be used a cover over the site (pg 5-7).
[03072003]

Exploration/Sampling Program - Refuse Piles

Within Chapter 3 of the current mining and reclamation plan, page 3-65, Table 7, Deer Creek Mine - Waste Rock Analysis, several problems are identified associated with materials taken from roof and floor materials. Data is incomplete since no determinations were made for selenium or for acid base potential. One of the samples had a paste pH value of 5.87, which indicates there could be acid forming potential. One Blind Canyon floor sample apparently had a very high SAR value, which indicates that although some areas may meet the Division's criteria, there are probably isolated problem areas. The Division lacks confidence in the data in Table 7 because some of the SAR values do not correlate with the reported calcium, magnesium, and sodium values.

Tables I and II in Chapter 4 also show some chemical analyses of coal waste and one sample of slag. The slag sample had a very high pH (10.9), but otherwise, no problems were found in the refuse or slag samples. However, these samples were not tested for several parameters listed in the Division's Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mine. In fact this sampling took place prior to implementation of the 1988 guidelines for topsoil and overburden. Information in Tables I and II has been placed in Appendix A of the submittal and will be supplemented by additional information (p 2-3).

Appendix R645-301-200-A contains recent analyses (2001) of two core samples from the refuse piles, one from Deer Creek Canyon (site #1) and one from Elk Canyon (site #6). Sample locations are shown on Drawing DS-1810-D. Sites #1 and #6 were sampled to depths of 25 feet. The texture of the material at site #1 was a sandy loam with a clay loam layer between 6 and 7.5 feet. At site #6, the texture was a sandy loam with a higher clay content at three feet creating a

loam texture. Acid base accounting information is positive for sample sites #1 and #6, however the refuse will require four feet of cover based upon the following information from the 2001 sampling:

- Extreme sodicity was found to a depth of 7.5 feet at site #1;
- SAR values were 30.7 and 42. This could be because the sample site was near storage docks where salt may have been used. The refuse in Elk Canyon, site 6, is also sodic, but not to the extreme noted at site #1. However an SAR value of 11.5 is combined with an extreme pH of 9.0 in the top 1.5 feet.
- Total Organic Carbon at site #1 was reported to be 22% in the top 2 feet and dropped to below 5% at fifteen feet depth. In addition, at site #6, the Total Organic Carbon content was 36% in the top two feet and remained above 21% for the entire depth of sampling, exceeding 50% at the nine to ten foot depth increments.
- At all depths, at both sites, selenium content exceeded the recommended limits in the Division guidelines.

Sampling to determine the extent of the toxic material and to discover substitute topsoil at depth in the fill will be continued in 2002 (submittal, page 2-4). Sample points will be placed randomly in the refuse areas, and samples will be taken at three-foot depth intervals to a point four feet below the grade of the proposed final surface configuration. Samples will also be taken along the proposed channel location. The 2002 sampling may include trenching at various locations. (Personal communication, January 2, 2002, with Dennis Oakley, Environmental Engineer, Energy West Mining Company.) This commitment is acceptable.

All soil and refuse sampling will be conducted according to R645-301-130: which is to say that names of individual collectors and dates and locations of collection will be reported (page 2-4). Qualified professionals will conduct technical analyses as per R645-301-132. [03072003]

Rilda Canyon

MRP Volume 11, section R645-301-220 provides a summary of all existing soil survey information. The 2003 soil survey of the Rilda sediment pond area is found in Volume 11 Appendix Volume – Soils Appendix A The 2004 Order I soil survey for the North Rilda portal facilities and soil storage areas is found in Volume 11 Appendix Volume – Soils Appendix B. Both appendices include soils maps (scaled: 1 inch = 100 ft). The Rilda surveys build upon earlier investigations of Rilda Canyon found in Volume 1 Part 2 Environmental Resources, pp 2-181.1 through 2-181.39 and a 1990 soil survey of the "Rilda Canyon Lease Tract Extension Area," shown on Map 2-16 of Volume 4. A chart itemizing disturbed acreage by soil type for the North Rilda Facilities is found in Section R645-301-222.200.

North Rilda site development will occur north of the county road, between the Star Point sandstone outcrop to the north and the alluvial soils of Rilda Creek to the south, at an elevation of 7,600 to 7,730 ft. MSL. Approximately seven acres of North Rilda facilities development will occur on the south facing slope, in Map Unit E, named "colluvial toeslopes; bench." These soils are described as "Cryoborolls" with a brown, mollic surface layer (A horizon, 9 – 16 inches). An accumulation of calcium carbonate is coincident with the change in color of the soil to yellow brown at a depth of 20 –38 inches. 2003/2004 laboratory analyses of three map unit E soil pedons are found in Volume 11 Appendix Volume – Soils Appendix B. The soil calcium carbonate equivalent percentage increases with depth to 18% at location RC1 (20 –40 inches) and is constant at about 32% in pedons RC3 and RC4 from the surface to two ft in depth. These carbonate contents constitute baseline information and are considered the norm for the area. All other parameters (texture, pH, EC, SAR, etc.) indicate good suitability for salvage. The planned salvage depth is 24 inches. The existing vegetation is of the pinyon/juniper and grass/shrub types (see Environmental Resource - Vegetation section for more detail).

Topsoil will be stored south of the creek on 0.41 acres of map unit A and 0.69 acres of disturbed ground (map unit D) associated with the reclaimed Helco Mine site [information derived from that provided in Addendum 1 of Appendix B Soils Appendix Vol. 11 (hereafter referred to as Addendum 1) and Section R645-301-222.200-300]. The alluvial soils are Brycan stony very fine sandy loam, on a 5% slope at 7,500 ft. The pedon description of sample site RC7 indicates an 18-inch mollic epipedon over C horizons extending to a depth greater than 72 inches. The existing vegetation is conifers, shrubs, aspen and grasses. The disturbed soils are described in the next paragraph.

About 3.5 acres of reclaimed/disturbed soils (map unit D) will be the site of the Rilda facilities sediment pond, topsoil stockpile and the subsoil storage area. The reclaimed sites have approximately 12 inches of topsoil, designated as AC horizon with 5 – 6% organic matter accumulation over a mixture of soil, coal fines and cobbles. A buried C horizon is underneath 3 – 12 inches of coal (Volume 11 Appendix Volume – Soils Appendices A, sample sites S1, S2, S3, S8 and Appendix B, sample sites RC 5 and RC 8). Due to the variable nature of the reclaimed site, the depth of soil to be salvaged for the sediment pond construction will be determined as material is handled (R645-301-231.100). The soils report indicates a salvage depth of 12 inches is possible (Addendum 1).

The subsoil storage area will also affect 1.3 acres of steep, rocky slopes in Map Unit B. The soil survey for this area was conducted in December 2004 (Volume 11 Appendix Volume – Soils Appendix B Addendum 1). These soils lie on a 60% slope and are described as very stony (20% in the surface layer) sandy loams, categorized as being in the Great Group Haplustepts or Ustorthents. The representative soil sample site RC 6 on an east facing slope had an A horizon four inches deep (Addendum 1). The C horizon (also with 20 – 25% stones) extended to lithic contact at 34 inches. This soil overlies the Starpoint sandstone.
[06302005]

Mill Fork Lease

Order III soil survey information is provided in Vol. 12 for the lease area. Pacificorp will ventilate the Hiawatha seam within the Mill Fork lease with a breakout within the existing Genwal Mine permit area (Vol 12. Sec. R645-301-230). This breakout will be approximately 75 ft. west of the Genwal intake portal on the south side of the stream (personal communication with Chuck Semborski, 12/16/2005). The Right-of-Way Easement for this proposed breakout was negotiated in June 2004 and was reviewed and incorporated into the MRP on April 21, 2005 (Legal & Financial Vol.) .[05042006]

Prior to surface disturbance in Crandall Canyon, Order I level soils information will be required, in accordance with R645-301-200. [12162005]

Findings:

Information provided in the plan meets the Environmental Soils Resource Information requirements of the regulations.

LAND-USE RESOURCE INFORMATION

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

Analysis:

The MRP meets R645-301-411.100 because the narrative describes the land uses and capability of the land, and maps illustrate the land uses. Vol. 4, Map 1-2 shows the surface ownership information. [06292005]

The MRP meets R645-301-411.200 because the narrative describes previous mining operations. [06292005]

The land uses for the permit area are primarily grazing, wildlife, and recreation. Other uses in the area include gas production. Currently (2005), there is one producing well and plans for future gas development. Effective August 12, 2005, PacifiCorp and Merit Energy Company established a working relationship to maximize recovery of both the coal and oil and gas estates, which would allow PacifiCorp to mine within the 15° angle-of-draw subsidence zone around the well. A copy of the agreement between PacifiCorp and Merit was provided to the Division. [042006]

A pipeline for the one gas well follows Forest Road 244 off the permit area. Utah Power and light has a ROW for a 345 KV power transmission line and another line for the Genwal,

Crandall Canyon Mine. The Flat Canyon road enters and leaves the southwest portion of the permit area.

Another land use for the area is a USFS trail near the Rilda portal project. The Permittee will construct a new trailhead and parking pad at the east end of the facilities site. The trail will run east west and extend past the facilities site. [06292005]

The USFS classifies sites within the permit area as winter range (critical/high priority) and summer range (high priority) for elk and summer range (high priority) for mule deer, mining and mineral development, and general timber and grazing rangeland (Vol. 11, p. 400-1). Volume 4, Map 2-19 shows mule deer and elk habitat of the permit area. Volume 11, Map 3-1 shows the vegetation communities of the permit and adjacent area. Volume 4, Map 2-16 is a general soils map that also shows the permit and adjacent area. [06292005]

One of the surface owners of the Rilda permit area is the USFS. USFS will evaluate timber values prior to development on their lands. The Permittee will compensate the USFS for the value of timber loss within the permit area. [06292005]

Findings:

Information provided in the plan meets the Land Use Resource Information requirements of the regulations.

ALLUVIAL VALLEY FLOORS

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

Analysis:

Alluvial Valley Floor Determination

Volume 11 Section R645-301-720 provides a detailed discussion of the characteristics of the ground-water flow and alluvial aquifer in Rilda Canyon. The discussion includes quantitative and qualitative description of the water collected by the North Emery Water Users Special Services District (NEWUSSD, formerly known as North Emery Water Users Association or NEWUA). In addition, Section R645-301-720 outlines the monitoring program for Rilda Creek and the NEWSSD springs.

The information presented in Section R645-301-720 is supported by reports and maps found in Volume 9 of the MRP and by the geotechnical, soils, and vegetation surveys in Volume 11 Appendices. A synopsis is reiterated below.

Geotechnical investigations of Rilda Canyon in the vicinity of the proposed North Rilda facilities construction indicate that a bench of unconsolidated colluvial material grades into a thick deposit of fine-grained alluvium (Volume 11 – Appendix Volume – Engineering Appendix F). The alluvial floor is composed of moderately compacted sandy gravel with boulders along with varying proportions of silt and clay, to depths greater than 50 ft (2004 AMEC Report in Appendix F, p. 11). North Rilda site ground-water levels are projected to be 25 ft or more below the surface, becoming shallower nearer to the creek (p. 23). The 2004 AMEC study included pit 12 located 25 ft horizontally from the channel and vertically at an elevation 11 ft above the creek. Although the soil was moist, no standing ground water was recorded in the pit at depth of 10 ft.

Soils on the south side of Rilda Creek (Soils Map 200-1, Unit A) were described as alluvial bottom land soils, having a periodic high water table at a depth of 18 – 30 inches, as evidenced by soil mottling. (Volume 11 Appendix Volume – Soils Appendix A appendix 6-4 and Appendix B pp 5,7). Brycan soils are dominant in Map Unit A. Schupert soils occupy the drainage channel bottom (Furst. 1991 soil survey of the Rilda fan portal area). A 1998 Energy West Mining Company ground stability analysis discusses the sub-surface hydrologic alluvial system and associated surface riparian vegetation zone (Volume 11 – Appendix Volume- Engineering Appendix A). For the most part, the proposed North Rilda Development will not affect these soils, except for the stockpiling of topsoil in the vicinity of the Helco Mine. Section R645-301-230 of the plan indicates that the topsoil stockpile will not affect the subsurface flow beneath the stockpile, because Well P4 (refer to Map 500-3) indicates the depth to saturation is 20 ft below the ground surface.

The above statements are supported by the April 2004, AMEC Earth and Environmental, Inc. geotechnical investigation of Rilda Canyon (Volume 11 – Appendix Volume - Engineering Appendix F), wherein AMEC described a channel 6 - 8 ft deep X 10 -15 ft wide incised through the bottomland sediments (p. 10) and near the NEWUSSD site, depth of alluvium exceeds 15 ft. (p. 11).

In addition to the above information provided in the MRP, the Division received a copy of the Vaughn Hansen Associates, Inc report titled, "Impact Analysis – NEWUA Rilda Canyon Springs," dated March 1983 (Incoming 2005 date folder 3/31/05). This document provides historical water quality information and a discussion of the nature of the ground water flow. In 1982, the report states that the ground water level was 11 ft below the creek above the north and south springs and was fed by the creek through a gravel drain. In the vicinity of the springs, the gravel drain is disrupted and the ground water flow is at the level of the creek. Downstream of the springs, the ground-water flow dipped below stream level again. Plate 3, Piezometric Contour Map indicates that the piezometric surface in the vicinity of monitoring wells R-4 and

R-5 wad 7,552 ft. in 1983. That was 8 to 28 ft below the surface elevation of 7560 to 7580 ft., in the location of the North Rilda facilities topsoil stockpile.

The 1983 Vaughn Hansen Assoc. report concludes that as long as surface protection zones are maintained around the north spring, there should be no impacts from surface disturbance south of the springs. The protection zones are described in Section 6.3.4 of the State of Utah Public Drinking Water Regulations as all land (of equal or higher elevation) within 1,500 horizontal feet of the spring source and all land of lower elevation within 100 ft of the spring source.
[06302005]

Rilda Canyon Alluvial Valley Floor Determination

Rilda Canyon is the site of a small alluvial valley as evidenced by the water collection system installed by the North Emery Water Users. The alluvium in Rilda Canyon is outlined on Drawing 200-1. Most of the operation in Rilda Canyon will be above the level of the alluvium, however the topsoil storage area is situated in the alluvial bottomlands.
[06302005]

Rilda Canyon Applicability of Statutory Exclusions

None

Findings:

Based on information provided in the application, the Division finds that there is an alluvial valley holding Rilda Creek in the bottomlands of Rilda Canyon. The extent of the alluvial valley floor is shown on Drawing 200-1 as map unit A. There are streamlaid deposits in the bottomlands that have historically been the source of irrigation and culinary water in Emery County. Precautions are being taken to limit activity near the spring collection system, to monitor quality and flow in the canyon and to provide a buffer zone between facilities and the creek.

PRIME FARMLAND

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

Analysis:

Previous non- prime farmland determinations made by the Soil Conservation Service for Rilda Canyon above the left and right forks of Rilda Canyon are found in Vol. 1 Part 2, pp 2-

218.1 – 2-218.3. For the north Rilda facilities area, the non-prime farmland correspondence is found in Vol. 11 – Appendix Volume Soils Appendix C.

The Division to consulted with the Natural Resources Conservation Service (NRCS) concerning the potential for prime farmland in Rilda Canyon. The matter was discussed with Leland Sasser of the NRCS Price Field Office in October 2004. The Division is in agreement with the NRCS that there are no prime farmlands in Rilda Canyon due to slope and rockiness of the soils. [06302005]

Findings:

The Division concurs with NRCS in finding that there are no prime farmlands in the permit area.

GEOLOGIC RESOURCE INFORMATION

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

Analysis:

Geologic information in the Volumes 8, 9, 11, and 12 is sufficient to assist in determining the probable hydrologic consequences of the proposed North Rilda Canyon Portal Facilities 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. It is also sufficient for determining all potentially acid- or toxic-forming strata down to and including the stratum immediately below the coal seam to be mined; determining whether reclamation can be accomplished and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area; and preparing the subsidence control plan. Geologic information includes a description of the geology of the proposed permit and adjacent areas down to and including the stratum immediately below the lowest coal seam to be mined. [07012005]

A description of the regional geology is presented in Volume 8, with additional information for the Rilda Canyon facilities in Volume 11 and for the Mill Fork Extension in Volume 12. Geophysical studies and consultant's reports are in Volume 9. The geologic description includes stratigraphy and structural geology of the permit and adjacent areas and how these may affect the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water. The description is based on maps and plans provided as resource information for the mine plan. There is site-specific information. [07012005]

At this time, the Division has not determined it necessary to 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. [07012005]

The Permittee has not requested that the Division waive requirements for borehole information or analysis. Several maps, including HM-1 in Volume 9 – Hydrology and Drawing MFU-48258 in Volume 12, identify the locations of boreholes from which geologic information and sampling was conducted. Chapter 6 and Appendix B of Chapter 6 list the exploration holes drilled within the permit area. As exploration drilling is done almost yearly, updated location information is shown on maps in the Annual Reports. Volume 11 Geology Appendix A lists Existing Exploration Drillhole Completion Details for the North Rilda Permit Area. Volume 12 – Geology Appendix B tabulates basic information for boreholes for the Mill Fork Extension: one representative lithologic log is included. Several additional logs are in Volume 8 – Geology, and all logs are available at the Energy West office in Huntington, Utah. [07012005. 04282006]

Analysis results for samples of Star Point Sandstone from boreholes drilled from the 2nd Right development entries at crosscuts #6 and #10 are in Volume 11, Appendix Volume - Geology Appendix B. Volume 12 - Geology Appendix A lists average values for proximate analysis, fusion temperatures, and ash analyses for Hiawatha and Blind Canyon coal. Appendix C of the Geology Section of Volume 12 contains a table of results of chemical analyses of roof and floor for the Blind Canyon and Hiawatha Seams up to 1999 and analysis results for the 2001 drilling program. Additional analyses results are in Volume 8 - Geology. [07012005]

The permittee discussed subsidence and subsidence control measures under Section R645-301-525, Volume 12 submittal. Pre-mining resources for the Mill Fork lease are identified on Drawing MFS 1839D. The Permittee also addresses the potential of impacts to the resources. Subsidence monitoring results are in the Annual Reports. (03/29/2005)

Information on thickness and engineering properties of clays or soft rock in the stratum immediately above and below each coal seam to be mined is not in the MRP. Rock mechanics and roof control studies by the Permittee, its contractors, and the former Bureau of Mines have been extensive. Rock strength, entry stress distribution, abutment loads, and roof support design are consistently evaluated. All data are continually processed for efficient layout and design of the Deer Creek Mine (MRP – Part 3, Section R645-301-511.200). [07012005]

Findings:

Information provided in the plan meets the Geologic Resource Information requirements of the regulations.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Water Replacement

The probability of subsidence causing such impacts or adverse affects in and adjacent to the Mill Fork Lease is small according to the Permittee (Volume 12, Section R645-301-728, E.; and R645-301-728, I. 2.), but because a possibility exists, the water replacement rules apply.

State-appropriated water supplies in and adjacent to the Mill Fork Lease, identified in R645-301-600, Appendix C of Volume 12, are covered by the water replacement regulations. Replacement of State-appropriated water supplies is discussed briefly in Section 731.530 in Volume 12, which refers to Table MFHT-2. Information in Table MFHT-2 constitutes a plan sufficient to satisfy the water replacement requirements in the Coal Mining Rules. [07012005]

Sampling and Analysis

Water-quality sampling and analyses of samples will be done according to the "Standard Methods for the Examination of Water and Wastewater" (Volume 9, Section 723). Volume 9, Appendix A describes sampling parameters, sampling locations, sampling frequency, and analytical methods and detection limits. [07012005]

Baseline Information

Ground-Water Information

Data on water quality and quantity, sufficient to demonstrate seasonal variation and water usage, are in Volume 9, Volume 12, Annual Reports, and the Division's database. Volume 9, Section R645-301-721.A contains a description of the ownership of existing wells, springs, and other ground-water resources, including seasonal quality and quantity of ground water and usage. Tables in Volume 9 summarize water rights, mode of occurrence, and water quality for ground water. Locations are on map HM-1 in Volume 9. Ground-water resources in and adjacent to Rilda Canyon, including water rights and water use, are further documented and discussed in Volume 11. For the Mill Fork Lease area, locations of known seeps and springs and water rights are shown on Drawings MFS1832D (Hydrology Section) and MFS1839D (Engineering Section) in Volume 12, and ground-water rights are described in some detail at R645-301-721, A. 15 and in Appendix C of Volume 12.

A potentiometric surface can be mapped in the Spring Canyon Member of the Star Point Sandstone in the Mill Fork tract (Volume 12, Figure MFHF-6). Seasonal variations for two in-mine piezometers are mapped on Figures HF-5A and HF-5B of Volume 9.

The connection between Genwal's baseline 1994, 1995, and 1996 spring and seep survey in the Mill Fork LBA tract is briefly explained in Section R645-301-721, A. 4 of Volume 12. These data, along with other data from 1980, 1981, 1982, 1991, 1992, and 1993 are presented in Appendix C (Historical Data tab) and Table MFHT-2 of Volume 12. The Permittee initiated a re-evaluation of ground-water resources in 2000; new baseline data were collected in 2000 through 2002 and correlated with the older data where possible. Criteria used to select springs for monitoring are in Section R645-301-731.200 A.1 of Volume 12. Baseline and operational parameters are in Appendix A of Volume 9.

The Permittee states that extensive research has established that the surface- and ground-water systems are not hydraulically connected, so no impacts to surface waters are anticipated from dewatering of perched systems in the coal seams and adjacent strata (Volume 12, Section R645-301-624). This research is summarized in *Surface-water and ground-water investigation of the Mill Fork Lease area, Emery County, Utah*, by Mayo and Associates, October 24, 2001 (Volume 12, Section R645-301-700, Appendix B).

In the Mill Fork West Extension LBA, spring UJV 213 is situated near both the end of a longwall panel and within the projected limit of subsidence, an area where the potential for surface cracking is greatest (Drawing MFS1825D). The Permittee has added UJV 213 to the water-monitoring plan. Mining near this spring isn't projected to begin until 2011 (MFU1840D) and planned monitoring should establish sufficient baseline before mining begins [01192007].

Little Bear Spring

The Permittee has not collected baseline data at Little Bear Spring, but CVSSD has measured flow since 1982 and documented quality for a number of years. Baseline water-quality and -quantity data from CVSSD for Little Bear Spring have been included in Volume 12 Appendix C (Little Bear Data tab), and Little Bear Spring has been added to the monitoring plan.

Joes Valley Fault

Three samples of water associated with the fault were collected in the Crandall Canyon Mine, and radiocarbon age and tritium content were measured (Volume 12, Section R645-301-700, Appendix B). A stipulation in the coal lease does not allow full extraction mining within a 22 degree angle-of-draw of the fault (Volume 12, Section R645-301-728, I. 4. a).

Surface Water Information

Surface-water resources are described in Volume 9, Section R645-301-721, B and also in Volume 12. Quality and quantity data sufficient to demonstrate seasonal variation and water usage are in Volume 9, the Annual Reports, and the Division's database. Locations for Deer Creek Mine UPDES discharge points are shown on HM-1 in Volume 9; there is no UPDES discharge at either portal facility in Rilda Canyon, nor anywhere in the Mill Fork tract.

Names and locations of surface water bodies within the Mill Fork Lease permit and adjacent areas are shown on several maps in Volume 12, including Plate 1 by Mayo and Assoc. and Drawing MFS1830D – Hydrologic Map in the Hydrology Section and Drawing MFS1839D - Pre-subsidence Survey Map in the Engineering Section. There are no known water-supply intakes for current users of surface waters flowing into, out of, and within the Mill Fork hydrologic area. The water supply system in Rilda Canyon is shown on Map 700-1 in Volume 12 and HM-8 in Volume 9.

Crandall Creek

Crandall Creek has been monitored for a number of years by Genwal Resources. The Permittee will not monitor this stream unless Genwal terminates monitoring (Volume 12, Section R645-301-721, B. 1. b. 1. (b)).

Rilda Canyon

Baseline quality analysis monitoring was done in 1989-1990, and is to be repeated every five years (Volumes 9 and 12, Section R645-301-721, B. 1. b. 1. (d)). Streamflow in Little Bear Canyon is not monitored, but Little Bear Spring is closely monitored by CVSSD. This spring has been added to the monitoring plan in Appendix A of Volume 9.

Mill Fork

Baseline and operational data have been collected since 1997 at MFA01 and MFB02 in Mill Fork. Based on a request from the USFS, an additional monitoring site, MFU-03, was added upstream of the Mill Fork Graben in 2002. Locations are shown on Volume 12, Map MFS1851D – Hydrologic Monitoring Map. Laboratory reports for 1997 through 2001 are in Appendix C of Volume 12.

Indian Creek

Indian Creek was monitored for baseline parameters in 2000 and 2001 (Volume 12, Section R645-301-721, B. 1. b. 2. (b)). Monitoring sites are marked on Map MFS1851D. Water-quality data for October 2000 through 2002 are in Appendix C of Section R645-301-600 of Volume 12 (Water-Quality Data a2000-2002 and Field Data 2000-2002 tabs). Genwal has been monitoring flow and water-quality at ICF since 1996, and the data have been incorporated

into the Permittee's hydrologic database. The Permittee will continue with operational water-quality monitoring during base-flow only (October or November) at ICA, ICB, and ICD (Volume 9, Appendix A, Section II.B.1.c), but will collect field parameters only at ICF (Section II.B.1.c). Information from ICA, ICB, and ICD in Volume 12, when combined with data from ICF, is sufficient to demonstrate seasonal variations of flow and water quality.

Supplemental information

A complete discussion related to the geomorphology characteristics of Rilda Creek is in to Volume 11, Hydrology Appendix C. UDWR is to conduct pre- and post-disturbance evaluations of macroinvertebrate populations and identify resident fish populations in Rilda Creek. The "Preliminary Report on Surveys Conducted to Determine Potential Impacts of Rilda Surface Facility Development in Rilda Canyon During 2004" in Volume 11, Biology Appendix C marks the completion of the predisturbance work. When the final report is completed, a copy will be added to the MRP. [07012005]

Baseline Cumulative Impact Area Information

The Division prepared a CHIA for East Mountain in 1994, and it has been updated as needed. The Division has obtained hydrologic and geologic information for the cumulative impact area from federal or state agencies. Additional information has been included with the Deer Creek Mine Volumes 9 and 12. The Crandall Canyon Mine has provided other information. Supplemental information on biological organisms and habitat and stream geomorphology will be included in information used to update the East Mountain CHIA. [07012005]

Modeling

Modeling has not been done for the Deer Creek Mine MRP. [07012005]

Probable Hydrologic Consequences Determination

For the Mill Fork Extension, the PHC determination compiled by Mayo and Associates is in Volume 12, Hydrology Appendix B. This PHC includes the Mill Fork West lease area. A discussion of the PHC is in Volume 12, Section R645-728. The geologic information presented in Volume 12 is sufficient to establish the hydrologic activities and functions for a probable hydrologic consequence determination.

Section 728 of the Hydrology section of Volume 11 contains the PHC Determination for the Rilda Canyon portal facilities and adjacent areas. This PHC Determination section is based on hydrologic, geologic, geomorphologic, biologic, and other information collected for initial permitting and during subsequent operation of the Deer Creek Mine, and the PHC section

restates much of this information. The required PHC findings are addressed, although the statements may be scattered through the text, often outside the PHC determination. The PHC determination in Volume 11 for the Rilda Canyon portal facilities meets the requirements of the R645 Coal Rules.

The plan, including monitoring, to discharge water from the Rilda Canyon portal facilities to the abandoned mine workings and the alternative plan are in Volume 11, Section 728, Hydrologic Balance-Groundwater, F. RUNOFF AND GRAY WATER DISPOSAL - ABANDON MINE WORKINGS). The plan to minimize potential impacts to Rilda Creek is in Section 728, Hydrologic Balance-Surface Water System, B. INCREASED SEDIMENT PRODUCTION TO RILDA CREEK). [11092006]

Groundwater Monitoring Plan

The detailed Hydrologic Monitoring Program in Volume 9 identifies monitoring locations, the monitoring schedule, and water-quality analysis parameters. [07012005]

Surface-Water Monitoring Plan

The detailed Hydrologic Monitoring Program in Volume 9 identifies monitoring locations, the monitoring schedule, and water-quality analysis parameters. [07012005]

Findings:

Information provided in the plan meets the Hydrologic Resource Information requirements of the regulations.

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:

Applicable cross sections and maps included in or referenced in Volume 12 have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer or land surveyor, with assistance from experts in related fields such as hydrology, geology, and biology (Volume 12, Section R645-301-513, p. 5-2).

Affected Area Boundary Maps

The affected area is usually considered by the Division to be the same as the total life of mine area. Because the total life of mine area is often difficult to predict, the Division usually allows the Permittee to give a best guess estimate.

The Mill Fork lease northern boundary is the Crandall Canyon mine so northern expansion is unlikely. The western boundary is near the Joes Valley Fault so western expansion is also unlikely. To the south is the existing Deer Creek mine. To the east is the South Crandall tract. Therefore, the Division will consider the permit area for the Mill Fork lease to be the same as the affected area.

When the Mill Fork lease was originally outlined by the BLM, the west boundary was based on the location of the Joes Valley Fault as it was projected by the USFS in 1997. In 2005, PacifiCorp made a new determination of the location of the Joes Valley Fault based on topography, aerial photography, resistivity and IP surveys, and in-mine horizontal drilling information. The revised location for the fault was several hundred feet west of the one originally used to define the Mill Fork lease. It became evident that a considerable volume of federal coal between the fault and the west boundary of the Mill Fork lease would become isolated and unrecoverable if the Deer Creek Mine plan were not modified to include recovery of this coal. The BLM granted an exploration license for the Mill Fork West Extension LBA area with the intent of allowing the Permittee to build gate roads, bleeders, and longwall set-up rooms in the federal coal. However, longwall mining and sale of the coal could not be done until the coal was leased and the lease area added to the state permit. The Mill Fork West Extension LBA added 214 acres to the Deer Creek Mine permit, increasing the permitted area by 9.6 %. This was a change to the underground operations only, and it will not involve any new surface disturbance. All maps have been updated to show that the permit boundary includes the Mill Fork West Extension. [11132006]

Archeological Site Maps

The MRP meets R645-301-411.141 because there are archeological maps showing known resource locations within the permit area. These maps are in the Confidential Binder (Division PIC). [06292005]

Coal Resource and Geologic Information Maps

The Permittee has submitted maps and tables identifying the local geologic and hydrologic features. Map MFU-1823D in Volume 12 shows the locations and elevations on the surface of all exploration drill holes and test wells within the Mill Fork lease area and the coal crop lines for the Hiawatha and Blind Canyon Seams. Map 600-1 (Drawing DS1882D) in

Volume 11 shows the surficial geology of Rilda Canyon and includes a general cross section. [03292005, JDS]

Strike and dip of the coal seams are shown by structural contours on the Hiawatha and Blind Canyon Seams, Maps MFU 1827D and MFU 1828D in the Geology section of Volume 12. The strike of the coal seams varies as the coal beds and surrounding strata are folded by the different structures. The dip of the coal beds in this area is usually gentle, with dips rarely exceeding 4 or 5 degrees. Additional coal resource maps and mine workings maps are in Volume 8. [03292005, JDS]

Cultural Resource Maps

The MRP meets R645-301-411.141 because there are cultural maps showing known resource locations within the permit area. These maps are in the Confidential Binder (Division PIC). [06292005]

Existing Structures and Facilities Maps

No surface structures exist or currently planned for the Mill Fork Lease area. However, the Permittee did make a statement that they are evaluating the possibility of new portals located at Crandall Canyon. This would require a separate permitting action and will not be approved under the C/015/018-PM01I (Mill Fork Lease).

Existing Surface Configuration Maps

Several maps show the existing surface configuration of the Mill Fork lease area, such as Drawing MFS1839D, Deer Creek Mine Mill Fork Lease ML-48258 Pre-Subsidence Survey Map. The map is at a scale of 1 inch = 1,000 ft and has 100-ft contours.

Existing surface configuration is portrayed in the Geologic Cross-sections, MFU-1829D and Geologic Formations Map, MFU-1823D. The characteristics of the drainage pattern are a result of the surface configuration on the plateau.

Map 500-1, Deer Creek Mine Rilda Canyon Pre-Disturbance Topography, shows the location of the existing facilities in Rilda Canyon. The map shows the location of surface features, public roads within 100 ft of the permit area and the location of coal waste. Large parts of the area in and around portal facilities were disturbed. AML reclaimed some of the areas disturbed by coal mining. The Permittee shows areas of mining and reclamation on Map 500-1 Sheet 1-3.

Map 500-1 Sheet 1 of 3 is at a scale of 1 inch equal 300 ft and shows the Emery County road to Highway 31. Map 500-1 Sheet 2 of 3 is an aerial photography of the area at a scale of 1

inch equals 100 ft. Map 500-1 Sheet 3 of 3 is a topography map of the area at a scale of 1 inch equals 100 ft. [06302005]

Mine Workings Maps

There has been some historic mining in the canyons east of the lease tract, but no mining has occurred within the Mill Fork Lease boundary. The Permittee has submitted maps showing the underground mine working associated with the Mill Fork Lease. The maps show active, inactive and abandoned underground mine workings of Genwal Coal Company, Skeen Mine, Helco Mine, Huntington #4 Mine, and the Deer Creek Mine.

The Permittee has given mine projection for the Blind Canyon and Hiawatha coal seam in the Mill Fork Lease. Map MFU-1840D gives the mining sequence for 2002 - 2021in the Hiawatha Seam. These maps are projections and can change in the future due to ground condition, roof control, coal quality, mineable reserves and coal market.

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The Permittee has given mine projection for the Blind Canyon and Hiawatha coal seam in the Mill Fork Lease. Map MFU-1840D gives the mining sequence for nineteen years in the Hiawatha Seam. These maps are projections and can change in the future due to ground condition, roof control, coal quality, mineable reserves and coal market. [06302005]

Monitoring and Sampling Location Maps

HM-1, the Water Monitoring Location Map, is in Volume 9 - Hydrologic Section. Several maps, including Geologic Formations Map MFU-1823D, identify the locations of boreholes from which geologic information and sampling was conducted. [03292005, JDS]

The MRP meets R645-301-323.200 because the Permittee provides maps showing locations for vegetation analysis, macroinvertebrate and fish monitoring, and prime bat-watering spots (Vol. 11, Sec. 300). [06292005]

Permit Area Boundary Maps

The permit area boundary is identified on several maps including maps MFU-1823D, MFU-1824D, MFU-1825D, MFU-1826D, MFU-1827D and MFU-1828D and MFU-1824D.

Subsurface Water Resource Maps

Water intercepted in the Deer Creek and Cottonwood/Wilberg Mine workings is usually perched water from tabular or stream-channel sandstones that have moderate porosity but low permeability and poor interconnectivity. Water is also encountered in open joint-systems in these rocks, in some fault zones - mainly the Roan Canyon fault zone, and the Straight Canyon Syncline (Volume 12, Section R645-301-624). The North Horn and Price River Formations also contain localized, perched aquifers or saturated zones (Volume 12, Section R645-301-624). [03292005, JDS]

Areal and vertical distribution of the formations that contain these perched waters are shown on Drawings MFU1823D and MFU1829D in the Geology section of Volume 12. There are no maps or cross-sections of individual aquifers, and the Division does not routinely require such detailed description or mapping of these localized, discontinuous perched ground-water zones. Seasonal differences of head for the Star Point Sandstone for two small areas of the Deer Creek Mine are plotted on Figures HFA-5A and HFA-5B in Volume 9. [03292005, JDS]

Map 700-1 shows the locations of the water-supply intakes for the NEWUSSD. Detailed information on the alluvial aquifer is in Volume 9 - Hydrologic Section of the Deer Creek Mine MRP, along with drawings of the NEWUSSD collection system. [03292005, JDS]

Surface and Subsurface Manmade Features Maps

The Permittee has identified surface and subsurface man made features within, passing through, or passing over the permit area. For the Mill Fork lease see pp. 5-20 and 5-21 and Map MFS1839D of Volume 12. [03292005, JDS]

Map MFU1840D shows that Genwal mine facilities are within 1,000 ft of the permit area. The Permittee has identified the buildings that are in or within 1,000 ft of the permit area. The buildings are the Genwal mine facility and are shown on Figure R645-301-500a of Volume 12.

The Permittee has shown two gas wells in the Mill Fork lease, one of which is proposed. This is illustrated on several of the mine maps, including Drawings MFU1840D and MFU1841D and the Pre-subsidence Survey Map, Drawing MFS1839D. Effective August 12, 2005, PacifiCorp and Merit Energy Company established a working relationship to maximize recovery of both the coal and oil and gas estates. This allows PacifiCorp to mine within what was formerly a 15° angle-of-draw subsidence buffer zone around Merit's East Mountain Unit 32-23 gas well in Section 23, T. 16 S., R. 6 E. A copy of the agreement between PacifiCorp and Merit was provided to the Division. Longwall mining between the years 2012-2016 will undermine the proposed gas well in Section 14. See map MFU1840D in Volume 12. [03292005, 04282006 JDS]

Surface and Subsurface Ownership Maps

Maps 1-1 (CE-10522-DR) and 1-2 (CE-10521-DR) show surface and subsurface ownership for the Deer Creek Mine permit area and adjacent areas. Maps 1-1 and 1-2 have been updated to show the 1995 AND 2004 BLM lease relinquishments. [04192005, JDS]

Surface Water Resource Maps

There are no known water-supply intakes for current users of surface waters flowing into, out of, and within the Deer Creek Mine hydrologic area. The water supply system in Rilda Canyon is shown on several maps and drawings in the MRP, particularly in Volumes 9 and 11. No surface waters will receive discharges from affected areas in the Mill Fork lease. Locations for Deer Creek Mine UPDES discharge points are shown on Map HM-1 in Volume 9. [03292005, JDS]

Locations of surface water bodies within the Mill Fork lease and adjacent areas are shown on Plate 1 and Drawings MFS1830D and MFS1839D in Volume 12 and HM-1 in Volume 9. [03292005, JDS]

Vegetation Reference Area Maps

The MRP meets R645-301-323.100 because vegetation maps illustrate community types within disturbed and reference areas, as well as illustrate the location of reference areas. For vegetation maps, refer to the Collins 2003/2004 report (Vol. 11, Sec. 300, App. A), Maps 300-1 and 300-2 (Vol. 11), and Drawing # MFS1821D. Vegetation map, Drawing #: MFS1821D, designates the vegetation types within the Mill Fork Lease and adjacent area. The Manti-La Sal National Forest provided the vegetation mapping for the Mill Fork Lease area. [06292005]

Well Maps

Locations of the Merit Energy Company East Mountain Unit 32-23 gas well in Section 23, T. 16 S., R. 6 E. and a proposed gas well in Section 14 are shown on several maps, including Drawings MFU1840D, MFU1841D, and Drawing MFS1839D in Volume 12. The Permittee, however, removed the buffer zone associated for this gas well from the vegetation, elk, moose, and deer maps. Water monitoring wells at the NEWUSSD system are shown on maps in Volume 9. [03292005, 04282006 JDS]

Contour Maps

Several maps show the existing contours of the Mill Fork Lease area, such as Drawing MFS1839D, Deer Creek Mine Mill Fork Lease ML-48258 Pre-Subsidence Survey Map in Volume 12. The map is at a scale of 1 inch = 1,000 ft and has 100-ft contours. [03292005, JDS]

Findings:

Information provided in the plan meets the Maps, Plans, and Cross Sections of Resource Information requirements 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

The Permittee plans to conduct only underground mining within the Mill Fork leases. [11092006]. All coal will be shipped out of the mine by conveyor belt to the existing Deer Creek coal handling facilities. Men and some of the material will enter then mine through these facilities, and some of the equipment and material will enter the Deer Creek mine by the portal at Rilda Canyon. The Permittee has mentioned in the proposal that surface facilities may be constructed at Crandall Canyon. This would be a separate action and is not considered in this review.

The Permittee has submitted a local and regional description of the geology, including stratigraphy and structure. Chapter 6 and Appendix B of Chapter 6 list the exploration holes drilled within the permit area. As exploration drilling is done almost yearly, updated location information is shown on maps in the Annual Reports. One representative lithologic log is presented in Appendix B. The Permittee submitted a generalized cross-sectional map, MFU 1829D, showing a cross-section of strata from north to south and east to west, but no detailed information is shown, like fence diagrams identifying changes in the stratigraphic column or location of ground-water bearing zones between drill sites. The drawing shows the Mill Fork Graben cutting the Blackhawk Formation on the geologic map, but not the Star Point Sandstone and Mancos Shale in the Cross-section. [04282006]

The Mill Fork leases encompass an area of East Mountain. Their extent is shown on several maps in the MRP. Drawing MFU 48258 shows the leases in relationship to surface ownership. They lie between Huntington Canyon and Joes Valley. Genwal Resources, Inc. controls leases to the north associated with the Crandall Canyon Mine, and Energy West control leases to the south associated with the Deer Creek Mine. All planned mining activities in the Mill Fork leases are underground. Coal extraction will take place in the Hiawatha (lower) and Blind Canyon (upper) coal seams. The extracted coal will be transported through mains to the Deer Creek Mine surface facilities. [11092006]

Type and Method of Mining Operations

The Permittee will use continuous miners for development of longwall panels and main entry development. Longwall mining will be used to extract the majority of the coal from the Mill Fork Lease (Drawings MFU-1824D through MFU-1828D). This method yields high coal recovery and is safer than other mining methods for heavy ground cover. This is the same method being used at the Deer Creek mine today.

Most of the mining in the Blind Canyon seam will take place in the northwest half of the lease. Drawing MFU-1824D identifies the thickness of the overburden above the Blind Canyon coal seam. Overburden thickness in the area of mining ranges from 0 to 2,600 ft. Most of the overburden thickness is over 1,000 ft. The thinner overburden is in the northeast corner of the lease near a side canyon of Crandall Canyon. Overburden Isopach maps MFU-18245D and MFU-1825D show only a portal access in that area. No full extraction mining will occur in that area. The greater overburden depth should minimize surface impacts.

Facilities and Structures

The Permittee has not proposed any new surface facilities on the Mill Fork leases. [11092006]

The Permittee adequately addressed the general requirements of R645-301-526 and R645-301-528 by providing a narrative of the type of structures and facilities at the North Rilda surface facility. In addition, the Permittee also described the handling of coal and coal mine waste at the site. [06302005]

Findings:

Information provided in the plan meets the Mining Operations and Facilities requirements of the regulations.

EXISTING STRUCTURES:

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

Analysis:

The Permittee listed the existing structures in Volume 12 on pp. 5-20 and 5-21. The structures listed include one operating gas well and two gas pipelines, two power transmission lines, one radio repeater station and two roads. Additional structures in the Mill Fork Lease area include the USFS road #244 and transmission lines in the southwest corner of the lease.

The information listed in Section R645-301-526 of Volume 12 is for surface structures in existing disturbed areas. The reader is instructed to refer to Volume 5, maps 3-9 and 3-9a for information about other existing structures in the permit area.

The Permittee addressed how they will use the existing structures in connection with the North Rilda Portal Facilities site. The existing structures within the disturbed area boundary that will be used are:

- The 25 KV powerline.
- Emery County Road #306.

The Division addressed the requirements for the use and realignment of the County Road 306 in the Relocations or Use of a Public Road section of the TA. The Permittee addressed how they will modify the existing 25 KV powerline in connection with North Rilda Portal Facilities in Section R645-301-521.180 of the MRP. [06302005]

Findings:

Information provided in the plan meets the Existing Structures requirements of the regulations.

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

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

Analysis:

The MRP meets R645-301-411.144 because the Permittee provides past and current historic resource survey reports. [06292005]

During mining construction, the Permittee will construct a new trailhead and parking pad at the east end of the Rilda facilities site. Reclamation will include removal of this trail and pad as well as restoring the existing road to the original location. [06292005]

Findings:

Information provided in the plan meets the Protection of Public Parks and Historic Places requirements of the regulations.

RELOCATION OR USE OF PUBLIC ROADS

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

Analysis:

PacifiCorp has two agreements for either relocating a public road or conducting mining within 100 ft of a public road. The agreements are as follows:

- Agreement #1 is with ECSSD and allowed the Permittee to reconstruct, realign, widen and surface County Road #306. The County agreed to the modifications for increases in speed and traffic.

- Agreement #2 will allow a portion of County Road #306 to be temporarily restricted to public use. See Section R645-301-526.116.1. Figure R645-301-500c shows the location of the road and a typical road section. ECSSD has not signed the agreement. [06302005]

Findings:

Information provided in the plan meets the Relocation or Use of Public Roads requirements of the regulations.

AIR POLLUTION CONTROL PLAN

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

Analysis:

The Deer Creek Mine operates under Air Quality Approval Order DAQE-AN0239002-02, issued on June 14, 2002. The Permittee committed to have an air quality approval order that would allow the Permittee to conduct mining operations at the North Rilda Canyon Portal Facilities before construction and operations.

The Division conducts monthly inspections of the Deer Creek Mine. As part of those inspections, the Division checks to see if the air quality orders are current. If the Permittee does not have a current air quality order, the Division will take enforcement action or refer the matter to the Division of Air Quality.

Dust suppression at Rilda Canyon will be controlled with asphalt surfaces for major roadways and limited travel on unpaved service roads.

All disturbed surfaces and regraded areas will be seeded. [06302005]

Findings:

Information provided in the plan meets the Air Protection Control Plan requirements of the regulations.

COAL RECOVERY

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

Analysis:

The Permittee will be using longwall mining for the main extraction of coal in the Mill Fork leases. Continuous miners will be used for development of longwall panels and main entries. This is the current method of mining at the Deer Creek and in Carbon and Emery Counties. This method of mining yields the highest safety and coal recovery possible for underground coal mining.

The Division relies on SITLA and BLM to evaluate the coal recovery plan. Both agencies have reviewed the coal recovery plan and found that the maximum amount of economically recoverable coal will be produced. The Division has reviewed the mine plan and concurs with the findings.

The BLM revised the R2P2 in connection with the North Rilda Canyon Portal Facilities and Mill Fork West extension. The BLM found that the mine plan would maximize the economic coal recover.

The Division relies heavy upon the R2P2 to determine if the mine plan will achieve maximum economic coal recover. After reviewing the plan the Division conclude that maximum economic coal recovery would occur. [11092006]

Effective August 12, 2005, PacifiCorp and Merit Energy Company established a working relationship to maximize recovery of both the coal and oil and gas estates. This allows PacifiCorp to mine within what was formerly a 15° angle-of-draw subsidence buffer zone around Merit's East Mountain Unit 32-23 gas well in Section 23, T. 16 S., R. 6 E. A copy of the agreement between PacifiCorp and Merit was provided to the Division.

Findings:

Information provided in the plan meets the Coal Recovery requirements of the regulations.

SUBSIDENCE CONTROL PLAN

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

Analysis:

Renewable Resources Survey

The Permittee has identified manmade features and renewable resources in the Mill Fork lease area. The manmade features in the area include unimproved roads, trails, a gas well and pipelines and power transmission lines. However, no non-commercial buildings or occupied residential dwellings and related structures were shown to exist in the area. The renewable resources include springs, water seeps, grazing land, timber and wildlife. State appropriated water rights are part of the renewable resources in the area.

R645-301-525.130 requires that the Permittee to conduct a survey of the quantity and quality of all State-appropriated water supplies that could be contaminated, diminished, or interrupted by subsidence within the permit and adjacent areas. The Permittee conducted the survey by assessing the State of Utah Water Rights database.

In the tables in hydrology section of the MRP, the Permittee list the water rights and owners within the affected area. A detailed print out of water rights is located in Appendix C of the MRP. Unless otherwise stated the Division will assume that the quality and quantity of water associated with each water right is that listed in the printout from Water Rights in Appendix C of the MRP.

The subsidence survey conducted by the Permittee shows renewable resources exists within the Mill Fork affected area. Therefore, the Permittee must provide the Division with a subsidence control plan.

Subsidence Control Plan

The subsidence control plan must address each of the following elements:

- A description of the method of coal removal. The Permittee will use longwall mining exclusively for production mining. The size of the panels, sequence, and timing are

shown on Drawing MFU1840D (Hiawatha Mine Plan) and Drawing MFU1841D (Blind Canyon Mine Plan.) Development mining in the Hiawatha Seem is scheduled to occur in 2003 and terminate in 2021. Development mining in the Blind Canyon seam should begin in 2006 with rock slopes from the Hiawatha seam to the Blind Canyon seam and terminate in 2017. Panel lengths will vary from 600 ft to 1,000 ft.

- A map of underground workings that describes the location and extent of areas in which planned-subsidence mining methods will be used and which includes all areas where measures will be taken to prevent or minimize subsidence and subsidence related damage and where appropriate, to correct subsidence-related material damage. Drawing MFS1866D shows the areas where planned subsidence will occur. The drawing shows two areas, one based on a 15 degree angle-of-draw and the other based on a 0 degree angle-of-draw. The drawing only shows the mine workings for the Hiawatha Seam. See Drawing MFU1841D for the Blind Canyon Mine Plan. The main areas that are protected from subsidence are the rock slopes between the seams. [04282006]

In Section 522 of the MRP, the Permittee states that the western extent of subsidence will be governed by a 22 degree angle-of-draw because of the Joes Valley Fault. This is a USFS requirement. In general, the Division assumes that a 15-degree angle-of-draw is adequate for most underground mines.

If the Permittee uses a 15-degree angle-of-draw the only subsidence that is scheduled to occur outside the permit boundary will be along the northern border next to the Genwal mine. The Genwal mine is also conducting longwall mining in the area and the Genwal mine could cause some subsidence in the Mill Fork area. Because all subsidence would be confined to permitted areas the Division will allow each mine to subside outside of their respective permit boundaries.

Effective August 12, 2005, PacifiCorp and Merit Energy Company established a working relationship to maximize recovery of both the coal and oil and gas estates. This allows PacifiCorp to mine within what was formerly a 15° angle-of-draw subsidence buffer zone around Merit's East Mountain Unit 32-23 gas well in Section 23, T. 16 S., R. 6 E. A copy of the agreement between PacifiCorp and Merit was provided to the Division.

The Permittee believes that no subsidence will occur outside the permit boundary because the angle-of-draw will be much less than 15 degrees. The Permittee makes these claims based on annual subsidence surveys.

- A description of the physical conditions, such as depth of cover, seam thickness, and lithology, which affect the likelihood or extent of subsidence and subsidence-related damage. That information was given in the geology section of the MRP and is considered adequate.

- A description of monitoring, if any, needed to determine the commencement and degree of subsidence so that, when appropriate, other measures can be taken to prevent, reduce, or correct material damage. The Permittee committed to monitor subsidence with aerial photography. This method has been effective in the past and is currently being used by the Permittee.

- A detailed description of the subsidence control measures that will be taken to prevent or minimize subsidence and subsidence-related damage, including, but not limited to: backstowing or backfilling of voids; leaving support pillars of coal; leaving areas in which no coal is removed, including a description of the overlying area to be protected by leaving the coal in place; and, taking measures on the surface to prevent material damage or lessening of the value or reasonably foreseeable use of the surface. The main concerns with subsidence damage are the Joes Valley Fault, the gas well and the escarpments. The Joes Valley Fault will be protected with a 22 degree angle-of-draw and the rock tunnels will be protected with a 15-degree angle-of-draw. The panels will be laid out to minimize damage to the escarpments. In addition, the Permittee will leave a 400-ft barrier between the most northern panel and the permit boundary. This should minimize any adverse effects on the Genwal mine.

- A description of the anticipated effects of planned subsidence, if any. On Figure R645-301-500d the Permittee shows the anticipated subsidence trough. The maximum amount of subsidence is expected to be five ft. Drawing MFS1866D shows the areas where subsidence should occur.

- A description of the measures to be taken to mitigate or remedy any subsidence-related material damage to, or diminution in value or reasonably foreseeable use of the land, or structures or facilities to the extent required under State law. In order to restore any land affected by operations to a condition capable of supporting the current and postmining land uses stated herein, the Permittee will replace water (including State Appropriated Water Supplies) determined to have been lost or adversely affected as a result of the Permittee's mining operations if such a loss or adverse impact occurs prior to final bond release. The water will be replaced from an alternative source in sufficient quantity and quality to maintain the current and postmining land uses as stated herein.

In Table MRHT-2 Mill Fork Spring and Seep Survey 2000-2002, the Permittee lists the surface and ground-water rights. In addition the Permittee lists the mitigation alternatives for ground water as: A) Rehabilitate spring source utilizing BTCA, B) Transfer water rights to adjacent ground-water sources, C) establish permanent ground-water collection and distribution system and D) in the case of disturbance to Little Bear Spring the Permittee will follow a negotiated mitigation agreement. The Permittee reserves the right to use any of the first three methods to replace all ground-water sources. The forth method will only be used in connection

with Little Bear Spring. For mitigation of surface water rights the Permittee proposes the following: A) Rehabilitate stream utilizing BTCA, B) Transfer Water Rights to adjacent ground-water sources and C) Establish permanent ground-water collection and distribution systems.

United States Forest Service Comments

The Division reviewed the USFS comments about subsidence issues for the Mill Fork lease. Those issues can be divided into two groups: protecting structures and commitments to repair damage. The USFS wants the Permittee to take action to protect the power line and gas well in the Mill Fork lease.

Protected areas are outlined in R645-301-525.200 of the Coal Mining Rules. Protected areas include:

- Public buildings and facilities.
- Churches, schools and hospitals.
- Impoundments with 20 acre-ft or more capacity.
- Aquifer or body of waters that is a significant source of a public water supply.

The power line and gas well are not considered protected structures. The Division cannot prohibit subsiding under those structures. The Permittee has shortened one longwall panel to reduce the possibility of impinging on the power line. Effective August 12, 2005, PacifiCorp and Merit Energy Company established a working relationship to maximize recovery of both the coal and oil and gas estates. This allows PacifiCorp to mine within what was formerly a 15° angle-of-draw subsidence buffer zone around Merit's East Mountain Unit 32-23 gas well in Section 23, T. 16 S., R. 6 E. A copy of the agreement between PacifiCorp and Merit was provided to the Division. The Permittee commits to coordinating mining activities with Merit and to giving six-months notification prior to conducting mining in or adjacent to the well. [04282006]

The USFS wants the Permittee to make specific commitments to repair of replace damages to structures. The requirements for repair of subsidence related damage to a structure are in R645-301-525.500. The requirements are that if subsidence causes damage the Permittee will repair the damage. Specific commitments for specific structures are not needed to meet the requirements of the Coal Mining Rules.

Performance Standards For Subsidence Control

The basic performance standard for subsidence control is that the Permittee shall comply with all provisions of the approved subsidence control plan. The Division will monitor the Permittee to insure that all mining is conducted in accordance with the MRP. If subsidence causes material damage the Division will take steps to insure that the land is restored to a

condition capable of maintaining the value and reasonably foreseeable uses that it was capable of supporting before subsidence. Repair of damage includes rehabilitation, restoration, or replacement of damaged structures or resources.

Notification

At least 6 months prior to mining, or within that period if approved by the Division, the underground mine operator shall mail a notification to all owners and occupants of surface property and structures above the underground workings. The notification shall include, at a minimum, identification of specific areas in which mining will take place, dates that specific areas will be undermined, and the location or locations where the operator's subsidence control plan may be examined. The Division will monitor the Permittee with respect to notification.

Findings:

Information provided in the plan meets the Subsidence Control requirements of the regulations.

SLIDES AND OTHER DAMAGE

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

Analysis:

There should be no slides occurring in the Mill Fork lease area because all mining activities are underground. If slides would occur, it would most likely be caused by subsidence. The area where slides would most likely occur is along the escarpments. The remedy for these slides would fall under the subsidence mitigation plan.

The Permittee has a plan in place to notify the Division should a slide occur and what action is needed to protect the public.

Findings:

Information provided in the plan meets the Slides and Other Damage requirements 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:

GENERAL WILDLIFE

The MRP meets R645-301-333, R645-301-342, and R645-301-358 because there is sufficient information for the protection or enhancement plan. [06292005]

The Permittee will protect or enhance the site during operations and reclamation, in part, by the following: (See MRP Sec. 330 for details.) [06292005 JAE]

- Utilize pre-disturbed sites for the Rilda expansion facilities.
- Revegetate previously disturbed areas to standards relative to the nondisturbed reference areas.
- Acquire a right-of-way within the existing Genwal Mine disturbed area for a future breakout.
- Monitor vegetation using infrared technology.
- Conduct construction outside of wildlife exclusionary periods.
- Reduce speed limit for the Rilda mine access road.
- Monitor macroinvertebrates in Rilda Creek.
- Monitor raptors.
- Protect escarpments on the Joes Valley side from subsidence.
- Install a "stay-out" sign near a large cavern.
- Enhance riparian corridor along the Rilda Creek.
- Install raptor safe electric power lines.
- Install a fence around a rat midden in Rilda Canyon.
- Design the surface drainage so water flows to a ditch north of Rilda Creek.
- Install barriers along the southern edge of the Rilda facilities area.
- Seed topsoil and subsoil piles.
- Comply with other regulating agencies such as Department of Environmental Quality. 06292005]

Protection and Enhancement Plan

The Permittee plans to conduct second mining under the Castlegate Sandstone escarpments on the east side of the permit area. This mining operation has caused cliff failure and rock falls in other areas mined within the Deer Creek permit area. The Pre-Subsidence Survey Map (MFS-1839D) shows the Castlegate Sandstone out crops. There is a fault within the area; therefore, the area is protected by an undermining buffer zone. This zone, will not only protect hydrological resources, it will also protect future raptor nests. Currently, there are no sitings of raptor nests in these escarpments. [06292005 JH]

The application includes an operation plan located in volume 11 chapter three, pp.16 through 19. Within that plan the permittee has included "methods, devices, and procedures to

protect fish, wildlife and stream degradation during construction and operation activities". With regard to the first method, (Reduced disturbed footprint), Map 500-1 has been revised to reflect the locations and acreages of the 4.4 acres of pre disturbed areas. As noted in this section of the application the pre disturbed areas were reclaimed in 1988. The areas were topsoiled, re-contoured and seeded. Because the vegetation is established and the areas are considered critical winter habitat for deer and elk there would not be a reduction in the disturbed area footprint. However 4.4 acres or 33.6% of the proposed disturbed 13.1 acres would be considered pre disturbed reclaimed land. As noted in the previous review, this method would not qualify as a procedure to protect fish, wildlife and stream degradation during construction and operation activities. [06292005 JH]

Additional protection procedures for Big Game species include #5. "Buffer Zone markers placed along the south disturbed border to make construction workers aware of the location of the stream. #6. Reduced speed limit on the mine access road." # 11. Indicates that the facilities will be located below the stream crossing at the forks of Rilda Canyon to allow Big Game access from one fork of Rilda Canyon to the other. #12. "Material haulage to the existing Rilda Canyon Fan will be discontinued". #14 Reclamation activities will not take place between December 1st and April 15th. This measure also includes construction activities. [06292005 JH]

Additional wildlife mitigation commitments for Big Game species are provided for in table 300-5, they include; [06292005 JH]

1.For the Leroy mine area; buried coal removal and landscape enhancement. The site was reclaimed by the Abandoned Mine Lands section of the Division of Oil Gas and Mining in 1988. The removal of the additional buried coal outside the disturbed area will be enhanced for wintering big game species throughout the life of the facility. These areas will be enhanced during the construction of the surface facilities.

2. For the AML areas outside the proposed disturbed area. The permittee proposes to cooperate with the AML and Forest Service to reclaim and enhance the Leroy Mine area. The project will include DOGM and the USFS as overseeing agencies with implementation and completion to be accomplished within two years.

3. For the aspen regeneration in Meetinghouse Canyon, the permittee has proposed to cooperate with the Division of Wildlife Resources, (DWR), in a timber harvest and aspen regeneration on 200 acres of private land. The project will include DWR as the overseeing agency with implementation and completion to be accomplished within two years. DOGM and the USFS will be appraised of the progress of the project.

4. For the 4,440 acres of privately owned lands on East Mountain the application indicates that the land will be managed for multiple use and protected through out the life of the mine. There

is an area where the conifers have been subject to beetle kill. The permittee plans to enhance this area in cooperation with the Forest Service by removing the beetle-killed trees.

For protection of Big Game species the Permittee also commits to conducting construction activities during months that would minimize impacts to breeding and birthing activities. The plan should also specify that construction activities would not interfere with the activities of deer and elk during periods of high stress, such as when the animals are utilizing the same area from early winter through late spring. Exclusionary periods for elk and deer should specify that the wintering period is from December 1 through April 15, and calving period is from May 15 through July 5.07/12/05 [06292005 JH]

The MRP states (p. 3-14) that experience from the existing PacifiCorp permit areas has shown that the effects of subsidence on grazing and grazing lands, timber resources (not identified as a land use) or access to timber resources, and wildlife resources are minimal. Bob Thompson (Forest Botanist, USFS) and Rod Player (USFS) opinions are that subsidence impacts will be negligible to vegetation and wildlife within the Mill Fork Lease (p. 3-19; 4th ¶). The MRP states that infrared color photographs will be used to record vegetation data changes until permit area reduction. When the Division has asked for vegetation information prior to permit area reduction, PacifiCorp has refused to provide such data and again states that their experience indicates no effects. The MRP contains a commitment to continue to analyze vegetation changes every five years using infrared technology. The mine operator will cease analysis once the Division approves a permit area reduction (p. 3-19; 4th ¶). In a letter to the Division (December 4, 2002; RE: Response to the deficiencies to the Mill For Lease Application Round 2...), the mine operator agrees to provide the annual reports on vegetation changes at the time of permit reduction (letter, p. 9). [06292005 JH]

In addition to the protection or enhancement measures that the MRP lists, the Permittee will conduct several mitigation projects for the Rilda portal disturbance. These projects are intended to help offset some of the impacts related to mining operations (see MRP Sec. 330 for details). The mitigation projects include: [06292005 JAE]

- Remove buried coal from predisturbed area.
- Reclaim predisturbed areas that are adjacent to the Rilda disturbed area.
- Cooperate with the DWR in a select timber harvest and aspen regeneration project.
- Provide funding to DWR to develop and analyze raptor data collected over the past twenty-five years.
- Participate with the Division, USFS, UDWR, and private property landowners (CW Mining and PacifiCorp) to rehabilitate Rilda Creek below Rilda Canyon Springs.
- Provide funding to either USFWS or DWR to develop a tracking system of mitigation projects within Huntington Canyon Drainage. [06292005]

Ungulates and other large mammals

The Permittee will make efforts to protect wildlife, in part, by conducting construction and reclamation outside of elk and deer wintering exclusionary periods (Vol. 11, p. 300-10). For elk and deer, the wintering period is from December 1 through April 15, and calving period is from May 15 through July 5. The Division, in consultation with DWR, considers that the elk will move up the mountain for calving, therefore, the Permittee is not restricted by the calving period for the Rilda portal project at this time. The Division and DWR also consider that the Permittee is not restricted by the fawning period because deer are not as sensitive as elk to human disturbance. [06292005]

Bats and other small mammals

There is at least one known rat midden within the permit area. The Permittee will protect this midden with a 6-ft fence around the base. [06292005]

The Permittee has conducted bat surveys within certain sites of the permit area. A 1997 survey concentrated on Huntington, Straight, and Cottonwood canyons, while a 2004 survey (Diamonds) concentrated on Rilda Canyon. The 2004 survey provided a thorough assessment of bat habitat, but the survey was conducted too late in the season to observe individuals. [06292005]

The Diamonds (2004) describe the opening for a mine adit as the largest in the area and recommend maintaining this site in good condition for bat use. The Permittee will provide a sign for construction workers to avoid areas beyond makers for the subsoil pile. [06292005]

Macroinvertebrates and fish

The Permittee will conduct macroinvertebrate-monitoring surveys the first year in the spring and fall following construction and every three years in the spring. The Division may require a protection, enhancement, or mitigation plan if the post-disturbance or monitoring surveys indicate negative impacts to the macroinvertebrates or fish adjacent to the Rilda portal project. [06292005]

DWR will conduct fish surveys in the Huntington drainage as part of their annual monitoring and will most likely include Rilda Creek as part of their wildlife management plan. [06292005]

Migratory and Game Birds, and Raptors

The Permittee will conduct yearly fly-over raptor surveys of the permit area.

The Permittee provides information concerning migratory and other sensitive bird species. Table 300-4 lists six species that may inhabit certain areas of the permit area. The Permittee will enhance the riparian corridor along the Rilda Creek, which should improve the habitat for these six species. [06292005]

The MRP includes a protection plan for electrical wire and power pole (Vol. 11, Sec. 300, App. H). It is important to note that West Ridge mine, developed in the Book Cliffs coalfield in 1998, located all power lines underground. The Division suggests the same best technology for the Rilda portal project. [06292005]

Endangered and Threatened Species

The MRP includes an overview of habitat and occurrence data for all the TE species in Emery County, the Manti-Lasal National Forest sensitive species, and any other state listed sensitive species. [06292005]

Mexican Spotted Owl

The only threatened or endangered species possibly present in the permit area is the Mexican spotted owl (although recognized as highly unlikely). The MRP states the potential surface impacts due to second mining have shown land surface disturbance is minimal to non-existent (p. 3-9).

The Permittee conducted a MSO ground-truthing survey for the Rilda portal project. The Division will not require a calling survey for individuals at this time. [06292005]

Colorado River Fish

The MRP includes derivations and values of consumption and addition of water to the Colorado River at the time of the Mill Fork lease extension review. The Permittee estimated the total water balance as an annual net gain of 2,453 acre-ft. The Division, in consultation with the USFWS, considered that mining operations were "not likely to adversely affect" the endangered fishes of the Colorado River Basin because there was no indication of depleting water from the Basin. [06292005]

The Permittee must update all equations and justifications with supporting documentation leading to the overall sum of water depletions or additions when projects would significantly change the current estimated value. The Permittee provided values during the review of the Mill Fork lease. The Permittee does not expect that the Rilda portal project will significantly change the current value. [06292005]

Bald and Golden Eagles

The Permittee will conduct yearly raptor fly-over surveys of the permit area. These surveys should include monitoring the eagle nest located in cliffs, where escarpment failure could occur. The Division may require a protection, enhancement, or mitigation plan if it is probable that current mining operations will impact individuals or their habitat. PacifiCorp should recognize that it is the Division's and not their responsibility to consult with DWR and USFWS. [06292005]

Wetlands and Habitats of Unusually High Value for Fish and Wildlife

The Permittee will protect and enhance the riparian area along Rilda Creek. The Permittee will monitor macroinvertebrates, which is an USFS indicator species for changes in water quality. All surface runoff from the Rilda facilities will flow to a ditch north of Rilda Creek. Barriers along the southern edge of the facilities area will provide additional protection to prevent runoff from entering the creek. The Permittee will also participate in an enhancement project of Rilda Creek. [06292005]

Findings:

Information provided in the plan meets the Operations - Fish and Wildlife Information requirements of the regulations.

TOPSOIL AND SUBSOIL

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

Analysis:

Topsoil Removal and Storage

The plan describes removing the A and B horizon (to a maximum depth of 24 inches) in one step and salvaging this material as topsoil (Section R645-301-233). The Permittee will have a qualified person (familiar with the soil survey and salvage plan) on site to monitor the soil salvage operations (Section R645-301-231.100).

Map 200-1 illustrates the area of topsoil salvage and shows the 1.1-acre stockpile site. A three-ft diameter culvert UC12 will be placed on the existing soil surface (Volume 11-Appendix Volume- Hydrology Appendix B Table 8, and Map 700-2). Marker fabric will be used on 10 ft centers to denote the native soil beneath the stockpile. The topsoil stockpile is designed to hold approximately 25,000 cu yds with an average stockpile depth of 20 ft and slopes of 2h:1v (Map

500-4 Sheet 3 of 5, Section R645-301-231.100 and Section R645-301-234). As described in Section R645-301-234, the topsoil stockpile will be protected from erosion by surface roughness, a layer of grubbed brush, and with the sagebrush/grass seed mix described in Table 300-4 of R645-301-341. Silt fence will be installed at the toe of the stockpile and a fence will surround the stockpile to protect the vegetation from grazing animals (Section R645-301-231.400. After construction, the stockpile will be surveyed and the volume of topsoil stockpiled will be documented (Section R645-301-232).

Section R645-301-232 indicates 3,200 cu yds of buried A and B horizon could be encountered at the LeRoy Mine AML site beneath the coal mine waste buried in the location of the proposed sediment pond. These soils will be used to reclaim the sediment pond site and will be stored in the subsoil or topsoil stockpiles at the discretion of the qualified soil scientist (Section Plan for Experimental Practice. In. Section R645-302-218).

Construction of the facilities pad will require removal of subsoil to a depth of 35 ft (Map 500-4, Sections R645-301-234 and R645-301-521.150). The excess spoil will be stored as shown on Map 500-3 in a stockpile with dimensions 550 ft x 250 ft, having 2h:1v slopes and maximum heights of 70 ft (averaging 40 ft, Map 500-4 Sheet 4 of 5 provides the stockpile cross-sections). The subsoil storage area will occupy 3.0 acres, some of which is previously disturbed (Rominger Mine). The capacity of the subsoil storage area is 107,000 cu yds. Topsoil will not be salvaged from beneath the storage area. Stockpiling the surplus cut soils on topsoil is an Experimental Practice discussed under R645-302-210.
[06302005]

Findings:

Information provided in the plan meets the Topsoil Salvage requirements of the regulations.

VEGETATION

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

Analysis:

Specific information concerning the effects of underground coal mining operations on rare and sensitive plant species if found under the Fish and Wildlife Information section.

In order to mitigate any impacts to vegetation from subsidence the impacts must be located, measured and quantified. The Permittee will conduct infrared color photography to record vegetation changes every five years. The Permittee will provide the results in Annual

Reports at the time of permit reduction and cease analysis once the Division approves a permit area reduction.

The MRP states that 33.6% of the area for the Rilda portal project was previously disturbed by historic mining operations. The Permittee will revegetate this previously disturbed area to standards relative to the nondisturbed reference areas. [06292005]

Findings:

Information provided in the plan meets the Operations - Vegetation requirements 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

No roads will be built for the Mill Fork lease. All access to the Mill Fork Lease will be from underground. Ventilation portals may be built in Crandall Canyon but that would be handled by a separate amendment. [03292005, JDS]

The only road that is constructed for the North Rilda Portal Access area is in the main mine area. The Division and the Permittee classified the road as primary. See Section 645-301-527.100. [06302005]

Plans and Drawings

The plans and maps for the North Rilda Portal Facility primary road are in Section R645-301-527.100, Road Classification and on Map 500-3. The road was designed to accommodate supply trucks and mining related activities. [06302005]

Performance Standards

Design requirements include:

- Map 500-3 shows the location of the road and a typical cross section.
- Because of the diversion ditches, there are no intermittent or perennial streams in the pad area.

- The Permittee will not use any temporary routes to ford streams.
- The Permittee will not alter any nature streams in connection with road construction.
- There are not low water crossings.
- The Permittee will remove and then reconstruct the road so it will be part of Emery County Road 306.

Performance standards for the road include:

- The Permittee paved the road to control erosion, and air pollution.
- See the biology sections for information about how the Permittee constructed the road/main mine area to control damage to fish and wildlife.
- See the hydrology sections for information about how the Permittee constructed the road/mine area to hydrologic impacts.
- The Permittee used native soils/materials to construct the sub base. See the soil sections for information about acid and toxic forming materials.
- The Permittee must maintain the road according to the regulations.
  Primary design standards include:
- The Permittee certified the road design on Map 500-3.
- The Permittee stated that because the road was in the flat area of the pad and that the road did not have an embankment the1.3 safety factor can be disregarded. While the Division cannot disregard the 1.3 safety factor requirement, the Division can agree that because the road is on a level surface that the safety factor can be assumed to be much greater than 1.3.
- The portal facility design took into account ways to minimize erosion.
- There are not fords.
- See the hydrology sections for culvert design.
- The Permittee pave the road with four inches of asphalt. The Division considers that adequate. [06302005]

Primary Road Certification

The primary road for the North Rilda Portal Facility was certified by a licensed professional engineer. [06302005]

Other Transportation Facilities

There are no other transportation facilities are the North Rilda Portal Facility. [06302005]

Findings:

Information provided in the plan meets the Road Systems and Other Transportation Facilities requirements 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

Disposal of noncoal waste will not change because there will be no breakout in the Mill Fork Lease. Noncoal waste materials will be removed either from the Deer Creek's mine portals or from the Rilda Canyon portal.

Coal Mine Waste

Coal mine waste will be re-mined from a 0.7-acre previously reclaimed site (the LeRoy Mine AML site). The volume of this coal mine waste is estimated at 3,600 tons based on an average depth of 4 ft and a particle density of 60 lbs/ft^3 (Section R645-301-528). A sample of the LeRoy coal mine waste was analyzed (Volume 11 Appendix Soils Volume – Appendix 6.2 of Appendix A, Sample ID RIL 1003). This sample indicates that the waste does not have acid forming potential or high SAR value.

Small quantities of coal mine waste will be brought to the surface from the Rilda facilities portal development and stored in locations shown on Map 500 – 2, Vol 11. Final disposal of coal mine waste will be at the Deer Creek Waste Rock Site. Representative samples of the mine development waste are found in Volume 11 Appendix –Geology Appendix B, samples from cross cuts #6 and #10.

Volume 11, Sec. R645-301-536, describes waste handling plan in Rilda Canyon as follows:

- The coal mine waste will be temporarily stored in concrete bunker.
- The concrete bunker was a capacity of 125 yyd^3.
- The coal mine waste will be shipped to the refuse pile whenever the bunker becomes full.

[06302005]

Refuse Piles

No new refuse piles will be associated with the Mill Fork Lease.

Impounding Structures

No additional impoundment structures will be associated with the Mill Fork Lease.

No new refuse piles will be associated with the Rilda Canyon Portal Facility. See Volume 10 of the MRP for details of the refuse pile. [06302005]

Burning And Burned Waste Utilization

Return of Coal Processing Waste to Abandoned Underground Workings

The Permittee has no plans to return coal processing waste underground. [06302005]

Excess Spoil:

No excess spoil will be generated from mining actives. Underground development waste generated from the Mill Fork lease will be not be classified as excess spoil.

Findings:

Information provided in the plan meets the Spoil and Waste Materials requirements 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:

Because they will be reclaimed, all sediment control structures at this site are considered temporary under the Coal Mining Rules. [07012005]

General

The Permittee has submitted a plan to minimize disturbance to the hydrologic balance, to prevent material damage, and to support approved post-mining land use (Volume 11, Section 731). The Rilda Canyon portal facilities monitoring plan is summarized in Volume 11, Section 731.200. Appendix A of Volume 9 contains the complete water-monitoring plan for the Permittee's mines. Water quality of Rilda Creek will be protected from potential impacts associated with the Rilda Canyon Portal Facilities through a combination sediment control structures and revegetation (Volume 11, Section 731.600. [07012005]

Groundwater Monitoring

Equipment and structures used in conjunction with monitoring the quality and quantity of ground water on- and off-site will be properly installed, maintained, operated, and will be removed by the Permittee when approved by the Division. Data will be submitted in an electronic format to the Division's Coal Water-Quality Database quarterly for each monitoring location. Monitoring submittals will include analytical results from each sample taken during the quarter. When the analysis of any ground-water sample indicates noncompliance with the permit conditions, the Permittee will promptly notify the Division and immediately take actions provided for in R645-300-145 and R645-301-731. Monitoring of the described ground-water resources will proceed through mining and continue during reclamation until bond release. (Volume 11, Section 731.200 Groundwater). [07012005]

Surface Water Monitoring

Equipment and structures used in conjunction with monitoring the quality and quantity of surface water on- and off-site will be properly installed, maintained, operated, and will be removed by the Permittee when approved by the Division. Surface water-monitoring stations will continue to be monitored quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Data will be submitted in an electronic format to the Division's Coal Water-Quality Database quarterly for each monitoring location. Monitoring submittals will include analytical results from each sample taken during the quarter. When the analysis of any surface water sample indicates noncompliance with the permit conditions, the Permittee will promptly notify the Division and immediately take actions provided for in R645-300-145 and R645-301-731. For point source discharges, monitoring will be conducted in accordance with 40 CRF Parts 122 and 123, R645-301-751 and as required by the Utah Division of Environmental Health for NPDES permit (Volume 11, Section 731.200 Surface Water).

Monitoring will continue until the release of the reclamation bond or until an earlier date to be determined after appropriate consultation with local, state, and federal agencies (Volume 9, Section 728, G - Surface Monitoring Plan). [07012005]

Acid- and Toxic-Forming Materials and Underground Development Waste

Chemical analyses for the Blind Canyon and Hiawatha coal seams within the permit area are available from drill cores from Energy West drill holes and run-of-mine coal sampling (Volume 8 - Geology and Volume 12 – Geology Appendix A). Data on sulfur for the Blind Canyon and Hiawatha Seams are available from drill cores and run-of-mine coal samples (Volume 8 and Volume 12 Section 624.230).

Volume 12 – Geology Appendix C contains a table of analyses for acid- and toxic-forming or alkalinity-producing materials above and below the coal seams to be mined. Volume 11, Geology Appendix B includes analyses of acid- and toxic-forming or alkalinity-producing materials related to the Upper Member of the Star Point Sandstone, which is representative of the underground development waste that will be generated during construction of the Rilda Canyon rock slopes. [07012005]

Transfer of Wells

In Volume 11, Section R645-301-731.400, the Permittee commits that before final release of bond, exploratory or monitoring wells will be sealed in a safe and environmentally sound manner in accordance with 8645-301-631, R645-301-738, and R645-301-765. Wells will be transferred to another party for further use only with the prior approval of the Division, and the conditions of such transfer will comply with Utah and local laws. The Permittee will remain responsible for the proper management of the well until bond release in accordance with R645-301-529 R645-301-551, R645-301-631, R645-301-738, and R645-301-765. [07012005]]

Discharges Into An Underground Mine

Discharges into an underground mine are discussed in Section 731.500 of Volume 11. Quantity of water discharged to the abandoned mine workings will be monitored and reported quarterly. If changes to the hydrologic balance are detected, the Permittee will immediately eliminate discharge to the abandoned workings and institute the alternative plan (Volume 11, Section 728, Hydrologic Balance-Groundwater, F. RUNOFF AND GRAY WATER DISPOSAL - ABANDON MINE WORKINGS).

Discharges of water from areas disturbed by coal mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining (Section R645-301-751, Water Quality Standards and Effluent Limitations): MSHA approval, which is required before the Permittee can pump into the mine, has not been obtained. The Permittee states that when MSHA approval is obtained, documentation will be in Volume 11, Engineering Appendix B. If necessary, discharge from the Rilda Canyon portal facilities sediment pond will be routed through the principal and emergency spillways (Volume 11 Appendix Volume - Hydrology: Appendix B). [07012005]

Gravity Discharges From Underground Mines

There are no mine openings in the Mill Fork Lease. For the Rilda Canyon portal facilities, gravity discharge from the underground mines is addressed under Section 645-301-731.520 of Volume 11. [07012005]

Water-Quality Standards And Effluent Limitations

Gray water and most runoff from the Rilda Canyon portal facilities will be collected and pumped underground into abandoned areas of the mine. If the initial collection and pumping system fails, the sedimentation pond is designed to fully contain runoff from a 10-year, 24-hour storm event (Volume 11, Section 731.500). Runoff from the topsoil piles and outslopes of the road and sedimentation pond will be treated by alternate sediment control methods (Volume 11, Hydrology Appendix B, Section 2.11; Plate 700-1).

Section F in the Rilda Canyon portal facilities PHC (Volume 11, Section R635-301-728) states that quantity of water discharged into the abandoned workings will be monitored and reported quarterly. . If changes are detected to the hydrologic balance, PacifiCorp will immediately eliminate discharge to the abandon mine workings and institute the alternative plan. The alternative plan will include disposing of the collected runoff and gray water through the established mine dewatering system and discharging the water at the approved UPDES discharge location in Deer Creek Canyon (Volume 11, Section R645-301-728, Hydrologic Balance-Groundwater, F). [07272005]

A copy of the Deer Creek Mine UPDES permit is in Appendix B of Volume 9. Because of the antidegradation rules of the Division of Water Quality (R317-2-3.2, -12.1), there can typically be no UPDES point-source discharge within USFS boundaries; however, the Deer Creek Mine UPDES permit allows discharge within the USFS boundary in Deer Creek Canyon (R317-2-12.2). The Rilda Canyon portal facilities are within USFS boundaries. The Rilda sedimentation pond is designed for total containment of the 10-year, 24-hour event, but has both a principal and an emergency spillway. Flow from these spillways will go into undisturbed diversion ditch UD-9, which empties into Rilda Creek at a point inside the USFS boundary (Volume 11, Hydrology Appendix B, Sections 3-1 b and 3.4 g; Maps 700-1 and 700-3). If the site receives a storm greater than the capacity of the collection tank and pumping system and sediment pond decanting system, discharge from the sediment pond will be routed through the principal and emergency spillways (Volume 11 Appendix Volume - Hydrology: Appendix B). The Permittee states such a discharge from the sediment pond would constitute an emergency situation and comply with Utah DWQ storm water regulations (Section R645-301-751, Water Quality Standards and Effluent Limitations). [07272005]

As currently designed, it does not appear there will be any non-point source discharge at the Rilda Canyon portal facilities, with all drainage being pumped into the mine or reporting to

the sedimentation pond. The alternative plan will include disposing of the collected runoff and gray water through the established mine dewatering system and discharging the water at the approved UPDES discharge location in Deer Creek Canyon (Volume 11, Section R645-301-728, Hydrologic Balance-Groundwater, F). Discharges of water from areas disturbed by coal mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining promulgated by the U.S. Environmental Protection Agency set forth in 40 CFR Part 434 (Section R645-301-751 in both Volume 11 and Volume 12,). [07272005]

Diversions: General

In Volume 11, Section R645-301-732.300, the Permittee commits that construction and maintenance of all diversions at the Rilda Canyon portal facilities will comply with the requirements of R645-301-742.100 and R645-301-742.300. Calculations of runoff volumes and designs for ditches, culverts, or other diversions are in Volume 11, Hydrology Appendix B. Diversions are designed to safely pass a 10-year, 24-hour design event rather than the smaller 2-year, 6-hour event required by the Coal Mining Rules for temporary diversion of miscellaneous flows (Volume 11, Hydrology Appendix B, 2.1). No diversions are planed for coal mining operations in the Mill Fork lease. Coal mining operations in the Mill Fork lease should have no impact on existing diversions in the Deer Creek Mine permit area or adjacent areas. [07012005]

Diversions: Perennial and Intermittent Streams

The creek in Rilda Canyon is intermittent above the NEWUSSD ground-water capture system and perennial below. The proposal does not include any culverting or other diversion of the Rilda Canyon stream.

Separate drainage systems will be provided at the Rilda Canyon Portal Facility for undisturbed and disturbed collection systems. (Section R645-301-742.230). [07012005]

Diversions: Miscellaneous Flows

Small, ephemeral, undisturbed drainages at the Rilda Canyon portal facilities, on the south-facing slope of North Rilda Ridge, will report to Rilda Creek through a series of culverts passing beneath the facility (Volume 11, Section R645-301-742.330). Watershed runoff calculations and culvert and ditch design calculations are in Appendix B. Precipitation Frequency Estimates are discussed in Volume 11, Appendix B, Section 2.1, Precipitation. Ditches and culverts have been sized to pass the 10-yr, 24-hour event rather than the smaller 2-yr, 6-hr event required by the R645 Rules for temporary diversion of miscellaneous flows. Culvert and ditch sizing information for the undisturbed drainages is summarized in Tables 1 through 8 of Appendix B.

By using the 10-yr, 24-hr event, the Permittee's designs exceed not only the 2-yr, 6-hr requirement for temporary diversions of miscellaneous flows, but also the 10-yr, 6-hr requirement for permanent diversions of miscellaneous flows. These diversions should be adequate to safely pass peak runoff from events much larger than those anticipated by the Coal Mining Rules.

Trash racks will be installed over culvert inlets to keep out debris, racks will be ramped to facilitate debris being swept away from the inlet, and will be cleared on a routine schedule and after storm events (Section 2.9, Culverts). [07012005]

Stream Buffer Zones

No land within 100 ft of a perennial stream or an intermittent stream will be disturbed by coal mining and reclamation operations unless the Division specifically authorizes coal mining and reclamation operations closer to or through such a stream. Signs will mark the area not to be disturbed (Volume 11, Section 645-301-731.600).

Mine construction and operations at the Rilda Canyon portal facilities will be within 100 ft of Rilda Creek, a perennial stream, but there is no plan to divert it. Signs will be installed to indicate the area beyond which no disturbance shall take place. Water quality of Rilda Creek will be protected from potential impacts associated with the Rilda Canyon Portal Facilities through a combination of sediment control structures and revegetation. Interim revegetation is described in section Volume 11, R645-301-300 and the drainage and sediment control plan is in Volume 11, Hydrology Appendix B.

Prior to any construction, temporary sediment control will be established to protect Rilda Creek from additional contributions of sediment (Volume 11, R645-301-322, -521.180). Disturbance will be held to the minimum required to allow construction of the Rilda Canyon portal facilities, and all disturbed surfaces will be revegetated immediately after completion of the construction phase (Volume 11, Section R645-301-728, B). [07272005]

A stream buffer zone was established to protect the alluvial/colluvial system of the Right Fork of Rilda Canyon. It was based on the extent of the riparian zone and the angle of draw from the Hiawatha Seam, the lowest seam to be mined (Section 645-301-731.600).

Wellhead protection for the NEWUSSD springs is covered in Volume 11, Section R645-301-728, Hydrologic Balance-Groundwater, B and in Volume 9. [07012005]

Sediment Control Measures

Sediment control measures will be located, maintained, constructed and reclaimed according to plans and designs given under R645-301-732, R645-301-742 and R645-301-760

(Section R645-301-752). Sediment control facilities at the Deer Creek Mine are discussed in Volume 2, Part 3 of the Deer Creek MRP. No surface facilities, sediment control, or other disturbance is planned in the Mill Fork Lease area. Drainage and sediment control for the Rilda Canyon Portal Facilities has been designed to conform to the recommendations of the USFS, NEWUSSD, and the Utah Coal Mining Rules (Volume 11, Hydrology Appendix B Section 1 - Introduction). Prior to any construction, temporary sediment control will be established to protect Rilda Canyon creek from additional contributions of sediment (Volume 11, R645-301-322, -521.180). Volume 11, Hydrology Appendix B contains designs for construction and maintenance of the sediment controls for the Rilda Canyon Portal Facilities. Silt fences at ASCAs will be removed after vegetation is established and approved by the Division (Volume 11, Hydrology Appendix B, Section 2.11). [07272005]

Siltation Structures: General

No siltation structures are planned for coal mining operations the Mill Fork Lease. Coal mining operations in the Mill Fork Lease should not impact existing siltation structures in the permit and adjacent areas.

Siltation structures at the Rilda Canyon portal facilities will be constructed and maintained to comply with R645-301-742.214. Any siltation structure that impounds water will be constructed and maintained to comply with R645-301-512.240, R645-301-514.300, R645-301-515.200, R645-301-533.100 through R645-301-533.600, 8645-301-733.220 through R645-301-733.224, and R645-301-743 (Volume 11,Section 732.100). Siltation structures for an area will be constructed before beginning any coal mining and reclamation operations in that area and, upon construction, will be certified by a qualified registered professional engineer to have been constructed as designed and as approved in the reclamation plan (Volume 11,Section 742.212). Details concerning design, construction and maintenance of sediment control measures, siltation structures, sedimentation pond, and impoundments for the Rilda Canyon portal facilities are in Volume 11, Hydrology Appendix B: Drainage and Sediment Control Plan. [07012005]

Siltation Structures: Sedimentation Ponds

No sedimentation pond is planned for coal mining operations the Mill Fork Lease Coal mining operations in the Mill Fork Lease should not impact existing sedimentation ponds in the permit and adjacent areas.

The permittee has met the minimum requirements of the R645 Coal Rules by supplying designs for the siltation catch basin (sediment trap) at the Deer Creek sediment pond. See Deer Creek Mine design called "Dumpable Sediment Box/Retaining Wall". [06102005, SJD]

A temporary sediment pond will be constructed below the proposed Rilda Canyon portal facilities surface facilities. It will be designed to contain runoff from a 10-year, 24-hour event and with principal and emergency spillways that each will safely discharge runoff from a 25-year, 6-hour event (Volume 11, Hydrology Appendix B, 3.4). Sedimentation pond designs will be in compliance with the requirements of R645-301-356.300, -356 .400, 513 .200, 742.200 through 742 .240, and –763 (Volume 11, Section R645-301-732.200) and will comply with -742 .220 and qualifying criteria of the MSHA, 30 CFR 77.216(a) (Volume 11, Section R645-301-742.222). Analyses utilized to determine the size and hydraulics related to the construction and operation of the sedimentation pond are in Volume 11, Hydrology Appendix B: Drainage and Sediment Control Plan.

Discharge from the sediment pond will be routed through the principal and emergency spillways (Volume 11 Appendix Volume - Hydrology: Appendix B). The Permittee states such a discharge from the sediment pond would constitute an emergency situation and comply with Utah DWQ storm water regulations (Section R645-301-751, Water Quality Standards and Effluent Limitations).

No permanent structures - including sediment ponds - are planned for the Rilda Canyon Portal Facilities (Volume 11, Sections 732.200, 733, and 743).

Although all of these requirements do not apply to a full-containment pond, the Permittee commits that the Rilda Canyon portal facilities pond will comply with the requirements of R645-301-732.221.1.through 731.221.2 (Volume 11, Sections 732.221.2 through 732.221.39. [07012005]

Siltation Structures: Other Treatment Facilities

No other treatment facilities are planned for coal mining operations the Mill Fork Lease Coal mining operations in the Mill Fork Lease should have no impact on existing treatment structures in the permit and adjacent areas. [03292005, JDS]

There is no Other Treatment Facility planned for the Rilda Canyon portals. Domestic waste or black water will be held on site in a holding tank then transported to a treatment facility (Volume 11, Section 742.230).

Siltation Structures: Exemptions

The Permittee does not identify any areas for exemption to the requirements of R645-301-742.200 and -763.No siltation structures are planned for coal mining operations the Mill Fork Lease Coal mining operations in the Mill Fork Lease should have no impact on existing siltation structures in the permit and adjacent areas. All disturbed areas at the Rilda Canyon facilities that do not report to the sedimentation pond will be treated with ASCAs. [07012005]

Discharge Structures

No discharge structures are planned for coal mining operations the Mill Fork Lease Coal mining operations in the Mill Fork Lease should have no impact on existing discharge structures in the permit and adjacent areas.

Discharge from the Rilda Canyon portal facilities sedimentation pond, temporary impoundments, and diversions will be controlled by energy dissipators, riprap channels, and - where necessary - other devices (Volume 11, Section R645-301-744). Discharge structures will be designed according to standard engineering design procedures. Discharge structures will be located, maintained, constructed and reclaimed to comply with R645-301-733, -734, -743, -745 and -760 (Volume 11, Section 753). Riprap or other protection such as culverts or concrete will be placed at all sedimentation pond inlets and outlets to prevent scouring (Volume 11, Hydrology Appendix B Sections 3.1 f) and 3.4 i)). Figure 11 shows culvert outlet design. [07012005]

Impoundments

No impoundments are planned for the Mill Fork Lease area. Coal mining operations in the Mill Fork Lease should have no impact on existing structures in the permit and adjacent areas.

Impoundments at the Rilda Canyon portal facilities will be located, maintained, constructed, and reclaimed to comply with R645-301-733 -734, -743, -745 and -760 (Volume 11, Section 753). Design and construction specifications for the Rilda Canyon portal facilities sedimentation pond are discussed in Volume 11, Hydrology Appendix B, Sections 3.1 and 3.4; Figures 6-9; Tables 15-18; and on Plate 700-3. Reclamation of the clay liner for the Rilda Canyon portal facilities sedimentation pond is discussed in Volume 11, Section 553. Construction and reclamation of the clay liner is also discussed in Volume 11, Hydrology Appendix B, Section 4.4. Volume 11, Section R645-301-521.180 discusses the tank that will provide primary sediment control for the Rilda Canyon portal facilities. [07012005]

Ponds, Impoundments, Banks, Dams, and Embankments

No ponds, impoundments, banks, dams, or embankments are planned for the Mill Fork Lease area. Coal mining operations in the Mill Fork Lease should have no impact on existing structures in the permit and adjacent areas.

No permanent structures are planned for the Rilda Canyon Portal Facilities. There will be no banks, dams, or embankments. Temporary impoundments for the Rilda Canyon portal facilities will be located, maintained, constructed, and reclaimed to comply with R645-301-733 - 734, -743, -745 and -760 (Volume 11, Section 753). Design and construction specifications for

the Rilda Canyon portal facilities sedimentation pond are provided in Volume 11, Hydrology Appendix B and on Plate 700-3. Volume 11, Sections 521.180, 532, 728, and 731.500 discuss the 26,000-gallon runoff-collection tank that will provide sediment control for the Rilda Canyon portal facilities. [07012005]

Water Replacement

The Permittee commits to promptly replace any State-appropriated water supply that is contaminated, diminished or interrupted by Underground Coal Mining And Reclamation Activities conducted after October 24, 1992, if the affected water supply was in existence before the date the Division received the permit application for the activities causing the loss, contamination or interruption. The baseline hydrologic and geologic information required in R645-301-700 will be used to determine the impact of mining activities upon the water supply (Section 731.530). (03/29/2005)

In 1993, the Permittee and NEWUSSD agreed upon mitigation plan that included construction of a slow sand water treatment plant with a 0.5 million-gallon storage reservoir. Construction of the plant and reservoir was completed and the plant brought on-line in November 1994. (Volume 9, Appendix D). [07012005]

Casing and Sealing of Wells

Each coal exploration borehole will be plugged by filling it from total depth to the surface with type II Portland cement, or if that is not feasible, with bentonite chips to within five ft of the surface with cement plug in the top of the hole. A brass marker with the hole number and year will be placed on top of the cement, two ft below surface grade. This method has been approved by the BLM and the Division and has been used in the past to prevent acid and toxic drainage from entering water resources, minimize disturbance to fish, livestock, and wildlife, machinery in the permit and adjacent area. If an exploration borehole is converted to a water-monitoring well, Utah water well regulations and the provisions of R645-301-731 of the Coal Mining Rules will be followed (Volume 12, sections R645-301-631 and -642, p. 6-23 and 6-24, 6-25 and 6-26).

Findings:

Information provided in the plan meets the Operational Hydrologic Information requirements of the regulations.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

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

Analysis:

No new surface support facilities or utility installations will occur because of the Mill Fork lease.

The Division discussed the support facilities in the mining and operations and facilities section of the TA. The Division found that some information on support facilities was deficient and discussed those deficiencies in the mining and operations and facilities section of the TA.

The Permittee described the support facilities in various sections of the MRP. Section R645-301-521.180 list the support facilities and give a description. Map 500-3 shows the location of the support facilities and a cross section of the primary road.

See the biology and hydrology operational sections of the TA for how the support facilities and utility installations met the requirements for controlling water pollution and siltation and damage to fish and wildlife.

The support facilities for the Rilda Canyon Portal Facilities are located away from by oil, gas, and water wells; oil, gas, and coal-slurry pipelines, railroads; electric and telephone lines and sewage lines. The water lines were relocated as needed or the Permittee designed the facilities so as not to disrupt water supplies.

The Division conducts monthly inspections to verify that the Permittee is operating support facilities in accordance with the regulations. [06302005]

Findings:

Information provided in the plan meets the Support Facilities and Utility Installations requirements of the regulations.

SIGNS AND MARKERS

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

Analysis:

No new signs or markers will be needed because of the Mill Fork lease.

The Permittee met the requirements for placing signs and markers. They committed to meet the relevant requirements as listed in R645-301-521.200. [06302005]

Findings:

Information provided in the plan meets the Signs and Markers requirements 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

In Section R645-301-524.200 of the MRP, the Permittee states that they will submit a blast design for any future surface blasts. [06302005]

Preblasting Survey

This section does not apply. (07152005)

General Performance Standards

In Section R645-301-524.200 of the MRP, the Permittee states that they will submit a blast design for any future surface blasts. [06302005]

Blasting Signs, Warnings, And Access Control

Control of Adverse Effects

This section does not apply. (07152005)

Records of Blasting Operations

This section does not apply. (07111152005)

Findings:

Information provided in the plan meets the Use of Explosives requirements 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:

Applicable cross sections and maps included in or referenced in Volume 12 have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer or land surveyor, with assistance from experts in related fields such as hydrology, geology, and biology (Volume 12, Section R645-301-513, p. 5-2).

There are no impounding structures associated with the Mill Fork Lease.

Affected Area Maps

The Division usually considers the affected area to be equivalent to the permit boundary. Several maps show the permit boundaries including Drawing MFU1840D, Deer Creek Mine Mill Fork Lease ML-48258 Hiawatha Mine Plan.

Mining Facilities Maps

There were no changes to the support facilities map for the Mill Fork lease because all associated mining activities are to be underground using existing facilities. [03292005, JDS]

The only potential surface facility associated with this permit extension is the possible ventilation breakout in Crandall Canyon, upstream of the existing Crandall Canyon Mine. The location for these portals is shown on Drawing MFU1841D in Section 500 of Volume 12. These locations are preliminary, and the need for the portals will be evaluated and the design will be made based on future coal exploration. If these portals are needed, they will be permitted in a separate application (Volume 12, section 623.200). [03292005, JDS]

The surface facilities map (Drawing DS202E) of the Deer Creek mine has been updated as of June 10, 2005. [06102005, SJD]

Map 500-3, Deer Creek Mine Rilda Canyon Surface Facilities shows the following:

- Buildings,
- Utility corridors
- Roads,
- Topsoil and subsoil storage areas
- Underground development waste (rock waste) temporary storage
- Noncoal waste storage area;

- Water diversion, collection, conveyance, treatment, storage and discharge facility
- Sedimentation pond
- Cross sections of the surface configuration during mining operations. [06302005]

Mine Workings Maps

The Permittee has submitted maps showing the underground mine working associated within the Mill Fork Lease. The maps show active, inactive and abandon underground mine workings of Genwal Coal Company, Skeen Mine, Helco Mine, Huntington #4 Mine, and the Deer Creek Mine.

The Permittee has given mine projection for the Blind Canyon and Hiawatha coal seam in the Mill Fork Lease. Maps MFU-1840D and MFU1841D give the mining sequence for nineteen years in the Hiawatha Seam. These map are projected and can change in the future due to ground condition, roof control, coal quality, mineable reserves, and coal market. Maps are PE certified.

Map HM-11 has been removed from the plan because all information is now included on Map HM-10. Maps HM-9 and HM-10 have been updated to show more recent mine workings in the North Rilda tract and the entries from North Rilda to Mill Fork. [03292005, JDS]

Map 500-3, Deer Creek Mine Rilda Canyon Surface Facilities shows the following:

- The location and extent of known workings of proposed, active, inactive, or abandoned underground mines within the Rilda Canyon Portal Facility area.
- Mine openings to the surface within the Rilda Canyon Portal Facility area.
- Location and extent of existing or previously surface-mined areas within the within the Rilda Canyon Portal Facility area. [06302005]

Monitoring and Sampling Location Maps

HM-1, the Water Monitoring Location Map, is in Volume 9. Map HM-9 shows the five shallow Rilda Canyon wells surrounding the spring collection system. There is no new monitoring for the Rilda Canyon facilities. For the Mill Fork leases, elevations and locations of monitoring stations used to gather data on water quality and quantity are on Plate 1 by Mayo and Assoc. and Drawings MFS1830D and MFS1839D. [11092006, JDS]

Certification Requirements

All maps and cross-sections that are required to be certified have been certified.

Findings:

Information provided in the plan meets the Maps, Plans, and Cross Sections requirements 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:

There will be no reclamation needed on the Mill Fork leases because all mining activities will be underground. Subsidence mitigation is not considered as a reclamation requirement. [11092006]

The vegetation- and land use- related information below provides discussion of the reclamation plan for disturbed sites and how the plan addresses the regulations.

In Section R645-301-541.300 of the MRP, the Permittee states:

All asphalt material from the disturbed area will be excavated and taken to a permitted class IV landfill.

The Permittee will not modify the spring collection system during reclamation. [06302005]

Findings:

Information provided in the plan meets the Reclamation - General Requirements 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 postmine land use is grazing, wildlife, and recreation. During the reclamation phase, the Permittee will remove a planned trail and parking pad near the Rilda portal project as well as restore the existing road to the original location. [06292005]

Findings:

Information provided in the plan meets the Reclamation - Postmining Land Uses requirements 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:

To enhance wildlife habitat, the Permittee will form rock piles and plant tublings during the reclamation phase. The Permittee will use a seed mix that provides wildlife with a "natural" and compatible food source once the plants are established.

The Permittee will monitor for changes in Rilda Creek during reclamation. [06292005]

Findings:

Information provided in the plan meets the Reclamation - Protection of Fish, Wildlife, and Related Environmental Values requirements 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:

Because no surface disturbance is planned for the Mill Fork area, the Permittee does not have to address the AOC section for the Mill Fork amendment.

The definitions of Approximate Original Contour (AOC) are contained in SMCRA and the R645 Rules. The objectives of AOC requirements are that the final surface configuration shall closely resemble the general surface configuration of the land before mining. Note: the requirement to return the disturbed area to the approximate original contour does not necessarily mandate that the site be restored to the original elevation. Therefore, the main criterion for compliance with AOC is "Does the postmining topography, excluding elevation, closely resemble its premining configuration?"

The Division examined the premining and postmining cross-sections and determined:

- The main mine site will be restored to the approximate premining configuration. The reclaimed slopes will be slightly smoother than the natural slopes. However, pocking will roughen the final surface so that it will look more natural than standard grading methods. See Map 500-4 Sheet 1 of 5 and Sheet 2 of 5.
- The topsoil storage site will be restored to the original contours. See Map 500-4 sheet 3 of 5.
- The subsoil/construction fill storage site will be restored to the original contours. See Map 500-4 sheet 4 of 5.
- The sediment pond area will be restored to a slope configuration similar to the premining slope. See Map 500-4 sheet 5 of 5, which shows how the reclaimed site will blend into the surrounding area.
- Map 500-5, Final Reclamation Topography, shows that the reclaimed site will blend into the surrounding area. The reclaimed site which will have slope of no more than 2H:1V will smoothly transition into the steeper surrounding hill or into the gentler streambed area.

Specific items that the Division uses to determine if the AOC requirements will be meet include:

- All spoil piles will be eliminated. The Permittee estimates that at final reclamation there will be approximately 6,000 $yd^3$of excess material. The total amount of fill is 110,982 $yd^3$and the total amount of fill is 110,982 yd^3. The fill material will come from the subsoil storage area or the topsoil storage area. The Permittee will place 2 ft of topsoil at the site.

- Elimination of all highwalls. There will be two highwalls at the North Rilda Portal Facility. The highwalls are shown on Map 500-4 sheet 1 of 5 at cross-section 2+50 and 5+00. The highwall areas are also shown on contour Map 500-5. On both maps, the Permittee shows that the highwalls will be eliminated.

- Hydrology. The two major hydrologic concerns are drainage restoration and sediment control. The Division considers that those issues were adequately addressed if the general hydrology regulations were addressed. The Permittee will install silt fences during

reclamation and the silt fences will remain in place for a minimum of two years after vegetation has been established.

- Postmining Land Use. The Division considers that the site met all AOC issues related to postmining land use if the site met the general postmining land use regulations.

Findings:

Information provided in the plan meets the Approximate Original Contour Restoration requirements 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

Because no surface disturbance is planned for the Mill Fork area, the Permittee does not have to address the backfilling and grading section for the Mill Fork amendment.

The general backfilling and grading requirements for the Rilda Canyon Portal Facility are:

- Achieve the approximate original contour requirements. The Division determined that the site meet those requirements. See the AOC section of the TA for details.
- Eliminate all highwalls, spoil piles and depressions. The highwall and spoil pile issues were addressed in the AOC section of the TA. The reclaimed surface as shown on Map 500-4 and 500-5 show that no depressions will be left. Minor depression from pocking and other surface roughening methods will leave minor depressions needed for micro environments, slope stability and erosion control.
- Slope Stability. In Section R645-301-553.140 of the MRP, the Permittee stated that the reclaimed slopes will not exceed 2H:1V, the soils will have similar characteristics to material used to reclaim the Des Bee Dove Mine. Because the two sites are similar, the North Rilda Portal area will have slopes that meet the minimum 1.3 safety factor requirement. Because the plans are certified by a professional engineer, the Division will accept the safety factor analysis.

- The Division considers that the erosion and water pollution both on and off the site will be minimized if the general hydrologic requirements are adequately addressed.
- The Division considers that the postmining land use will be meet if those requirements have been adequately addressed.

Specific backfilling and grading issues are:

- Settled and revegetated fills. There are no settled and revegetated fills in the area that the Permittee proposes to leave that do not meet the general backfilling and grading requirements.
- There are no toxic or acid forming materials on the site.
- There are no exposed coal seams on the site.
- There will be not cut and fill terraces on the site.
- Pocking and other surface roughening methods will ensure that topsoil slippage is minimal. [06302005]

In Rilda Cyn, 97,259.65 yd^3 of subsoil will be salvaged for replacement during final reclamation (Vol 11, Section R645-301-232.500). Pad surface will be recontoured before subsoil is redistributed, effectively eliminating the compacted pad surface (Map 500-4 and Section R645-301-553).

Regraded subsoil will be sampled on 500 ft intervals to a depth of four ft as described in Section R645-301-231.300. The samples will be analyzed on site for pH and EC. Problem areas will be further sampled and sent to a laboratory for analysis. When subsoil testing is complete and any problems are resolved, topsoil will be hauled by dumptruck and redistributed by track equipment.

The construction of a sediment pond is briefly mentioned in Sections 645-301-521.180, 645-301-526, and 645-301-732.200, 645-301-742.220. More detail is provided in Volume 11 Appendix – Hydrology Appendix B section 3. Section 3 indicates that native fill will be used where possible. However, due to the very permeable sandy gravel below the surface soils, imported clay will line the sediment pond as suggested in the geotechnical reports included in Appendix F of Volume 11- Appendix – Engineering. The clay liner will be buried at least four ft below the surface during final reclamation (Volume 11 Section R645-301-533 and Volume 11 Appendix - Hydrology Appendix B).
[06302005]

Previously Mined Areas

The provisions of the previously mined areas allow a Permittee to only partially reclaim highwalls under specific circumstances. None of those circumstances exists at the site because

all highwalls will be constructed post-SMCRA. The Permittee committed to reclaim all highwalls that they create.

Findings:

Information provided in the plan meets the Backfilling and Grading requirements 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 Permittee has not proposed any new mine opening on the Mill Fork Lease or a change in the mine opening closure plan.

In Section R645-301-550 of the MRP, the Permittee states that portal sealing plan. The plan meets the Division and MSHA requirements by having a block seal 25 ft from the opening and then backfilled. The drill hole used to pump gray water into abandoned workings will be plugged and then backfilled with concrete

Findings:

Information provided in the plan meets the Mine Openings requirements of the regulations.

TOPSOIL AND SUBSOIL

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

Analysis:

Redistribution

Deer Creek Mine Facilities

Table 3-1 shows the timing of various steps in reclamation, and Table 3-2 is a schedule of monitoring activities. Except for soil sampling, the reclamation timetable does not show months in which the activities would occur, but a note below the table discusses the timing of seeding

and planting more specifically. Soil salvage and replacement activities would be done during backfilling and grading operations.

Reclamation will involve three disturbed areas: Deer Creek Canyon, Deer Canyon, and Elk Canyon. According to the backfilling and grading plan in Section R645-301-553 of the application, reclamation will begin at the uppermost parts of the disturbed areas and will proceed down the canyons. Various stages of the process will be occurring simultaneously. Substitute topsoil will be excavated from the existing undisturbed drainage corridor. Substitute topsoil will be placed as shown on drawing DS-1816-D in Appendix R645-301-500C.

Maps DS1783D Sheets 1 and 2 illustrate substitute topsoil excavation along the length of the Deer Creek drainage. The locations of these cross sections are shown on map DS-1782-D. A statement on page 5-6 indicates that substitute topsoil will be taken from between stations 9+00 to 15+00 and 24+00 to 31+00. It is estimated 58,891.08 cubic yards of material can be obtained to provide an average cover depth of 27 inches over 16 acres as illustrated on Map DS-1816-D.

The fill slopes at the equipment yard and run of mine conveyor which were seeded twenty years ago will be used as substitute topsoil over less desirable soils (high SAR) in the material storage yard (pg 5-7). The procedure will be as follows:

1. Push the top seven feet of pad soils towards the cut slope.
2. Utilize remaining soils to complete the 2:1 slope and cover the salt-laden soils.

Substitute topsoil for the water tank and fan pad will come from the top layer of the berm and outslope of the pad (Section R645-301-500, page 5-7).
[03072003]

Soil Nutrients and Amendments at the Deer Creek Facilities

The biology chapter of the application says fertilizer will be applied at the rate of 40 pounds per acre of ammonium nitrate and 35 pounds per acre of triple superphosphate. The Division encourages operators to use minimal amounts of fertilizer, and these quantities are relatively low.

In addition to the fertilizer, the applicant commits to apply one ton per acre of certified noxious weed free hay, and the hay and fertilizer will be incorporated into the soil in the gouging process. This should help to increase the amount of organic matter and the fertility and structure of the substitute topsoil.
[03072003]

Deer Creek Refuse Pile Reclamation

To date, information on the refuse shows that it is unsuitable as a plant growth medium. However, sampling of vegetation established on portions of the refuse pile for interim erosion control indicates the refuse can, at least in some areas, support vegetation. In 1998, vegetation cover on the refuse pile was measured by the applicant's consultant as 40.5%, and in 1999, vegetation cover on the pinyon-juniper reference area was roughly estimated as about 40%. While this seems to indicate the refuse can, by itself, support adequate vegetation, there is no vegetation established on the area of the refuse pile where the high salt concentrations were found near the surface.

Refuse distributed in the fill must be covered by four feet of non-toxic material. Refuse that is cut during grading will be used as fill along cut banks and highwalls. Any acid-forming or toxic materials will be covered with four feet of non-acid and/or nontoxic material (pp 2-3, 5-9 and 5-10 of the submittal).

The Permittee has indicated that the volume of refuse requiring four feet of cover can not be estimated until the 2002 sampling program is completed (page 2-3 and 2-4). To date, sampling information indicates that the surface 7.0 feet will be excavated and buried in the fill. Sampling in the year 2002 will concentrate on the Deer Creek and Elk Canyon refuse piles. Page 5-10 also indicates that the spoil stored southeast of the coal bin (Elk Canyon) will be tested for acid/toxic characteristics prior to its use as fill within the top four feet.

Refuse/Soil sampling will occur in the field season of 2002. Results of this sampling will be used to update the Mining and Reclamation Plan with the estimated volume of refuse in the Deer Creek refuse pile (vicinity of site #1) and the Elk Canyon refuse pile (vicinity of site #6). Information provided in the proposal is adequate to meet the requirements of Operation Plan, [03072003]

Rilda Canyon

The Rilda Canyon sediment pond and portal facilities areas will be recontoured with subsoil, scarified and covered with topsoil dedicated to reclamation of the respective sites (R645-301-242 and R645-301-231.100).

Regraded subsoil will be sampled on 500 ft intervals to a depth of four ft as described in Section R645-301-231.300 (three or four samples for the 2,000 linear ft in the facilities area). The samples will be analyzed on site for pH and EC. Problem areas will be further sampled and sent to a laboratory for analysis.

When subsoil testing is complete and any problems are resolved, topsoil will be hauled to by dumptrucks and will then be redistributed by track-mounted equipment. Approximately 6.1

acres (excluding road and sediment pond) will receive 24 inches of stockpiled topsoil, depending upon actual recovery volumes (Section R645-301-242). Stakes will be used to monitor the replacement depth (Section R645-301-242). Three composite samples will be taken from the facilities area and sediment pond. Samples will be analyzed for parameters to be compared with baseline information and to determine the need for amendments, including fertilizer. Boulders will be replaced to provide 5% surface cover. The site will be gouged.

Topsoil storage sites and slopes less than 2h:1v in the subsoil storage area will be reclaimed with roughening of the surface as described (Section R645-301-242 and Item 5 of Plan for Experimental Practice In. R645-302-218). Subsoil storage area slopes greater than 2h:1v will receive an application of anionic polyacrylamide (PAM). (Some details of this application are described in Item 5 of Plan for Experimental Practice In. Section R645-302-218.) Boulders will be placed randomly to achieve 5% coverage. Seeding and root stock planting is described in Tables 300-7 and 300-8. Root stock will be treated with PAM before planting. Slopes greater than 20% will receive a tackifier (R645-301-243).

Reestablishment of microbial activity in stockpiled soil material usually occurs as a result of the addition of straw or hay and with seeding. The plan encourages rapid establishment of locally adapted strains of microbes through the use of a slurry of native soil and water (Vol. 11, Section R645-301-243).
[06302005]

Findings:

Information provided in the plan meets the Reclamation - Topsoil and Subsoil requirements 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:

No new roads or road reclamation plans are associated with the Mill Fork Lease.

Reclamation

Retention

The pavement within the main North Rilda Portal Facility will be reclaimed as part of the general backfilling and grading plan.

The Permittee will realign and resurface the main haul road (County Road 306) during reclamation. See Section R645-301-526.116.2.

The Permittee and Emery County have an agreement for the realignment of County Road 306 and the agreement is included in the MRP. [06302005]

Findings:

Information provided in the plan meets the Reclamation - Road Systems and Other Transportation Facilities requirements 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:

Hydrologic Reclamation Plan

There is no planned surface disturbance in the Mill Fork leases area. There will be no need for postmining removal, reclaiming, or rehabilitation of structures, sedimentation ponds, diversions, impoundments, and treatment facilities within the Mill Fork Lease area. (11092006)

The Rilda Canyon portal facilities hydrologic reclamation plan is in Volume 11, Hydrology Appendix B, Sections 4.1 – 4.4. Some details are discussed in Section 553.100. Siltation structures and diversions will be located, maintained, constructed, and reclaimed according to plans and designs given under R645-301-732, R645-301-742 and R645-301-763 (Volume 11, Section 752). Before abandoning the permit area or seeking bond release, the Permittee will ensure that all temporary structures are removed and reclaimed (Section 760). The road and culverts will be removed during final reclamation from the site and the Forest Development Trail will be re-established (Section 543). All permanent sedimentation ponds, diversions, impoundments, and treatment facilities meet the requirements of R645-301 and R645-302 for permanent structures, have been maintained properly, and meet the requirements of the approved reclamation plan for permanent structures and impoundments (Section 760). No permanent structures are planned for the Rilda Canyon Portal Facilities (Sections 732.200, 733, and 743). (07012005)

Casing and sealing of wells

Each water well will be cased, sealed, or otherwise managed, as approved by the Division (Volume 9, Section R645-3101-748, 755, and 765). All wells will be managed to comply with R645-301-748 and R645-301-765 (Volume 11, Sections 551, 631, 731.400, and 755). (07012005)

Water Monitoring

Surface water-monitoring stations (Volume 9, Appendix A) will continue to be monitored quarterly (when accessible) throughout the operational phase of the mine. Monitoring will continue until the release of the reclamation bond or until an earlier date to be determined after appropriate consultation with local, state, and federal agencies (Volume 11, Section728, Hydrologic Balance-Surface Water System, F).

Monitoring of the described ground-water resources will proceed through mining and continue during reclamation until bond release. The Rilda Canyon piezometers will be removed after approval from the Division in conjunction with the Utah State Division of Water Rights (Volume 11, Section 731.200). (07012005)

Diversions

There are no diversions in the Mill Fork Lease. [03292005, JDS]

There are no permanent structures at the Rilda Canyon facilities. The Rilda Canyon portal facilities hydrologic reclamation plan is in Volume 11, Hydrology Appendix B, Sections 4.1 – 4.4. Related information is in Volume 11, Section 540. Before abandoning the permit area or seeking bond release, PacifiCorp will ensure that all temporary structures are removed and reclaimed (Volume 11, Hydrology, Section 760). Silt fences or straw bales will be located in the reclaimed drainage to treat and control sedimentation (Volume 11, Engineering, Section 553.100). (07012005)

Findings:

Information provided in the plan meets the Reclamation – Hydrologic Information requirements 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

The plan for the Rilda Canyon portal project does not include contemporaneous reclamation during the construction and operation phases. The Permittee will conduct interim reclamation for the topsoil stockpiles. The Permittee will also stabilize reclaimed areas by seeding immediately following earthwork. [06292005]

Findings:

Information provided in the plan meets the minimum Reclamation - Contemporaneous Reclamation requirements 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

Volume 11 includes the reclamation and revegetation plan for the Rilda portal project. Volume 2, Part 4 includes the reclamation and revegetation plan for the left fork facilities. [06292005]

Volume 11, Tables 300-8 through 300-10 provide three community-based seed mixes for the interim and final reclamation phases for the Rilda portal project. The seed mixes are for the pinyon/juniper, sagebrush/grass, and white fir/aspen community types. The Permittee will use the same seed mixes for interim and final reclamation. The topsoil piles from the undisturbed and disturbed AML areas will receive the sagebrush/grass seed mix (Vol. 11, p. 300-23) and white fir/aspen (Vol. 1. p. 30-28), respectively. The Permittee will use the pinyon/juniper seed mix for the 0.25 acres of disturbed Douglas fir/white fir community type near the eastern edge of the main facilities site in Rilda Canyon (refer to Collins 2003/2004 vegetation map). The Permittee will also use the pinyon/juniper seed mix for the previously mined and reclaimed AML site. [06292005]

The Permittee will plant containerized plants of shrub species that are native to the Rilda Canyon area. These transplants will augment seeding in areas commonly difficult for seed to germinate e.g., steep slopes, southern exposures and extremely windy sites. Transplants will contribute to soil stabilization and wildlife habitat enhancement. [06292005]

Revegetation: Timing

Volume 11, Tab. 300-6 is a general reclamation timetable for the Rilda portal project. According to this timetable, many reclamation activities will occur simultaneously. [06292005]

Volume 11, Tab. 300-7 is a monitoring program timetable for evaluating site stability, plant health, need for reseeding, and vegetation for bond release. The Permittee will conduct vegetation monitoring during the 4th, 8th, 9th, and 10th years following reclamation.

Revegetation: Mulching and Other Soil Stabilizing Practices

The Permittee will conduct earthwork immediately followed by seedbed preparation and seeding. Seedbed preparation will include:

- Amending the soil with 2000lbs./acre of certified noxious weed free alfalfa hay.
- Pocking to provide water-catching sites and incorporate the hay.
- Hurricane or hydroseeding with native seed mixes.
- Hydromulching with 1,500 lbs./acre of wood fiber or other acceptable product.
- Applying a tackifier to slopes greater than 2:1 at the manufacturers recommended rate.
- Planting tublings at a rate of 200/acre.
- Placing signs around the site to limit access and ensure slope protection. [06292005]

The Permittee may consider using the track hoe to cast some dead trees and large rocks back onto the reclaimed surface. This debris would provide solar protection and increases available moisture in small areas as well as increases topographic and vegetation diversity.

Revegetation: Standards For Success

The Permittee must use the Division's approved sampling techniques listed in the Division's "Vegetation Guidelines, Appendix A". Qualitative surveys will include sampling reclaimed sites for cover, woody species density, diversity, and productivity. [06292005]

The Division will assess success of the revegetated sites to the designated reference areas. Success measurements include evaluating the effectiveness and permanence of the vegetation for the approved postmine land use as well as the extent of cover compared to the reference area. The Permittee will meet success standards when ground cover and production rates are not less than 90% of the standard at the 90% confidence level.

Two of the postmine land uses for the permit area are wildlife and recreation. Success standards for wildlife require that tree and shrub stocking rates, planting arrangement, and value are appropriate for the postmine land use. The Permittee will meet success standards when:

- Density attains at least set rates.
- Trees and shrubs are healthy.
- 80% of trees and shrubs are in place at least 60% of the extended responsibility period.

The Permittee will use reference areas as the measure of success for the previously mined AML reclaimed site in Rilda Canyon. This action is above the requirement for predisturbed sites. The Collins 2003/2004 surveys provide data for cover, cover by species, and woody plant density for the pinyon/juniper reference (Collins 2003, Tab. 3) and AML reclaimed areas (Collins 2003, Tab. 2). The NRCS 2004 evaluation provides the required productivity value and range condition for this site. The NRCS evaluated this site within the required range of fair to better condition. The surveyors conducted the vegetation survey and evaluation within a normal precipitation year. [06292005]

There is no plan to irrigate following reclamation.

The Permittee will implement a weed or rodent control program, only if needed. The Permittee will seek approval prior to implementing an animal control program.

The Permittee plans to follow regulations associated with repair of rills and gullies.

Findings:

Information provided in the plan meets the minimum Reclamation – Revegetation requirements of the regulations.

STABILIZATION OF SURFACE AREAS

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

Analysis:

Hay mulch (1 Ton/ac) will be blown over the redistributed topsoil surface. Small depressions (pocks) will be constructed for the purpose of retaining moisture and minimizing erosion (Section R645-301-552). Pocks will measure 2 ft in diameter and 18 inches deep. Wood fiber mulch will be applied to the surface, and on slopes greater than 2h:1v, a soil tackifier will be used (R645-301-244 and Plan for Experimental Practice - Rilda Canyon Portal Facility Reclamation Plan In. Section R645-302-218.)

Boulders larger than 1 ft in diameter will be segregated during construction of the site for use in final reclamation (R645-301-232.500) when they will be redistributed over the surface to provide 5% surface cover (R645-301-244).

Rills and gullies will be reworked if they affect the post mining land use (wildlife and grazing and recreation) or if they affect water quality standards in Rilda Creek (R645-301-244). Sediment control on the reclamation site will be monitored by water quality measurements as described in Surface Monitoring Plan in Section F of Section R645-301-728 of the MRP. [06302005]

Findings:

Information provided in the plan meets the Reclamation -Stabilization of Surface Areas Configuration requirements of the regulations.

CESSATION OF OPERATIONS

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

Analysis:

Where temporary cessation of operations is necessary for a period beyond 30 days, the applicant will submit the proper notification and information required of R645-301-515 .300 to DOGM – Volume 11, Section R645-301-515. (07152005)

Findings:

Information provided in the plan meets the Reclamation – Cessation of Operatons requirements of the regulations.

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 Division usually considers the affected area to be equivalent to the permit boundary. Several maps show the permit boundaries including Drawing MFU1840D, Deer Creek Mine Mill Fork Lease ML-48258 Hiawatha Mine Plan.

Bonded Area Map

The bonded area is usually the same as the disturbed area. Because no new surface disturbance is planned for the Mill Fork Lease area, the bonded area map will not change.

Map 500-5, Deer Creek Mine Rilda Canyon Final Reclamation Topography, is adequate because it shows the disturbed area boundaries. [06302005]

Reclamation Backfilling And Grading Maps

Because no new surface disturbance will occur with the Mill Fork Lease no backfilling or grading on the Mill Fork Lease will be needed.

The backfilling and grading maps and cross sections are shown on Map 500-4 and Map 500-5. The maps are at a scale of 1 inch equal 100 ft and the cross-sections vary between 1 inch equals 60 ft and 1 inch equals 40 ft. [06302005]

Reclamation Facilities Maps

No new surface facilities will be associated with the Mill Fork Lease.

The Permittee shows the reclamation facilities for the North Rilda Canyon Portal Facilities on Map 500-5. The map is adequate because it shows the reclamation facilities such as the restored trailhead and public parking lot. [06302005]

Final Surface Configuration Maps

No surface structures or facilities will be developed for the Mill Fork Lease. Therefore, no new disturbed areas will be created. Because subsidence will take place, the final surface elevations will be shorter. The Division usually is not concerned with the surface configuration after subsidence has taken place.

The final surface configuration for the North Rilda Portal Facility is shown on Map 500-4 and Map 500-5. [06302005]

Reclamation Monitoring And Sampling Location Maps

Elevations and locations of monitoring stations used to gather data on water quality and quantity are on Plate 1; Drawing MFS1830D – Hydrologic Map; and Drawing MFS1839D - Pre-subsidence Survey Map.

Reclamation Surface And Subsurface Manmade Features Maps

Reclamation Treatments Maps

Certification Requirements.

Findings:

Information provided in the plan meets the Maps, Plans, and Cross Sections of Reclamation Operations requirements of the regulations.

BONDING AND INSURANCE REQUIREMENTS

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

Analysis:

General

The Division does not consider that being under bonded is a deficiency. The Division can make a finding that the information in the permit is adequate but wait to give approval until the bond is posted. [07012005]

The Deer Creek mine has liability insurance and will provide coverage for the Mill Fork Lease.

Form of Bond

Determination of Bond Amount

A detailed reclamation cost estimate is included in the MRP.

Terms and Conditions for Liability Insurance

The Deer Creek mine has liability insurance sufficient to meet the requirements of the R645 Coal Rules. Copies of Insurance Certificates (for the period 04/01/2005 to 04/01/2006) are in Appendix E of the Legal and Financial Volume. (04192005)

Findings:

Information provided in the plan meets the Bonding and Insurance requirements of the regulations.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

INTRODUCTION

Regulatory Reference: 30 CFR Sec. 785; R645-302, et seq.

Analysis:

An Experimental Practice is described at the end of Chapter 2, Vol. 11 of the Deer Creek Mining and Reclamation Plan. The Division has received information that shows that the Experimental Practice will be conducted according to the applicable requirements of the regulatory program. All of the general permanent program provisions apply to these operations, unless otherwise specifically provided under the Experimental Practice.

Findings:

Information provided in the plan meets the Introduction requirements of the regulations.

EXPERIMENTAL PRACTICES MINING

Regulatory Reference: 30 CFR Sec. 785.13; R645-302-210, -302-211, -302-212, -302-213, -302-214, -302-215, -302-216, -302-217, -302-218.

Analysis:

Chapter 2, Soils, incorporates traditional methods of salvaging/stockpiling and an experimental practice method for protecting soils in-place. The Experimental Practice is unique by taking a reclamation approach to topsoil protection on steep slopes and over previously buried mine waste. In addition, the experimental practice includes: 1) measurements of bulk density testing of the in-place soils on slopes less than 2h:1v, before and after burial, to advance understanding of the depth of compaction created by large stockpiles on surface soils; and 2) treatment of slopes greater than 2h:1v with anionic polyacrylamide (PAM) to enhance stability and water retention.

Operations - Experimental Practices

An Experimental Practice is described at the end of Chapter 2, Vol. 11 of the Deer Creek Mining and Reclamation Plan. Energy West Mining proposes a topsoil protection plan that incorporates Experimental Practices (R645-302-200) for in-place soil storage beneath a subsoil stockpile. The experimental practice will occur in Rominger Canyon where a subsoil pile with dimensions 550 ft long X 250 ft wide X 40 ft deep (on the average) will be constructed to hold 107,000 yd^3 of subsoil and where boulders will be stored until use during reclamation (cross sections of the subsoil site are on Map 500-4 sheet 4 of 5).

The 3.0-acre experimental practice area will be covered with marker fabric. The fabric will provide a physical barrier between existing soil and the imported stored subsoil. During final reclamation the marker fabric will be removed and slopes greater than 50% will be treated with polyacrylamide (PAM). The PAM should enhance infiltration of water and stabilize soil aggregates to improve vegetation establishment and minimize erosion of the re-exposed, reclaimed slopes. By utilizing these procedures, the original ground surface configuration including cobbles, rocks, and soil cementation of the profile will be preserved in place. The experimental practice monitoring will provide an indication of the degree of compaction related to the loading of the in place soil through measurements of the bulk density of the in-place soil before and after burial.

Existing Soil Resources

The experimental practice will occupy 3.0 acres as shown on Map 500-3. (There are no prime farmlands in the vicinity.) Within these 3.0 acres, there is an undisturbed area of 1.6 acres and the remainder of the 3.0 acres (1.4 acres) contains mine waste that was reclaimed in 1989 with approximately 18 inches of cover soil (see attached Map 500-3). A photo of the Rominger mine side canyon is provided in Volume 11-Appendix Volume – Engineering Appendix G.

The 1.6 acres of undisturbed soils on the slopes around the reclaimed Rominger disturbance is represented by soil sample site RC6 on Map 200-1 (Mt. Nebo Scientific Survey, Dec. 2004). The site description indicates that the soil is on a slope of 60% and has a 0-4 inch topsoil horizon, with a lithic contact at 34 inches. The soil was placed in the Great Group of Haplustepts and Ustorthents and is described as stony sandy loam (20% stones at the surface).

The 1.4 acres of disturbed soils in the Rominger side canyon are approximately 18 inches deep over mixed coal/soil (AMR project report #AMR-015-904M). Sample S-8 is shown on Map 200-1(Soils Appendix Vol 11.), and a site description confirms 14 inches of topsoil over coal mixed with soil. The soils contain 20% gravels, 15% cobbles, 5% stones, and 5% coal fragments on the surface. The original soil surface was found buried under the coal at a depth of about 5 ft in AMEC pit 13 (Vol 11. Appendix- Engineering). Disturbed soils of the reclaimed Rominger site were sampled for laboratory analysis in December 2004 (site RC5, Appendix B, Vol. 11) to establish a baseline condition.

Under optimal conditions, salvage from the 3.0 acres would yield approximately 3 yd^3 of soil: based upon 4-inch recovery over 1.6 acres and 14-inch recovery over 1.4 acres. This figure is the maximum potential for the site, because the coal mine waste burial site in Rominger Canyon does not have even coverage and because the steeper slopes have a large amount of rock on the surface and in the profile.

Construction Sequence

Step 1.
Bulk density will be analyzed to a depth of 4 ft. on slopes less than 2h:1v, prior to disturbance to provide baseline information on the native and reclaimed surface soils of Rominger Mine Canyon. The bulk density testing will follow an accepted agronomic procedure described in the following reference:

Soil Science Society of America. 1986. Series No. 9. Methods of Soil Analysis: Physical and Mineralogical Methods. Part 1. Second Edition. Arnold Klute, Ed.

Bulk density measurements will be taken again, after re-exposure of the buried soil, to provide an indication of the degree of compaction created by large stockpiles of soil.

Step 2.
Large vegetation will be removed and track equipment will be used to install 2 ft diameter culvert UC10 (Sections R645-301-231.100 and R645-301-231.400 and Vol. 11-Appendix - Hydrology Appendix B Table 8, and Map 700-2) to direct surface flows (originating from the watershed above Rominger Canyon) beneath the storage pile.

Step 3.
Marker fabric will be laid over the entire surface of the storage area.

Step 4.
The subsoil will be placed on top using track equipment.

Experimental Practices -Operational Monitoring

Ongoing monitoring

Section R645-302-218 indicates that the undisturbed bypass culvert inlet and outlet will be regularly monitored and maintained, as required by R645-301-742.312, to be stable and to provide protection against flooding, etc.

Prior to disturbance and Reclamation Monitoring

Bulk density testing of the existing soil surface to a depth of four ft (or lithic contact) prior to and after disturbance will be conducted on slopes less than 2h:1v, to obtain information about the depth of compaction resulting from long term storage of soil. The important aspect of the bulk density testing is that the same procedure is used before and after disturbance. Monitoring will follow an agronomic method, such as listed in Soil Science Society of America. 1986. Series No. 9. Methods of Soil Analysis: Physical and Mineralogical Methods. Part 1. Second Edition. Arnold Klute, Ed., Chapter 13.

The Permittee has developed a split-spoon method of determining density in large stockpiles that will be compared to the agronomic method. If initial tests determine the two methods are equivalent, then the split spoon method will be used to determine bulk density down to a depth of six ft prior to and after reclamation. And if successful, the method will be provided in written form as an attachment to the Experimental Practice.

Application of PAM to slopes greater than 50% (2h:1v) will be monitored for cover and erosion as described in item 6) Experimental Practice Monitoring, p. 37, Chap 2, Vol. 11 of the MRP. The treated slopes will be compared with monitoring of adjacent undisturbed areas to determine effectiveness of the PAM application in encouraging vegetation establishment and limiting erosion.

Reclamation - Experimental Practices

Slopes steeper than 50% (2h:1v)

At final reclamation, the stored construction fill soil will be removed to the depth marker fabric. Care will be taken not to sub-excavate or disturb the native soil profile. Fill removal will be done by small earth moving equipment. The marker fabric will be removed and the condition of the underlying soil materials observed at this time.

Re-exposed soil of the reclaimed Rominger Mine site (lesser slopes) will be tested for nutrient status and bulk density.

Slopes steeper than 50% will be treated with an anionic polyacrylamide (PAM) during seeding to increase cohesion and infiltration of water without disrupting soil structure. Seed mix will be as described in Table 300-8, Vol 11. Bareroot or containerized plant stock will be pre-treated with PAM and used as enhancement plantings on the re-exposed, steep slopes. The Division and Permittee assume that 20 years hence, advances will be made concerning the specifics of PAM application, consequently the plan indicates that details of the PAM application will be reviewed prior to implementation.

For current information on the use of PAM:
http://kimberly.ars.usda.gov/pampage.shtml
http://esce.ucr.edu/soilwater/spring_2001.htm
http://www.hydrosource.com/clpbbs02.htm

Slopes less than 50% (2h:1v)

Slopes less than 2h:1v will be sampled for bulk density to a depth of four ft (Section R645-301-242) before and after soil burial. The effect of soil storage on underlying soils will be reported, increasing our understanding of the compaction created by large soil stockpiles.

To relieve soil compaction and increase the ability of the soil to absorb moisture, the re-exposed soils over reclaimed mine waste will be covered with 1 T/ac alfalfa hay mulch which will be worked into the soil with gouging. (Fertilizer will be added pending test results and comparison with baseline information.) Gouging will create a pattern of depressions that help control erosion through water retention, minimize siltation, and allow for air and water penetration into the soil horizon.

Excess boulders will be randomly placed to cover 5% of the surface. The seed mix described in Table 300-8 will be applied. PAM will not be applied to slopes less than 50%.

Analysis of the Proposed Experimental Practice

The soils regulations are intended to protect and preserve topsoil resources for the purpose of revegetation thus providing a stable surface capable of supporting the postmining land use. The proposed experimental practice, including operation and reclamation procedures, provides protection equal to or greater than what would be obtained through traditional methods required in the regulations. The Division has analyzed issues related to the proposed experimental practice, and the Permittee has adequately addressed each of these concerns as follows:

1. **Compaction.** Pad fill material will compact the soil, but to what degree and what depth is unknown. Previous in-place experimental practices have assumed that below 18 inches, there should be few effects of compaction from the fill. The Permittee intends to measure the bulk density of the in-place soil before and after subsoil storage to gain some understanding of the depth of compaction with loading. Compaction will be monitored on slopes less than 2h:1v and will be relieved through gouging of the surface. This procedure, combined with natural processes (e.g., freeze/thaw), should adequately alleviate compaction and allow vegetation to become established. Compaction will be relieved on steep slopes because the entire soil profile of boulders, rocks, cobbles will remain in place and through the use of PAM

which is reported to provide for infiltration of water which will encourage root growth.

2. **Decreased microbial activity.** Soil sterility is a problem whether soil is salvaged and stockpiled for years, or buried in place. Previous experimental practices have assumed that natural inoculation from adjacent undisturbed areas occurs over time. The Rominger Canyon Experimental Practice will enhance natural re-colonization by microorganisms with a supernatant from a slurry of soil and water that will be added to the hydroseeder. The soil in the slurry will be taken from adjacent undisturbed topsoil (Vol. 11, Section R645-301-243).

3. **Preserving configuration.** The experimental practice will not only allow preservation of soils in place, it will also preserve the configuration of boulders, cobbles, stones and cementation that provides structure, support and stability of the soils. This structure is difficult to duplicate in reclamation.

4. **Contamination.** Subsoils were sampled and analyzed during the soil survey (to a depth of six ft) and found to be non-toxic. It is unlikely that native soils would be contaminated by the imported subsoils, because subsoils will be placed against the native soils on a 60 ° slope and water will tend to drain downward into the subsoil fill. The in-place reclaimed mine waste at the bottom of the fill is not likely to be contacted by leachate from the subsoil as the depth of fill will average 40 ft and the average rainfall is 16 inches annually.

   Subsoils removed from the experimental practice area at final reclamation will be tested at the time of reclamation to determine whether extremes of pH or salts exist. Extreme values will provide an indication for remedial action of the subsoil (Vol 11, Section R645-301-231.300).

[06302005]

Findings:

The Division finds that the information provided meets the requirements for approval of the Experimental practice and seeks the concurrence of the Office of Surface Mining in accordance with:

R645-302-214.100, the experimental practice encourages advances in coal mining and reclamation technology due to 1) information gained from bulk density testing of the existing surface soils prior to and after storage of the subsoil. 2) enhancement of reclamation technique on steep slopes through the use of anionic polyacrylamide (PAM).

R645-302-214.200, the experimental practice is potentially more, or at least as, environmentally protective, during and after coal mining reclamations, as would otherwise be required, because

1) Additional disturbance in the form of a larger topsoil storage area would be required for salvage and storage of the native soil and soil covering the coal mining waste.
2) The undisturbed surface soils will be covered the with marker fabric to delineate and protect it in place from contamination and erosion.

R645-302-214.300, The coal mining and reclamation operations are not larger than necessary to determine the effectiveness of the experimental practice: storage of subsoil will take place in a single side canyon, previously disturbed by mining (reclaimed by the Division's AML program). The use of the previously disturbed area allows evaluation of the experimental practice of storing subsoils on undisturbed topsoil and against steep, undisturbed slopes, without creating additional disturbed lands.

R645-302-214.400, The experimental practice does not jeopardize the public health and safety. The soil will be placed, stored and removed in a stable manner. The application of PAM will be according to manufacturers directions. Details of application type and rate will be reviewed with the Division at reclamation.

MOUNTAINTOP REMOVAL MINING

Regulatory Reference: 30 CFR Sec. 785.14, 824; R645-302-220, et. seq.

Analysis:

Special Permanent Program Performance Standards--Mountaintop Removal

This section does not apply. (07012005)

Findings:

This section does not apply. (07012005)

STEEP SLOPE MINING

Regulatory Reference: 30 CFR Sec. 785.15; R645-302-230 et. seq.

Analysis:

This section does not apply. (07012005)

Findings:

This section does not apply. (07012005)

PRIME FARMLAND

Regulatory Reference: 30 CFR Sec. 785.16, 823; R645-301-221, -302-300 et seq.

Analysis:

Previous non- prime farmland determinations made by the Soil Conservation Service for Rilda Canyon above the left and right forks of Rilda Canyon are found in Vol. 1 Part 2, pp 2-218.1 – 2-218.3. For the north Rilda facilities area, the non-prime farmland correspondence is found in Vol. 11 – Appendix Volume Soils Appendix C.

The Division to consulted with the Natural Resources Conservation Service (NRCS) concerning the potential for prime farmland in Rilda Canyon. The matter was discussed with Leland Sasser of the NRCS Price Field Office in October 2004. The Division is in agreement with the NRCS that there are no prime farmlands in Rilda Canyon due to slope and rockiness of the soils. [06302005]

Prime Farmland Application Contents

This section does not apply. (07152005)

Consultation with Secretary of Agriculture

This section does not apply. (07152005)

Issuance of Permit

This section does not apply. (07152005)

Soil Removal and Stockpiling

This section does not apply. (07152005)

Soil Replacement

This section does not apply. (07152005)

Revegetation and Restoration of Soil Productivity

This section does not apply. (07152005)

Findings:

The Division concurs with NRCS in finding that there are no prime farmlands in the permit area.

COAL PREPARATION PLANTS NOT LOCATED WITHIN THE PERMIT AREA OF A MINE

Regulatory Reference: 30 CFR Sec. 785.21, 827; R645-302-260, et seq.

Analysis:

This section does not apply. (07012005)

Findings:

This section does not apply. (07012005)

OPERATIONS IN ALLUVIAL VALLEY FLOORS

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

Analysis:

Based on information provided in the application, the Division finds that there is an alluvial valley holding Rilda Creek in the bottomlands of Rilda Canyon. The extent of the alluvial valley floor is shown on Drawing 200-1 as map unit A. There are streamlaid deposits in the bottomlands that have historically been the source of irrigation and culinary water in Emery County. [07152005]

Essential Hydrologic Functions

Precautions are being taken to limit activity near the spring collection system and to provide a buffer zone between facilities and the creek. [07152005]

Protection of Agricultural Activities

This section does not apply. [07152005]

Monitoring

Precautions are being taken to monitor quality and flow in the canyon. [07152005]

Findings:

Based on information provided in the application, the Division finds that there is an alluvial valley holding Rilda Creek in the bottomlands of Rilda Canyon. The extent of the alluvial valley floor is shown on Drawing 200-1 as map unit A. There are streamlaid deposits in the bottomlands that have historically been the source of irrigation and culinary water in Emery County. Precautions are being taken to limit activity near the spring collection system, to monitor quality and flow in the canyon and to provide a buffer zone between facilities and the creek. [07152005]

IN SITU PROCESSING

Regulatory Reference: 30 CFR Sec. 828; R645-302-254.

Analysis:

This section does not apply. (07012005)

Findings:

This section does not apply. (07012005)

AUGER MINING

Regulatory Reference: 30 CFR Sec. 785.20, 819; R645-302-240 et. seq.

Analysis:

This section does not apply. (07012005)

Findings:

This section does not apply. (07012005)

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

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

Analysis:

The Division has updated the CHIA to include the Mill Fork lease, South Crandall Lease, Crandall Canyon IBC, and Rilda Canyon portal facilities. (07012005)

Findings:

The Division has updated the CHIA to include the Mill Fork lease, South Crandall Lease, Crandall Canyon IBC, and Rilda Canyon portal facilities. (07012005)

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.

REPORTING OF TECHNICAL DATA

Title: Confidential. **Objective**: Submit confidential information in amendments, annual reports, and explorations in a separate folder. **Frequency**: NA. **Status**: Starting in June 2005. **Reports**: NA. **Citation**: NA.

ENVIRONMENTAL RESOURCES: LAND USE

Title: Trail. **Objective**: Construct a new trailhead and parking pad at the east end of the facilities site. **Frequency**: NA. **Status**: Pending Rilda portal construction in 2005. **Reports**: NA. **Citation**: MRP, Sec. 526.116.2, p. 34.

OPERATIONS: FISH AND WILDLIFE INFORMATION

Title: Revegetate. **Objective**: Revegetate previously disturbed areas to nondisturbed standards. **Frequency**: NA. **Status**: Pending Rilda portal construction in 2005 and reclamation. **Reports**: NA. **Citation**: MRP, Sec. 330, p. 16, #1 of list.

Title: Wildlife. **Objective**: Adhere to wildlife exclusionary periods. **Frequency**: NA **Status**: Ongoing during Rilda portal construction in 2005 and reclamation. **Reports**: NA. **Citation**: MRP, Sec. 322, p. 10; Sec. 330, p.16, #14 in list; Sec. 342, p. 32, #7 in list.

Title: Macroinvertebrates "Aquatic". **Objective**: Monitor macroinvertebrates in Rilda Creek. **Frequency**: Spring/fall two years prior to and spring/fall one year immediately following start of construction. Spring every three years during operations and reclamation. **Status**: On going.

Spring/fall 2006 is the anticipated date for the year following construction. Spring 2009 is the anticipated date for the first of the three-year monitoring surveys. **Reports**: Division Annual Report. **Citation**: MRP, Sec. 330, p. 26.

Title: Fish "Aquatic". **Objective**: DWR will monitor fish in Rilda Creek as part of annual surveys. **Frequency**: Spring/fall two years prior to and spring/fall one year immediately following start of construction. Spring every three years during operations and reclamation. **Status**: On going. Spring/fall 2006 is the anticipated date for the year following construction. Spring 2009 is the anticipated date for the first of the three-year monitoring surveys. **Reports**: Division Annual Report. **Citation**: MRP, Sec. 330, p. 26.

Title: Raptors. **Objective**: Over-flight surveys. **Frequency**: Yearly. **Status**: On going for life of mine. **Reports**: Upon request. **Citation**: MRP, Sec. 322, Subsec. Terrestrial Species.

Title: Bats. **Objective**: Install a "stay-out" sign near a large cavern. **Frequency**: NA. **Status**: Prior to Rilda portal construction in 2005. **Reports**: NA. **Citation**: MRP, Sec. 330, p. 16, #15 in list.

Title: Rilda Creek. **Objective**: Enhance riparian corridor along the Rilda Creek. **Frequency**: NA. **Status**: Initiate 180 days after Rilda portal construction begins in 2005. **Reports**: NA. **Citation**: MRP, Sec. 330, Tab. 300-5.

Title: Rat midden. **Objective**: Install a fence around a rat midden in Rilda Canyon. **Frequency**: NA. **Status**: Prior to Rilda portal construction in 2005. **Reports**: NA. **Citation**: MRP, Sec. 322.

Title: Mitigation. **Objective**: Several projects to enhance and mitigate potential impacts associated with Rilda portal facilities. **Frequency**: NA. **Status**: Pending approval or Rilda portal construction in 2005. **Reports**: NA. **Citation**: MRP, Sec. 330, Tab. 300-5.

SOILS

R645-301-230 •**Title: Soil Salvage plan** • **Objective:** The Permittee will have a qualified person (familiar with the soil survey and salvage plan) on site to monitor the soil salvage operations (Section R645-301-231.100). • **Frequency:** during construction • **Status:** ongoing • **Reports:** as-built volumes of salvaged soil • **Citation:** Vol 11. Section R645-301-231.100

R645-301-231.400 •**Title: Topsoil Pile Construction** • **Objective:** After construction, the stockpile will be surveyed and the volume of topsoil stockpiled will be documented •

Frequency: after construction • **Status:** ongoing • **Reports:** As-built of topsoil stockpile • **Citation:** Vol 11. R645-301-232

R645-301-731.311, •**Title:** Subsoil Testing • **Objective:** Regraded subsoil will be sampled on 500 ft intervals to a depth of four ft (three or four samples for the 2,000 linear ft in the facilities area). The samples will be analyzed on site for pH and EC. Problem areas will be further sampled and sent to a laboratory for analysis. • **Frequency:** Final regarding • **Status:** ongoing • **Reports:** Laboratory analysis to be provided to the Division • **Citation:** Vol 11. Section R645-301-231.300

R645-301-231.300, •**Title:** Topsoil Handling Testing Plan • **Objective:** Three composite samples will be taken from the facilities area and sediment pond. Samples will be analyzed for parameters to be compared with baseline information and to determine the need for amendments, including fertilizer • **Frequency: Final Reclamation** • **Status:** ongoing • **Reports:** Laboratory analysis to be provided to the Division • **Citation:** Vol 11. Section R645-301-242

PERMIT INFORMATION TABLE

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EAST MOUNTAIN
CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT
(CHIA)

For

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C/015/0019

DEER CREEK MINE
C/015/0018

DES-BEE-DOVE MINE
C/015/0017

CRANDALL CANYON MINE
C/015/0032

In

EMERY COUNTY, UTAH

January 19, 2007

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I. INTRODUCTION

East Mountain and the East Mountain Cumulative Impact Area (CIA) are located in Emery County, Utah, west of the town of Huntington (Plate 1). There are currently two active mines in the East Mountain CIA - PacifiCorp's Deer Creek Mine and the Crandall Canyon Mine, jointly owned by Andalex Resources, Inc. and Intermountain Power Agency (IPA). PacifiCorp has two inactive permitted operations in the East Mountain CIA - the Cottonwood-Wilberg Mines and the Des-Bee-Dove Mines: Phase I reclamation (demolition of structures, backfilling and grading, and seeding) at the Des-Bee-Dove Mines was completed in January 2006. (PacifiCorp's inactive Trail Mountain Mine, located immediately west of East Mountain and separated from it by Cottonwood Creek, is outside the East Mountain CIA.) Mountain Coal Company's Huntington #4 Mine in Mill Fork Canyon was reclaimed in 1985 and released from reclamation bond in 1998 (Plate 2).

Expansion of the Deer Creek Mine into the Mill Fork, Joes Valley, and Crandall Canyon drainages required an update of the Cumulative Hydrologic Impact Assessment (CHIA) in March 2003. Leasing of the coal in the South Crandall Canyon Coal Lease Tract (UTU-78953) by Genwal in June 2003, the addition of several adjacent coal tracts in 2004, and PacifiCorp's 2005 plans for access and fan portals in Rilda Canyon required further modification of the East Mountain CHIA in July 2005. The addition of federal lease UTU-84825, the Mill Fork West Extension IBC, on the east side of the Mill Fork tract is the reason for this update of the CHIA; the area added to the Deer Creek Mine permit area is small but involves a new federal lease, so the mine plan modification requires federal approval.

The Division has the responsibility to assess the potential for mining impacts both inside and outside permit areas. The CHIA is a findings document prepared by the Division that assesses whether existing, proposed, and anticipated coal mining and reclamation operations have been designed to prevent material damage to the hydrologic balance outside the permit areas. The Division cannot issue a permit to a proposed coal mining operation if the probable, anticipated hydrologic impacts will create material damage to the hydrologic balance outside the permit area. The CHIA is not only a determination if coal mining operations are designed to prevent material damage beyond their respective permit boundaries when considered individually, but also if there will be material damage resulting from effects that may be acceptable when each operation is considered individually but are unacceptable when the cumulative impact is assessed.

INTRODUCTION

The objective of a CHIA document is to:

1. Identify the Cumulative Impact Area (CIA) **(Part II)**
2. Describe baseline conditions in the CIA; identify hydrologic systems, resources and uses; and document baseline conditions of surface and ground water quality and quantity **(Part III)**
3. Identify hydrologic concerns **(Part IV)**
4. Identify relevant standards against which predicted impacts can be compared **(Part V)**
5. Estimate probable future impacts of mining activity with respect to the parameters identified in 4 **(Part VI)**
6. Assess probable material damage **(Part VII)**
7. Make a statement of findings **(Part VIII)**

This CHIA complies with the federal Surface Mining Control and Reclamation Act of 1977 (SMCRA) and subsequent federal regulatory programs under 30 CFR 784.14(f), and with Utah regulatory programs established under Utah Code Annotated 40-10-et seq. and the attendant State Program rules under R645-301-729.

II. CUMULATIVE IMPACT AREA (CIA)

Reviewing Permit Application Packages (PAP) and Mining and Reclamation Plans (MRP) alone is not sufficient to assess impacts to the geologic and hydrologic regimes. Specific knowledge of the geology and hydrology is crucial in assessing the dynamics and interactions of chemistry, surface- and ground-water movement, and surface disturbance and subsidence impact associated with the minesites. The Division uses pertinent information from many sources, including federal and state agencies; geological and hydrological reports; textbooks and other publications; site visits; and a knowledge base built on experience and training.

Plate 2 delineates the CIA for current and projected mining in the East Mountain area. The CIA encompasses approximately 109 miles^2 centered around East Mountain: the area within the CIA that is above the base of the Blackhawk Formation is approximately 69 miles^2, and the approximate area covered by coal leases is 52 miles^2. Mine workings have or will undermine roughly half of the leased areas. Huntington Canyon, Scad Valley, Joes Valley, and Cottonwood Canyon are the primary features bounding the CIA.

SCOPE OF MINING

Coal has been mined from East Mountain since the late 19th century. The old, typically small mines on East Mountain - such as the Rominger (Ferrell), Jeppson, Leroy (Comfort), Johnson, and Helco Mines - are not discussed in detail. Many of the disturbed areas associated with these old mines have been incorporated into larger, more recent mines permitted under the Utah coal mine regulatory program. The Division's Abandoned Mine Lands (AML) program has done reclamation at some of the old mines.

PacifiCorp Mines

The Cottonwood/Wilberg and Deer Creek permit areas overlap, and the Des-Bee-Dove permit area is immediately adjacent to them. Together, the three permit areas encompass approximately 29,000 acres. Utah Power and Light (UP&L), which was merged into PacifiCorp in 1989, acquired these mines from earlier operators. The mines are permitted by PacifiCorp. Energy West Mining Company, a wholly owned subsidiary of PacifiCorp, has operated the mines since 1990. MidAmerican Energy Holdings Co. purchased PacifiCorp from Scottish Power in 2006 and reorganized operations into three business units: coal mining operations are under PacifiCorp Energy (the other two units are Rocky Mountain Power – formerly UP&L – which delivers electricity in Utah, Idaho, and Wyoming; and Pacific Power, which delivers electricity in the northwest.).

Cottonwood/Wilberg Mine

The Cottonwood/Wilberg Mine permit area presently covers approximately 11,500 acres, a combination of fee lands and federal and state leases: some coal leases have been relinquished by PacifiCorp but the permit still includes those areas. Coal has been produced from the Hiawatha Seam, using both longwall and continuous methods.

Coal mining operations have existed in the Wilberg area since the 1890's. Cyrus Wilberg began operating the Wilberg Mine in 1945. UP&L acquired the Wilberg Mine in September 1977 from the Peabody Coal Company, which had acquired it in 1958. UP&L acquired a large, adjacent federal coal lease, called the South Lease, in 1982.

A tragic fire occurred in the Wilberg Mine in December 1984, and on July 1, 1985, the operation was divided into two separate and independent coal mines, the Cottonwood and the Wilberg Coal Mines. Each mine has a separate MSHA identification number; however, a single mining and reclamation permit (ACT/015/019) was issued to both mines because the surface facilities, on 20 acres at the head of Grimes Wash, are shared by both mines.

Mining resumed in the Wilberg Mine in September 1987 and the last coal was mined in January 1988. Longwall mining in the Cottonwood Mine ended in September 1995 and the equipment was moved to the Trail Mountain Mine. Total production to that time was 40 million tons, and remaining reserves in the Hiawatha Seam are estimated at 2 million tons. Portals for both mines are in the Hiawatha Seam, and only the Hiawatha Seam has been mined. There are Blind Canyon reserves, but there currently is no plan to recover these through the Cottonwood/Wilberg Mine.

After mining ceased in the Cottonwood/Wilberg Mine in 1995, a conveyor through the Cottonwood Mine continued to transport coal from the Trail Mountain Mine through East Mountain to the to the truck load-out at the Cottonwood Mine surface facilities in Grimes Wash. After operations ceased at the Trail Mountain Mine in 2001, the Cottonwood/Wilberg Mine was placed in temporary cessation.

Deer Creek Mine

Coal mining operations had taken place on fee land in Deer Creek Canyon prior to 1946, when the first federal coal lease was issued in this area. Peabody Coal Company acquired leases on the Deer Creek property and began operations in 1969. UP&L purchased the Deer Creek Mine in 1977 from Peabody. The current Deer Creek Mine permit area is approximately 24,800 acres, including approximately 5,560 acres added by the Mill Fork Extension in 2003 and 214 acres added by the Mill Fork West Extension IBC in 2006.

The Deer Creek Mine surface facilities are located on a 25-acre site at the junction of Deer Creek and Elk Canyons, side canyons in the Huntington Creek drainage. The portals are in the Blind Canyon Seam. In the southern portion of the Deer Creek Mine, the underground workings are in the Blind Canyon Seam only: they overlap but are separate from the Cottonwood/Wilberg Mine workings in the Hiawatha Seam. In the Rilda Canyon area, rock slopes from the Blind Canyon Seam provide access to the Hiawatha Seam.

Entry to the Mill Fork Lease is by entries advanced from the Hiawatha Seam through Lease Modification #3, a 65.7-acre area that has been added to Lease U-06039 for this purpose. Coal will be mined in both the Blind Canyon and Hiawatha Seams. The Blind Canyon Seam is to be mined first, accessed from the Hiawatha through rock slopes that are to be built within the Mill Fork Lease area. Total cumulative vertical extraction from both seams will not exceed 20 feet. The full extraction methods to be used are anticipated to cause subsidence that can be planned and controlled.

The Division has approved plans for construction of new portals and a bathhouse in Rilda Canyon. The Division had consensus from the BLM, USFS, and DWR. The disturbed area in Rilda Canyon will be approximately 12 acres, 3 acres being for topsoil and subsoil storage. The sedimentation pond will be on land previously disturbed by the Leroy (Comfort) Mine. These new portals will not be used for coal transport but will be used only for ventilation and transportation of workers and materials into the mine. As of the end of 2006, only ventilation and emergency escape portals have been built (there has also been mitigation work at the Leroy Mine site, which involved removal of coal-mine waste buried by the AML program).

PacifiCorp may eventually add a ventilation breakout in Crandall Canyon, upstream of the existing Crandall Canyon Mine, but an application to add this breakout to the mine plan has not been submitted to the Division. The design of the breakout and the request for permit modification will be made based on the results of future coal exploration.

The majority of the Deer Creek Mine utilizes the longwall mining method. All underground operations, including the Mill Fork Extension, are projected to end around the year 2032.

Table 1
Annual Production in millions of tons
Deer Creek Mine
(Production data from MSHA, 2007)

1983	2.2	1995	4.1
1984	1.9	1996	4.3
1985	2.0	1997	4.5
1986	2.1	1998	3.8
1987	2.5	1999	3.8
1988	2.9	2000	4.2
1989	3.3	2001	4.3
1990	3.4	2002	4.0
1991	3.0	2003	3.9
1992	3.5	2004	3.4
1993	3.2	2005	3.9
1994	4.0	2006	3.7

Des-Bee-Dove Mines (Deseret, Beehive and Little Dove Mines)

The Des-Bee-Dove Mines are located in an unnamed narrow, steep canyon that is part of the Grimes Wash drainage. Mining began in the canyon in 1898 as the Griffith Mine. From 1936 to 1938, the Castle Valley Fuel Company, owned by Messrs. Edwards and Broderick, operated the mine workings. The Church of Jesus Christ of Latter-day Saints (LDS Church) acquired 400 acres adjacent to the Castle Valley Fuel Company mine in 1938, and the adjoining properties were mined by both operators from 1938 to 1947. The LDS Church purchased Castle Valley Fuel Company in 1947, and Deseret Coal Company operated the mines for the church. UP&L acquired the Des-Bee-Dove Mine complex in 1972.

The Dove and Beehive Mines accessed the Blind Canyon Seam and the Deseret Mine the Hiawatha Seam. Mining was done by a series of continuous room and pillar sections. A series of north-south trending faults dictated mine layout. The mines were very dry, requiring importation of water to operate.

The three mines ceased operations on February 6, 1987 and the portals were sealed. Before operations ceased, the Des-Bee-Dove Mines were producing 725,000 tons per year. Reclamation of the entire Des-Bee-Dove site began in 1999 and Phase I reclamation (demolition of structures, backfilling and grading, and seeding) was completed in January 2006.

The Des-Bee-Dove Mine permit area, a combination of fee land and state and federal leases, at one time encompassed over 2,800 acres. The Des-Bee-Dove paved coal-haul road was transferred to Emery County and removed from the permit in 1998, so the site of the reclaimed sedimentation pond and associated access road are now isolated from the rest of the permit area. The permit area was reduced to 155 acres in November 2001, and BLM Right of Way UTU-53809 was relinquished in 2005. PacifiCorp recalculated the acreage in 2005, and the best determination is that the Des Bee Dove permit area is 153.9 acres.

XTO holds a federal oil and gas lease that includes the USFS Special Use area in the Des Bee Dove permit. Wells have been completed in the lands around the Des Bee Dove Mines, and XTO has a well location on the lower end of the reclaimed Des Bee Dove main access road. The Division is currently reviewing PacifiCorp's application for PMLU change and Phase III bond release for the area.

Associated Sites

Underground development waste, sediment from sedimentation ponds, and other coal-mine waste from the Deer Creek, Des-Bee-Dove and Cottonwood/Wilberg Mines are stored at waste rock disposal areas located near the mines (Plate 2).

- Cottonwood/Wilberg - Des-Bee-Dove Waste Rock Disposal Site (inactive). BLM ROW U-37642 was issued in 1981. It is along the east side of state road 57. Of the original 49 acres, 14 acres were relinquished to Texaco for coal-bed methane operations, including a roadway that cuts through the middle of the site. South of the road, 14 acres have been reclaimed and 5 acres remain to be reclaimed, and 16 acres north of the road (including a vegetation reference area) remain undisturbed. Phase I Bond Release on the 14 reclaimed acres was granted on July 22, 1999 (ACT/015/019-BR98). There are no plans for further waste disposal at this site.

- Cottonwood/Wilberg –Trail Mountain - Des-Bee-Dove Waste Rock Disposal Site (inactive). BLM ROW-UTU-65027 was issued in 1990. This site is across state road 57 from the disposal site on ROW-U37642. Total area is approximately 26 acres, with 17 acres disturbed. Presently, waste is not being placed here because the mines are inactive.

- Deer Creek Mine Waste Rock Disposal Site (active). This site lies northeast of state road 31 on land owned by Utah Power & Light. The access road and waste disposal area cover approximately 32 acres.

The Cottonwood/Wilberg Mine sewer absorption field and sewer line, part of the permitted area, are located on BLM right-of-way U-37641 outside the main permit area boundary. This system is designed to also handle Trail Mountain Mine sewage, which is piped

through the Cottonwood/Wilberg Mine.

There are several additional, small rights-of-way for power and telephone lines and haul roads.

Huntington Canyon #4 (Beaver Creek Coal Company)

The Huntington Canyon #4 Mine permit area contained 1,320 acres. The underground operations utilized room and pillar mining methods in the Blind Canyon and Hiawatha coal seams in Federal Leases U-33454 and SL-064903. All underground mine operations ceased November 1, 1984.

The mine working advanced generally to the northwest. The Blind Canyon Seam was mined within and northwest of the Mill Fork Graben. According to Dan Guy, former Engineering Manager for the mine (personal communication, February 26, 2003), the mine closed because of economic conditions related to coal quality: as mining moved northwest from the graben into what was called the Dellenbach Lease, the coal was oxidized and could not be economically processed.

The mine intercepted faults and some water sources, but Mr. Guy does not recollect large inflows to the mine. He speculated that the oxidation was the result of ancient activities and did not know if it was related to the recharge source to Little Bear Spring. Beaver Creek Coal Company commissioned a study by Vaughn Hansen and Associates (1977) that included Little Bear Spring; they concluded there was no connection between the mine and the spring.

Beaver Creek Coal Company reclaimed the #4 Mine site during the period of August 15, 1985 through September 30, 1985. Three portals and one opening were sealed. The disturbed area, including the access road, was backfilled and regraded. Soil was replaced and reseeded. The reclamation bond was released in May 1998.

Crandall Canyon Mines (Genwal Resources, Inc.)

Coal for local, domestic use was mined from Crandall Canyon from November 1939 to September 1955. Approximately 35,000 tons were mined from the Hiawatha Seam (Crandall Canyon Mine MRP, p. 4-6 and 4-7). There was no reclamation done.

Genwal Resources (Genwal) began mining in this area in 1983. Some of the older workings have been incorporated into the Crandall Canyon No. 1 Mine. Andalex and Intermountain Power Agency (IPA) purchased Genwal and the mine in 1995, but Genwal is still the operator. Andalex Resources was purchased by Murray Energy, Inc. in 2006. Both continuous and longwall mining methods are currently used. Pillars will be fully extracted unless they are needed for safety or to protect the outcrop.

Table 2
Annual Production in millions of tons
Crandall Canyon and South Crandall Canyon (starting in 2003) Mines
(Production data from MSHA, 2007)

1983	0.002	1995	2.1
1984	0.1	1996	2.5
1985	0.2	1997	2.7
1986	0.1	1998	3.5
1987	0.2	1999	3.8
1988	0.2	2000	3.9
1989	0.4	2001	4.0
1990	0.6	2002	3.3
1991	0.9	2003	1.2
1992	1.2	2004	1.0
1993	1.5	2005	1.8
1994	1.7	2006 (through Oct.)	1.2

The permit area for the Crandall Canyon No. 1 Mine contains approximately 5,320 acres in Huntington Canyon in Emery County, Utah. Approximately 11 acres are disturbed. In February 1993, Genwal applied to lease 4,053 acres of Federal coal lands adjacent to the south of the Crandall Canyon No. 1 Mine, initiating the process that led to the leasing of the Mill Fork tract. However, PacifiCorp won the bid for that lease, which became the Mill Fork Extension of the Deer Creek Mine. In February 2005, Genwal received approval to begin mining an additional 120-acre Incidental Boundary Change (IBC) (addition to Lease U-68082) located at the northeast portion of the existing permit boundary.

The South Crandall Canyon Coal Lease Tract - Lease U-78953

The South Crandall Canyon Coal Lease Tract was deleted from the Mill Fork tract because of the concerns that were raised regarding Little Bear Spring. The South Crandall Canyon area was reevaluated, and based on a Decision Notice/Finding of No Significant Impact (DN/FONSI) signed by the BLM and USFS in February 2003, the South Crandall Canyon Tract was leased through competitive bid to Andalex in 2003.

The South Crandall Canyon tract covers 880 acres. There are an estimated 6 million tons of recoverable coal. Access is through the South Crandall Canyon portals constructed in 2003 on the south side of Crandall Canyon, in fee coal that is jointly owned by IPA and Andalex but commonly referred to as the "Dellenbach" lease.

A 40-acre parcel of the Mill Fork Lease has been transferred from PacifiCorp to Genwal to allow more efficient mine layout and increased coal recovery. A 160-acre fee tract has also been added, bringing total acreage to 1,080 acres in the South Crandall Canyon extension.

III. DEFINE BASELINE CONDITIONS; IDENTIFY HYDROLOGIC SYSTEMS AND USES, AND DOCUMENT BASELINE CONDITIONS OF SURFACE AND GROUND-WATER QUALITY AND QUANTITY

BASELINE CONDITIONS

East Mountain is located in Emery County, Utah, west of the town of Huntington and approximately 20 miles southwest of Price (Plate 1). It is in the Wasatch Plateau Coal Field. The eastern margin of the Wasatch Plateau is a rugged escarpment that overlooks Castle Valley and the San Rafael Swell to the east. Elevations along the entire eastern escarpment of the Wasatch Plateau range from approximately 6,500 to over 9,000 feet. The climate of the Wasatch Plateau has been classified as semiarid to subhumid. Precipitation varies from 40 inches at higher elevations to less than 10 inches at lower elevations, and ranges from 10 to 30 inches per year within the CIA (Danielson and others, 1981).

East Mountain is a north-south trending ridge, bounded by Huntington Canyon on the northeast and north, Left Fork of Huntington Canyon and Scad Valley on the north and northwest, Joes Valley and upper Cottonwood Canyon on the west, and lower Cottonwood Canyon on the south. The southeast side of the mountain is part of the Wasatch Plateau escarpment that separates the plateau from Castle Valley. Elevations in the East Mountain CIA range from 7,000 in the canyon bottoms to over 10,700 feet along the crest of East Mountain. Much of the surface is steep and dissected by steep, narrow canyons with heavy vegetation and barren cliffs.

Soils - based on information in the USFS 1997 Environmental Assessment (EA), pages III-3 and III-4

Shallow to very deep soils on the lease tract have developed primarily from sandstone and shale parent materials. Rock outcrops are common, especially within the Castlegate Formation. Because of the steepness of the slopes and rapid runoff, most soils are well drained.

Soils derived from sandstone are typically cobbly or stony with textures of loamy sand, sandy loam, or loam. Clay loam, silty clay loam, and clay are common in soils derived from North Horn Formation. Subsoils often have higher clay content than the surface.

Topsoil development is most pronounced under aspen vegetation types, where it is commonly 20 to 30 inches thick and has a relatively high organic matter and nutrient content.

On the steep, north facing slopes that support a spruce-fir type, topsoil thickness may vary from about three to ten inches. Alluvial soils are found in drainages.

The elevation range, steep slopes, and contrasting aspects account for large soil temperature and moisture differences. Soils on the lower-elevation south-facing slopes are hot and dry, and those at the higher elevations and on north-facing slopes are cool and moist. Soil temperature regimes include cryic (cold) and frigid, and the soil moisture regimes are udic (moist) and ustic (semiarid). The aspen and spruce-fir vegetation types are characteristic of the cryic/udic environment, and lower-elevation mountain brush with some pinyon-juniper is characteristic of the frigid/ustic situation.

Vegetation

Vegetation of the Wasatch Plateau area is classified within the Colorado Plateau floristic division (Cronquist and others, 1972). The area occupies parts of both the Utah Plateaus and the Canyonlands floristic sections. Vegetation communities of the area include desert shrub (shadscale) at the lowest elevations through sagebrush, sagebrush-grassland, pinyon-juniper, mountain brush, Douglas fir-white fir-blue spruce, and Engleman spruce-subalpine fir.

Desert shrub communities are sparsely vegetated shrublands that, depending on elevation and soils, may be dominated by shadscale (Atriplex confertifolia), fourwing saltbush (A. canescens), Castle Valley clover (A. cuneata) or mat saltbush (A. corrugata) and may include winterfat (Ceratoides lanata), Mormon tea (Ephedra spp.), budsage (Artemisia spinescens), miscellaneous buckwheats (Eriogonum spp.), Indian ricegrass (Oryzopsis hymenoides), galleta grass (Hilaria jamesii), grama grass (Bouteloua spp.), needle and thread grass (Stipa comata), sand dropseed (Sporobolus cryptandrus) and squirreltail (Sitanian hystrix). Greasewood (Sacobatus vermiculatus) - saltgrass (Distichlis stricta) may dominate bottomlands.

Many sagebrush communities of the area are relatively dense shrub stands of Artemisia tridentata with very little understory growth. In relatively undisturbed sagebrush communities, rabbitbrush (Chrysothamnus nauseosus or C. viscidiflorus), Mormon tea, and several perennial grasses may be common, including thickspike and western wheatgrass (Agropyron dasystachyum and A. smithii), basin wildrye (Elymus cinereus), Indian ricegrass and dropseed species.

In the sagebrush-grassland type, the typical big sage may give way to Artemisia tridentata var. vaseyana (mountain big sage) with a co-dominant perennial grass understory. Salina wildrye (Elymus salinus) may be co-dominant in these communities and may dominate an herbaceous grassland type. Black sage (A. nova) with Salina wildrye or western wheatgrass understory is also common.

Pinyon-juniper (Pinus edulis and Juniperus osteosperma) woodlands occupy drier sites, often with stony to very rocky soils. Pinyon and juniper are co-dominant in the overstory. Understory vegetation provides sparse to moderate ground cover. Range condition is poor to excellent condition. Understory species include sagebrush, mountain mahogany (Cercocarpus montanus), snowberry (Symphoricarpus oreophilus), and several perennial grasses including slender wheatgrass (Agropyron trachycaulum), Salina wildrye, junegrass (Koeleria cristata) and Indian ricegrass.

Dominant shrubs of the mountain brush communities will vary depending on elevation and aspect. The drier south and west-facing slopes may support dense stands of Gambel oak (Quercus gambellii). Other dominants of this community may include serviceberry (Amelanchier utahensis), mountain mahogany (Cercocarpus montanus or C. Ledifolius), bitterbrush (Purshia tridentata) and snowberry.

The range of the Douglas fir-white fir-blue spruce community is about 8,000 to 10,000 feet. Douglas fir (Pseudotsuga mensiesii) is usually the dominant tree with white fir (Abies concolor) and blue spruce (Picea pungens) usually limited to the most mesic sites, often along streams. With dense canopies, understory vegetation may be sparse. Common shrubs include serviceberry (Amelanchier spp.), Oregon grape (Berberis repens), chokecherry (Prunus virginiana), Rocky Mountain maple (Acer glabrum), mountain lover (Pachistima myrsinites) and snowberry. Bluebunch wheatgrass (Agropyron spicatum), mountain brome (Bromus carinatus), and Kentucky bluegrass (Poa pratensis) are common grasses. Stands of aspen (Populus tremuloides) can be found throughout the zone, particularly in mesic sites, and as successful communities.

Engelman spruce (Picea engelmannii) and subalpine fir (Abies lasiocarpa) dominate the spruce-fir zone at the highest elevations of the hydrologic impact area. While receiving about the same precipitation as the Douglas fir communities, lower vapor-transpiration with cooler temperatures can permit more lush vegetation in the spruce-fir zone. Limber pine (Pinus flexilis) often occupies steep or rocky, drier sites of this zone.

Small riparian communities are found at all elevations within the impact assessment area. With greater water availability and cooler temperatures, the riparian zone often includes more mesic species, (e.g., those from a higher vegetation zone). Shrub species from the mountain shrub type may be found at most elevations.

Additional riparian zone shrubs include Narrowleaf cottonwood (Populus angustifolia), red osier dogwood (Cornus stolonifera), skunkbush (Rhus trilobata), river birch (Betula occidentalis) and various willows (Salix spp.). Grass species from the mesic zones may be represented (mountain shrub and higher zones) along with fescues (Festuca spp.) and miscellaneous sedges (Carex spp). Small wet areas around springs and seeps will often support a dense growth of grasses, sedges and willows.

Aquatic Species - based on information in the USFS 1997 EA, pages III-14, 15 and 16

Some stream channels in the CIA support naturally-reproducing trout fisheries and typical coldwater, mountain-environment aquatic communities, including aquatic plants, insect populations, periphyton, and zooplankton. Information provided by the Utah Division of Wildlife Resources and cited in the EA indicates that in addition to trout, it is likely that there are speckled dace, mottled sculpin, bluehead suckers, and mountain suckers. It is likely adult cutthroat trout and sculpins are present in spawning habitats in headwater areas of the intermittent channels only during the spring reproductive period. The EA cites evidence that tiger salamanders, western toads, and Great Basin spadefoot toads probably inhabit the area.

High-gradient streams in the CIA are characterized by rock- and wood-created step-pools, deeply incised channels, and occasional beaver ponds. Riparian zones are composed of spruce-fir/aspen communities and thick willows. Spawning gravels are patchy and distributed in lower-gradient reaches. Successful spawning requires the presence of clean, well-oxygenated spawning gravels, so protecting these channels from excessive erosion and sedimentation is a high priority. In the past, stream channels throughout the area were degraded by livestock grazing and erosion from high runoff, such as occurred in 1983-84.

Small seep or pothole-type wetlands act as water reserves and provide baseflows that can support aquatic communities during low-water periods. Potholes, small ponds and marshy areas provide subsurface flow that supplements direct water sources like springs and run-off. These wet areas also provide important habitat for invertebrate and amphibian populations. Wet areas need to be protected from soil compaction, disturbance, and the removal of woody material to maintain existing habitat quality and quantity for aquatic organisms.

Geology

Stratigraphy

Consolidated strata exposed in the Wasatch Plateau Coal Field range in age from Late Cretaceous to Tertiary (Eocene), as seen in Figure 1 and Plate 3. The oldest exposed rocks are upper members of the Mancos Shale. The Cretaceous Mesaverde Group, which in the Wasatch Plateau consists of the Star Point Sandstone, Blackhawk Formation, Castlegate Sandstone, and Price River Formation, overlies the Mancos. Above the Mesaverde Group are the Paleocene North Horn Formation and Flagstaff Limestone of the Wasatch Group: the Flagstaff is the youngest and uppermost consolidated formation exposed in the CIA. Unconsolidated Quaternary colluvium, alluvium, and soils have been formed by weathering and erosion and are found on terraces, along canyon bottoms, and are especially prominent along the base of East Mountain in Joes Valley. Upper Cottonwood Canyon contains deposits of glacial till.

The stratigraphy displays an overall regressive sequence from marine (Mancos Shale) through littoral (Star Point Sandstone) and lagoonal (Blackhawk Formation) to fluvial (Castlegate Sandstone, Price River Formation and North Horn Formation) and lacustrine (Flagstaff Limestone) depositional environments. There are no major disconformities exposed in this area, but Spieker (1931, p. 42) considered the Castlegate-Blackhawk contact as likely unconformable in the Wasatch Plateau. Oscillating depositional environments within the overall regressive trend are represented by intertongueing lithologies, especially within the Blackhawk Formation and Star Point Sandstone. The Star Point consists of three main sandstone tongues - in ascending order, the Panther, Storrs, and Spring Canyon Sandstone Members.

The major coal-bearing unit in the Wasatch Plateau Coal Field is the Blackhawk Formation. The commercial coal seams are usually near the base of the Blackhawk, and in the East Mountain area the lowest seam, the Hiawatha, is often directly on or just above the Spring Canyon Sandstone. The Hiawatha Seam has been mined in the Crandall Canyon No. 1, Deer Creek, Des-Bee-Dove, Cottonwood-Wilberg, and Huntington #4 Mines. The Blind Canyon Seam has been mined at the Deer Creek, Des-Bee-Dove, and Huntington #4 Mines. Both seams will be mined in the South Crandall Canyon tract.

System	Series	Stratigraphic Unit			Thickness (feet)	Description
Tertiary	Eocene	Green River Formation			-	Greenish-gray and white claystone and shale, also contains fine-grained and thin-bedded sandstone. Shales often dark brown, containing carbonaceous matter. Full thickness not exposed.
Tertiary	Paleocene	Colton Formation	Wasatch Formation		300 - 2,000	Colton consist of brown and dark-red lenticular sandstone, shale, and siltstone, thins westward and considered a tongue of the Wasatch.
Tertiary	Paleocene		Wasatch Formation		3,000	Wasatch predominantly sandstone with interbedded red and green shales with basal conglomerate. Found in east part of field and equivalent to Colton and Flagstaff in west.
Tertiary	Paleocene	Flagstaff Limestone	Wasatch Formation		0 – 500	Flagstaff mainly gray and cream colored limestone, variegated shale, and fine-grained, reddish-brown sandstone.
Tertiary	Paleocene	North Horn Formation *MINOR COAL*	Tucher Formation		350 – 2,500	North Horn Formation - Gray and gray-green calcareous and silty shale, tan to yellow-gray fine-grained sandstone, and minor conglomerate. Unit thickens to the west.
Tertiary / Cretaceous	Paleocene / Danian	North Horn Formation *MINOR COAL*	Tucher Formation		0 – 200	Tucher Formation - Light gray to cream-white friable massive sandstone and subordinate buff to gray shale that exhibits light greenish cast. Contains minor conglomerate and probably represents lower part of North Horn, only present in east part of coal field.
Cretaceous	Maestrichthian	Price River Formation MINOR COAL		Mesaverde Group	500 – 1,500	Yellow-gray to white medium-grained sandstone and shaley sandstone with gray to olive green shale. Contains carbonaceous shale with minor coal and thickens along east edge of field.
Cretaceous	Maestrichthian / Campanian	Castlegate Formation *MINOR COAL*		Mesaverde Group	100 – 500	White to gray, fine-grained sandstone, argillaceous massive resistant sandstone thinning eastwardly with subordinate shale. Carbonaceous east of Horse Canyon but coal is thin and lignitic.

		Blackhawk Formation *MAJOR COAL SEAMS*		600 – 1,100	Cyclical littoral and lagoonal deposits with six major cycles. Littoral deposits mainly thick-bedded to massive cliff-forming yellow-gray, fine- to medium-grained sandstone, individual beds separated by gray shale. Lagoonal facies consist of thin- to thick-bedded yellow-gray sandstones, shaley sandstones, shale, and coal. Coal beds of Wasatch Plateau and Book Cliffs Coal Fields. Unit thins eastward, grading into the Mancos Shale.
		Star Point Sandstone		0 – 580	Yellow-gray, massive medium- to fine-grained littoral sandstone tongues projecting easterly, separated by gray marine shale tongues projecting westerly.
	Santonian	Masuk Tongue Emery Sandstone		4,300 - 5,050	Gray marine shale, locally heavily charged with carbonaceous material, slightly calcareous and gypsiferous, nonresistant forming flat desert surfaces and rounded hills and badlands. Separated mainly to into tongues by westward projecting littoral; sandstone that eventually grade into shale. Sandstones are fine- to medium-grained, yellow-gray to tan, and medium-bedded to massive and cliff-forming.
	Coniacian	Garley Canyon Sandstone Blue Gate Shale Mancos Shale			
	Turonian	Ferron Sandstone *MINOR COAL* Tununk Shale			
	Cenomanian	Dakota Sandstone		2 - 126	Heterogeneous sandstone, conglomerate, and shale, thin resistant cuesta former.

Figure 1 - General Stratigraphy of the Wasatch Plateau Coal Field (after Doelling, 1972)

Regional aquifer is a phrase commonly used by mine operators in the Book Cliffs and Wasatch Plateau coal fields. In such usage, regional aquifer usually refers to any water found in the Star Point Sandstone and Blackhawk Formation irrespective of quality, quantity, use, storage, flow and transport, and discharge. In preparing this CHIA, the Division has adhered to the definition of *aquifer* as found in the Coal Mining Rules (R645-100-200), and the term regional aquifer has been deliberately used or avoided, as appropriate, throughout this CHIA. Although there are local perched and fracture-related aquifers at East Mountain, the quality, quantity, use, storage, flow and transport, and discharge of ground water do not indicate the presence of a regional aquifer or aquifer system. After evaluating the geologic and hydrologic evidence, the Division does not consider the saturated strata in the Star Point, Blackhawk and associated formations in the East Mountain CIA to be a regional aquifer.

Hydraulic Conductivity and Permeability

In sedimentary rocks, there is a wide range of textures or fabrics that determine the hydraulic characteristics of the unfractured medium. These textures or fabrics are related to the mineralogy or composition of the sediments, the range of sizes of the sedimentary particles (sorting), the spatial distribution of different sediment-sizes (grading), the shape and spatial orientation or arrangement of the sediment particles after compaction (packing), cementation, and properties acquired or altered as and after the sediments were lithified. Lateral and vertical

variations in these characteristics can create internal low-permeability zones or barriers, so that a unit that to the eye appears to be very uniform and to have aquifer characteristics can actually be incapable of storing or transporting water in any significant amount. Such vertical and lateral inhomogeneities are common within sandstone units of the Blackhawk and Price River Formations and in the Star Point Sandstone.

Based on slug tests and determinations from core samples, hydraulic conductivity of the Star Point Sandstone is typically low, so movement of ground water through the unfractured sandstone is slow and unfractured Star Point Sandstone is not generally considered to be an aquifer. However, hydraulic conductivity values within the Star Point Sandstone vary through several orders-of-magnitude, and unfractured units in the Star Point Sandstone can locally transmit sufficient ground water to sustain small springs or wells. (As a very general rule-of-thumb, aquifers have hydraulic conductivities of 10^{-5} cm/sec or greater.) Strata above the Star Point Sandstone have hydraulic conductivities that are generally as low or lower than those in the Star Point Sandstone.

Table 3 – Hydraulic Properties of Strata in the Wasatch Plateau Coal Field

cm/sec = hydraulic conductivity cm²/sec = transmissivity

		Price River	North Horn	Blackhawk	Star Point
USGS Lab Measurements on Cores (Lines, 1985)	*17-6 27bda* Horizontal			Ss 5.3×10^{-6} cm/sec	
				Silt 3.3×10^{-11} cm/sec	
				Ss 3.9×10^{-6} cm/sec	
				Shale 3.9×10^{-12} cm/sec	
				Silt 7.0×10^{-11} cm/sec	
					Ss 1.1×10^{-5} cm/sec
					Ss 5.3×10^{-6} cm/sec
	17-6 27bda Vertical			Ss 1.3×10^{-6} cm/sec	
				Silt 4.2×10^{-11} cm/sec	
				Ss 1.4×10^{-6} cm/sec	
				Silt 7.8×10^{-10} cm/sec	
					Ss 3.9×10^{-6} cm/sec
					Ss 2.3×10^{-6} cm/sec
USGS Recovery or Drawdown Test (Lines, 1985)	17-6 24dcd			2.2×10^{-2}cm²/sec (~ 3.9×10^{-6} cm/sec)	
	17-6 27bda			8.6×10^{-2}cm²/sec (~ 4.8×10^{-6} cm/sec)	
					6.4×10^{-2}cm²/sec (~ 2.6×10^{-6} cm/sec)
	17-6 28bad	8.6×10^{-3}cm²/sec (~5.6×10^{-6} cm/sec)			
	17-6 34dda		1.1×10^{-1}cm²/sec (~ 7.8×10^{-5} cm/sec)		
				7.5×10^{-3}cm²/sec (~ 1.6×10^{-5} cm/sec)	
	18-6 4bac			1.07cm²/sec (~ 5.8×10^{-5} cm/sec)	
Genwal Mine Slug Tests – MRP – Panther Tongue	MW-1 (1987)				3.5×10^{-5} cm²/sec
	MW-4 (1992)				2.1×10^{-4} cm²/sec
	MW-5 (1992)				8.8×10^{-4} cm²/sec
Genwal Mine Slug Tests – Spring	MW-2 (1997)				1.5×10^{-6} cm/sec

cm/sec = hydraulic conductivity cm^2/sec = transmissivity						
			Price River	North Horn	Blackhawk	Star Point
	Cyn Tongue	MW-6a (1997)				1.3 to 1.8x10^{-6} cm/sec
		MW-7 (1997)				2.2x10^{-6} cm/sec
	Panther Tongue	MW-6 (1997)				1.9 to 2.2x10^{-6} cm/sec
Trail Mountain Mine		TM-3				5.1x10^{-3} cm/sec
Skyline Mine Hansen Associates, 1979, p. 85		Blackhawk coal			2.7x10^{-8} cm^2/sec (~4.4x10^{-6} cm/sec)	
		Aberdeen Ss			2.5x10^{-2} cm^2/sec (~2.5x10^{-6} cm/sec)	
Bear Canyon Mine Slug Tests	Panther Tongue	DH-1A				5.5x10^{-1} cm^2/sec (~2.6x10^{-4} cm/sec)
		DH-2				2.4x10^{-2} cm^2/sec (~8.8x10^{-6} cm/sec)
		DH-3				7.4x10^{-2} cm^2/sec (~3.4x10^{-5} cm/sec)
	Storrs Tongue	DH-1A				3.2x10^{-2} cm^2/sec (~1.1x10^{-5} cm/sec)
		DH-2				89.3 cm^2/sec (~2.7x10^{-2} cm/sec)
		DH-3				7.5x10^{-4} cm^2/sec (~2.8x10^{-6} cm/sec)
	Spring Cyn Tongue	DH-1A				1.4x10^{-1} cm^2/sec (~5.1x10^{-5} cm/sec)
		DH-2				1.5x10^{-2} cm^2/sec (~4.2x10^{-6} cm/sec)
		DH-3				4.0x10^{-2} cm^2/sec (~2.0x10^{-5} cm/sec)
		DH-4				3.1x10^{-1} cm^2/sec (~5.7x10^{-5} cm/sec)
Horizon Mine MRP Slug test	HZ-95-1S (shallow Blackhawk)				7.3x10^{-3} cm/sec	
	HZ-95-1					5.7x10^{-3}cm/sec
	HZ-95-2					8.8x10^{-5}cm/sec
	HZ-95-3					7.1x10^{-5}cm/sec

Falling–head permeability tests of the Mancos Shale at the Deer Creek Mine Waste Rock Storage Facility yielded values of 0.0 ft/yr for unweathered, unfractured shale and 0.0 ft/yr to 820 ft/yr (7.9x10^{-4} cm/sec) for weathered shales and mudstones.

Swelling Clays

The interbedded claystones, siltstones, and sandstones of the Wasatch Plateau are rich in swelling clay minerals of the montmorillonite or smectite group. Swelling clays absorb water and expand to as much as 150 percent of their dry volume. These swelling clays reduce the hydraulic conductivity of the rock or soil that contains them and contribute to the rapid closing

or healing of tension fractures that result from subsidence. Genwal examined six shale and siltstone samples from the Blackhawk Formation by X-ray diffraction and cross-polarized light microscopy and found the samples contained 3 to 34 percent smectitic clays, with an average of 24 percent. Siltstones and shales in the Castlegate (three samples) averaged 19 percent smectitic clay, and the Price River Formation (three samples) 15 percent. Non-swelling clays, which also inhibit ground-water flow, constituted an additional 1 to 6 percent of the rock volume (Crandall Canyon Mine MRP, App. 7-41).

Coal

The Blackhawk Formation contains the economic coal resource in the Wasatch Plateau Coal Field. The Hiawatha and Blind Canyon are the only seams in the East Mountain area that can be mined economically. Coal washing facilities at the Hunter Power Plant allow lower-quality and higher-ash coal to be mined and used for power generation. The Cottonwood Seam, which lies between the Hiawatha and Blind Canyon Seams, has been determined by UP&L and the BLM to be unminable: temperatures indicate it may be burning in areas. The Bear Canyon Seam, which is above the Blind Canyon Seam in Crandall Canyon, is thick but not extensive enough to be mined economically.

The lowest coal seam is the Hiawatha, characteristically lying on or just above the Star Point Sandstone. This seam has been mined in the Cottonwood/Wilberg, Deer Creek, Des-Bee-Dove, Huntington #4, and Crandall Canyon No. 1 Mines. The Hiawatha Seam thins to less than 5 feet in the north end of the Cottonwood/Wilberg Mine, but then thickens again to the north, where it is mined in the Rilda Canyon area by way of rock slopes down from the Deer Creek Mine. Access to this seam in the Mill Fork Extension is by way of entries advanced from the Deer Creek Mine through the 65.7-acre lease modification added to Lease U-06039, and PacifiCorp's Rilda Canyon portals will connect with these entries. The Hiawatha Seam reaches a thickness of 12 feet in the north workings of the Crandall Canyon Mine and over 6 feet where it will be mined in the South Crandall Canyon Tract.

The Blind Canyon Seam lies 40 to 100 feet above the Hiawatha Seam. The Blind Canyon Seam has been mined in the Deer Creek, Huntington #4, and Des-Bee-Dove Mines. This seam is too thin to be mined economically south of the Deer Creek Mine and in the area of the Crandall Canyon No. 1 Mine, but it will be mined in the Mill Fork Extension (up to 19 feet thick) and South Crandall Canyon tract (up to 7 feet thick). In both the Mill Fork Extension and South Crandall Canyon Tract, this seam will be accessed by way of rock slopes from the Hiawatha Seam.

Overburden thickness in areas where full-extraction mining has been done or is projected in the Deer Creek, Cottonwood/Wilberg, Des-Bee-Dove, and the Crandall Canyon No. 1 Mines is 200 to 2,600 feet. Where subsidence is projected for the Mill Fork Tract, overburden ranges from 900 feet in the South Fork of Crandall Canyon to 2,600 feet under East Mountain, and for

the South Crandall Canyon Tract it varies from under 500 feet, near the coal outcrops, to 1,500 feet.

Structure

Cliffs, narrow canyons, and high plateaus characterize topography in the East Mountain CIA. Strata in the Wasatch Plateau were tilted in response to the rise of the San Rafael Swell and modified by subsequent tectonic, orogenic, and erosional events. Strike of the beds is generally parallel to the face of the Wasatch Plateau escarpment, and dip is usually less than 5 degrees, whether it is regional or caused by local structural deformation. Major structural features associated with East Mountain are:

- Flat Canyon Anticline;
- Crandall Canyon Syncline;
- Straight Canyon Syncline;
- Roans Canyon Graben;
- Mill Fork Fault Graben or Fault Zone;
- Deer Creek Fault;
- Pleasant Valley Fault; and
- Joes Valley Graben, Joes Valley Fault, and other related faults

These are shown on Plate 3. PacifiCorp has mapped the Flat Canyon anticline as a gentle fold that begins at Joes Valley Fault and trends northeast and then north before dying-out in upper Mill Fork Canyon. The EA prepared by the USFS and BLM described this anticline as simply having a north-south orientation (p. III-3).

In the area of the Crandall Canyon No. 1 Mine, strata dip at less than 5° on both flanks of a gently south-plunging, unnamed anticline that terminates in the Crandall Canyon Syncline. Because the axis of this fold is near Joes Valley Fault, the west flank of this anticline is limited in extent and may simply be a drag fold caused by movement on Joes Valley Fault.

The Crandall Canyon Syncline is oriented northeast-southwest on the Joes Valley side of East Mountain but curves roughly 90° and trends northwest–southeast where it crosses Little Bear Canyon on the Huntington Canyon side of the mountain. This syncline terminates at approximately a right angle against the Mill Fork Fault Graben, near Little Bear Spring.

Straight Canyon Syncline extends southwest to northeast from Trail Mountain, across Cottonwood Canyon, and then terminates between the upper forks of Meetinghouse Canyon. Its axis is just south of and parallel to Roans Canyon Graben.

Roans Canyon Graben is a series of several parallel normal faults, with four main faults. The graben extends from Trail Mountain to Meetinghouse Canyon. Maximum displacement on

the faults is 150 feet. Where the Deer Creek Mine crosses the graben at the 3rd North crossing, strata north of the graben are 40 feet lower than those south of the graben and the floor of the graben has been dropped 114 feet. Gouge in the four main faults is absent at some locations and up to 30 feet thick at others (1988 PacifiCorp Annual Report). Experience in the Deer Creek Mine indicates the faults impede ground-water movement across the graben but facilitate flow parallel to the graben, both vertically and horizontally.

The Mill Fork Fault Graben or Zone is a northeast-southwest trending series of faults. PacifiCorp has mapped this zone as branching from the Roans Canyon Fault Graben at Trail Mountain and extending to Huntington Canyon. In places, the faults that mark this zone can be mapped from features visible at the surface, but the zone has been extended across the CIA based on underground encounters in the Deer Creek and Huntington #4 Mines and a geophysical study performed by PacifiCorp in the Rilda Canyon area. Offset is approximately 25 to 30 feet on the faults bounding both sides of the graben. The faults are exposed in Little Bear Canyon, where Little Bear Spring flows from the bounding fault on the west side of the graben.

The Deer Creek and Pleasant Valley Faults trend north-south along the southeast side of East Mountain. They are representative of a series of en-echelon faults that extend from the south end of Gentry Mountain and across Huntington Canyon to East Mountain. These faults are the southern end of a group of major north-south faults that includes the Pleasant Valley, Trail Canyon, and Bear Canyon Faults. Layout of the Des-Bee-Dove Mines was dictated by a system of these north-south faults, and the Deer Creek Fault separates the Des-Bee-Dove Mines from the Deer Creek and Wilberg Mines. Fault displacements are generally less than 30 feet and not more than 200 feet.

Joes Valley lies west of East and Trail Mountains in Joes Valley Graben. At the north end of Joes Valley, at the northwest corner of the CIA (Plate 3), the elevation of the divide between Joes Valley and Scad Valley is 9,200 feet. From that divide Joes Valley slopes south to Joes Valley Reservoir, located several miles south of the CIA, where the elevation of the valley floor (submerged below the reservoir) is 6,800 feet.

Joes Valley Graben and its bounding faults are regional features that run north-south for roughly 80 miles and extend both north and south well beyond the geographic area named Joes Valley. Joes Valley Fault is the eastern bounding fault of Joes Valley Graben. It is a normal fault with up to 3,000 feet of vertical offset, but maximum offset in the CIA is approximately 1,500 feet. The fault scarp has eroded to form the steep, western flank of East Mountain. Joes Valley Graben is itself broken into a number of smaller grabens and horsts. Bald Ridge and Middle Mountain, two horsts that expose Upper Price River and North Horn Formation bedrock, separate Indian Creek from other Joes Valley Graben drainages to the west.

Indian Creek flows in a narrow sub-drainage between Joes Valley Fault on the east and Bald Ridge and Middle Mountain. This drainage is surfaced with a westward thinning wedge of

colluvial and alluvial material that has been shed from East Mountain and deposited over North Horn Formation bedrock. Indian Creek does not flow down the middle of this drainage, rather, having been displaced by the alluvial-colluvial wedge, it flows on the west side of the valley, near the North Horn-alluvium contact at the base Bald Ridge and Middle Mountain.

Jointing, which affects hydrologic characteristics, is significant in the Mill Fork Lease area. As the Crandall Canyon Mine workings neared Joes Valley Fault, a series of subsidiary tensional fractures was encountered. The dominant joints parallel Joes Valley Fault, trending predominantly north-south to north 10^0 east, and secondary fracture sets follow other orientations (Mill Fork Extension MRP, R845-301-624).

Climate

Temperatures range from 32° to 90° F in the summer and -10° to 40° F in the winter. Potential evapotranspiration has been estimated to be 18 to 21 inches per year. Prevailing winds are from the west and northwest. The average velocity at the Crandall Canyon Mine, based on information from the Utah State Climatological Office, is 12 mph (Crandall Canyon Mine MRP, Section 7.24.4).

Annual precipitation ranges from 10 to 30 inches per year in the CIA (see Plate 1 *in* Danielson and others, 1981). Table 4 shows variation is not strictly controlled by elevation; for example, the Crandall Canyon Mine averages 40 percent more precipitation than PacifiCorp's higher elevation East Mountain station. At the East Mountain station, there are two wet-dry cycles during the year: June is typically the driest month, with another dry period in December. Precipitation peaks in March and September, but no month averages over 1.5 inches. June is also the driest month at the Crandall Canyon Mine, but the five months from November through March each average over 2 inches of precipitation, with December being the wettest, averaging over 3 inches. August also has over 2 inches of precipitation from the late-summer so-called *monsoon* rains typical of the region.

Table 4
Annual Precipitation in the
East Mountain CIA Area

	Annual Precipitation (inches)	Water Years	Elevation (feet)	Source of Information
Crandall Canyon Mine	20	NA	8,000	Crandall Canyon Mine MRP, Section 7.24.4
Hunter Power Plant*	8	1976 – 2003	5,800	2003 PacifiCorp Annual Report -

Huntington Power Plant	10	1971 – 2000	6,500	Tables 3,4,5, and 6
Electric Lake*	23	1971 - 2003	8,350	
East Mountain	13	1981 - 2003	9,000	

* - Located outside the East Mountain CIA

The East Mountain CIA straddles the boundary between Palmer Hydrologic Drought Index (PHDI) Regions 4 and 7 and is near Region 5; Figure 2 shows the PHDI for 1978 through 2004. The area was in a drought, at times extreme drought, from 2000 to the end of 2004.

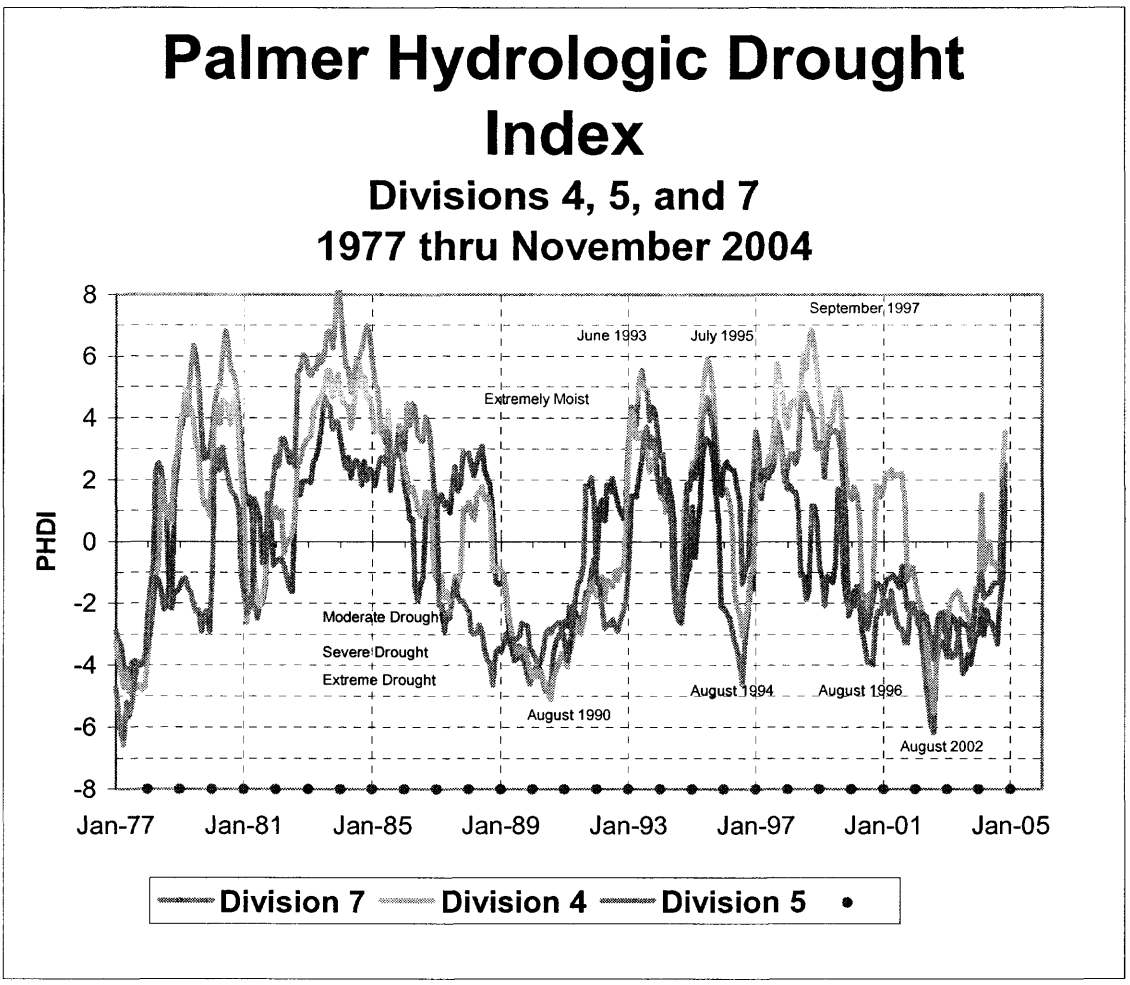

Figure 2 - PHDI, Divisions 4, 5, and 7

HYDROLOGIC SYSTEMS and USES

Ground Water

Ground-water regimes in the CIA are dependent upon climatic and geologic parameters that establish systems of recharge, movement, and discharge.

In the East Mountain CIA, snowmelt at higher elevations provides most of the water for ground-water recharge. Recharge has been estimated to be 3 to 8 percent (Danielson and Sylla, 1983) and 9 percent (Waddell and others, 1986) of the average annual precipitation for areas in the Wasatch Plateau and Book Cliffs coal fields. Well-developed soils and permeable or fractured lithologies exposed at the surface facilitate recharge.

Recent studies in Australia (Barnes and others, 1994) and at the Nevada Test Site (French and others, 1996) indicate that recharge is not a linear process in arid and semi-arid environments, but rather there are threshold conditions involving the soil and the amount, rate, and timing of precipitation that must be met before recharge occurs. Therefore, precipitation data can be used to estimate possible recharge, but used alone they may not accurately predict recharge: there can be years with precipitation but no recharge.

Once recharge enters the ground, the rate and direction of ground-water flow is governed mainly by gravity and geology. Lateral ground-water flow dominates in the gently dipping Tertiary and Cretaceous strata of the Wasatch Plateau, where layers of low-permeability rock that impede downward movement are common. Both lateral and vertical flow may be channeled through faults and fractures, but plastic or swelling clays that can seal faults and fractures are abundant.

Ground water tends to flow more readily through shallower systems where weathering and fracturing produce hydraulic conductivities that are generally larger than in deeper systems. Much of the ground-water flow continues both laterally and downward through these shallower, local systems until it intercepts the surface and is discharged at a spring or seep, enters a stream as baseflow, is transpired by vegetation, or simply evaporates to the atmosphere. However, some of the ground water follows deeper and slower flow-paths where it becomes isolated from the surface and is, in effect, stored.

The Star Point Sandstone, Blackhawk Formation, Castlegate Sandstone, Price River Formation, North Horn Formation, Flagstaff Limestone, and Quaternary deposits contain potential reservoirs or conduits for ground water in the CIA. Strata of the Mesaverde Group do not readily receive recharge from surface water because they are dominantly low-permeability claystones and siltstones. Large volumes of these rocks may be unsaturated or even dry.

In the Blackhawk, Price River, and North Horn Formations, higher permeability sandstones occur as lenticular and tabular channel and overbank deposits within a lower permeability claystone and siltstone matrix. The sandstones are laterally and vertically discontinuous and pinch-out over short distances, and individual sandstone units are poorly interconnected, isolated by claystones and siltstones. However, these sandstones, especially where fractured, can produce significant ground-water flows from local systems.

Although the Star Point Sandstone is often characterized as a homogeneous sandstone body, it consists of three major sandstone members – Panther, Storrs, and Spring Canyon - intertongued with finer-grained rock. These major members can be further subdivided into coarser- and finer-grained units or sequences. As with the other strata in the CIA, significant ground-water flows are usually associated with fractures.

There are some isolated Flagstaff Limestone outcrops on East Mountain that have reservoir properties which have developed through dissolution and fracturing.

As is typical of ground water throughout the plateaus and mountains surrounding the Price River basin, ground water in the CIA occurs under both confined and unconfined conditions. Shale, siltstone and cemented sandstone beds act as aquicludes to impede ground-water movement. Such localized aquitards occur within all stratigraphic units. The Mancos Shale is considered a regional aquiclude that limits downward flow within and adjacent to the CIA.

Piezometric data from the Crandall Canyon Mine indicate ground water in the Spring Canyon Member of the Star Point Sandstone moves from northwest to southeast, from the crest of East Mountain towards Huntington Canyon. The USGS has identified the Star Point and Blackhawk Formations as an aquifer (Danielson and others, 1981), and Lines (1984) designated these formations as a regional aquifer. *Regional aquifer* is a common phrase used by mining operators in the Carbon and Emery County coal fields. In such usage, regional aquifer usually refers to any water found in the Star Point Sandstone and Blackhawk Formation irrespective of quality, quantity, use, storage, flow and transport, and discharge. The Division has adhered to the definition of *aquifer* as found in the Coal Mining Rules (R645-100-200). Although there are local aquifers in the Star Point and Blackhawk strata, the Division does not consider the Star Point Sandstone and Blackhawk Formation in the East Mountain CIA to constitute a regional aquifer.

Faults and fractures can act as effective conduits for ground water and allow downward flow, even potentially bypassing unsaturated strata. Fractures in the Roans Canyon Fault Graben appear to act as significant vertical conduits for ground water. Drilling from within the Deer Creek Mine in advance of mining operations identified two major hydrogeologic units associated with the graben, and aquifer testing indicated a horizontal flow component within the graben towards the east, with discharge into the Huntington Creek drainage (1988 PacifiCorp Annual

Report).

There are numerous seeps and springs within the CIA. PacifiCorp identified 198 seeps and springs in and adjacent to the Mill Fork Tract in their 2000-2002 baseline survey, and another 83 are listed in Volume 9 of the Deer Creek, Des-Bee-Dove, Cottonwood-Wilberg, Trail Mountain PAP. The Crandall Canyon No. 1 Mine PAP lists 357 seeps and springs in Crandall and Horse Canyons. Between them, Genwal and PacifiCorp have monitored 167 springs and seeps (this undoubtedly double-counts some sites that have been monitored by both companies.) The discharge volumes given in Table 5 are very general because not all sources were monitored over the same time period; however, the total of the average discharges from the monitored springs appears to be on the order of 3,000 gpm. Based on data from the springs that have been monitored, spring discharge is distributed roughly as follows:

Table 5
Spring Discharge Volumes in the
East Mountain CIA

Lithologic Unit	Number of Springs Listed by Permittees	Number of Springs Monitored	Total Average Monitored Discharge
Flagstaff Limestone	17	8	45 gpm
North Horn Formation	243	100	2,610 gpm
Price River Formation	127	34	109 gpm
Castlegate Sandstone	32	6	6 gpm
Blackhawk Formation	83	17	110 gpm
Star Point Sandstone	19	3	350 gpm
Alluvium	120	8	190 gpm
Total	641	167	3,420

Water quality progressively decreases from the Flagstaff Limestone to the Star Point Sandstone.

The sandstones of the Star Point generally have low permeability and typically produce water where permeability has been enhanced by fracturing or weathering; however, culinary water-supply well MW-1 at the Crandall Canyon Mine flows from apparently unfractured Star Point Sandstone, from a zone noted by the driller as being coarser-grained than the rest of the unit. The water-bearing sandstone was 290 to 335 feet below the surface. When initially completed in March and April 1987, pressure head in MW-1 was 130 ft. MW-1 has provided culinary and mine process water for use in the mine and bathhouse, but generally at rates of less than 1 gpm (Crandall Canyon Mine MRP, Section 7.24.1.Mine Plan Aquifers). There has been no flow reported since March 2002. Tritium and radiogenic carbon values have not been reported for this water.

At an exploratory hole in Dairy Canyon (SE¼SE¼SE¼ Sec 3, T. 17 S., R 6 E.) on Trail Mountain, water from the Blackhawk Formation flowed to the surface at 150 gpm from a depth of 129 feet, approximately 500 feet above the Star Point Sandstone (Davis and Doelling, 1977, p. 36). The Division has not located any other information on this bore hole and its water.

Well TM-3 in Straight Canyon was completed through the Star Point Sandstone by PacifiCorp in 1994. It is 1,300 feet from the nearest mine workings. This well flowed 25 gpm and had a pressure head of 65 psi when completed. The head remained relatively constant until late 1996, and then began to decline in November 1996 when gate entries for the 8th and 9th Right longwall panels were being opened. The 9th, 8th, and then 10th Right panels were mined beginning in March 1997 and TM-3 ceased flowing when the head fell below the top of the casing in April 1997. The Trail Mountain Mine began discharging water to Cottonwood Creek in June 1997. Pumping from the mine ended in 2001 and the head in TM-3 has been recovering. The gauge was reinstalled in August 2003 because the water level was approaching the top of the casing, but pressures were not recorded until July 2003 (Figure 3).

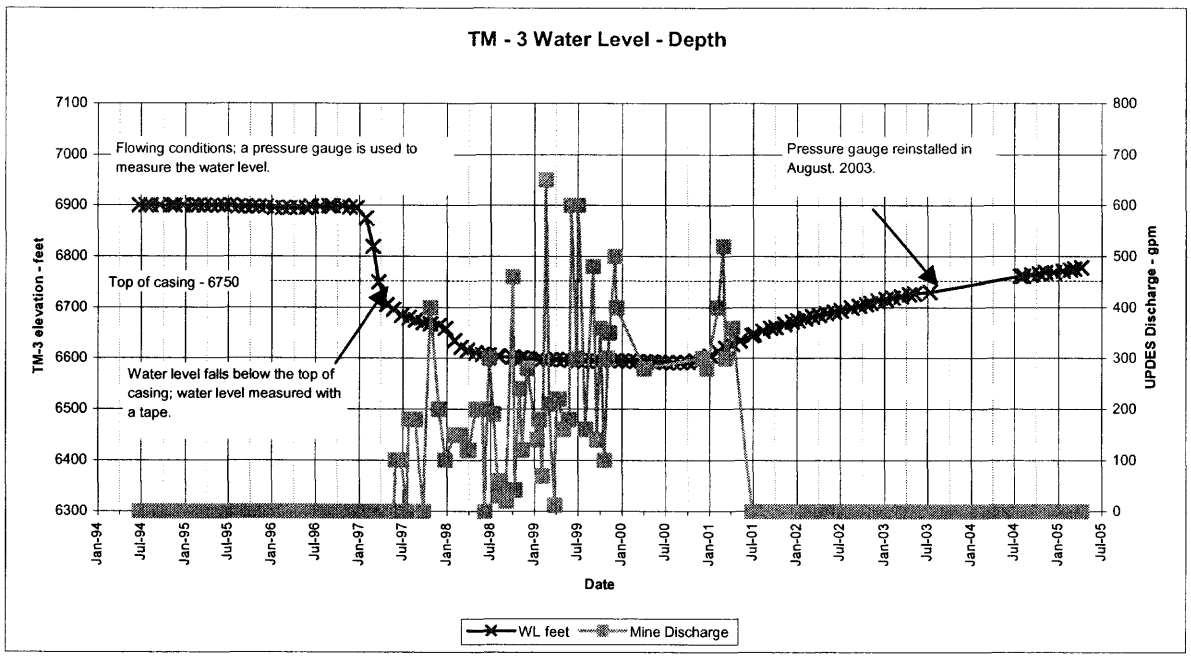

Figure 3 – Water level in well TM-3, adjacent to the Trail Mountain Mine

Mine Inflow and Discharge

Water that flows into the mines in the CIA is ground water that has been stored in the adjacent Blackhawk Formation and Star Point Sandstone, including faults and fractures, or is

actively flowing along faults and fractures. A substantial portion of the water that enters the mines is lost as water vapor during mine ventilation and extracted during the mining process as coal moisture content. Table 6 shows the estimated ground-water discharge rates and volumes for mines in the East Mountain CIA for 2004.

Table 6
Estimated Ground-Water Discharge and Consumption in 2004
East and Trail Mountains

Mine	UPDES Discharge (gpm)	Evaporation, Extraction, and Domestic Use (gpm)	Yearly Total	
			(gallons/year)	(acre-feet/year)
Crandall Canyon Mine	900	120	540×10^6	1,640
Deer Creek Mine	220	55	140×10^6	440
Des-Bee-Dove Mines	0	0	0	0
Cottonwood/Wilberg Mine	28	0	15×10^6	50
Trail Mountain Mine	0	0	0	0
Total	**1,148**	**175**	**695×10^6**	**2,130**

In the Crandall Canyon Mine, little water was encountered before 1996, and water was pumped from Crandall Creek to supply water for mine operations. In late 1996, ground-water inflow increased as mining progressed westward towards the fractured zone adjacent to the Joes Valley Fault and water no longer needed to be pumped into the mine; rather, excess water was discharged directly to Crandall Creek under a UPDES permit (UPDES Site 002). Figure 4 shows estimated yearly discharge. The mine operator reported monthly average discharges ranging from 90 to 700 gpm from November 1996 through 1999, and 900 to 1,200 gpm from January 2000 through December 2004. Water mainly dripped from fractures and channel sandstones exposed in the roof, but there was also slow leakage through the floor from the underlying Spring Canyon Member of the Star Point Sandstone.

According to the Crandall Canyon Mine MRP, the estimated volume of water extracted by ventilation is approximately 50 to 60 gpm, and the volume lost due to coal moisture content is approximately 70 gpm. Water seeping into the mine consumes 10 gpm, and mine operations another14 gpm, for total estimated consumption of approximately 150 gpm (Section 7.24.1, Mine Dewatering).

Mine water was never discharged at the Des-Bee-Dove Mines. In 2000, estimated discharge from the other three PacifiCorp mines totaled 1.03×10^9 gallons, or roughly 2,000 gpm: 57×10^6 gallons was discharged as water vapor during mine ventilation, 15×10^6 gallons diverted for various domestic uses in the mines, and the remainder discharged to the surface (2000 Annual Report).

The Cottonwood/Wilberg ventilation portals in Miller Canyon were permanently sealed in 1987, but 2-inch drainpipe was placed through one of the seals. A small volume of water still seeps out of the mine, bypassing the seals and drainpipe by way of sandstones that underlie the coal seam (Cottonwood/Wilberg Mine MRP, Appendix XXII). Volumes are small, and since 2001, when the portal area was reclaimed and UPDES UT0022896-001 moved from the portal area to the confluence of Miller Canyon with Cottonwood Creek, there has been no measured flow.

Operations ceased at the Trail Mountain and Cottonwood/Wilberg Mines in 2001. There has been no further discharge from the Trail Mountain Mine. The Cottonwood/Wilberg Mine was placed in temporary cessation and pumping within the mine and discharge to Grimes Wash ceased. The Cottonwood/Wilberg UPDES permit was modified and water now drains by gravity to the Trail Mountain Access Tunnel in Cottonwood Canyon, where it discharges to Cottonwood Creek (point UT0022896-001). Discharge has averaged 27 gpm since 2001.

By 2003, the total discharge from the PacifiCorp mines had dropped to 244×10^6 gallons. Total discharge was down to 208×10^6 gallons in 2005, with no discharge from Trail Mountain and only 8×10^6 gallons from Cottonwood/Wilberg (2000, 2003, and 2005 Annual Reports).

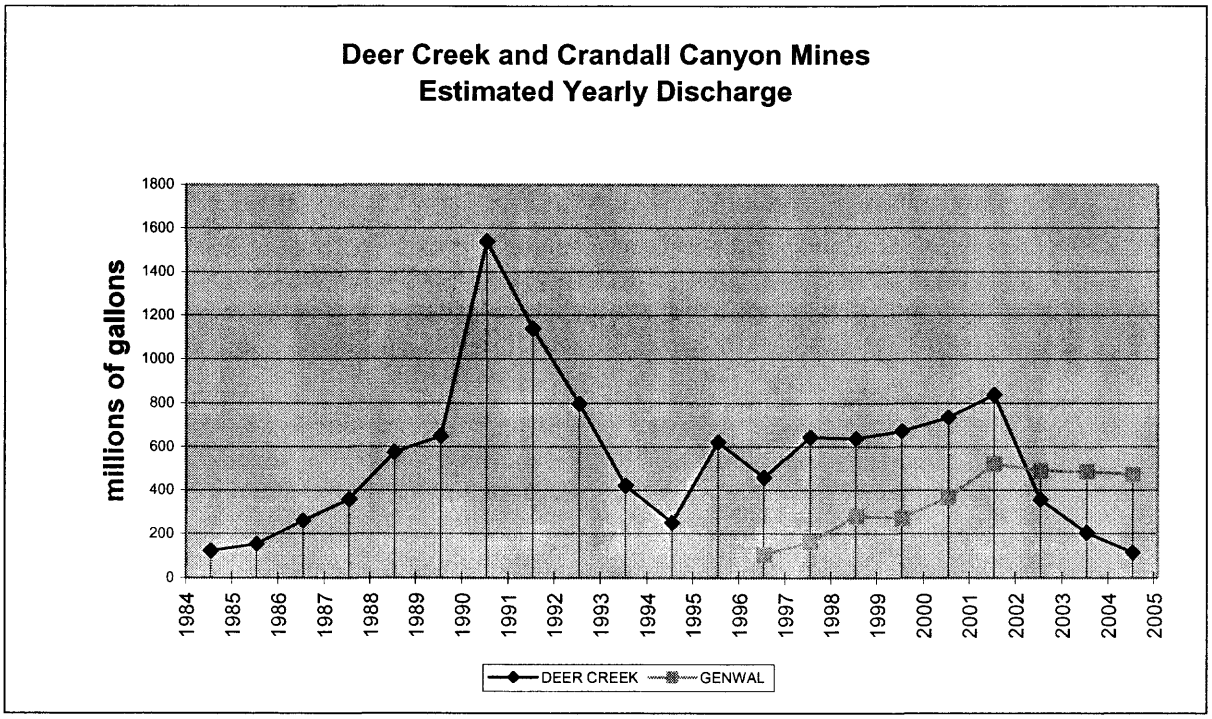

Figure 4 – Estimated Yearly Discharge of Active Mines

Estimated total yearly discharge from the Deer Creek Mine shown in Figure 4 is based on DMR Average Discharge rates reported to the Division and Water Quality. Between 1992 and 2001, discharge averaged roughly 1.6×10^6 gallons/day, or 1,100 gpm. In addition to the mine discharge, PacifiCorp estimates each ventilation fan causes evaporation of an additional 19×10^6 gallons (36 gpm) yearly, and domestic consumption is up to 10×10^6 gallons (19 gpm) (Annual Reports). In the past, discharge from the Deer Creek Mine went directly to the Huntington Power Plant, but the power plant no longer accepts water from the mine and all discharge goes to Deer Creek (Dennis Oakley – Energy West, personal communication, January 7, 2003).

PacifiCorp has estimated that inflow to the Mill Fork Extension will be similar to what has occurred in the Deer Creek Mine, except interception of a fault zone is not expected. Where Deer Creek Mine operations intercepted open joint-systems in the Roans Canyon fault zone at two locations in the 4th North section in 1990, there were large ground-water inflows to the mine, estimated to be as much as 5,000 gpm. In 1992, the 4th South area was sealed and water production dropped significantly. The rate of discharge was back on an upward trend, but in 2002 it dropped again. PacifiCorp attributes the 2002 drop to installation of a more accurate flow meter and development of new in-mine sumps (PacifiCorp, 2005 Annual Hydrologic Report, pp. 23-24).

In the down-plunge end of the Straight Canyon Syncline, Trail Mountain Mine operations exposed the Spring Canyon Member. Ground water under pressure entered the mine at a rate of 200 to 300 gpm until the Spring Canyon Member was depressurized (Mill Fork Tract MRP, Appendix 700-B): the sandstone was not described as fractured.

The Huntington #4 Mine recovered Blind Canyon coal from within the Mill Fork Graben and northwest of the graben. Offset at the bounding faults on both sides of the graben was approximately 25 to 30 feet. PacifiCorp reports that within the graben and at the bounding faults, only minor amounts of ground water were encountered (Deer Creek Mine MRP - Volume 12, Hydrology, R645-301-721, A, 15, b). Flow at Little Bear Spring was not measurably impacted: either the mine was above the potentiometric surface or there is an aquitard – perhaps one of the coal seams – that isolated the mine from the water.

Little Bear Spring

Little Bear Spring in Little Bear Canyon, east and south of the South Crandall Canyon lease, is an important source of water for the Castle Valley Special Services District (CVSSD), supplying 65 percent of the culinary water to the residents of Huntington, Cleveland, and Elmo. The only treatment required before use is chlorination. It is probably the largest and most consistently flowing spring in the region.

Little Bear Spring is on the south side of Little Bear Creek. It flows from the Panther Tongue of the Star Point Sandstone and appears to be issuing from a fracture that is the bounding fault on the northwest side of the Mill Fork Graben.

Several investigations - including isotope analyses (Mayo and Associates, 1997a and 1997d), geophysical studies (Sunrise Engineering, 2001a and 2001b; WTR, 1999), dye-tracer tests (Mayo and Associates, 2001c), and analyses of piezometric, chemical, and flow data - indicate that one important recharge area for Little Bear Spring, perhaps the principle recharge area, is upper Mill Fork Canyon. Precipitation runoff, snowmelt, and discharge from numerous springs collect in both the channel and alluvium of Mill Fork, and the water is diverted to Little Bear Spring through the Mill Fork Graben. PacifiCorp added a stream-monitoring point in Mill Fork, upstream of the Mill Fork Graben, at the request of the USFS.

However, investigations of Little Bear Spring conducted prior to 1998 indicated a component of flow from the north or northwest. These hydrogeologic analyses concluded recharge was coming from the north, perhaps from Crandall Canyon or Huntington Creek and flowing along the Mill Fork Graben or faults parallel to it. During the review of the South Crandall Lease addition to the Crandall Canyon Mine, the USFS maintained that this northerly component of flow to Little Bear Spring was not eliminated as a possibility in later studies. In addition, more recent interpretations indicate fractures oriented north-south to northwest-southeast may provide some of the flow to the spring, 30 to 40 percent according to the 1998 AquaTrack study (WTR, 1998), but a recharge area has not been identified.

At Little Bear Spring, Danielson (Danielson and others, 1981) measured flows of 110 to 165 gpm between April 1978 and March 1979, apparently before the spring was developed as a culinary water source by CVSSD. CVSSD has measured flow at Little Bear Spring monthly since 1982, and regularly monitors the quality of the water. Recent water-quality and isotopic analyses (Mayo and Associates, 1997a) show the water from Little Bear Spring is similar to waters in Huntington and Little Bear Creeks. The high tritium and modern carbon content show the water is of modern origin, indicating regional flow through unfractured, low-permeability Star Point Sandstone is not a significant source of water for this spring.

Average flow measured by CVSSD has been approximately 340 gpm. Flow varies seasonally, one indication of a shallow-circulating ground-water system, but minimum flows have never dropped significantly below 190 gpm. This sustained baseflow indicates that the system has considerable storage capacity, probably in the channel-bottom alluvium of Mill Fork Canyon and in the fractures of the Mill Fork Graben, and possibly some in the Star Point Sandstone adjoining the fractures.

Because there is a small possibility that mining in the Mill Fork tract or the Crandall Canyon lease area could impact some portion of the flow at Little Bear Spring, PacifiCorp and Genwal were required to develop water replacement plans before mining in the Mill Fork and

South Crandall Canyon Extensions. Additional stipulations were placed on the federal lease for the South Crandall Canyon Extension by the USFS to reduce possible impacts from mining into fractures northwest of the Mill Fork Graben and Little Bear Spring.

Recharge to Little Bear Spring from unfractured Star Point Sandstone and Blackhawk Formation is generally discounted because of low hydraulic conductivity and permeability (Mayo and Associates, 1997c); however, even with low permeabilities, the large area exposed by the fractures in the graben could provide some recharge to Little Bear Spring from these formations. The down-plunge end of the Crandall Canyon Syncline could concentrate or enhance ground-water flow where it intercepts the Mill Fork Graben between Mill Fork and Little Bear Canyons.

Rilda Canyon Springs

North Emery Water Users Special Service District (NEWUSSD) has developed springs in lower Rilda Canyon to provide domestic and industrial water for areas outside the cities of Huntington, Cleveland, and Elmo. Studies performed by PacifiCorp indicate that approximately 80 percent of the recharge to these springs originates in the Right Fork of Rilda Canyon.

Studies have been proposed by PacifiCorp to see if the NEWUSSD collection system can be relocated in the Right Fork, which would move the collection system away from the access and ventilation portals proposed by PacifiCorp for Rilda Canyon.

Elk Spring

NEWUSSD has discussed developing Elk Spring to replace or supplement other water supplies, but the Division does not know of any firm plans or commitments from the mine operators to proceed with this option.

Joes Valley

Joes Valley Fault separates Joes Valley from the coal mining activities at East and Trail Mountains. Joes Valley Fault is a normal fault with up to 3,000 feet of vertical offset, downthrown on the west side, but maximum offset within the CIA is approximately 1,500 feet. The fault forms the eastern side of the Joes Valley Graben, and uplift along the fault resulted in the steep western flank of East Mountain. Joes Valley Graben is a regional feature that runs north-south for roughly 80 miles and extends well beyond the East Mountain CIA.

Even with the uplift of East Mountain along the Joes Valley Fault, the Blind Canyon and Hiawatha Seams in the East Mountain mines are still several hundred feet lower in elevation than the floor of Joes Valley.

Indian Creek drains the section of Joes Valley adjacent to East Mountain. Upper Price River Formation crops out just to the north, in Scad Valley, but the floor of Joes Valley along Indian Creek consists of North Horn Formation overlain by a westward thinning wedge of alluvium and colluvium that was shed from the west flank of East Mountain. Indian Creek does not flow down the middle of this drainage, rather, having been displaced by deposition of the wedge of sediments, it flows on the west side of the valley at the base of Bald Ridge and Middle Mountain. Springs in the Indian Creek drainage flow mainly from the alluvium or from the North Horn Formation exposed west of the creek. Wetlands in the Indian Creek drainage are supported in part by ephemeral flows from the west flank of East Mountain. These wetlands often support diverse communities of amphibians, macroinvertebrates, and other flora and fauna.

Springs also flow in the small canyons that have been eroded into the west flank of East Mountain. These springs appear to be less numerous to the north, at the Crandall Canyon Mine where the Joes Valley Fault and the mountain ridge are close to each other, and to become more numerous towards the south as the distance between the fault and ridge increases (Deer Creek Mine MRP, Volume 12, Plate 1 and Drawing MFU1823D). This indicates ground-water flow to these springs is most likely related to the amount of adjacent surface area exposed for recharge.

Three samples of water were collected inside the Crandall Canyon Mine in 1997: two from fractures that were encountered where Main West and 5th West approached Joes Valley Fault, and one from in-mine well MW-7, which was drilled to the Star Point Sandstone from a location in Main West approximately 200 feet from the fault. Water quality and age were determined for these samples. There was a small amount of tritium (0.95 TU) in the 5th West sample but none in the other two. Mean residence time determined from radiocarbon dating was 2,000 to 5,000 years. Based on these analyses, mining near Joes Valley Fault could intercept modern water recharged from the surface, but this so-called active zone near the fault will also yield deeper, older water (Mayo and Associates, 1997a; Deer Creek Mine MRP, Volume 12, Appendix B). A stipulation in the Mill Fork tract coal lease does not allow full extraction mining within a 22 degree angle-of-draw of the Joes Valley Fault. Mining projections for the Mill Fork Extension show no full-extraction mining within 400 feet of the projected fault trace, although bleeders and entries may intercept the fault.

When the Mill Fork lease was originally outlined by the BLM, the west boundary was based roughly on the location of the Joes Valley Fault projected by the USFS in 1997. The coal tract was transferred to SITLA as part of an exchange of federal and state lands and minerals under the Utah Schools and Land Exchange Act of 1998 (Public Law 105-335). PacifiCorp obtained the lease, ML-48258, from SITLA in 1999. In 2005, PacifiCorp made a new determination of the location of the Joes Valley Fault based on topography, aerial photography, resistivity and IP surveys, and in-mine horizontal drilling information. The new location for the fault is several hundred feet west of the one used to define the Mill Fork lease. It became evident that a considerable volume of federal coal between the fault and the west boundary of the Mill Fork lease would become isolated and unrecoverable if the Deer Creek Mine plan were not

modified to include recovery of this coal.

The BLM granted an exploration license for the Mill Fork West Extension LBA area with the intent of allowing PacifiCorp to build gate roads, bleeders, and longwall set-up rooms in the federal coal. However, longwall mining could not be done and coal recovered from mine development could not be sold until this coal had been leased and the area added to the state permit. Anticipating the lease acquisition, PacifiCorp submitted the IBC amendment to add this area to the permit on April 30, 2006. Federal lease UTU-84825 was issued in August 2006.

Surface Water

Surface runoff from the east side of the Wasatch Plateau flows either to the Price River or San Rafael River (Plate 1). The Price River Basin, which includes about 1,800 square miles in six counties, is located primarily in Carbon and Emery Counties in east-central Utah. Headwaters of the Price River are the drainages around Scofield Reservoir and Soldier Summit. The river flows southeasterly and joins the Green River approximately 15 miles north of the town of Green River, Utah. The drainage is bounded by the Book Cliffs on the northeast, the Wasatch Plateau on the west and the San Rafael Swell on the south.

All drainage from the East Mountain CIA flows to the San Rafael River. The San Rafael River Basin lies south of the Price River Basin. This basin includes about 2,300 square miles in three counties, but is located mainly in Emery Country. The San Rafael River Basin occupies part of two physiographic sections of the Colorado Plateau - the High Plateaus to the north and west and Canyonlands to the south and east (Fenneman, 1946). Headwaters extend for 40 miles along the high central ridges and peaks of the Wasatch Plateau. Principal streams in the basin are Huntington and Cottonwood Creeks, which merge to form the San Rafael River, and Ferron Creek, which joins the San Rafael River within a mile of the Cottonwood - Huntington confluence. The San Rafael River flows in a southeasterly direction to eventually join the Green River.

The CIA can be subdivided into 15 drainage basins as shown on Plate 4. Crandall, Little Bear, Mill Fork and Rilda Creeks drain the east side of East Mountain, flowing generally from west to Huntington Creek on the east. Cottonwood Creek flows down Cottonwood Canyon between Trail and East Mountains, and the west slopes of East and Trail Mountains drain to Indian Creek through a number of short but steep tributaries. Indian Creek flows south to Lowry Water and then to Joes Valley Reservoir, which discharges to Cottonwood Creek by way of Straight Canyon.

Sixty-five percent of runoff in Huntington Creek occurs from April to July as a result of snowmelt. Water-content of the April 1 snowpack correlates well with annual discharge (Danielson and others, 1981, p. 11).

Under the Standards of Quality for Waters of the State of Utah (UAC R-317-2.13), waters in Huntington and Cottonwood Creeks and their tributaries are classified as 1C, 2B, 3A and 4.

- 1C - protected for domestic use with prior treatment,
- 2B - protected for recreational uses except swimming,
- 3A - protected for cold water aquatic life, and
- 4 - protected for agricultural uses.

All waters on USFS lands are designated as High Quality Water Category 1 (no point-source UPDES discharge allowed), except part of Deer Creek is designated as High Quality Water Category 2 (UPDES discharge permitted but no degradation of quality allowed).

Water quality of both the Price and San Rafael Rivers is good in the mountainous headwater tributaries, but deteriorates rapidly as flow traverses the Mancos Shale. The shale lithology typically has low permeability, is easily eroded, and contains large quantities of soluble salts that are major contributors to poor water quality. Depending on the duration of contact, water quality degrades downstream to where TTDS levels of 4,000 mg/L are not uncommon. The predominant ion leached from the Mancos Shale is sulfate, with values over 1,000 mg/L common in the lower reaches of the Price River.

Left Fork of Huntington Creek (1)

This drainage, including the major tributary, Scad Valley Creek, delineates the north and northwestern-most boundary of the CIA. There is little, if any, surface or subsurface drainage to these waters from areas potentially affected by any mine operations.

Horse Canyon (2)

Horse Canyon drainage encompasses approximately 2,700 acres. The upper canyon divides into a main and south fork. The stream flows east into Huntington Creek and is perennial downstream of where the two forks join. The main fork is considered intermittent above where the stream forks, and the south fork is considered perennial for approximately one mile above where the stream forks. The south fork flows almost entirely within the Crandall Canyon Mine permit area. The mine permit limits retreat mining within the stream buffer zone of the perennial section.

Blind Canyon (3)

Blind Canyon drainage encompasses approximately 1,140 acres. The upper reaches of Blind Canyon Creek are intermittent and become perennial within approximately one mile of Huntington Creek. The creek is mostly intermittent within the Crandall Canyon Mine permit

area, with approximately ¼ mile of the perennial portion extending into the permit area. In July 1991 Genwal installed a 12-inch Parshall flume near the mouth of Blind Canyon. As of June 2005, maximum flow was 488 gpm (May 2002), but the stream has frequently been dry. TDS has ranged from 234 to 450 mg/L, and TSS from below detection to 54 mg/L.

The coal beneath Blind Canyon has been retreat mined and the effects of subsidence on watershed erosion and stream flow were to have been studied under the direction of the USFS Intermountain Research Station. In addition to determining effects of retreat-mining induced subsidence on stream flow and interconnectivity of surface and ground water, goals were to determine changes in channel relief and morphology, watershed erosion, and sediment routing. The final report was due September 1995. The Division has never received the report on this study, and the study (or at least the final report) may have never been completed.

Shingle Creek Canyon (4A)

Shingle Creek Canyon is a smaller drainage encompassing 480 acres with an intermittent stream flowing east into Huntington Creek. The upper reaches of the stream branch into left and right forks. Both of the forks extend into the Crandall Canyon Mine permit area as part of a 120-acre lease modification addition to Lease U-68082. A stipulation of the lease agreement (Special Coal Lease Stipulation #1) states that full extraction mining will not be authorized with overburden less than 50 times the thickness of coal removed plus 50 feet (projected to be 300 feet in the lease modification area).

Crandall Canyon (4)

Crandall Canyon drainage encompasses approximately 3,580 acres. The Crandall Canyon Mine underlies 2,145 acres of the drainage (including 330 acres of the South Crandall Canyon lease area), and the Mill Fork Lease underlies 1,120 acres.

The average gradient of Crandall Creek is 16 percent. The channel immediately below the mine is described as steeper than 4 percent, and it has a boulder or bedrock channel (EA 1997, p. III-5). Crandall Creek flows east into Huntington Creek. It is considered perennial from the confluence with Huntington Creek to approximately ¾ mile up each of its two main forks.

The USGS measured streamflow at station 09317919 at the mouth of Crandall Canyon on a seasonal basis (typically May through November) for water years 1977 to 1984. Daily mean streamflow ranged from no-flow (for one week) in November 1977 to 88 cfs (39,512 gpm) in May 1983, and averaged 5.4 cfs (2,425 gpm). Except for the winter of 1978-1979, values for flow were not reported during winters, presumably because the gauge and stream were frozen: during the 1978 - 1979 winter, flow was 0.4 to 0.9 cfs (180 to 404 gpm). About 80 percent of streamflow in Crandall Creek occurs between April and July as a result of snowmelt, peak flow usually occurring in late May. Suspended sediment concentration in Crandall Creek in 1978 and

1979, when there was no mining in the canyon, ranged from 15 to 60 mg/L, which equaled a calculated daily load of 0.08 to 0.41 tons/day (Danielson and others, 1981, p. 17).

Genwal has measured water quality at sites located upstream and downstream of the mine since October 1983. The flumes equipped with automatic continuous recorders were installed in 1986: flow values were reported for most months between March 1988 and December 1992, and have been reported quarterly since. Before 1996 water was pumped from Crandall Creek to supply water for mine operations, which partially explains why during that time the measured average flow was greater above the mine than below (Table 7). Periodically the stream experiences extremely high flows from snowmelt or thunderstorms.

The Crandall Canyon Mine facility is in the lower reaches of the canyon and consists of approximately 11 acres of surface disturbance. Several hundred feet of the Crandall Creek channel has been diverted through a culvert beneath the mine pad. All surface disturbance is treated by maintained sediment controls. Because Crandall Creek has a boulder and bedrock channel, there have been no observed changes to the channel morphology from the discharge of mine water to the creek.

Table 7
Measured Flow in Crandall Canyon Flumes
(1986 - 1995, and 1996 - 2004)

Time Interval	Site ID	Flow in gpm		
		Min	Max	Avg.
07/86 – 12/95	UPF	0	12,023	1,131
	LOF	0	6,890	672
03/96 – 06/06	UPF	1.5	12,930	862
	LOF	4.2	10,156	1,258

UPF – Upper Crandall Canyon Creek Flume
LOF - Lower Crandall Canyon Creek Flume

Little Bear Canyon (5)

Little Bear Canyon drains approximately 820 acres. The average gradient of Little Bear Creek is 30 percent. The South Crandall Canyon tract includes approximately 360 acres in Little Bear Canyon. Little Bear Creek is considered ephemeral and intermittent upstream of Little Bear Spring (located approximately ½ mile from the confluence with Huntington Creek), and perennial downstream of the spring. The USFS considers much of the creek above the spring to be 'functionally perennial' in that sufficient water flows subsurface in the alluvium to support riparian vegetation. Because of USFS concerns on the effects of subsidence to Little Bear Creek and associated ecosystem within the South Crandall Canyon Lease, a lease stipulation was added to prevent subsidence in Little Bear Canyon area where overburden is less than 600 feet unless it

can be demonstrated that the effects of subsidence would be negligible (Special Coal Lease Stipulation #9).

CVSSD diverts 200 to 400 gpm from Little Bear Spring to provide culinary water to nearly 2,500 residents in the towns of Huntington, Cleveland and Elmo. The flow from Little Bear Spring is perennial and has not dropped below 190 gpm since CVSSD began keeping records in 1982. Flows in Little Bear Creek in 1978 and 1979, measured by Danielson at the point the stream discharges to Huntington Creek, are shown in Table 8 (Danielson and others, 1981). However, it is not known if Little Bear Spring was being diverted at the time Danielson made these measurements.

Table 8
Flow in Little Bear Stream
Measured by Danielson (1981)

Date	Flow	
	cfs	gpm
October 13, 1978	0.24	108
October 18, 1978	0.5 (est.)	224
July 19, 1979	1.0	449
October 16, 1979	0.75	337
October 30, 1979	0.24	108

The USFS excluded the area covered by the South Crandall Canyon Coal Lease Tract from the Mill Fork Lease because of concerns for potential adverse impacts to Little Bear Spring. The South Crandall Canyon area was reevaluated, and based on a Decision Notice/Finding of No Significant Impact (DN/FONSI) signed by the BLM and USFS in February 2003, the South Crandall Canyon Tract was leased through competitive bid to Andalex in 2003. A stipulation of the lease agreement (Special Coal Lease Stipulation #17) states "In order to adequately protect flow from Little Bear Spring, the Lessee must enter into a written agreement with Castle Valley Special Services District (CVSSD) to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The agreement must be in place prior to mining." A water treatment plant was constructed under the provisions of an agreement between Genwal, PacifiCorp, and CVSSD. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51 of the Crandall Canyon Mine MRP.

Mill Fork Canyon (6)

Approximately 3,960 acres are drained by Mill Fork Canyon. The average gradient of Mill Creek is 13 percent. PacifiCorp leases cover approximately 2,300 acres in Mill Fork Canyon but do not extend into Little Bear Canyon.

The old Huntington #4 Mine underlies approximately 1,300 acres in Mill Fork and Little Bear Canyons. The 12-acre surface disturbance for the #4 Mine, all in Mill Fork Canyon, has been reclaimed and bond has been released.

Mill Creek is considered perennial in its lower reaches. Field observations by USFS personnel in August 1996 found that Mill Fork Creek was dry at the lower forks in Section 17, T. 16 S., R. 7 E., but flow was observed emanating from the creek bottom approximately 0.5 mile downstream of the forks. In the seep and spring inventory done by Genwal for the EA, 49 springs in the head of Mill Fork Canyon were identified. Flows ranged from seeps to 50 gpm, with most flows below 5 gpm (EA 1997, p. III-6). The occurrences were classed as follows:

Table 9
Springs in upper Mill Fork Canyon

Flow in gpm	Number of Springs
>25	4
20-25	0
15-19	4
10-14	5
5- 9	7
0- 4	29

Utah DWR has identified cutthroat and rainbow trout in Mill Fork and Little Bear Creeks, and considers these streams likely habitat for non-game fish as well (Deer Creek Mine MRP, Volume 12, p. 3-7).

Rilda Creek (7)

Lower Rilda Creek has historically been a perennial stream, mainly due to several large springs found in the middle reaches of the creek just below the confluence of the left and right forks. Several of these large springs have been developed by NEWUSSD, so some of what naturally flowed down the stream is now diverted for use in the NEWUSSD culinary water system. The average gradient of Rilda Creek is 11 percent.

Rilda Canyon drains approximately 5,100 acres, and the PacifiCorp permit area covers 3,600 acres of this drainage. The Right Fork drains about 2,114 acres and is the larger of the two main forks. The Left and Right Forks join above the NEWUSSD springs. Studies performed by PacifiCorp indicate that approximately 80 percent of the recharge to these springs originates in the Right Fork of Rilda Canyon.

PacifiCorp measures flow at six locations, which are shown on Plate 6. Maximum, minimum, and average flow for the streams and NEWUSSD springs are summarized in Table 10.

Table 10
Rilda Canyon Flow

ID in Database	Description	First and Last Measurement		Flow in gpm		
				Min	Max	Avg.
RCF-1	Upper Right Fork Flume, just downstream of the Mill Fork Graben	4/89	6/06	0	10,000	490
RCF-2	Flume Above the NEWUSSD Springs	4/89	6/06	0	6,800	370
RCF-3	Flume Below the NEWUSSD Springs	4/89	6/06	0	18,800	480
RCW-4	Flume Above the confluence with Huntington Creek	6/89	6/06	0	23,800	600
RCLF-1	Lower Left Fork	4/90	6/06	0	440	20
RCLF-2	Upper Left Fork	10/95	6/06	0	490	26
NEWUA Meter-2	Combined flow from Side Canyon and South Spring.	9/90	6/06	0	20	3
NEWUA Meter-3	Collection system from the central area. Includes old Meter #4 flow.	9/90	6/06	0	220	83

Genwal's EA spring and seep inventory found 41 springs and seeps in the Right Fork of Rilda drainage, 25 of which reached the stream (EA 1997, p. III-7). The occurrences were classed as shown in Table 11.

Table 11
Springs and Seeps in the Right Fork of Rilda Canyon

Flow in gpm	Number of Springs
>25	4
20-25	3
15-19	4
10-14	7
5- 9	4
0- 4	19

Near the NEWUSSD springs, surface disturbances from the Helco, Jeppson, Rominger, and Leroy Mines were reclaimed by the Division's AMLprogram in 1988 through 1991, with additional reclamation work done in late 2002. Construction of new portals and a bathhouse in

Rilda Canyon has been discussed with the Division, BLM, USFS, US Fish and Wildlife Service, and Utah DWR and Energy West has submitted plans to the Division. The disturbed area will be approximately 12 acres, 3 acres being for topsoil and subsoil storage. The sedimentation pond will be on land previously disturbed by the Leroy (Comfort) Mine. Current projections are that these new portals will not be used for coal transport but will be used only for ventilation and transportation of workers and materials into the mine. As of the end of 2006, only ventilation and emergency escape portals have been built (there has also been mitigation work at the Leroy Mine site, which involved removal of coal-mine waste buried by the AML program).

Meetinghouse Canyon (8) and Deer Creek Canyon (9)

Meetinghouse Creek is considered ephemeral and Deer Creek is considered perennial. The average gradient of Meetinghouse Creek is 12 percent and the average gradient of Deer Creek is 13 percent. The approximate areas of Meetinghouse and Deer Creek Canyons are, respectively, 5,500 acres and 4,000 acres: PacifiCorp's permit area includes approximately 5,000 acres in Meetinghouse Canyon and 3,700 acres in Deer Creek Canyon.

Deer Creek Mine operations have disturbed approximately 30 acres in the middle of Deer Creek Canyon. Runoff from surface facilities is treated by sediment controls. All coal produced at the mine is conveyed to the Huntington Power Plant, which is located near the bottom of Deer Creek Canyon and adjacent to Huntington Creek.

Discharges from the Deer Creek Mine have averaged 1,030 gpm, and the maximum reported discharge was 3,680 gpm in December 1990. Prior to December 1990, all discharge was piped to the Huntington Power Plant and none entered the natural drainages. A temporary discharge permit was issued in November 1990 because of high inflows into the mine at the Roans Fault crossing, and 1990 and 1991 was a period of consistently high discharge rates (Figure 4). The power plant is no longer accepting water from the mine (Dennis Oakley – Energy West, personal communication, January 7, 2003). Water is now diverted to abandoned mine sections and used underground for mine operations, and only excess water is discharged directly to Deer Creek at UPDES discharge point UT0023604-002.

Table 12
Flow in Deer Creek

ID in Database	Description	First and Last Measurement		Flow in gpm		
				Min	Max	Avg.
DCR01	Deer Creek above the mine.	1/84	9/06	0	2,900	150
DCR04	Deer Creek as it leaves the permit area	6/84	9/06	0	3,100	660

DCR06	Deer Creek at confluence with Huntington Creek	1/84	9/06	0	3,100	580

Maple Gulch (10) and Danish Bench (11)

Approximately 5,400 acres of Maple Gulch and 4,600 acres of the Danish Bench drainages are associated with the CIA. Both areas are primarily Mancos Shale flats draining away from the southern end of East Mountain, so steep, deeply incised canyons are not as prominent as in the other drainages in the CIA. Danish Bench drains to Cottonwood Creek with an average gradient of 12.5 percent. Maple Gulch drains to Huntington Creek and has an average gradient of 17 percent. Permitted areas of the PacifiCorp mines encompass 840 acres of Maple Gulch and 250 acres of Danish Bench. The Des-Bee-Dove underground workings are beneath Maple Gulch drainage, and there are reclaimed ventilation portals in Maple Gulch.

Grimes Wash (12)

Grimes Wash drainage has an area of approximately 8,400 acres, 4,600 of which are in PacifiCorp's permit areas. The average gradient of Grimes Wash is 14 percent.

Cottonwood/Wilberg Mine surface facilities are located in Grimes Wash. There are 31 acres of surface disturbance, with a sedimentation pond and other and sediment controls to treat runoff from the disturbed area.

The Des-Bee-Dove mine portals, located at the head of a small, narrow canyon in the Grimes Wash drainage, disturbed 36 acres. Reclamation of the Des-Bee-Dove mines began in 1999 and grading and reseeding were completed in 2006.

Cottonwood Creek (13)

This area encompasses approximately 11,000 acres that drain to Cottonwood Creek along the southwest edge of the CIA. The portion of PacifiCorp's permit areas contained in this drainage is approximately 5,200 acres. The Cottonwood Creek drainage has many small tributary canyons.

This drainage contains 12 acres of surface disturbance associated with the never-completed Cottonwood Fan Portal of the Cottonwood/Wilberg Mine. The disturbed area has been reclaimed, and Phase I reclamation bond release was completed in 2003. The 10.69-acre disturbed area for the Trail Mountain Mine is also in this canyon, directly across from the reclaimed Cottonwood Fan Portal area.

There are also three reclaimed Cottonwood/Wilberg portals in Miller Canyon, a side canyon to Cottonwood Creek. Although the portals are sealed, drainage in the mine apparently

accumulates behind the seals and periodically discharges through the sandstones that underlie the coal seam. The discharge drains to Miller Canyon and potentially can reach Cottonwood Creek. There is a UPDES discharge point where Miller Canyon meets Cottonwood Creek, but, to date, the discharge from the mine through the sandstones has been insufficient to reach that point. In addition to the UPDES monitoring, the USFS stipulated sampling of any water at the sealed portals in June and October of 2002 and 2003, but only one time was there sufficient water to collect a sample.

Indian Creek (14)

The EA (p. III-7) reported that the USFS measured Indian Creek flows ranging from 1 cfs to 30 cfs (450 to 13,500 gpm) from 1972 to 1975. Since 1996, Genwal has monitored Indian Creek quarterly at a flume located approximately one-half mile south of the USFS guard station, next to the east-west road that crosses the creek (near the common corner of Sections 15, 16, 21, and 22, T. 16 S., R. 6 E.). The flume is usually inaccessible during the end of the fourth quarter and the entire first quarter. Measured flow has ranged from 0.0 gpm in March 1998 to 7,070 gpm in October 1996.

Numerous short, steep unnamed channels or gulleys carry precipitation and snowmelt runoff down the west side of East Mountain to Indian Creek. These ephemeral drainages not only provide seasonal flow directly to Indian Creek but also recharge the alluvial and bedrock aquifers that provide baseflow throughout the year. The valley contains several marshy wetland areas along the stream.

Water draining from East Mountain could be intercepted if subsidence were to localize along Joes Valley Fault or if ground movement produced fractures at the surface. A stipulation in the Mill Fork Tract lease does not allow full extraction mining within a 22 degree angle-of-draw of the fault, so the possibility of such interception is greatly reduced.

Only the north end of the Indian Creek drainage, upstream of the Genwal flume, is included in the CIA. The drainage continues south of the flume for roughly 8 miles. Indian Creek flows into Lowry Water, which then flows to Joes Valley Reservoir. The Crandall Canyon and Mill Fork leases occupy 3,100 acres in the upper end of this drainage.

BASELINE CONDITIONS

Surface-Water Quality And Quantity

In the Wasatch Plateau, water quality is good in headwater areas, where rocks contain only small amounts of readily soluble material, TDS concentrations are typically less than 500 mg/L and dominant ions are calcium, magnesium and bicarbonate. TDS concentrations increase at lower elevations, where streams flow onto more saline marine sediments such as the Mancos

Shale. Sodium and sulfate ions become more common. Diversion of low-TDS water for irrigation, return drainage of irrigation water from saline soils, and inflow of sewage and other pollutants add to the natural increase of dissolved solids in the lower elevation reaches of these streams. The lowest dissolved solids concentrations are associated with high flows from snowmelt, and highest concentrations with low-flows during late summer through winter. Sediment yields in the Upper Huntington Creek drainage were estimated at 0.1 acre-feet per square mile, and increasing to 3 acre-feet per square mile at lower elevations where rocks are predominantly shale and sandstone (Waddell and others 1981, pp. 17, 25-26, 28, Plate 6).

Ground-Water Quality and Quantity

Ground water occurs in all of the strata exposed in the Wasatch Plateau, but the units are not saturated uniformly. It is unlikely that large amounts of recharge infiltrate from the surface through the Star Point Sandstone, Blackhawk Formation and overlying units due to low permeability materials that impede downward migration of water. Ground water is found on several modes:

- Laterally discontinuous, perched, local water-bearing zones where permeable layers of sandstone overlie less permeable layers of shale, mudstone or clay;
- A more continuous saturated zone in the Star Point Sandstone;
- Alluvial materials in canyon bottoms; and
- Faults and fractures in the local strata.

According to Lines (1985), the Blackhawk Formation and Star Point Sandstone contain a regional ground-water system in the Trail Mountain area. In the East Mountain CIA, it does not appear that the Blackhawk contains large quantities of water. The Division adheres to the definition of "aquifer" as found in the Coal Mining Rules (R645-100-200); although there are local or perched aquifers in the Star Point and Blackhawk strata at East Mountain, the quality, quantity, use, storage, flow and transport, and discharge of ground water do not indicate a regional aquifer. Mine inflow is from channel-sandstones in the Blackhawk Formation that are exposed in the mine roof, discharges from the Star Point Sandstone through the floor, and in fault zones.

Precipitation occurs mainly as snow, augmented by intense thundershowers during late summer. Steep slopes drain excess water away quickly, so most water from snowmelt and thundershowers runs off rather than percolating into the ground. Thin soils with high clay content are rapidly saturated by runoff and reject additional infiltration from snowmelt and thundershowers. Only an estimated 3 percent (Danielson and Sylla, 1983) to 9 percent (Waddell and others, 1986) of the average annual precipitation goes to ground-water recharge, and most of this is retained in shallow, local, perched water-bearing zones. If threshold conditions involving the soil and the amount, rate, and timing of precipitation are not met, there can be years with precipitation but no recharge (Barnes and others 1994, French and others, 1996).

Recharge percolates into permeable soils and rock, flows vertically until it hits an impermeable layer, then flows laterally. Impermeable layers present in the local strata tend to impede downward flow, but fractures can locally enhance vertical flow. Some water does infiltrate to deeper strata, where it becomes, in effect, stored water.

Perched Water-Bearing Zones

Springs associated with perched water-bearing units generally exhibit their highest flow during or immediately after snowmelt and recede to a baseflow condition or cease flowing by late summer or fall. Such rapid response indicates that the springs are close to their recharge sources and the systems are local rather than regional. Flow from these perched systems is often associated with fractures.

These systems may not always be perched in the strict sense because they may be underlain or even enveloped by saturated low-permeability rock, but large contrasts in hydraulic conductivity effectively isolate them.

The water may be either confined or unconfined. At an exploratory hole in Dairy Canyon (SE¼SE¼SE¼ Sec 3, T. 17 S., R 6 E.) on Trail Mountain, water from the Blackhawk Formation flowed to the surface at 150 gpm from a depth of 129 feet, approximately 500 feet above the Star Point Sandstone (Davis and Doelling, 1977, p. 36).

Perched water-bearing zones and associated springs are typically located in the North Horn Formation, at the North Horn - Price River contact, or at the base of the Castlegate Sandstone. A cluster of springs at the head of Little Bear Canyon issue from the base of the Castlegate Sandstone or are associated with landslides: these flow from 0.25 to 2 gpm. Numerous springs on the west flank of East Mountain issue from the Price River Formation and Castlegate Sandstone. Flows range from seepage to 10 gpm and are typically in the 1-2 gpm range.

In the coalmines, perched or isolated sandstone channels are routinely exposed in mine roofs or breached while installing roof bolts. Inflow can be significant initially but decreases, usually rapidly, as the system is drained, with no source of recharge sufficient to maintain the flow.

Ground Water in the Star Point Sandstone

Values of hydraulic conductivity in the Star Point Sandstone, measured at a number of locations and using different methods, range from 2.7×10^{-2} cm/sec to 5.3×10^{-6} cm/sec (Table 3). In general, the Star Point is not a good aquifer and exhibits aquifer characteristics only locally, usually where weathering or fracturing have produced secondary permeability. Age dating of

ground water from wells completed in the Star Point Sandstone from inside the Crandall Canyon Mine indicates a mean residence time of about 15,000 years (Mayo and Associates, 1999), which supports the concept that flow rates through the sandstone are very slow. The exact recharge mechanism for the Star Point sandstone is not known but it is more likely that recharge reaches the sandstones mainly through faults and fractures rather than by infiltration at outcrops or through overlying strata.

Water levels in monitoring wells in the Crandall Canyon No. 1 Mine workings and in the southernmost portion of the Crandall Canyon tract indicate a local east-southeast flow direction in the Spring Canyon Member. Local geologic structures, such as the South Crandall Syncline or the Flat Canyon Anticline, likely influence any ground-water flow through the Star Point, assuming flow generally follows the dip of the strata (EA, p. III-10).

Artesian conditions in the Star Point Sandstone have been confirmed at several locations. Well MW-1, located near the portals of the Crandall Canyon No. 1 Mine, was completed in the Spring Canyon Member of the Star Point Sandstone in March and April 1987, in apparently unfractured Star Point Sandstone from a zone noted by the driller as being coarser-grained than the rest of the unit. The water-bearing sandstone was 290 to 335 feet below the surface. When initially completed in March and April 1987, pressure head in MW-1 was 130 ft. MW-1 has provided culinary and mine process water for use in the mine and bathhouse, but generally at rates of less than 1 gpm (Crandall Canyon Mine MRP, Section 7.24.1.Mine Plan Aquifers). There has been no flow reported since March 2002. MW-7, another Crandall Canyon in-mine well, flowed 0.05 to 0.6 gpm (average 0.16 gpm) from June 1997 until the well became inaccessible in the last quarter of 2002.

In places, the Hiawatha Seam rests directly on the Spring Canyon Member of the Star Point Sandstone; otherwise, there is an intervening shale layer of varying thickness. Unfractured coal and fine-grained sediments under the coal seam are an effective aquiclude. Unless they are fractured, under-coal rocks continue to confine the water after the coal is removed. In 1997, operations in the Trail Mountain Mine were in the down-plunge end of the Straight Canyon Syncline, where the Hiawatha Seam was directly on the Star Point Sandstone. Water flowed through the floor of the Trail Mountain Mine at 200 to 300 gpm until the Star Point was depressurized.

Alluvial Water-bearing Zones

Alluvial water-bearing zones are associated with two important sources of culinary water. The waters are of high quality, requiring only chlorination before use.

NEWUSSD has developed springs and collection galleries in the alluvial materials in lower Rilda Canyon. Springs higher in the basin contribute flow to the creek and likely support the shallow ground-water flow in the alluvial deposits. Studies performed by PacifiCorp indicate

that approximately 80 percent of the recharge to the NEWUSSD springs originates in the Right Fork of Rilda Canyon.

Similarly, springs in upper Mill Fork Canyon contribute to ground water in the alluvium in the lower canyon, which produces flow in the lower canyon. This alluvial flow appears to be a major source of recharge to Little Bear Spring by way of the Mill Fork Fault Graben, so it is an important, although indirect, source of water for the CVSSD.

Springs and seeps in the Indian Creek drainage occur in both the wedge of colluvial and alluvial sediments that were shed from East Mountain and in the exposed North Horn Formation. They are major factors in maintaining perennial flow in Indian Creek. Flows measured in these springs range from 0.5 to 50 gpm, with most springs flowing approximately 1 to 2 gpm (EA, 1997, p. III-9).

Faults

The hydraulic function of faults in the CIA is not well defined. Faults in this area, as elsewhere on the Wasatch Plateau, are generally thought to act as barriers to ground-water flow across the faults but as conduits for flow, both horizontal and vertical, through fractures that parallel the faults. In the Huntington #4 Mine, mining in the Blind Canyon Seam across and within the Mill Fork Graben encountered only minor quantities of groundwater (Deer Creek Mine MRP, Volume 12, Hydrology p. 51). When the Roans Canyon Fault was intercepted by the Deer Creek Mine workings in the Blind Canyon Seam, it initially yielded water at up to 5,000 gpm, but flow eventually dropped to 150 gpm or less (Deer Creek Mine MRP, Volume 12, Hydrology Appendix B, p. 74-76).

The northeast-southwest trending Mill Fork Fault Graben branches from the Roans Canyon Fault Graben at Trail Mountain and extends to Huntington Canyon. Little Bear Spring flows from the fault on the northwest side of the graben. At least some of the recharge to Little Bear Spring flows from Mill Fork through this graben: some more recent studies support almost all recharge to Little Bear Spring coming through the graben (Mayo, 2001c), although earlier reports attribute 70 percent or less to this source (see for example WTR, 1998).

Synthetic faults associated with the Joes Valley Fault zone yielded water at a rate of 30 gpm when intercepted in the Crandall Canyon Mine in the Hiawatha Seam; flow subsequently reduced to approximately 10 gpm (EA, p. III-10). Isotopic dating of water samples collected near this fault indicated the water has a mean residence time of 2,000 years or more (Mayo and Associates 1999).

In the CIA, strata along the upthrown side of Joes Valley Fault dip to the west, very likely from drag-folding. Flow along the fault could be contributing to the system of springs that supports flow in Indian Creek (Hansen, Allen and Luce, 1997).

Little Bear Spring

Little Bear Spring is one of the largest springs in the Wasatch Plateau. It flows from a fracture in the Panther Member of the Star Point Sandstone on the west side of the Mill Fork Graben, at the contact with the Mancos Shale. The elevation of the spring is 7,650 feet, approximately 100 to 150 feet below the Hiawatha coal bed. Little Bear Spring is developed and maintained by CVSSD and provides 65 percent of the culinary water for the cities of Huntington, Cleveland and Elmo. Water in the spring is of good quality, requiring only chlorine treatment before it is suitable for consumptive use.

Little Bear spring flows continuously, with average monthly discharge ranging from 200 to 440 gpm. Flow varies seasonally, with a typical increase of 20 percent in response to spring runoff, although spring runoff in 1994 and 2002 did not produce a seasonal increase and flow decreased from the beginning to the end of the year. The lowest average monthly measured baseflow was 198 gpm in April 1995. Isotopic analyses to evaluate the age of the water indicate that the spring discharges modern water that is isotopically similar to water in both Crandall and Huntington Creeks (Mayo and Associates, 1997a). Chemical analyses show the water is very similar to surface water in both Little Bear and Huntington Creeks.

The hydraulic conductivity of the Star Point Sandstone is low, so movement of ground water through the sandstone is slow, and flow from the Star Point Sandstone into the fracture system of the graben is not generally considered to be the source of water discharging at Little Bear Spring. Assuming a 5,000-foot capture zone along the Mill Fork Graben, a total saturated thickness of 50 feet in the Star Point Sandstone, and lateral hydraulic conductivity of 5.0×10^{-6} cm/sec, the potential flow available for discharge at the spring would be only 18.4 gpm (EA, p. III-12). However, it's easy to see that the flow estimate is very sensitive to the assumed value of hydraulic conductivity, and based on slug tests and determinations from core samples, hydraulic conductivity values in the Star Point Sandstone vary through at least a one order-of-magnitude range (Table 3).

Several investigations - including isotope analyses (Mayo and Associates, 1997a and 1997d), geophysical studies (Sunrise Engineering, 2001a and 2001b; WTR, 1999), dye-tracer tests (Mayo and Associates, 2001c), and analyses of piezometric, chemical, and flow data - indicate that one, perhaps the main, recharge area for Little Bear Spring is upper Mill Fork Canyon. Precipitation runoff, snowmelt, and discharge from numerous springs collect in both the channel and alluvium of Mill Fork, and water is diverted to Little Bear Spring through the Mill Fork Graben. Studies conducted prior to 1998 have indicated that there is also a component of flow reaching the spring from the north and west.

Rilda Canyon - NEWUSSD Springs

NEWUSSD has developed the springs in Rilda Canyon as a culinary water supply. Based on investigations by PacifiCorp, approximately 80 percent of the discharge at the springs originates as snowmelt and precipitation runoff that percolates into the alluvium in the Right Fork of Rilda Canyon (PacifiCorp 2002 Annul Hydrologic Report). Additional water enters the alluvium from nearby faults. Above the Rilda springs the stream is ephemeral, losing water to the alluvium, and below the springs it is considered perennial (even though there has occasionally been no measurable flow for brief periods). Estimated ground-water yield from the Rilda Canyon basin is on the order of 400 gpm during high flow (Hansen, Allen and Luce, 1997). Reported flow through the NEWUSSD system averaged 90 gpm from 1990-2003, and ranged from 40 gpm to 340 gpm. Water quality from the spring system is good, with major constituents being calcium, bicarbonate and magnesium. Isotope data show the water is recent or modern in age.

Ground Water Intercepted by Mining

Water intercepted in mines on the Wasatch Plateau typically comes from channel-sandstones that are exposed in the mine roof as mining progresses. When mining is in areas where the roof is of finer-grained rock, inflows are much lower than where the roof is sandstone (1987 Cottonwood/Wilberg Mine Annual Report; 2001 PacifiCorp Annual Report). These sandstones typically drain for a few weeks, but flows decline rapidly and eventually cease, which indicates sources very limited in size and without extensive interconnection. Water also seeps or flows up through the floor from the Star Point Sandstone and from fractures or faults. Available information indicates that most of the water intercepted in mines is not in direct communication with the surface or near-surface ground water.

In 1996, water was sampled where the Deer Creek Mine crosses the Roans Canyon Graben. Isotopic analyses indicated this was modern water; however, these samples were taken after water had flowed from the fault for seven years: water that flowed from the fault when it was breached in 1989 might have been older water stored in the fault zone. Water temperatures in 1996 were 4 degrees cooler than other ground waters in the Deer Creek Mine, indicating a source closer to the surface. Fractured rocks in the fault were iron-stained, indicating oxygen from communication with the atmosphere. These all indicate that, at the time the samples were collected, the water entering the mine at the Roans Canyon fault crossing in the Deer Creek Mine was in recent connection with the surface, probably infiltrating through the nearby highly-fractured cliff faces. Mayo and Associates (1997b) collected a sample of gob-water that included water from where the 1st and 2nd Right entries intercepted the fault in 1990, a location more remote from the fractured outcrops. Isotopic analysis of this gob-water indicated water in the fault at locations more distant from the outcrop is older water and likely is not in communication with recent or shallow ground water (Mayo and Associates, 1997b).

Water intercepted as the Crandall Canyon No. 1 Mine approached Joes Valley Fault was a mixture of old and modern water. There was a minor tritium content in one of three samples, but ^{14}C indicated a mean residence time of 2,500 to 5,000 years (Mill Fork Extension MRP, Appendix B). There is apparently some modern water infiltrating from the surface through synthetic fractures associated with Joes Valley Fault and mixing with older water stored in the fractures. Isotopic analyses taken from water coming from the Crandall Canyon mine roof showed the water has a mean residence time of over 14,000 years (Mayo and Associates, 1997a).

IV. IDENTIFY HYDROLOGIC CONCERNS

SUBSIDENCE

Subsidence impacts are largely related to extension and expansion of existing fracture systems and upward propagation of new fractures. Inasmuch as vertical and lateral migration of water appears to be partially controlled by fracture conduits, readjustment or realignment in the conduit system will inevitably produce changes in the configuration of ground-water flow. Potential changes include increased flow rates along fractures that have "opened", and diverting flow along new fractures or within permeable lithologies. Increased flow rates along fractures would reduce ground-water residence time and potentially improve water quality. Subsurface flow diversion may cause the depletion of water in certain localized aquifers and potential loss of flow to springs that will be undermined.

Subsidence due to mining in the Blind Canyon and Hiawatha Seams is expected to be similar to that which has been experienced at other mines in the East Mountain area. Mining in the area has been by both room-and-pillar and longwall methods, and both will be used in future mining. Surface cracks are common above mines on East Mountain, especially along faults and in shallow overburden areas. Subsidence is likely only over longwall panels, over room-and-pillar areas where second mining is done, and in surrounding areas within the expected angle-of-draw.

The predicted angle-of-draw is 15 degrees for most areas, which is based largely on the experience of coalmine operators at East Mountain. Because of the possibility of subsidence fractures propagating to the surface along existing fault fractures, the USFS feels the greatest potential for opening of subsidence-caused cracks would be along Joes Valley Fault; therefore, the USFS has stipulated a 22 degree angle-of-draw adjacent to Joes Valley Fault. Based on angle-of-draw calculations, there will be some subsidence outside the Mill Fork Tract permit area, along the common boundary with the Crandall Canyon No. 1 Mine; however, based on PacifiCorp's experience, significant subsidence will remain inside the permit boundary (Deer Creek Mine MRP, Volume 12, Engineering, Section R645-301-525, Lease Boundary Subsidence Barriers).

Within the Crandall Canyon No. 1 Mine permit area, subsidence from mining in the Hiawatha Seam has been less than anticipated. Layout of the mine has not allowed longwall-mining of large blocks (2000 Crandall Canyon Mine Annual Report), and therefore critical width (at which maximum subsidence occurs) has not been reached. Also, an overlying, competent 30-foot thick sandstone limits rubbelization and subsidence by acting as a structural beam that bridges the voids left by mining.

Because of USFS concerns on the effects of subsidence to Little Bear Creek and its associated ecosystem within the South Crandall Canyon Lease, a lease stipulation was added to

prevent subsidence in the Little Bear Canyon area where overburden is less than 600 feet unless it can be demonstrated that the effects of subsidence would be negligible (Special Coal Lease Stipulation #9). Although Little Bear Creek is intermittent within the South Crandall Lease area, the USFS considers the creek to be 'perennially functioning'. The ecosystem associated with Little Bear Creek is also reliant on the many springs emanating from the Blackhawk Formation and the base of the Castlegate Sandstone. Little Bear Creek is not projected to be undermined, but, in order to comply with the lease stipulation and conduct single-seam mining in Little Bear Canyon, Genwal has committed to: 1) additional monitoring of springs in Little Bear Canyon, 2) compiling a map identifying and showing the general location of vegetation in the area that could potentially be affected by mining, and 3) compiling a detailed map of riparian and wetland vegetation associated with the monitored springs. In the event of multiple-seam mining beyond spring site LB-7 in Little Bear Canyon, Genwal has committed to submitting a monitoring plan to be approved by the Division in concurrence with the USFS.

Because of USFS concerns on the effects of subsidence to Shingle Creek and springs within Lease U-68082, a lease stipulation was added to prevent full extraction mining with overburden less than 50 times the thickness of coal removed plus 50 feet - projected to be 300 feet in the lease modification area (Special Coal Lease Stipulation #1).

In the Mill Fork tract, the plan is to mine adjacent long-wall panels, which should result in critical width and maximum subsidence similar to that at other PacifiCorp mines at East and Trail Mountains. Mining in the Mill Fork tract has been planned so that subsidence will occur as a general lowering of the surface over broad areas, which will limit change or damage to the land surface, land uses, and renewable resources. Based on PacifiCorp's experience, the surface will stabilize in most areas after two years. Based on a total combined thickness 20 feet of coal removed, maximum predicted subsidence for the Mill Fork tract is 75 percent or 15 feet (Mill Fork Extension MRP R645-301-525, Mining Methods and Subsidence). Actual subsidence is anticipated to be less than the predicted maximum because of the sandstone layers above the coal. Subsidence of the ground surface over other PacifiCorp operations on East Mountain has typically been at or below the predicted amount, although in one area it exceeded the predicted displacement by 84 percent (2001 PacifiCorp Annual Report, p. 131).

Tension cracks occur along the edges of full-extraction areas under shallow overburden on canyon slopes. The Castlegate Sandstone yields to subsidence by fracturing, so fracturing and spalling from tension cracks occur at Castlegate outcrops. Where overburden is thick, the clay-rich strata yield by plastic deformation, reducing the impacts of subsidence at the surface for most of the area (2001 PacifiCorp Annual Report, p. 134). With the exception of cracks in the Castlegate Sandstone, cracks are expected to heal naturally over a period of 2 to 5 years (EA, 1997, p. IV-2). Only limited and isolated surface cracks are reasonably foreseeable in other areas. The Division studied subsidence effects on East Mountain in 2003 and 2004. Surface fractures caused by subsidence were found in several areas, but no permanent damage to the surface or land uses were indicated.

GROUND WATER

The greatest mining-related potential for impacting ground-water resources in the CIA comes from dewatering and subsidence. Following spring and seep surveys and baseline studies prior to mine permitting, representative springs and seeps are chosen for a mine's monitoring plan to aid in the determination of mining-related impacts to the hydrologic balance and water rights.

Under the currently proposed mine layout for the Mill Fork Tract, mining will occur beneath numerous seeps and springs. Seventeen springs are being monitored within the Mill Fork Tract area, and another six in the adjacent area. (Mill Fork Tract MRP, Drawing MFS1830D). In addition to the 200 to 400 gpm flowing from Little Bear Spring, the other sixteen springs had a combined average flow of 40 gpm during the 2001 - 2002 baseline period, the largest average being 20 gpm from MF-213. Overburden thickness averages more than 1,000 feet beneath areas where springs are located. Diversion of spring flow is considered to be at overall low risk.

Twenty-five springs and seeps are being monitored within and adjacent to the Crandall Canyon Mine permit area (including seven within the South Crandall Lease tract). Monitoring of springs for the Crandall Canyon Mine has not identified any mining-related impacts and future diversion of spring flow is considered to be an overall low risk. Because of the importance of Little Bear Spring as a municipal water supply, the mine has committed to mitigate for potential disruption to the spring as a stipulation of the South Crandall Lease Agreement (Special Coal Lease Stipulation #17). A water treatment plant is to be constructed under the provisions of an agreement between Genwal, PacifiCorp, and the CVSSD to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring.

Changes in vegetation will have minimal impact on ground-water recharge because mining will disturb less than 150 acres of the 44,000-acre CIA. Probability of disturbance of phreatophytic vegetation, primarily cottonwood and some willow, is negligible.

The Cottonwood/Wilberg Mine Waste Rock Storage area is located below the coal resource on Quaternary sediment gravel that directly overlies the Masuk Member of the Mancos Shale. Inasmuch as the Mancos Shale is considered a regional aquiclude, the storage facility presents a low risk for impacting ground-water resources.

Intercepted ground water is used in the mines underground, disposed of underground in sumps, or discharged to the surface. Other than MW-a, there are no developed wells in the Mill Fork or South Crandall Canyon tracts that use ground water from the area. Ground water

encountered in the Crandall Canyon mine has been determined to have mean residence times of 2,500 years to over 14,000 years. Except for the modern water at TW-10, water intercepted in the PacifiCorp mines has mean residence times of 1,000 to 12,000 years.

Water users have expressed concerns that water intercepted underground may be discharged into a watershed other than the one where the ground water was originally destined. According to the Utah Coal Mining and Reclamation Act and rules, a mine may divert water underground and discharge to the surface if material damage to the hydrologic balance outside of a permit area is prevented and disturbance to the hydrologic balance within the permit area is minimized (R645-301-731.214.1). Furthermore, any state-appropriated water affected by contamination, diminution, or interruption resulting from underground mining must be replaced (R645-301-731.530). The Division evaluates a mine's Probable Hydrologic Consequences Determination (PHC) and updates the CHIA prior to permitting, and reviews water monitoring data during mining and post-mining reclamation to determine if adverse hydrologic impacts, as defined by the rules, can be demonstrated. Underground mining may result in some diversions of intercepted ground water into drainages that are not topographically within (above) the area where the water was encountered. The PHCs of mines in the East Mountain CIA have demonstrated that water that is projected to be intercepted is mostly ancient and therefore hydrologically isolated from springs, seeps, and streams. If it is subsequently demonstrated that the mining has caused or will cause a diminution, contamination, or interruption of an appropriated water right or a material impact to the hydrologic balance either within or outside of the permit area, the permittee will be required by the division to address means of minimizing the impact and replacing any appropriated water rights.

Dewatering

Plate 2 delineates the CIA for current and projected mining in the East Mountain area. The CIA encompasses approximately 70,000 acres (109 miles^2) centered on East Mountain. The area within the CIA that is above the base of the Blackhawk Formation is approximately 44,000 acres (69 miles^2), the approximate area covered by coal leases is 33,000 acres (52 miles^2). Mine workings have or will undermine roughly half of the leased areas.

Where channels intersect ground water within the Blackhawk Formation and Star Point Sandstone, baseflow discharge occurs directly to perennial streams. Horse, Blind, Crandall, Little Bear, Mill Fork, Rilda, Deer, Cottonwood, Huntington, and Indian Creeks are the perennial streams in the CIA. All of these streams except Indian Creek intersect the lower Blackhawk Formation and Star Point Sandstone.

A study conducted along Miller Creek in the adjacent Gentry Mountain area indicated streamflow substantially increases (from 8 to 115 gpm) as a result of baseflow discharge from the Blackhawk Formation and Star Point Sandstone (Cyprus-Plateau Mining Company, Star Point Mine PAP, pages 783-40). The results from this Miller Creek Study suggest perennial

steams that traverse the Blackhawk Formation and Star Point Sandstone on East Mountain receive similar base-flow recharge; accordingly, total base-flow recharge to the nine perennial streams that cross the Blackhawk Formation and Star Point Sandstone in the CIA can be roughly estimated to be on the order of 100 to 1,000 gpm.

Based on UPDES discharge data reported for 2004 and information provided in annual reports and MRPs, the estimated volume of water that coal-mining operations within the CIA are withdrawing from the ground-water system, including coal extraction and evaporation from mine ventilation, is approximately 1,320 gpm, or 2,400 acre-feet/year (Table 6). A rough estimate of ground water discharge in the East Mountain CIA is 2,000 gpm or 3,000 ac-ft/year (Table 13).

Table 13
Estimated Ground-Water Discharge
East Mountain CIA

Discharge	Rate (gpm)	2004 Yearly Total	
		(gallons)	(acre-feet/yr)
Baseflow to Perennial Streams*	550	290×10^6	890
Crandall Canyon, Deer Creek, and Cottonwood/Wilberg Mines (Table 6)	1,320	695×10^6	2,400
Total	**1,870**	**985×10^6**	**3,290**

* Average based on the estimated 100 to 1,000 gpm

Another rough estimate of total discharge can be made based on available recharge and the assumption that recharge and discharge are in equilibrium. Approximately 44,000 acres within the CIA are a potential recharge area for the strata above the coal seams (Plate 5). Using 20 inches as the average annual precipitation over this potential recharge area, the estimated total annual precipitation over the outcropping recharge area is 73,000 acre-feet (Table 14). Using 3 to 9 percent as rates of recharge (Danielson and Sylla, 1983; Waddell and others, 1986), water available for discharge would be between 2,200 to 6,600 acre-feet /year.

Table 14 compares the number of springs from rock units overlying the coal seams with area of outcrop and estimated precipitation. Values for Total Precipitation on Outcrop are skewed because 20-inches of precipitation/year was used for all strata: the amount of precipitation is not strictly related to elevation, but this estimate of Precipitation on Outcrop is probably low for the Flagstaff and North Horn formations at the highest elevations and high for the Blackhawk Formation at lower elevations. Along with greater precipitation at higher elevations, the large surface area of Flagstaff and North Horn that is exposed for recharge is undoubtedly an important factor as to why the number of springs and amount of discharge are so much greater in the Flagstaff and North Horn formations than in lower strata.

Springs that issue from the Star Point Sandstone (most notably Little Bear Spring that flows from the lower Star Point Sandstone but is not recharged from adjacent strata) and those that issue from alluvium are not accounted for in Table 14 because they discharge below the Blackhawk Formation. Little Bear Spring discharges 200 to 400 gpm, and average flow measured by CVSSD has been approximately 340 gpm. Of the 120 identified alluvial springs, the 8 that are monitored yield 190 gpm.

Table 14
Precipitation and Springs for Areas Above the Blackhawk Coal Seams
East Mountain CIA

Lithologic Unit	Outcrop Area (acres)	Total Precipitation on Outcrop * (acre-feet)	Seeps and Springs Identified	Seeps and Springs Monitored	Total Average Measured Discharge
Undivided - Flagstaff Limestone, North Horn Fm.	17,600	29,000	260	108	2,655 gpm
Price River Fm.	9,400	16,000	127	34	109 gpm
Castlegate Sandstone	5,000	8,000	32	6	6 gpm
Blackhawk Formation	12,000	20,000	83	17	110 gpm
Totals	**44,000**	**73,000**	**502**	**157**	**~2,900 gpm**

* based on 20-inches/year

Flows have been measured at only about one-third of the known seeps and springs; however, monitored springs are those with the greatest and most consistent flow, so the flow from the unmeasured springs and seeps is a fraction of measured flow. Using 50 percent of the measured flow as a very rough estimate of the flow at unmonitored seeps and springs, estimated ground-water discharge by seeps and springs in the CIA is on the order of 4,000 to 4,500 gpm.

Total ground-water discharge within the CIA is therefore estimated to be roughly 5,400 to 6,800 gpm (8,700 to 11,000 acre-feet/year), where 100 to 1,000 gpm represents baseflow to streams, 1,323 gpm results from mining activities, and 4,000 to 4,500 gpm is spring discharge.

Inflow to the Deer Creek Mine increased in the late 1980's as mining progressed northward. The increased flow into the mine was attributed partially to better record keeping, but also to the increasing amount of sandstone being exposed in the mine roof and to mining in the trough of the Straight Canyon Syncline and near the Roans Canyon Fault Graben. 1990 and

1991 was a period of consistently high discharge rates because of high inflows into the mine at the Roans Fault Graben (Figure 4).

To access coal reserves for the Deer Creek Mine, PacifiCorp drove a rock tunnel across the Roans Canyon Fault Graben in 1989 and 1990. Prior to advancing the tunnels, a drilling and testing program identified two water-bearing fracture zones within the graben (HIS, 1988). The mine operator minimized inflow during development of the rock tunnels by dewatering the zone prior to development and by pressure-grouting the water-bearing zones during development. Predicted potential inflow to the tunnels was as much as 500 gpm (HIS, 1988). There is no record on what the actual inflow was from the tunnel construction, but mine discharge increased significantly during construction of the tunnels (Figure 4) (Mayo and Associates, 1997b; 1990 PacifiCorp Annual Report). When work was completed, inflow to the tunnels was 50 gpm (1990 PacifiCorp Annual Report).

Also in 1990, mining operations unexpectedly breached the Roans Canyon Fault Graben at two locations in the 4th North section. The first penetration was in January 1990 in the 1st Right entries, where several hundred gallons per minute entered through the mine roof. The next breach was in April when the 2nd Right entries intercepted a small sympathetic fault: the mine operator estimated peak discharge to be as much as 5,000 gpm initially, but flow had declined to 125 gpm by March 1991 (Mayo and Associates, 1997b; 1990 PacifiCorp Annual Report).

Mining in the Mill Fork Extension and South Crandall Canyon Tract will not cross any major structures such as the Roans Canyon Fault, so the only expected inflows are drippers from channel-sandstones in the roof. These flows may increase when operations reach the trough of the Crandall Canyon Syncline. Planned mining operations should remain far enough from the Joes Valley Fault zone that there will be no significant increase in flows from that fracture zone.

Following the cessation of mining, the discharge of ground water to streams, the Huntington Power Plant, and the atmosphere will cease and workings will flood. Complete flooding of the abandoned mine workings will probably never occur because hydraulic head will increase as the mines flood until it reaches equilibrium with water within the surrounding rock. The potentiometric surface is below the coal throughout most areas that have been or will be mined. Mine flooding will conceivably recharge storage and re-establish the natural ground-water conduit system that was operational prior to mining, and restore stream baseflow that might have been lost.

SURFACE WATER

Increased discharge, especially runoff from disturbed areas, could alter flow volumes, water quality, and runoff and flood patterns in creeks. Mining in the Mill Fork Extension and South Crandall Canyon Tract is not expected to increase discharge of surface or ground water beyond current levels. Creeks and drainage areas discussed are shown on Plate 4, Surface Water

Drainage Map.

Subsidence could affect the character of drainages by altering the natural slope of the channel. However, large-scale impacts are unlikely because of the thick overburden (typically projected to be from 600 to 2,600 feet thick) between the mine operations and the surface drainages. In addition, full extraction mining is not planned under any perennial reaches of streams within the CIA. Where undermining beneath a drainage, the thinnest overburden (600 feet) is projected to be in the Right Fork of Mill Fork Canyon above the 8th North Mains in the Blind Canyon Seam. Where full extraction of both seams is planned under this drainage, overburden thickness will be 800 feet for a small area but rapidly thickens upstream because of the steep gradient of the stream channel. Minimum overburden thickness in Rilda Canyon is 1,200 feet, above the access tunnels; the minimum over longwall panels will be 1,800 to 2,000, and 2,200 feet over areas where both seams are mined. Only a small area of the Left Fork of Crandall Canyon will be involved in full-extraction mining, where minimum thickness is projected to be 800 to 1,000 feet. At the Skyline Mine, mining under perennial drainages has been monitored: where there was 600 feet or more of overburden, single-seam longwall mining has not produced permanent adverse effects at the surface (Sidle, 1995). Surface cracks are possible above subsided areas but, because of thick overburden in the CIA, conductivity between surface cracks and the rubbelized zone is not likely.

The potential for cracks to divert water underground is limited by the self-healing characteristics of the formations, which consist of interbedded claystone, siltstone, and sandstone that are rich in montmorillonite clays. Fractures at the surface are prone to heal rapidly because of the expanding nature of these clays. Material from the Blackhawk Formation was examined by X-ray diffraction and found to contain up to 58 percent montmorillonite clays (Crandall Canyon Mine MRP, App. 7-41). These clays absorb water and their volume can expand as much as 50 percent even when they are associated with other soil and rock materials.

Cottonwood/Wilberg Mine

The Cottonwood/Wilberg Mine is located in Grimes Wash. Headwaters of the Right Fork of Grimes Wash are on interbedded shales, siltstones, and sandstones of the North Horn Formation, which contain an abundance of calcareous material. As a result, the Right Fork contributes a relatively high amount of suspended solids to the Grimes Wash drainage. Mine discharge and flow from the Left Fork have lower solids concentrations than the Right Fork. Seeps emanating from the Mancos Shale have been known to raise the TDS level in the stream below the mine (Annual Hydrologic Monitoring Report for 1988, pg. 24).

All surface facilities are treated by sediment controls and as such, potential impacts from sediments generated from disturbed areas are minimized.

Waste Rock Disposal Site

Waste rock generated from the Des-Bee-Dove and Cottonwood/Wilberg Coal Mines has been disposed of in a series of seven interconnected storage cells at a waste rock disposal site (Plate 3). The waste rock storage site is at an elevation of 6,800 feet. Annual precipitation is approximately 14 inches, and the vegetation surrounding the waste rock storage area is the pinyon-juniper community type.

Each complete waste rock containment structure consists of over four feet of shot and crushed coal, sandstone, and mudstone rock. The anticipated waste rock was approximately 70 percent sandstone, 20 percent interbedded mudstone and siltstone, and 10 percent bony coal. Roof and floor materials are sandy loam to loamy sand in nature. Analyses of roof and floor material indicate high Sodium Adsorption Ratios (SAR) (Mean = 17.36, Standard Deviation = 25.14), and movement of sodic materials is typically associated with hydroscopic rise and leaching processes. High SAR in the waste rock storage area should not be a concern to water quality because drainage from the storage site should be minor.

Analyses from Drill Hole EM-23C, indicates low pH (3.3, 2.9, 3.7) within the mudstones and siltstones directly below the Hiawatha Coal Seam. Analyses of roof and floor samples indicate that Fe_2 in pyrite and marcasite averages 8.15% (Standard Deviation = 10.82%). However, the colluvium and Mancos Shale that underlie the waste rock storage area are calcareous and should be sufficient to neutralize any acidic seepage from within the waste rock storage site.

Most water associated with the Cottonwood/Wilberg Waste Rock Storage Area will evaporate, but some will inevitably percolate through the storage cells and underlying colluvium deposits. Drainage from the waste rock storage site should have little down-gradient effect: it will eventually contact the Mancos Shale, where waters have naturally high TDS, mainly sodium, chloride, and sulfate ions.

Deer Creek Mine

Referencing Table 15, it is apparent that the quality of Deer Creek runoff degrades from the upper to lower sampling points. The quality of the lower point is dominated by chloride, sulfate and sodium. In addition to the mine and sedimentation pond discharges, quality is affected by the Mancos Shale at the lower end of the mine site.

Table 15
Deer Creek Water Quality
(1984 – 2002)

		Conductivity (umhos/cm)	TDS (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Sulfate (mg/L)	Magnesium (mg/L)	TSS (mg/L)
Above Mine (DCR01)	Max	1,140	897	53	176	45	255	33	162
	Mean	566	342	44	17	34	61	28	21
Mine Discharge (UPDES 002)	Max	1,380	3,300	150	1,460	150	520	90	2,780
	Mean	850	630	90	40	30	200	50	70
At Permit Boundary (DCR04)	Max	7,000	2.340	96	1,093	728	560	56	547
	Mean	1,059	590	66	85	113	146	42	31

Surface water originating from undisturbed lands upstream of the facilities area is controlled and diverted around the operation. Surface drainage facilities are designed to safely control water and sediment runoff from all disturbed areas. Storm runoff from 25 acres of disturbed land within the mine facilities area is collected in a system of open ditches, bermed roadways and culverts, then temporarily detained in the Deer Creek Mine sedimentation pond and released to Deer Creek at UPDES discharge point UT0023604-001. The sedimentation pond is designed to detain the 10-year, 24-hour storm event. When the 10-year, 24-hour design event is exceeded, sediment detention times are reduced, leading to a slightly higher sediment load in Deer Creek. Surface-water impacts associated with the Deer Creek Mine operations have been minimal. The Deer Creek sedimentation pond discharge exceeded UPDES limits for TDS in May 1990 during an emergency discharge from the mine; otherwise it has been within limits.

Discharges from the Deer Creek Mine have been reported as early as 1978, and discharge has been almost continuous since 1980 (Figure 4). Discharge has averaged 1,400 gpm, and the maximum reported discharge was 3,700 gpm, in December 1990. The minimum was 6 gpm, in February 1995. Prior to December 1990, all discharge was piped to the Huntington Power Plant and none entered the natural drainages. A temporary discharge permit was issued in November 1990 because of high inflows into the mine at the Roans Fault crossing, and 1990 and 1991 was a period of consistently high discharge rates. Currently, the power plant is not accepting water from the mine (Dennis Oakley – Energy West, personal communication, January 7, 2003). Water is now diverted to abandoned mine sections and used underground for mine operations, and only excess water is discharged directly to Deer Creek at UPDES discharge point UT0023604-002: excess water from the Mill Fork Extension will also be discharged through this point.

Reclamation of the drainage at the Deer Creek Mine will consist of removing the temporary drainage system, diversions, and sedimentation pond. Permanent channels will be constructed over the fill and into a splash basin. All channels are designed to pass the 100-year, 24-hour runoff peak flow. The proposed surface-water reclamation plan will have negligible impact on water quantity or quality of Deer Creek and its tributaries.

Des-Bee-Dove Mine

The Des-Bee-Dove Mine complex ceased operations in February 1987 for economic reasons. The mines were dry and water for mine operations was piped from springs higher on East Mountain.

Reclamation began in 1999, and Phase I reclamation was completed in 2003. Deep surface pocking and vegetation are the primary sediment control measures. Runoff reports to a sedimentation pond built to capture the entire runoff of the ephemeral drainage. Because there are no active operations other than reclamation, and because surface roughening, vegetation, and a sedimentation pond treat all runoff, the effects of the Des-Bee-Dove Mine operations on the hydrologic balance are negligible.

Huntington #4 Mine

The old workings of the Huntington #4 Mine underlie approximately 1,300 acres in Mill Fork and Little Bear Canyons. There were 12 acres of surface disturbance in Mill Fork Canyon. The mine is reclaimed and bond has been released. There is no anticipated impact to Mill Creek from the Huntington #4 Mine due to the lack of potential sources.

Crandall Canyon Mine

The Crandall Canyon No. 1 Mine is located in Crandall Canyon. The U.S. Geological Survey established a gauging station at the mouth of Crandall Canyon in 1978. Flow data collected at the gauging station are not complete for the winter in most years, due presumably to the gauge or flume freezing. However, the limited data indicate that most of the flow of Crandall Canyon Creek occurs in the period of May through July. For the periods when flows were recorded, maximum flow was 39,000 gpm, the average was 2,400 gpm, and there were short periods when there was no flow. Assuming an average of 0.5 gpm for the period when records were missing, the average annual flow for the six-year period of data would be approximately 2,800 acre-feet.

Crandall Canyon Creek is diverted beneath the mine facility in Crandall Canyon through a culvert. Water monitoring is conducted in the creek at a flume above the facility and the culvert (upper flume – UPF) and approximately 500 feet downstream of the culvert at another

flume (lower flume – LOF). Surface water quality data collected from Crandall Canyon Creek by Genwal since 1985 indicate that the dominant ions are calcium and bicarbonate. As shown in Table 16, the water quality of Crandall Canyon Creek degrades from the upper to lower monitoring point. The change in water quality is likely due to a combination of mine discharge and runoff through the Mancos Shale at the lower end of the mine site.

Table 16
Crandall Canyon Creek Water Quality
(1994 – 2004)

		Conductivity (umhos/cm)	TDS (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Sulfate (mg/L)	Magnesium (mg/L)	TSS (mg/L)
Above Mine Facility (UPF)	Max	1,200	678	111	58	39	341	60	44
	Mean	571	337	68	3	5	63	38	6
Mine Discharge (UPDES 002)	Max	808	1,293	NS	NS	NS	NS	NS	14
	Mean	708	439	NS	NS	NS	NS	NS	6
Below Mine Facility (LOF)	Max	976	700	97	230	116	193	53	41
	Mean	670	413	63	17	30	90	39	9

NS = Not Sampled

Surface drainage facilities are designed to safely control water and sediment runoff from all disturbed areas. Storm runoff from disturbed land within the mine facilities area is collected in a system of open ditches, bermed roadways, and culverts and then temporarily detained in the Crandall Canyon Mine sedimentation pond. The sedimentation pond is designed to detain the 10-year, 24-hour storm event. There has been only one reported discharge from the sediment pond UPDES discharge point UT0024368-001 (March 2000) to Crandall Canyon Creek between 1988 and 2005. This sediment pond discharge was within UPDES limits for all parameters.

Reclamation of the drainage at the Crandall Canyon Mine will consist of removing the temporary drainage system, diversion and sedimentation pond. The proposed surface-water reclamation plan will have negligible impact on water quantity or quality of Crandall Canyon Creek and its tributaries.

Mill Fork Extension

Headwaters of Rilda, Mill Fork, and Crandall Creeks are in the Mill Fork tract, but full extraction mining is not planned under the main channels of these streams (Mill Fork Extension MRP, p. 5-23). The lease impinges on the perennial reach of Crandall Canyon, but no mining is planned for this area.

The short, steep tributaries of Indian Creek that are on the west side of the tract could be influenced by surface subsidence. Cracks on the surface along the Joes Valley Fault trace might divert water from these tributaries, and such loss of water could reduce the flow that supports the streamflow and wetlands in Joes Valley. Under the proposed mine plan, active workings would extend within approximately 500 feet of Joes Valley Fault at the mine level; however, no full extraction mining is to be done in the areas nearest the fault, as determined by the 22 degree angle-of-draw stipulated by the USFS. Projections of subsidence effects indicate there should be no subsidence or tension cracking involving the Joes Valley Fault zone, so the potential for adverse impacts to the tributaries that cross this fault is very small.

AQUATIC HABITAT

Only intermittent headwaters will be undermined and subsided; no perennial reaches will be undermined or subsided by planned mine operations in the CIA.

Intermittent channels provide aquatic habitat when water is present. Because flows in these small streams decrease in late summer and early fall, their primary use by fish - such as cutthroat trout and sculpins - will be as spawning and rearing streams. If present at all, adult fish are likely present in headwater areas only during the spring reproductive period. The intermittent streams probably contribute invertebrates to Huntington Creek, an important sports fishery in the region. Aquatic habitat could be lost or degraded if the character or quantity of streams and streamflows change as a result of subsidence.

Gravels suitable for spawning are patchy in lower-gradient reaches of the tributaries to Huntington Creek. Because successful spawning requires the presence of clean, well-oxygenated spawning gravels, the USFS considers it a high priority to protect these channels from excessive erosion and sedimentation (EA, 1997, p. III-16). Studies in Burnout Canyon (Sidel, 1995) are inconclusive but suggest that subsidence may cause fragmentation of riffles into cascades, so spawning habitat in low-gradient riffles could become inaccessible due to step-like fragmentation of the longitudinal profile of the stream: drops of twelve inches or more are considered barriers for inland trout species. It is conceivable that subsidence could shift the stream substrate enough to present barriers to the movement of spawning fish. None of the lower reaches of streams will be subsided in the Mill Fork CIA.

Crandall Creek has a year-round population of adult cutthroat trout. Prior to expansion of the Crandall Canyon No. 1 Mine pad, the fish were in the beaver ponds immediately adjacent to the mine portal. Expansion of the pad and culverting of the stream required mitigation to protect this population: the mitigation is described in Appendix 3-12 of the Crandall Canyon Mine MRP.

Water withdrawals within the Colorado River Basin impact habitats of four endangered fish species in the Colorado River and its tributaries: the Colorado squawfish, razorback sucker, bonytail chub, and humpback chub. Annual water withdrawals in excess of 75 acre-feet could trigger consultation requirements with the U.S. Fish and Wildlife Service (USFWS). The mines in the CIA discharge more water than they consume.

V. IDENTIFY RELEVANT STANDARDS AGAINST WHICH PREDICTED IMPACTS CAN BE COMPARED

The UPDES permits for the PacifiCorp and Genwal mines provide some standards for water quality in the area.

Utah water quality standards exist for numerous parameters other than those discussed below, but at this time there is neither evidence to indicate nor reason to believe that those parameters are of concern in the East Mountain CIA. However, additional parameters recommended for routine monitoring in UDOGM directive Tech-004 are included in the water-monitoring plans of the PacifiCorp and Crandall Canyon Mine operations.

Flow: There is no standard for flow in the Utah water quality standards. The UPDES permits for the PacifiCorp and Crandall Canyon Mines contain no limit on flow. Discharge is to be measured monthly, and the duration of intermittent discharge is to be reported along with flow. Characteristics such as stream morphology, vertebrate and invertebrate populations, and water chemistry can be affected by changes in flow and therefore can provide an indirect standard for flow.

R645-301-731.530 and -731.800 require prompt replacement of State-appropriated water that is contaminated, diminished, or interrupted. Baseline hydrologic and geologic information is to be used to determine the impact of mining activities upon ground- and surface-water supplies.

Oil and Grease: There is no State water quality standard for oil and grease, but the limit in the PacifiCorp and Crandall Canyon Mines UPDES permits is 10 mg/L, which is typical of UPDES permits for coalmines in the Wasatch Plateau and Book Cliffs. One grab-sample a month is required to measure oil and grease at the Crandall Canyon Mine. Oil and grease are not analyzed routinely at the PacifiCorp Mines, but any observation of visual sheen requires a sample be taken immediately.

A 10 mg/L oil and grease limit does not protect fish and benthic organisms from soluble oils such as those used in longwall hydraulic systems, and UDWR has recommended soluble oils be limited to 1 mg/L (Darrell H. Nish, Acting Director UDWR, letter dated April 17, 1989 to Dianne R. Nielsen, Director UDOGM).

pH: Allowable pH ranges are 6.5 to 9.0 under State water quality standards for all Classes, and also under the UPDES permits.

Total Dissolved Solids (TDS) concentrations: TDS is commonly used to indicate general

water quality with respect to inorganic constituents. There is no state water quality standard for TDS for Classes 1, 2, and 3, but 1,200 mg/L is the limit for agricultural use (Class 4).

The Crandall Canyon Mine UPDES permit allows a daily maximum concentration of 723 mg/L TDS, to be determined by one grab sample per month. TDS allowances vary for the PacifiCorp mines:

Table 17
TDS Limits for PacifiCorp Mines

Mine	UPDES Site	Maximum Loading lbs/day	Quantity or Concentration Average	Quantity or Concentration Daily Max.
Des-Bee-Dove*		2,000		Report Daily Max.
Deer Creek 001	001	2,000	Report 30-day Average	5,000 mg/L
	002		800 mg/L Quarter Average	1,000 mg/L
Trail Mountain 001	001	2,000		5,000 mg/L
	002			1,200 mg/L
Cottonwood/Wilberg	001	2,000		
	002**, 003, and 005	2,000 (Combined)		
	004	2,000		

* The Des Bee Dove sedimentation pond was reclaimed in 2006 so there are no longer UPDES discharges
** The Cottonwood/Wilberg sedimentation pond for UPDES site 002 was reclaimed in 2002 so there are no longer UPDES discharges.

Total Suspended Solids (TSS) and Settleable Solids: There is no State water quality standard for solids in the water, but an increase in turbidity is limited to 10 NTU for Class 2A, 2B, 3A, and 3B waters and to 15 NTU for Class 3C and 3D waters.

The PacifiCorp and Crandall Canyon Mine UPDES permits have the following allowable limits on TSS: 30-day average, 25 mg/L; 7-day average, 35 mg/L; daily maximum, 70 mg/L. TSS is to be determined by a monthly grab sample.

Under the current UPDES permits, all samples collected during storm water discharge events are to be analyzed for settleable solids. Samples collected from increased discharge, overflow, or bypass that is the result of precipitation that does not exceed the 10-year, 24-hour precipitation event may comply with a settleable solids standard of 0.5 ml/L daily maximum rather than the TSS standard, although TSS and the other UPDES parameters are still to be

determined. If the increased discharge, overflow, or bypass is the result of precipitation that exceeds the 10-year, 24-hour precipitation event, then neither the TSS nor settleable solids standard applies.

Iron and Manganese: UPDES limits on daily maximum total iron, determined by a monthly grab sample, are as follows:\

Crandall Canyon Mine	1.3 mg/L
Trail Mountain Mine	1.4 mg/L
Deer Creek Mine	1.0 mg/L
Cottonwood/Wilberg Mine	1.8 mg/L at 001 and 002
	1.0 mg/L at 003, 004, and 005
Des-Bee-Dove Mine	1.0 mg/L

State water quality standards (UDWQ 1994) allow a maximum of 1,000 µg/L (1 mg/L) dissolved iron in Class 3A, 3B, 3C, and 3D waters, with no standard for Class 1, 2, and 4 waters.

Monitoring of total manganese is required by SMCRA and the Utah Coal Mining rules, but there is no UPDES or Utah water quality standard for either total or dissolved manganese.

Macroinvertebrates: Macroinvertebrates are excellent indicators of stream quality and can be used to evaluate suitability of a stream to support fish and other aquatic life. Baseline studies of invertebrates (Lines and Plantz, 1981; USGS, 1980, 1981,and 1982; and Price and Plantz, 1987) provide standards against which actual conditions in Huntington, Crandall, and Cottonwood Creeks can be evaluated if desired.

UDWR is to conduct pre and post-disturbance evaluations of macroinvertebrate populations and identify resident fish populations in Rilda Creek. The "Preliminary Report on Surveys Conducted to Determine Potential Impacts of Rilda Surface Facility Development in Rilda Canyon During 2004" in Volume 11, Biology Appendix C marks the completion of the predisturbance work.

Whole effluent testing - chronic toxicity: Requirements for biological testing with Ceriodaphnia and fathead minnows have been recently added to the UPDES permits for outfall 002 at the Crandall Canyon Mine and outfall 001at the Cottonwood/Wilberg Mine.

MATERIAL DAMAGE

Material damage to the hydrologic balance would possibly manifest itself as an economic loss to the current and potential water users, would result in quantifiable reduction of the capability of an area to support fish and wildlife communities, or would cause other quantifiable adverse change to the hydrologic balance outside the permit area. The basis for determining material damage may differ from site-to-site within the CIA according to specific site conditions. Surface-water and ground-water concerns have been identified for CHIA evaluation.

The Division received comments from NEWUSSD and Huntington-Cleveland Irrigation Company, plus from several individuals who receive water from these companies regarding permitting of the Mill Fork Extension. The main concern was that flows from streams and springs, in particular Little Bear Spring, would be diminished by mining operations in the Mill Fork Extension and the South Crandall Lease area.

The USFS excluded the area covered by the South Crandall Canyon Coal Lease Tract from the Mill Fork Lease because of concerns for potential adverse impacts to Little Bear Spring. The South Crandall Canyon area was reevaluated, and based on a Decision Notice/Finding of No Significant Impact (DN/FONSI) signed by the BLM and USFS in February 2003, the South Crandall Canyon Tract was leased through competitive bid to Andalex in 2003. Genwal has committed to mitigate for potential disruption to the spring as a stipulation of the South Crandall Lease Agreement (Special Coal Lease Stipulation #17). A water treatment plant is to be constructed under the provisions of an agreement between Genwal, PacifiCorp, and the CVSSD to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring.

Parameters for surface-water quantity and quality

The potential material-damage concerns this CHIA focuses on are changes of surface flow rates and chemical composition that would physically affect the off-permit stream channel systems as they presently function and affect aquatic and wildlife communities. There is no farming in the CIA; however, there is livestock production. Therefore, water-quality and quantity criteria are intended to identify changes in the present discharge regime that might be indicators of economic loss to the water users and grazing-right owners, of significant alteration to the channel size or gradient, or of loss of capacity to support existing fish and wildlife communities within the CIA. In order to assess the potential for material-damage to these elements of the hydrologic system, the following indicator parameters were selected for evaluation at each evaluation site: low-flow discharge rate, TDS, and sediment load.

Low-Flow Discharge Rate

Measurements provided by mine operators are generally of instantaneous flow and provide some indication of long-term trends, but are probably no more accurate either individually or as a whole than the *poor* USGS measurements. In the Wasatch Plateau, Waddell and others (1981) found that correlating three years of low-flow records (September) at stream sites against corresponding records from long-term monitoring sites would allow the development of a relationship that could be used to estimate future low-flow volumes at the stream sites within a standard deviation of approximately 20 %. Ten years of measurements reduced the standard deviation to 16 - 17 % and 15 years of data reduced it to about 15 %. This relationship indicates that a change in low-flow rates of less than 15 to 20 % probably would not be detectable. A 20 % decrease in the low-flow rate will provide a threshold indicator that decreased flows are persisting and that an evaluation for material damage is needed. However, because flow in many streams is intermittent, material damage due to loss of flow is very unlikely, and the intermittent nature of the flow will also make any such loss almost impossible to detect. Any such apparent change in discharge would need to be correlated against precipitation and a drought index such as the PHDI.

Monitoring of mine-water discharge rates will provide a means to evaluate effects of the mine discharge on the receiving streams. The potential for material damage by mine discharge water is tied to the effect of that discharge on the flow in the receiving streams, and that effect will be most pronounced during low-flow. Water from disturbed areas will be monitored at the discharge from the sedimentation ponds.

Total Dissolved Solids (TDS)

The concentration of dissolved solids is commonly used to indicate general water quality with respect to inorganic constituents. Wildlife and livestock use is the designated post-mining land use for the CIA, so established dissolved solids tolerance levels for wildlife and livestock have been adopted as the thresholds beyond which material damage may occur. The state standard for TDS for irrigation of crops and stockwatering (Class 4) is 1,200 mg/L. If TDS concentrations persistently exceed 1,200 mg/L in springs, UPDES discharges, or receiving streams, it will be an indication that evaluation for potential material damage is needed.

Sediment Load

Sediment is a common constituent of ephemeral stream flow in the western United States. The quantity of sediment in the flows affects stream-channel stability and most uses of the water. Excessive sediment deposition is detrimental to existing aquatic and wildlife communities. Large concentrations of sediment in streamflow may preclude use of the water for irrigating crops because fine sediment tends to reduce infiltration rates in the irrigated fields, and the sediment reduces capacities of storage facilities and damages pumping equipment. Sediment

load measurement error is, at a minimum, the same as the flow measurement error because sediment load is directly dependent on flow and in practice cannot be measured more accurately than the flow.

TSS is the indicator parameter initially chosen for evaluating the sediment hazard to stream-channel stability and irrigation. Threshold values have initially been set as the greater of 1 standard error above the baseline mean TSS value or 120 % of the baseline mean TSS value (by analogy with the low-flow discharge rate measurement accuracy and assuming that the error in TSS will contribute equally to the error in flow when determining mean sediment load). If TSS concentrations persistently exceed these threshold values it will be an indication that evaluation for material damage from sediment load in the streams might be needed.

Parameters for ground-water quantity and quality

The potential material-damage concerns of this CHIA are intended to limit changes in the quantity and chemical composition of water from ground-water sources to magnitudes that:

- Will not cause economic loss to existing or potential agricultural and livestock enterprises;
- Will not degrade domestic supplies;
- Would not cause structural damage to aquifers; and
- Will maintain adequate capacity for existing fish and wildlife communities.

To assess the potential for material damage to these elements of the ground-water hydrologic system, the following indicator parameters were selected for evaluation: seasonal flow from springs and TDS concentration in spring and mine-discharge water.

Ground-water concerns will be monitored at numerous springs, wells, and UPDES discharge points. Locations are identified on Plate 3. If inflow to a mine is significant or persistent, UDOGM can require monitoring of mine inflow.

Seasonal flow from springs

Maintain potentiometric heads that sustain average spring discharge rates, on a seasonal basis, equal or greater than 80 % of the mean seasonal baseline discharge, or in other words baseline minus 20 % probable measurement error. The 20 % measurement error is based on analogy with the accuracy of measuring low-flow surface discharge rates. A 20 % decrease in flows, determined on a seasonal basis, will indicate that decreased flows are probably persisting and that an evaluation for material damage is needed.

TDS concentration

The concentration of total dissolved solids is commonly used to indicate general water quality with respect to inorganic constituents. The quality of water from underground sources reflects the chemical composition of the rocks the water passes through. Ground-water quality may be degraded by intrusion of poorer quality water from wells or mines, by leakage from adjoining formations, or by recharge through disturbed materials. Wildlife and livestock use ground water discharging from seeps and springs, and those are the designated postmining users most likely to be impacted. There is no water quality standard for TDS for aquatic wildlife. The state standard for TDS for irrigation of crops and stockwatering (Class 4) is 1,200 mg/L. If TDS concentrations persistently exceed 1,200 mg/L it will be an indication that evaluation for material damage is needed.

VI. ESTIMATE PROBABLE FUTURE IMPACTS OF MINING ACTIVITY WITH RESPECT TO THE PARAMETERS IDENTIFIED IN V.

GROUND WATER

Dewatering and subsidence related to mining have the greatest potential for impacting ground-water resources in the CIA.

Dewatering

Underground mining removes the support to overlying rock, causing caving and fracturing of overlying strata. In areas where fracturing is extensive, subsidence induced caving and fracturing can create conduits that allow ground water to flow into the mine. Dewatering caused by fracturing may decrease ground-water storage. Ground water in storage is not a major recharge source to springs. Fracturing of overlying strata will only intercept some of the deep ground-water storage. These areas will eventually drain and dry up because most of the beds have low hydrologic conductivities. In the CIA, it is unlikely that fractures will reach shallower perched aquifers that supply springs because of the thickness of the overlying strata over most areas to be mined is well over 600 feet. Water discharged from the mines is at times of better quality than natural spring flow or baseflow.

Total ground-water storage above the Blackhawk coal seams in the Mill Fork Tract can be estimated by assuming an area of 5,544 acres and a large storage coefficient of 0.10. Over much of the Mill Fork Lease Tract, cover above the coal seams reaches 2,600, so 1,000 feet is a reasonable estimate of potentially saturated thickness. Using these estimates as input, total ground-water storage above possible Mill Fork Extension workings could be as much as 554,400 acre-feet.

Approximately 44,000 acres (69 miles^2) within the CIA are a potential recharge area for the strata above the coal seams (Plate 5). Using 20 inches as the average annual precipitation over this potential recharge area, the estimated total annual precipitation over the outcropping recharge area is 73,000 acre-feet (Table 14). Using 9 percent as rate of recharge (Waddell and others, 1986), estimated annual average ground-water recharge would be 6,600 acre-feet /year. For the 33,000 acres (52 miles^2) above the PacifiCorp and Crandall Canyon Mines leases, recharge is roughly estimated to be 5,000 acre-feet. Because of hydrologic isolation between the Blackhawk Formation and the surface, neither an increase in recharge rates nor a decrease in discharge rates at the surface is a probable consequence of dewatering deeper strata. A notable or measurable increase in recharge is also unlikely because recharge is generally available only for a few months during spring snowmelt and for very brief periods during summer thundershowers. During these seasonal, relatively short events the soils reach saturation quickly

and reject most available water.

The Blackhawk Formation is probably saturated in most areas (Waddell and others, 1986, p. 41) and new mining can be expected to produce water at rates similar to those currently observed in the Genwal and PacifiCorp mines. Most water entering mines comes from ground water stored in the immediately overlying strata after fracturing of the rock above the mine.

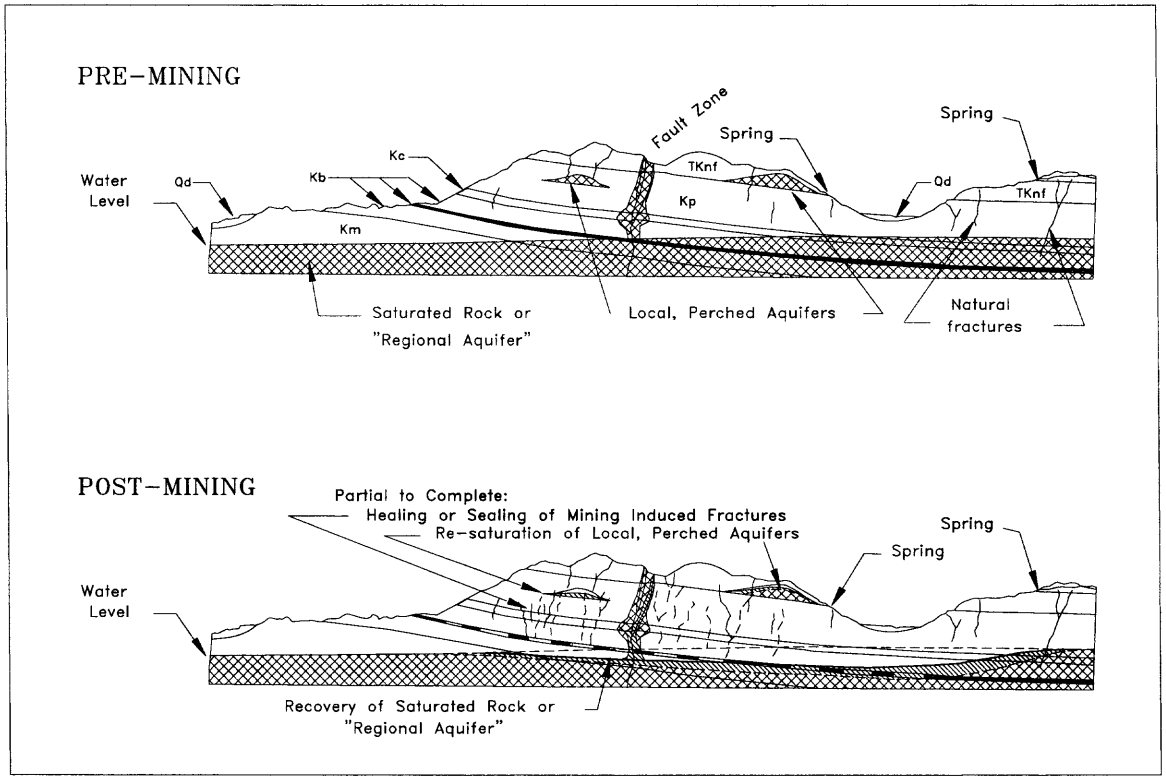

Figure 6. A diagrammatic cross-section of the Wasatch Plateau showing the relationship between mining, geologic strata and ground water before and after mining.

Affects to springs in the Mill Fork Extension or their recharge sources are not expected due to the great thickness of strata between the coal and springs on the surface. The mobility and expanding characteristics of clays, shales and mudstones in the overlying strata should also help seal conduits created by fracturing (Figure 5). Overlying, competent sandstone units limit rubbelization and subsidence by acting as a structural beam that bridges the voids left by mining.

Subsidence

Subsidence impacts are largely related to extension and expansion of existing fracture systems and upward propagation of new fractures. Inasmuch as vertical and lateral migration of water appears to be partially controlled by fracture conduits, readjustment or realignment in the conduit system will inevitably produce changes in the configuration of ground-water flow. Fracturing and spalling can be expected where tension cracks intercept Castlegate outcrops. With the exception of cracks in the Castlegate Sandstone, cracks are expected to heal naturally over a period of 2 to 5 years (EA, 1997, p. IV-2). Only limited and isolated surface cracks are reasonably foreseeable in other areas. Subsidence induced fractures rarely extend from mine workings to the surface, and the thicker the overburden, the less likely this is to occur. The Division studied subsidence effects on East Mountain in 2003 and 2004; surface fractures caused by subsidence were found in several areas, but no permanent damage to the surface or land uses were indicated.

Potential hydrologic changes include decreased flow through existing fractures that close, increased flow rates along existing fractures that open further, and the diverting of ground-water flow along new fractures or within newly accessible permeable lithologies. Subsurface flow diversion may cause the depletion of water in local aquifers and loss of flow to springs that are undermined.

Because of the possibility of subsidence fractures propagating to the surface along existing fault fractures, the USFS has stipulated a 22 degree angle-of-draw along the west side of the Mill Fork Extension adjacent to Joes Valley Fault, which should be more than adequate to avoid interaction between mine-induced subsidence and the fractures of the Joes Valley Fault system. Because of USFS concerns on the effects of subsidence to Little Bear Creek and its associated ecosystem, a lease stipulation was added to prevent subsidence in the Little Bear Canyon area where overburden is less than 600 feet unless it can be demonstrated that the effects of subsidence would be negligible. Similar concerns for Shingle Creek and springs within the addition to Lease U-68082 resulted in a lease stipulation to prevent full extraction mining with overburden less than 50 times the thickness of coal removed plus 50 feet - projected to be 300 feet in the lease modification area. Commitments in the Crandall Canyon Mine MRP address these stipulations.

Mining in the Mill Fork tract has been planned so that subsidence will occur as a general lowering of the surface over broad areas, which will limit change or damage to the land surface, land uses, and renewable resources. The Castlegate Sandstone and thick overburden are responsible for minimizing surface subsidence over mines in the CIA, and it is anticipated that similar thicknesses - 600 feet to 2,600 feet - of the same formations over the Mill Fork Extension will also prevent subsidence. Annual reports for the PacifiCorp Mines indicate surface subsidence over current permit areas is as much as 75 percent of the thickness of the extracted coal, but actual subsidence on East Mountain has typically been at or below the predicted amount. Under much of the Mill Fork Extension, mining will be done in two seams, with a combined removed thickness of up to 20 feet (Mill Fork Extension MRP R645-301-525, Mining

Methods and Subsidence), (2001 PacifiCorp Annual Report, p. 131).

SURFACE WATER

Changes in flow volume and in water quality have the greatest potential for impacting water resources in the CIA. Sites that have been or are currently being used to monitor surface and ground water are shown on Plate 3.

Water Quality

Uncontrolled runoff from the disturbed lands and waste piles could increase sediment concentrations and alter the distribution and concentration of dissolved solids in the receiving streams. Sediment control measures such as sedimentation ponds and ASCAs are already in place at the Crandall Canyon and PacifiCorp mines to protect receiving streams from impacts from the mine's disturbed areas.

Deer Creek and Crandall Creek are monitored above and below the respective mine discharges. Monitoring of ephemeral and perennial flows will continue in the major perennial and ephemeral drainages tributary to Huntington Creek. Indian Creek, a perennial tributary to Cottonwood Creek, will also continue to be monitored. Discharges directly from mines and from sedimentation ponds will be monitored when they occur.

There will be no additional surface disturbance with the Mill Fork Extension or the South Crandall Lease Tract (with the exception of the Rilda Canyon portal facilities associated with the Mill Fork Extension). Water from the Mill Fork Extension or the South Crandall Lease Tract will be discharged into Deer Creek or Crandall Canyon Creek, respectively, at the existing UPDES discharge points and subjected to monthly monitoring stipulated by a UPDES permit.

There is no plan to discharge water from the Rilda Canyon portal facilities. Disturbed-area runoff and gray water from the Rilda facilities is to be pumped into abandoned mine workings, but if monitoring detects changes to the hydrologic balance due to this water, PacifiCorp will cease the pumping, transport the water through the mine dewatering system, and discharge it at the UPDES location in Deer Creek Canyon (Volume 11, Section 728, Hydrologic Balance-Groundwater, F. RUNOFF AND GRAY WATER DISPOSAL – ABANDONED MINE WORKINGS). The Division also considers this the alternative plan should other agencies deny the permits needed for underground disposal of this water.

CIA Sediment Control

Sedimentation controls are already in place at the Crandall Canyon Mine and PacifiCorp mines. The Helco and Huntington #4 mines have been reclaimed and are no longer under reclamation bond. The Des-Bee-Dove mine is being reclaimed, but the sedimentation pond is

still in place and the permitted area is bonded. Portions of the Cottonwood/Wilberg Mine and Deer Creek Mine permit areas have been reclaimed.

Water Quantity

If it becomes necessary to discharge water from the Mill Fork Extension or the South Crandall Lease Tract, the water will discharge into Deer Creek or Crandall Canyon Creek, respectively, at the existing UPDES discharge points and will be subject to monthly monitoring stipulated by a UPDES permit. In addition, flow volumes of Deer Creek and Crandall Creek are monitored above and below the mine discharge.

There is no plan to discharge water from the Rilda Canyon portal facilities. Disturbed-area runoff and gray water from the Rilda facilities is to be pumped into abandoned mine workings, but if monitoring detects changes to the hydrologic balance due to this water, PacifiCorp will cease the pumping, transport the water through the mine dewatering system, and discharge it at the UPDES location in Deer Creek Canyon (Volume 11, Section 728, Hydrologic Balance-Groundwater, F. RUNOFF AND GRAY WATER DISPOSAL – ABANDONED MINE WORKINGS). The Division also considers this the alternative plan should other agencies deny the permits needed for underground disposal of this water.

Upon termination of mining operations, discharge will be discontinued and the mines will begin to flood. There will be a reduction in surface flow because of the loss of the mine discharge. There is little or no baseflow to the intermittent streams, and surface flow will probably be unaffected by a return to pre-mining conditions as the mines flood. The time required for mine flooding will depend not only on the rate of water inflow but also on the amount of caving and the void space remaining after caving. Complete flooding of the mines may never occur because flow out of the mines through the roof, floor, and ribs and into the surrounding rock will increase as flooding increases the hydraulic head within the abandoned workings.

It is anticipated that discharge of water from the Mill Fork Extension mine operations will be similar what has been observed or predicted at the Deer Creek Mine. Upon termination of mining operations, workings will probably flood to some extent, but because the formations slope back away from the mine portals there will be no gravity discharge from the mine.

It is anticipated that no acid or toxic mineral contamination will take place during or anytime after mining. Soils and bedrock surrounding the coal contain buffering compounds of calcium carbonates and bicarbonates. All rock and coal waste removed from the PacifiCorp mines and having a potential of acid or toxic forming materials will be buried at least four feet deep at the waste rock disposal site. All disturbed area runoff will be contained, monitored, and treated if required before discharge to ensure water quality standards are met.

ALLUVIAL VALLEY FLOORS

There are no alluvial valley floors within the CIA
.

VII. ASSESS PROBABLE MATERIAL DAMAGE

FIVE-YEAR PERMIT TERM

Deer Creek Mine

Planned operational monitoring will document any measurable changes in the surface- and ground-water systems. Surface disturbances and UPDES permitted discharges are not expected to degrade surface- or ground-water quality. There is no AVF to be impacted. Sediment control measures should continue to effectively prevent diminution of water quality in the receiving drainages.

The Mill Fork Extension is expected to have water inflow similar to that in the existing workings under East Mountain. Overburden thickness of 600 to 2,600 feet will minimize surface impacts of subsidence. No adverse impacts to streams or springs are anticipated from subsidence.

Crandall Canyon Mine

Planned operational monitoring will document any measurable changes in the surface- and ground-water systems. Surface disturbances and UPDES permitted discharges are not expected to degrade surface- or ground-water quality. There is no AVF to be impacted. Sediment control measures should continue to effectively prevent diminution of water quality in the receiving drainages.

Mining in the South Crandall Lease area began in 2005. There will be no new surface disturbance. Water inflow is expected to be similar to that in the Crandall Canyon No. 1 Mine and any mine water discharge will be UPDES permitted. Significant springs to be undermined in Little Bear Canyon are in areas with greater than 600 feet of overburden and are subject to additional monitoring for potential effects of subsidence on the springs and ecosystem associated with Little Bear Creek. No mining is projected beneath Little Bear Creek. Although Little Bear Spring is located outside of the South Crandall Permit boundary and adverse impacts are not expected, because it is such an important source of water in the region, a water replacement agreement is in place to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. No adverse impacts to streams or springs are anticipated from subsidence.

FUTURE MINING

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

interruption of an appropriated water right or a material impact either within or outside of the permit area, the permittee will be required by the Division to address means of minimizing the impact and replacing any appropriated water rights. Evaluations of PHCs and the preparation of this CHIA do not indicate that there is any evidence that such impacts will result from the proposed mining in the East Mountain CIA, and as a consequence, there is no reason to require operators to propose alternatives for disposing of the displaced water or other possible actions as part of the PAP.

Increased rates of dewatering may in the future result in depletion of ground-water storage in some beds above the coal seams. Upon cessation of mining, ventilation losses and mine water discharge, if there has been any, will be discontinued. Ground-water conditions similar to those that existed before mining will probably be established as the mine workings flood.

Drainage from surface disturbance due to coal mining and reclamation operations will be managed through appropriate sediment controls. Waste rock storage areas will be adequately covered with topsoil and all disturbed areas will be stabilized and revegetated to prevent surface water contamination.

VIII. STATEMENT OF FINDINGS

Based on the information presented in this CHIA, the Utah Division of Oil, Gas and Mining finds that the proposed coal mining and reclamation operations in of the Deer Creek Mine, including the Mill Fork Extension and Rilda Canyon portal facilities, and the Crandall Canyon Mine, including the South Crandall Lease area, have been designed to prevent material damage to the hydrologic balance outside the permit areas. No evidence of material damage from actual mining operations in the CIA has been found. No probability of material damage from existing and anticipated mining operations in the CIA has been found.

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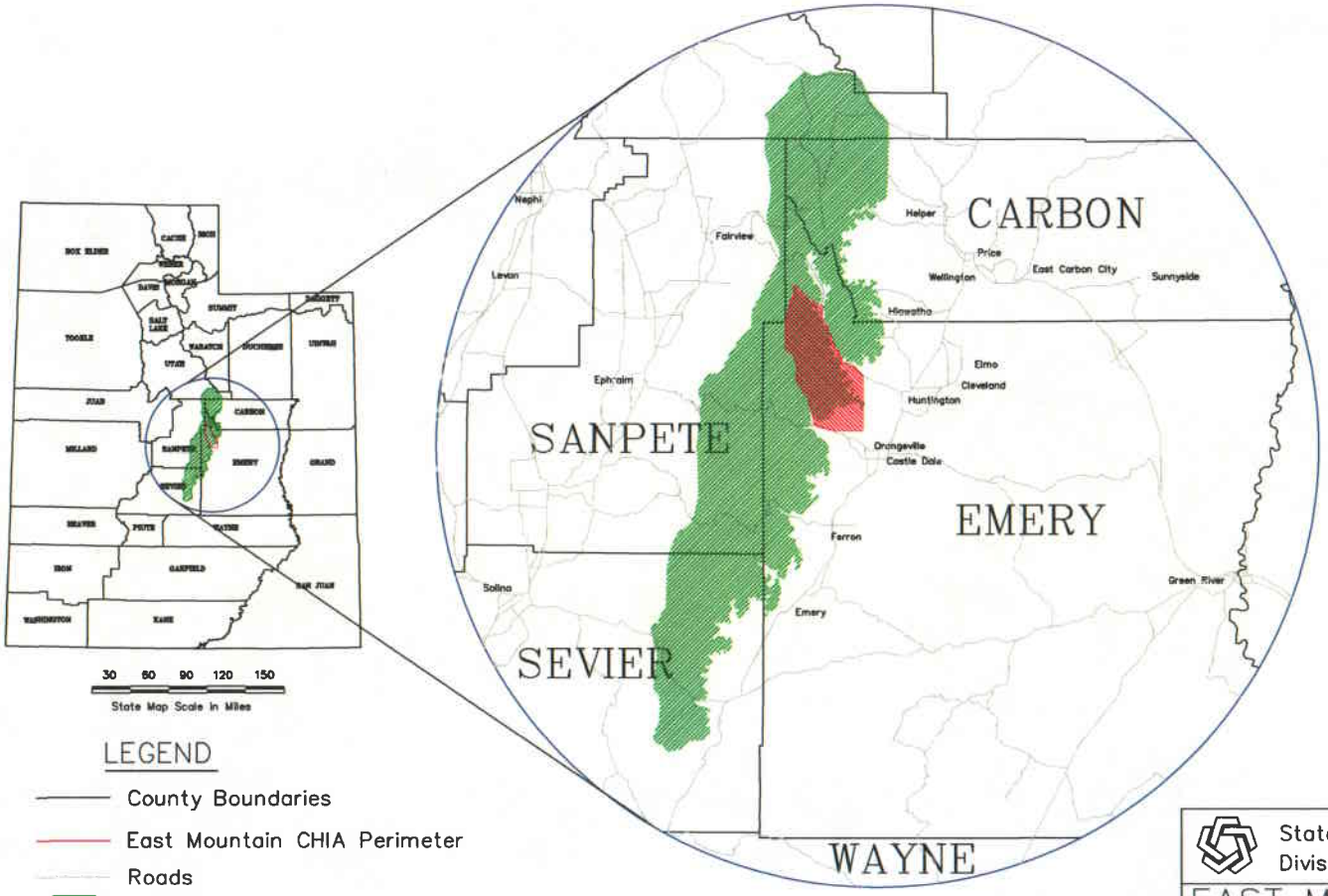
ABREVIATIONS

AML	Abandoned Mine Lands
AVF	Alluvial Valley Floor
BLM	Bureau of Land Management
CIA	Cumulative Impact Area
CHIA	Cumulative Hydrologic Impact Area
CVSSD	Castle Valley Special Service District
DWR	Utah Division of Wildlife Resources
EA	Environmental Assessment
NEWUSSD	North Emery Water Users Special Service District
MRP	Mining and Reclamation Plan
MSHA	Mine Safety and Health Administration
PAP	Permit Application Package
PHC	Probable Hydrologic Consequences
PHDI	Palmer Hydrologic Drought Index
SMCRA	Surface Mining Control and Reclamation Act of 1977
UDOGM	Utah Division of Oil, Gas and Mining
UDWR	Utah Division of Water Resources
UDWQ	Utah Division of Water Quality
UPDES	Utah Pollution Discharge Elimination System
UP&L	Utah Power and Light
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

PLATES

Plate 1 Wasatch Plateau Coal Field
Plate 2 CIA and Mining Map
Plate 3 Major Hydrogeologic Features
Plate 4 Surface Water Drainage Map
Plate 5 Potential Recharge Areas Above the Coal Resources
Plate 6 Water Monitoring Locations

PLATE 1: Wasatch Plateau Coal Field



LEGEND

- County Boundaries
- East Mountain CHIA Perimeter
- Roads
- Wasatch Plateau Coal Field
- East Mountain CIA

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EAST MOUNTAIN CHIA
Wasatch Plateau Coal Field

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UPDATED BY: JDS

DATE: 9/23/94
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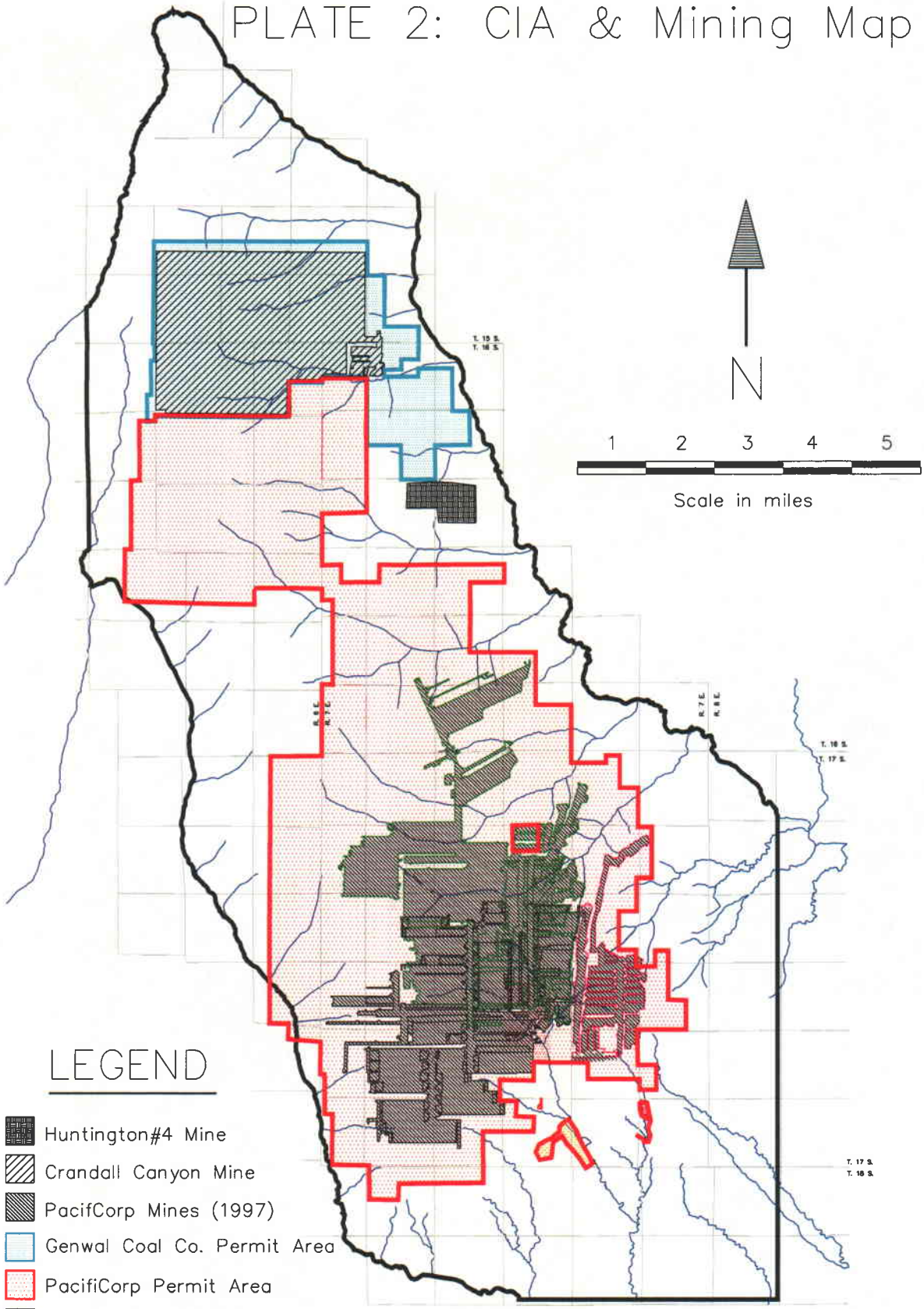
PLATE 2: CIA & Mining Map



LEGEND

- Huntington#4 Mine
- Crandall Canyon Mine
- PacifCorp Mines (1997)
- Genwal Coal Co. Permit Area
- PacifiCorp Permit Area
- PacifiCorp Waste Rock Disposal Areas
- Deer Creek Mine workings
- Des-Bee-Dove Mine workings
- Cottonwood/Wilberg Mine workings
- Streams
- CHIA Boundary

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EAST MOUNTAIN CHIA
CIA and Mining Map

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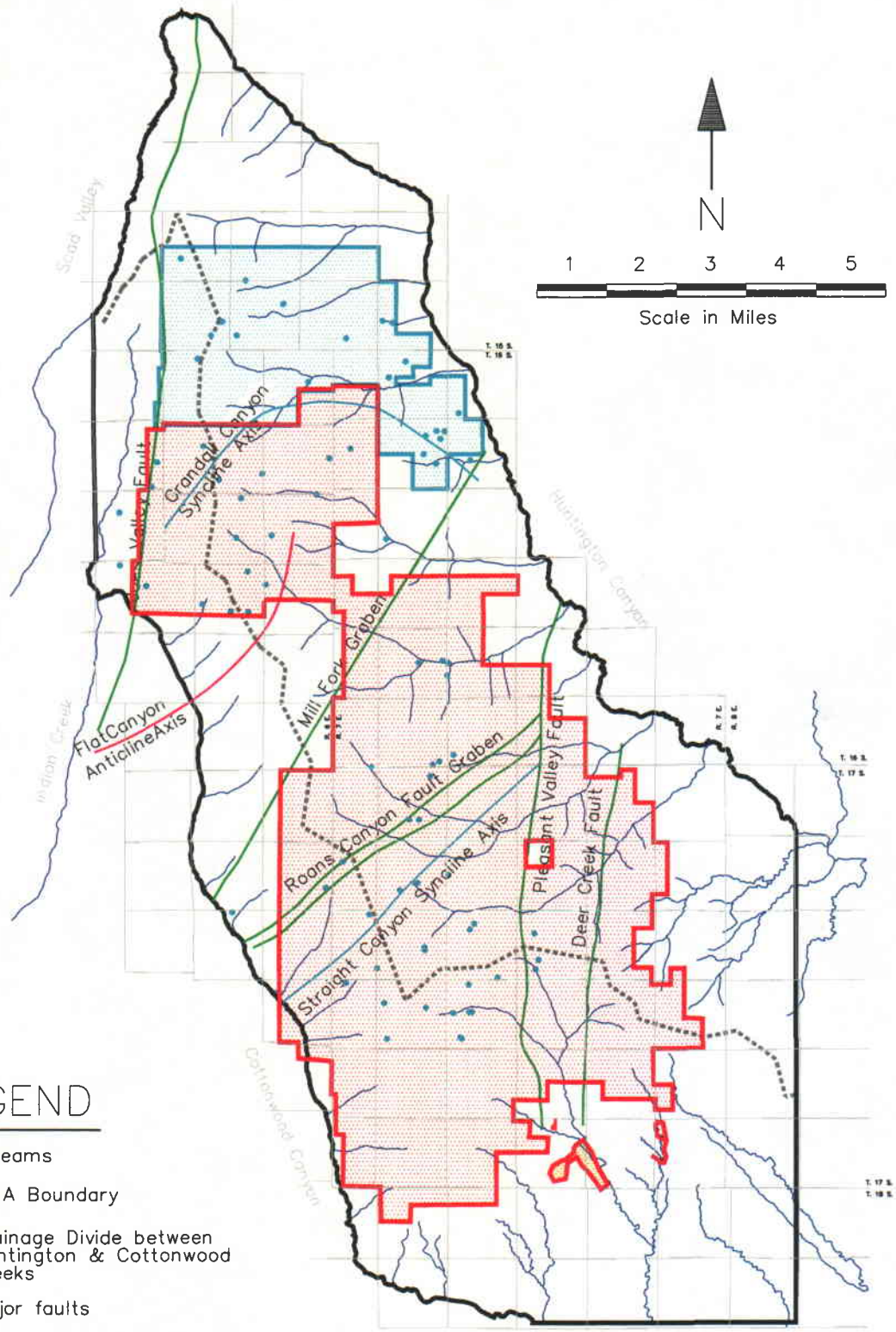
PLATE 3: Major Hydrogeologic Features



LEGEND

- Streams
- CHIA Boundary
- Drainage Divide between Huntington & Cottonwood Creeks
- Major faults
- Syncline Axis
- Anticline Axis
- Monitored Springs
- Genwal Coal Co. Permit Area
- PacifiCorp Permit Area
- PacifiCorp Waste Rock Disposal Areas

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EAST MOUNTAIN CHIA
Major Hydrogeologic Features

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DATE: 03/24/05	UPDATED BY: DD
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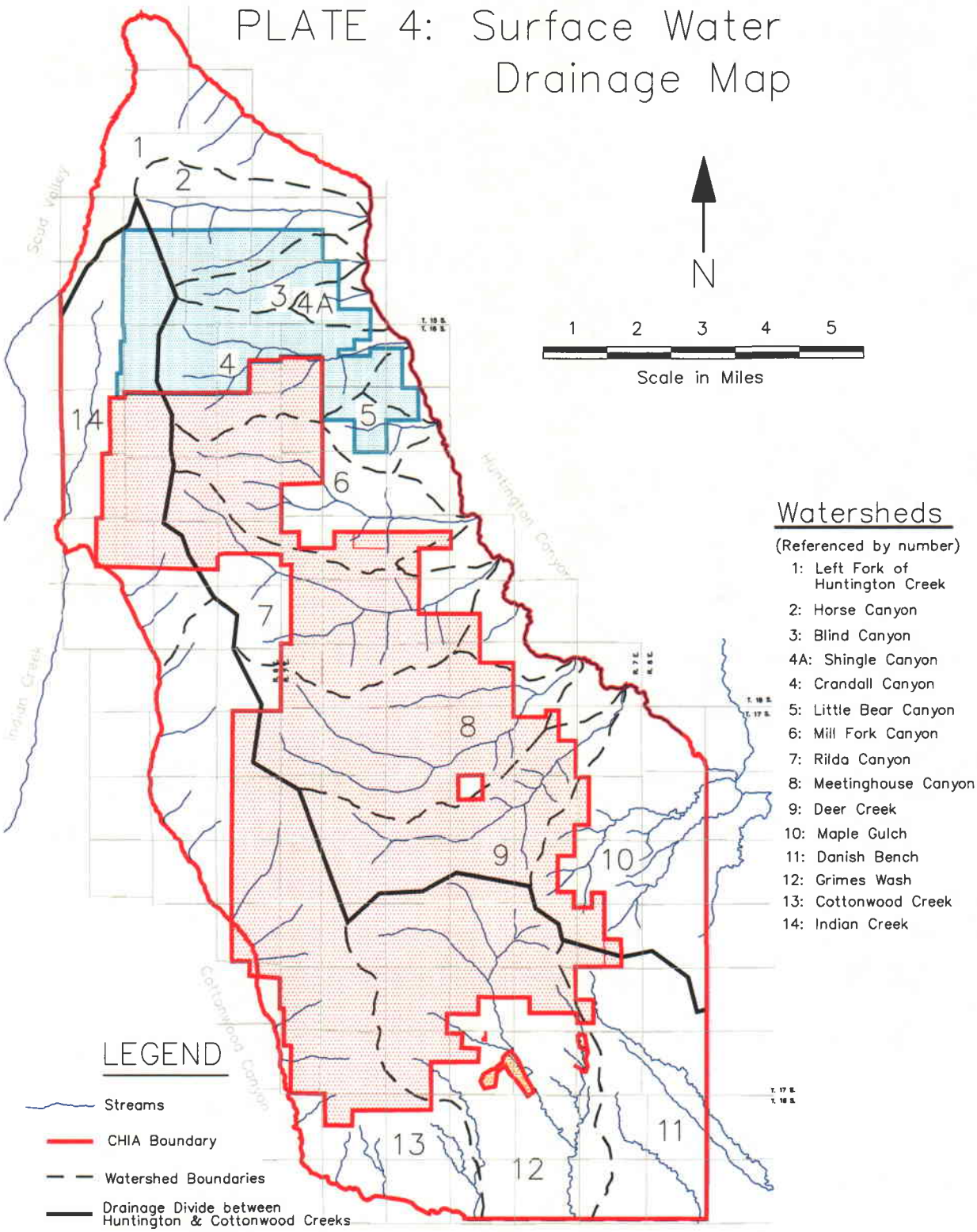
DATE: 10/31/06	UPDATED BY: JDS

PLATE 4: Surface Water Drainage Map



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EAST MOUNTAIN CHIA
Major Hydrogeologic Features

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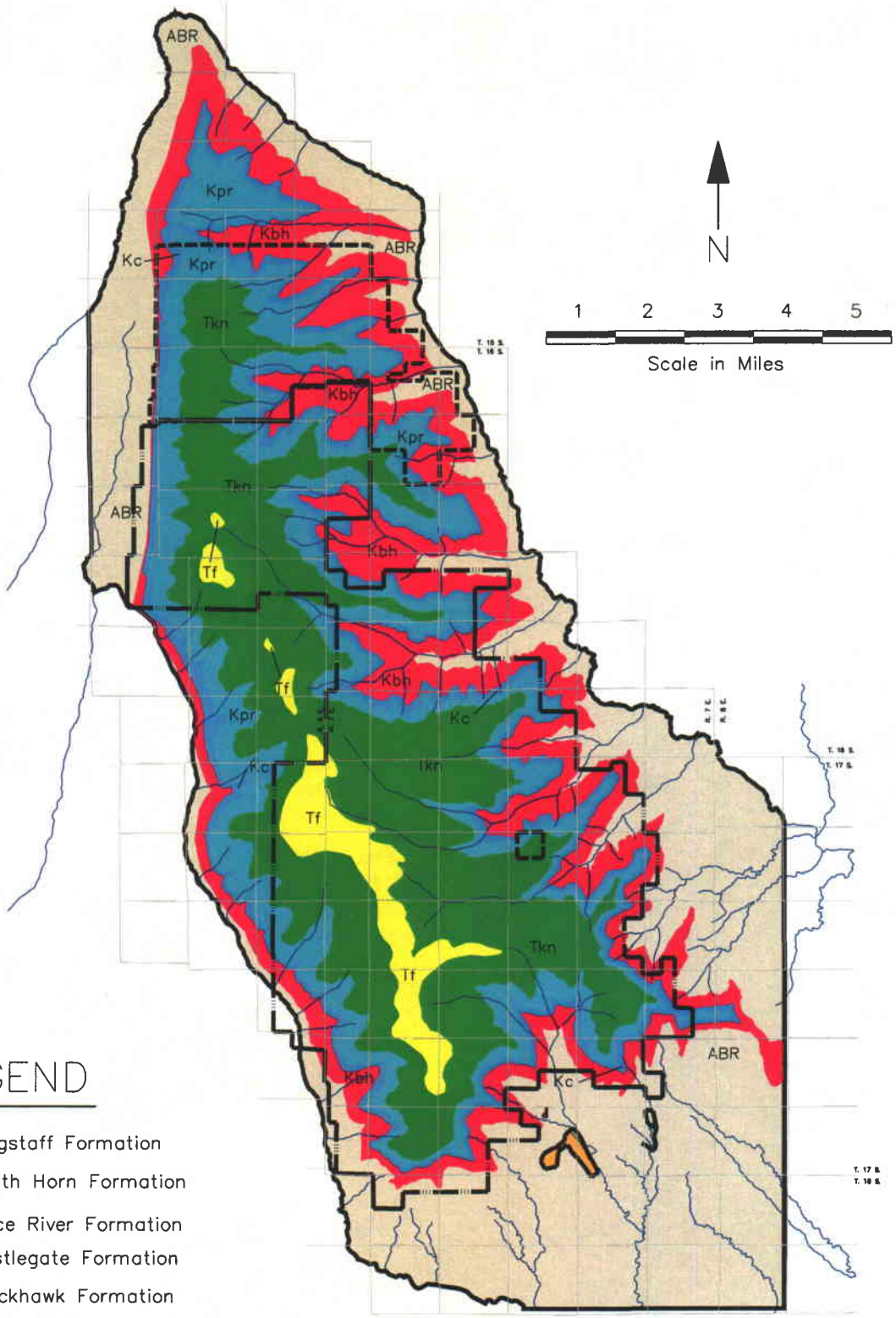
PLATE 5: Potential Recharge Areas Above the Coal Resource



LEGEND

- Flagstaff Formation
- North Horn Formation
- Price River Formation
- Castlegate Formation
- Blackhawk Formation
- Areas below the Coal resource (ABR)
- Genwal Coal Co. Permit Boundary
- PacifiCorp Permit Boundary
- PacifiCorp Waste Rock Disposal Areas

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EAST MOUNTAIN CHIA

Potential Recharge Areas
Above the Coal Resource

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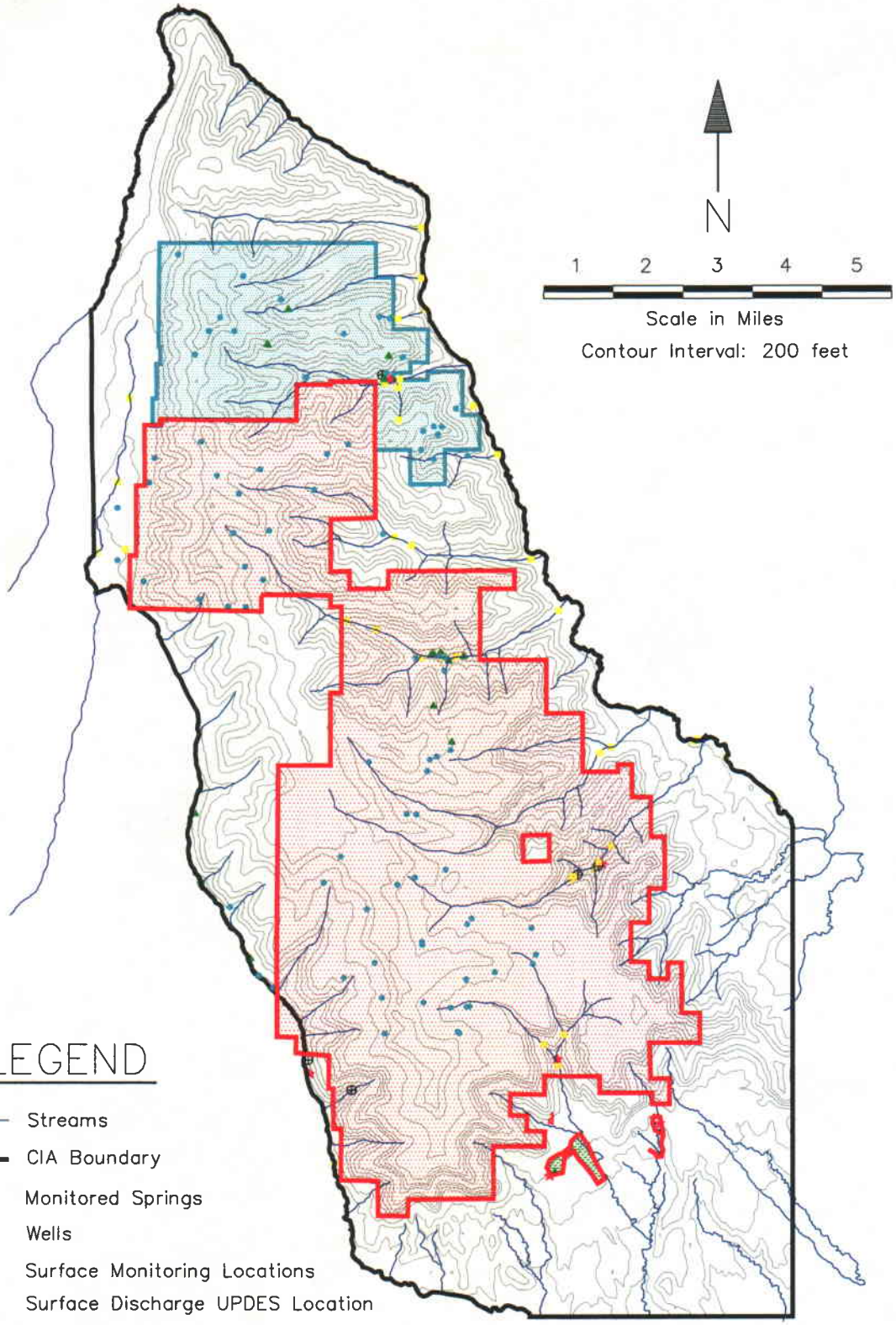
DATE: 03/11/05	UPDATED BY: JDS
DATE: 10/31/06	UPDATED BY: JDS

PLATE 6: Water Monitoring Locations



LEGEND

- Streams
- CIA Boundary
- Monitored Springs
- Wells
- Surface Monitoring Locations
- Surface Discharge UPDES Location
- Mine Water Discharge UPDES Location
- Genwal Coal Co. leases
- PacifiCorp leases
- PacifiCorp Waste Rock Disposal Areas

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EAST MOUNTAIN CHIA
Water Monitoring Locations

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DATE: 03/29/05	UPDATED BY: JDS
DATE: 10/31/06	UPDATED BY: JDS

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

January 9, 2007

To: Compliance File

From: Pamela Grubaugh-Littig, Permit Supervisor PGL for PGL

Re: 510 (c) Recommendation for PacifiCorp, Deer Creek Mine, C/015/0018

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 Deer Creek Mine. There are no finalized civil penalties, which are outstanding and overdue in the name of PacifiCorp. PacifiCorp 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 Deer Creek Mine that states there are no outstanding violations.

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telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • *www.ogm.utah.gov*

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

December 12, 2006

TO: Internal File

THRU: Pamela Grubaugh-Littig, Permit Supervisor

FROM: Jerriann Ernstsen, Ph.D., Environmental Scientist, Biology.

RE: DOGM's Informal Phone Consultation with USFWS and Decision Memo for OSM for the Mill Fork West Extension LBA/Federal Lease, Energy West Mining Inc., PacifiCorp, Deer Creek Mine, C/015/0018, Task ID #2544, 2656

DOGM TECHNICAL ANALYSIS SUMMARY:

The Permittee submitted a plan on June 30, 2006 for an extension to access federal coal (lease number UTU-84285) that is west of the Mill Fork State Lease (ML-48258). The extension would increase their mine permit area by 213.57 acres. The plan does not include adding acreage to the disturbed area for operations. The proposed extension area would allow the Permittee to locate the "set-up rooms" farther to the west providing greater coal recovery, mostly, from the long-wall mining within the Mill Fork State Lease. The proposed area above the set-up rooms should not subside.

THREATENED, ENDANGERED, AND SENSITIVE ANIMAL/PLANT SPECIES

The MRP meets R645-301-322 because there is adequate discussion, supporting documentation, and maps on TES species that could occur within or adjacent to the permit area.

The MRP includes current TES lists and an overview of habitat and occurrence data for all the TE species in Emery County, the Manti-Lasal National Forest sensitive species, and other state listed sensitive species (Vol. 11, Sec. 300, App. C, and Tabs. 300-1 through 300-4; Vol. 12, Sec.300). Of the TE species listed for the area, the only TE species that may be present is the Mexican spotted owl (although recognized as highly unlikely).

Plants

The MRP states that no threatened or endangered plant (or animal) species inhabit the Mill Fork or Rilda Canyon areas. There are, however, sensitive species within the permit area. The MRP discusses the potential presence of Monti's milkvetch, Canyon sweetvetch, Peterson

catchfly, and Link trail columbine. A query to the Utah Natural Heritage program identified Carrington daisy, USFS sensitive species, occurring in the permit area. The MRP describes the potential of this species occurring primarily within the southern region of the mine permit area. USFS considers that subsidence will not impact this species. The Utah Natural Heritage program identified the Link Canyon columbine and Canyon sweetvetch, both USFS sensitive species, occurring adjacent to the permit area in Little Bear Canyon.

Mexican Spotted Owl

The Mill Fork permit area includes MSO habitat. The Willey 1997 and 2000 models illustrate that the habitat is on the far northeastern boundary of the permit area and is in the far southwestern corner of the permit area (T16S, R6E, S22). The MSO habitat is not within the predicted subsidence zone.

Fish

The Permittee addresses the Colorado River cutthroat trout and its habitat within or adjacent to the permit area. The mine's overall water budget is a contribution not depletion to the Colorado River basin and here is no significant change in water contribution. The 2004 fish surveys reported observations of cutthroat in Rilda Creek, but DWR considers that the observed fish were most likely Yellowstone cutthroat. Populations of this species, however, are known to exist in Crandall Creek.

DOGM INFORMAL, PHONE CONSULTATION WITH USFWS SUMMARY:

The Division initiated informal consultation with the USFWS (Diana Whittington) on September 6, 2006 for this application. Jerriann Ernstsen informed Diana that there was no surface disturbance and that the Permittee does not predict subsidence for the extension area. Jerriann mentioned that of the TE species listed for the area, the only TE species that may be present is the Mexican spotted owl (although recognized as highly unlikely). Jerriann mentioned that there are no known raptor nests for the area (#1475 is close, but not within). The project map (MFS1866D) shows that the area may include 5 relatively steep sites, however, the Division supports that these areas are talus slopes and not steep escarpment sites.

DOGM INFORMAL DECISION

The Division's determination is that the proposed Deer Creek expansion project is "No effect" to threatened or endangered species listed for the County because there would be no surface disturbance for facilities, there is no subsidence planned for the extension area, and there is no depletion of water from the Colorado River basin.

DETERMINATION OF SIGNIFICANCE AND EFFECT

R4-2300-4 (6/04)

USDA-Forest Service - Intermountain Region
(Ref FSM 2360)

To be completed by a cultural resource specialist and attached to the CR report and project EA. Type all entries.

Pacific Corp Mill Fork Federal Coal Lease Tract UTU-71307 Extension, Emery County, Utah
Project Title

ML-1189, U-06-FS-0588f
Cultural Resource Report No.

A cultural resource investigation has been conducted for this project and cultural values have been identified. Based on the attached report, the Forest Service has made the following determinations:

CULTURAL SIGNIFICANCE

Class	No. of Sites	USFS Site Numbers
I - Eligible	0	
II - Unevaluated	0	
III - Not Eligible	0	

EFFECT - There will be no historic properties affected because:

- ☐ They are outside the project area.
- ☐ They are outside impact zones.
- ☐ Final project plans will avoid them.
- ☐ National Register characteristics will not be changed.
- ☒ Other (explain below).
  - ☐ Check here if sites will be affected, and attach a detailed explanation.

COMMENTS AND COORDINATING REQUIREMENTS

The following actions are proposed to ensure the protection of known or suspected sites. ☐ None
No sites in proposed project area.

FOREST SERVICE CERTIFICATION

Professional CRM Specialist	05-01-06 Date	Line Officer Approval * District Ranger	05-01-06 Date

* Required when significant sites may be affected and/or when non-routine action is recommended.

S.H.P.O. COMMENTS

I have reviewed the documented provided by the Forest Service.
☒ I agree with the determinations. ☐ I disagree, as explained below or in the attached letter.

Signature	Matthew T. Seddon, RPA Deputy State Historic Preservation Officer Title	5/8/06 Date

INTERDISCIPLINARY TEAM ANALYSIS RECORD

Project Title: Mill Fork West Extension Tract Lease Application

NEPA Log Number:

File/Serial Number:

Project Leader:

FOR EAs: NP: not present; NI: resource/use present but not impacted; PI: potentially impacted
FOR DNAs only: NC: no change (anticipated resource impacts not changed from those analyzed in the NEPA document on which the DNA is based)

STAFF REVIEW OF PROPOSAL:

NP/NI/PI NC	Resource	Date Reviewed	Specialist/ Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
			CRITICAL ELEMENTS	
NI	Air Quality	5/3/06	Karl Boyer Karl Boyer	All proposed lease activities are related to underground mining. No ventilation shafts or portal facilities would be constructed. The only surface disturbance to take place would be subsidence. The lease is not in an air quality non-attainment area. Impacts would be negligible. Total mine emissions would be unchanged.
NP	Areas of Critical Environmental Concern	5/3/06	Karl Boyer Karl Boyer	The Mont E. Lewis Botanical Area is located approximately three miles north of the proposed lease tract. The area includes a wet meadow complex at the toe of Seeley Mountain, overlooking Scad Valley. This area would not be affected by the proposed lease tract.
NC	Cultural Resources	5/15/06	Bruce Ellis [illegible]	The area had not been completely surveyed. The additional area was surveyed on April 27, 2006. No cultural resources were found. State Historic Preservation Office (SHPO) consultation is required. The project may not be implemented until SHPO concurrence is obtained.
NI	Environmental Justice	5/16/06	Ann King Ann King	This project would not have any disparate impacts on individual groups of peoples or communities. Implementation of this project would produce no adverse effects on minorities, low-income individuals, Native Americans or women. No civil liberties would be affected.
NP	Farmlands (Prime or Unique)	5/3/06	Karl Boyer Karl Boyer	There are no prime or unique farmlands in the area. The area is used for grazing allotments which would not be significantly impacted by underground mining.
NC	Floodplains	5/3/06	Karl Boyer Karl Boyer	Mining activities related to the lease would not involve development or occupancy of any floodplains. There are no floodplains within the proposed lease tract but there is a large floodplain nearby associated with the Indian Creek drainage. The tributaries to Indian Creek on the west slope of East Mountain are ephemeral. Mining related subsidence effects in the ephemeral streams contributing to Indian Creek would be mitigated by the depth of overburden (~1000 feet for the upper seam and ~1200 feet for the lower seam); however, if parallel faulting exists in a fault zone to the east of the main Joes Valley Fault, as indicated by the resistivity surveys, the effects of mining related tension cracks could be intensified by combining effects with the pre-existing natural faulting in the zone east of the main fault. This combined effect could disrupt some of the flow contributing to the floodplain associated with Indian Creek, resulting in a potential impact. Recently acquired in-mine drilling data have provided greater confidence regarding the location of the fault. This additional data and observance of Stipulation #19 of the Special Coal Lease Stipulations (22 degree angle of draw) reduces the likelihood of significant impacts occurring.

NP/NI/PI NC	Resource	Date Reviewed	Specialist/ Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
NC	Invasive, Non-native Species	5/9/2006	Matthew Meccariello	There would be no surface access for the proposed lease tract and therefore only limited potential to transport invasive or non-native species into the proposed lease area due to mining. Significant impacts would not be expected.
NC	Native American Religious Concerns	5/15/2006	Bruce Ellis	The area had not been completely surveyed. The additional area was surveyed on April 27, 2006. No cultural resources were found. Tribal consultation is required. The project may not be implemented until tribal concurrence is obtained.
NC	Threatened, Endangered or Candidate Plant Species	5/15/2006	Terry Nelson For	A BE/BA has been completed for the proposed lease. No threatened, endangered or candidate plant species occur within the proposed lease area.
NC	Threatened, Endangered or Candidate Animal Species	5/15/2006 5/3/06	For Terry Nelson Pam Jewkes	A BE/BA has been completed for the proposed lease. The proposed lease would not affect any threatened, endangered or candidate animal species or their habitat.
NI	Wastes (hazardous or solid)	5/8/06	Dale Harber	All federal and state laws on hazardous and solid waste apply. If the standard lease stipulations are included with the proposed lease, impacts would be negligible.
NC	Water Quality (drinking/ground)	5/3/06	Karl Boyer	No developed drinking water sources are found in the proposed lease tract. The closest groundwater development is a developed spring on the west side of Joes Valley, about 1 mile west of the proposed lease tract, which is used for the Indian Creek Campground. The North Emery Water Users Association also has a water development in Rilda Canyon; approximately five miles to the southeast. It is not likely that water encountered in the mine would be associated with surface and near surface groundwater. It is anticipated that groundwater encountered during mining would be through the interception of paleo-sandstone channels in the tops of the coal seams and seepage from the mine floor where the hydrostatic pressure is above the bottom of the lower coal seam.
NC	Wetlands/Riparian Zones	5/3/06	Karl Boyer	There is a wetland just west of the proposed lease tract associated with the Indian Creek drainage. The tributaries to Indian Creek on the west slope of East Mountain are ephemeral. Mining related subsidence effects in the ephemeral streams contributing to the wetland would be mitigated by the depth of overburden (~1000 feet for the upper seam and ~1200 feet for the lower seam); however, if parallel faulting exists to the east of the main Joes Valley Fault, as indicated by the resistivity surveys, the effects of mining related tension cracks could be intensified by combining effects with the pre-existing natural faulting in the zone east of the main fault. This combined effect could disrupt some of the flow contributing to the wetland associated with Indian Creek. If subsidence was intensified due to the combined effects of mining related tension faulting and pre-existing fractures, the riparian areas around the springs and seeps could also be impacted by a disruption of their recharge areas and supply paths. These potential impacts are not anticipated to be significant due to recently acquired in mine drilling data that has provided greater confidence regarding the location of the fault. This additional data and observance of Stipulation #19 of the Special Coal Lease Stipulations (22 degree angle of draw) reduces the likelihood of significant impacts occurring.
NP	Wild and Scenic Rivers	5/16/06	Ann King	There are no wild and scenic rivers in the project area. The nearest designated rivers are approximately five miles away, Huntington Creek and the Lower Left Fork of Huntington Creek. Mining in the proposed lease tract would not affect these streams.
NP	Wilderness	05/04/06	Marlene Depietro	There are no existing Wilderness or designated National Recreation Areas in or around the proposed lease tract. The Forks of the Huntington National Recreation Trail is 5 miles to the north. The Fish Creek National Recreation Trail is located 22 miles to the north. The nearest wilderness area is the Mt. Nebo Wilderness located on the Uinta National Forest approximately 35 miles to the

NP/NI/PI NC	Resource	Date Reviewed	Specialist/ Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
				northwest. The proposed lease tract is within the East Mountain IRA. No construction of roads or surface facilities is planned.
			OTHER RESOURCES / CONCERNS*	
NC	Rangeland Health Standards and Guidelines	5/9/2006	Matthew Meccariello Matt Meccariello	Extending several longwall panels to the west may cause subsidence cracks, affecting seeps, springs and surface resources (over land flow) in the immediate and adjacent area. The rangeland impacts are not anticipated to be significant.
NC	Livestock Grazing	5/9/2006	Matthew Meccariello Matt Meccariello	Portions of two grazing allotments are found within this lease; Trail Mountain C&H and Crandall Ridge S&G allotments. Mining activities should have no affect on the control/management of livestock. See attached map & E-mail for location of springs troughs and flow rates.
NC	Woodland / Forestry	5/15/06	Alan Lucas Karl Boyer	The surface area above the proposed mining activity consists of very steep to moderate west facing slopes with an elevation range of approximately 8800 – 9500 feet. Tree vegetation, both as to occurrence and species composition, varies widely, with soil depth, moisture, micro aspect, and elevation being the primary determining factors. Commercial species which may be found in the area include; ponderosa pine, white fir, alpine fir, Englemann spruce and aspen. Woodland type vegetation may include juniper, oak, and various shrub species. Currently no commercial or personal use forest product sales are planned for this area. The proposed mining activities and resultant subsidence should have no adverse effect on the general timber and woodland resource. In the immediate vicinity of significant tension cracks that have a surface expression, individual trees may be damaged by physical displacement or injury to root systems. Such situations are expected to be few in number and of minimal impact to the overall resource.
NC	Vegetation including Special Status Plant Species other than FWS candidate or listed species	5/15/2006	for Terry Nelson Rock Olson	A BE/BA has been completed for the proposed lease tract. No special status plant species are likely to occur in or near the proposed extension tract lease area. The proposed lease would not impact any special status plant species or their habitat.
NI	Fish and Wildlife including Special Status Species other than FWS candidate or listed species, e.g., migratory birds	5/15/2006 5/3/06	Rock Olson for Pam Jewkes Terry Nelson Pam Jewkes	A Wildlife Resources Report has been completed for the proposed lease tract. The proposed lease would not impact any special status fish or wildlife species or their habitat.
NC	Soils	5/3/06	Karl Boyer Karl Boyer	Soils in the lease tract are derived from the Price River and North Horn formations. Other than subsidence related effects there would be no impacts to the soils. The possibility exists that tension cracking on steep slopes with water saturated soil could be a contributing factor in promoting soil slumping. Some minor loss of topsoil could occur in areas in close proximity to tension cracks on hillsides.
NC	Recreation	5/3/06	Bill Broadbear Bill Broadbear	Operations will not interfere with access to the area. Indian Creek Campground is less than ½ mile from the projected subsidence zone. Dispersed camping occurs along Spoon Creek Road. Rockfalls from the Castlegate Sandstone would have a remote potential to disrupt campers and recreationalists.
NC	Visual Resources	5/8/06	Brent Hanchett Karl Boyer	Potential escarpment failures within view of recreation trails are in areas of Modification and would be well within the context of the surrounding landscape character. Exixting Visual quality Objectives would continue to be met.
NC	Geology / Mineral Resource / Energy Productions	5/3/06	Karl Boyer Karl Boyer	Tension cracking in the Castlegate Sandstone is likely in the subsidence zone of full extraction areas on the western slope of East Mountain. The greatest potential for subsidence related surface cracks would be along the Joes Valley Fault. If full extraction mining took place within the 22 degree angle-of-draw, it would be possible that subsidence would be focused along the surface expression of the fault. New mining and photographic data indicate the Joes Valley Fault is located further west than originally thought. Based upon these

NP/NI/PI NC	Resource	Date Reviewed	Specialist/ Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
				new data the old resistivity data was reinterpreted so that a second geophysical anomaly was chosen to indicate the new position of the fault rather than the anomaly (farther to the east) that was used in the Mill Fork Tract mining plan submittal. If the anomaly originally chosen to represent the fault position represents parallel faulting within a fault zone, the subsidence (and associated impacts to surface resources) could possibly be more pronounced in this area as the effects of mining related tension faulting combined with the naturally occurring faults/fractures. These new data may allow extending several longwall panels to the west, enabling recovery of approximately two million tons of additional coal. There are no existing oil and gas leases in the proposed coal lease tract and no new oil and gas leases would be offered within the proposed coal lease tract until the tract is mined out and subsidence has been determined to be substantially complete.
NC	Paleontology	5/8/06	Dale Harber Dale L. Harber	The proposed mining would extend subsidence several hundred feet to the west, but should have negligible impacts on paleontological resources. Forest Service Standard Stipulation #1 (included in the lease) describes the required protection of paleontological resources.
NP	Lands / Access	5/3/06	Jeff Alexander	No new road construction is associated with this project. There are no existing roads in the proposed lease tract; therefore, damage to any existing roads would not occur.
NI	Fuels / Fire Management	5/3/06	Karl Boyer Karl Boyer	The proposed underground mining activities would not present any fire hazards to surface resources.
NC	Socio-economics	5/3/06	Karl Boyer Karl Boyer	The proposed lease tract would allow extending several longwall panels to the west, enabling recovery of approximately two million tons of additional coal. The coal would be mined through the Deer Creek Mine with no need for additional surface disturbance. If the coal is bypassed it would be uneconomical for future mining. Royalties would be collected on the coal mined and distributed among the federal, state and county governments.
NP	Research Natural Areas	5/15/2006	For Terry Nelson Karl Boyer	There are no Research Natural Areas located in or near the proposed Deer Creek Mine Mill Fork West Extension Tract Lease area.
NP	Wild Horses and Burros	5/15/2006	For Terry Nelson Karl Boyer	There are no wild horse or burro populations inhabiting areas in or near the proposed Deer Creek Mine Mill Fork West Extension Tract Lease.
NI	Inventoried Roadless	5/3/06	Karl Boyer Karl Boyer	The proposed lease tract is located on the western edge of the East Mountain Inventoried Roadless Area. Road construction and surface facilities are not authorized as part of the proposed lease.

FINAL REVIEW

Reviewer Title	Date	Signature	Comments
Forest Service Coordinator	5/17/06	Karl Boyer	
Manager			

NOTE: Review Comments should include information explaining how the specialist came to their conclusion - how does he/she know the element/resource is not present (site visit and date of visit, familiarity with location, etc.). For all 'NIs' give a brief explanation as to why that element/resource would not be impacted.

* The list of Other Resources / Concerns to be considered may vary by individual field office. Note: Native American Trust Responsibilities should be considered for FO's with Indian Mineral interests.

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

File Code: 2820-4
Date: August 1, 2006

Pamela Grubaugh-Littig
Division of Oil, Gas, and Mining
P.O. Box 145801
Salt Lake City, UT 84114-5801

Dear Ms. Grubaugh-Littig:

The Forest Service has completed our review of the Mill Fork West Extension Mine Plan Modification and the potential impacts to non-coal resources. The Forest Service had one concern regarding Stipulation 19 of the Decision Notice as it pertained to subsidence in the Joes Valley Fault buffer zone. The issue has been satisfactorily addressed by Energy West. This mine plan modification is consistent with the Forest Service stipulations in the lease. Therefore, I consent to this mine plan modification.

Please contact Karl Boyer at (435) 636-3551 if you have any questions.

Sincerely,

Eileen Richmond

EILEEN F. RICHMOND
Acting Forest Supervisor

RECEIVED
AUG - 1 2006
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

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
3425
UTU-84285
(UT-923)

OCT 11 2006

CERTIFIED MAIL – Return Receipt Requested

OCT 2006
Received
Interwest Mining Company

DECISION

PacifiCorp c/o Interwest Mining Company 201 South Main Street, Suite 2100 Salt Lake City, Utah 84111	: : : : :	Coal Lease UTU-84285

Lease Issued
Bond Accepted

Pursuant to the August 1, 2006, Lease By Application Coal Sale, the bid of PacifiCorp, was determined to be the acceptable high bid for the Mill Fork West Tract. Satisfactory evidence of the qualifications and holdings of the bidder has been reviewed and found to be acceptable.

On September 28, 2006, PacifiCorp furnished to this office a surety bond in the amount of $236,000, with PacifiCorp, as principal, and Travelers Casualty and Surety Company of America, as surety, which provides bond coverage for coal lease UTU-82485. This bond has been reviewed by this office and has been found acceptable as of September 28, 2006, the date of filing in this office.

First year's rental of $682 was submitted by the bidder, and a check for $488.72 has been submitted to cover the cost of advertising the sale. Four copies of the lease have been executed by the bidder. Therefore, coal lease UTU-84285 is hereby issued effective November 1, 2006.

Annual rental of $682 and a bonus bid payment of $19,600 are due by November 1, 2007.

James Kohler
Chief, Branch of
Solid Minerals

Enclosures:

1. Coal Lease UTU-84285

cc: Travelers Casualty and Surety Company of America, One Tower Square, Hartford, CT 06183
Price Coal Office (Attn: Steve Falk) (w/encl.)
MMS, Solid Minerals Staff (w/encl,)
Resource Development Coordinating Committee (w/encl,)
Mr. John Baza, Director, UDOGM, Box 145801, SLC, UT 84114-5801 (w/encl,)

Form 3400-12
(January 2004)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COAL LEASE

FORM APPROVED
OMB NO. 1004-0073
Expires: January 31, 2007

Serial Number

UTU-84285

PART 1. LEASE RIGHTS GRANTED

This lease, entered into by and between the UNITED STATES OF AMERICA, hereinafter called lessor, through the Bureau of Land Management (BLM), and *(Name and Address)*

PacifiCorp
c/o InterWest Mining Company
201 South Main Street, Suite 1200
Salt Lake City, Utah 84111

hereinafter called lessee, is effective *(date)* 11 / 1 / 2006, for a period of 20 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 the 20th lease year and each 10-year period thereafter.

Sec. 1. This lease is issued pursuant and 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 bonuses, 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 following described lands:

T. 16 S., R. 6 E., SLM, Utah
Sec. 10, S½NE¼NE¼, SE¼NE¼, W½E½SE¼;
Sec. 15, E½W½E½;
Sec. 22, lot 3.

containing 213.57 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 must 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 will not be credited against either production or advance royalties for any year.

Sec. 2. (a) PRODUCTION ROYALTIES - The royalty will 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 BLM 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 will 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 must maintain in the proper office a lease bond in the amount of $ 236,000 . The BLM may require an increase in this amount when additional coverage is determined appropriate.

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 will terminate the lease. Lessee must submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after lease issuance.

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 will 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 will then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

(Continued on page 2)

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION - At such times and in such form as lessor may prescribe, lessee must 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 must keep open at all reasonable times for the inspection by BLM 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 must 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 will 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 must comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee must 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 must be submitted to the BLM.

Lessee must 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 must 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 must 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 must: 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 should 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 should 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 will 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 must 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 must remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the BLM. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, will become the property of the lessor, but lessee may either remove any or all such property or 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 will waive the requirement for removal, provided the third parties do not object to such waiver. Lessee must, 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 will be subject to cancellation by the lessor only by judicial proceedings. This provision will 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 will 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 will extend to and be binding upon, and every benefit hereof will inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec.13. INDEMNIFICATION - Lessee must 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 Clean Water Act (33 U.S.C. 1252 et seq.), the Clean Air Act (42 U.S.C. 4274 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

This coal lease is subject to termination if the lessee is dertermined at the time of issuance to be in noncompliance with Section 2(a)2(A) of the Mineral Leasing Act.

SEE ATTACHED STIPULATIONS

(Continued on page 3)

Sec. 15. SPECIAL STIPULATIONS (Cont'd.) -

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished with the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181-287 and 30 U.S.C. 351-359.

PRINCIPAL PURPOSE: BLM will use the information you provide to process your application and determine if you are eligible to hold a lease on BLM Land.

ROUTINE USES: BLM will only disclose the information according to the regulations at 43 CFR 2.56(d).

EFFECT OF NOT PROVIDING INFORMATION: Disclosing the information is necessary to receive a benefit. Not disclosing the information may result in BLM's rejecting your request for a lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:

This information is being collected to authorize and evaluate proposed exploration and mining operations on public lands.

Response to the provisions of this lease form is mandatory for the types of activities specified.

BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average one hour per response including the time for reading the instructions and provisions, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to: U.S. Department of the Interior, Bureau of Land Management (1004-0073), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, Mail Stop 401 LS, Washington, D.C. 20240.

THE UNITED STATES OF AMERICA

PacifiCorp	By James F. Kohler
(Company or Lessee Name)	James F. Kohler
ARWalje	(BLM)
(Signature of Lessee)	CHIEF, SOLID MINERALS
A. Richard Walje, President, Rocky Mountain Power On behalf of PacifiCorp	(Title)
(Title)	October 11, 2006
September 27, 2006	(Date)
(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.

Mill Fork West Federal Coal Lease Tract
UTU-84285

Lease Stipulations

Federal Regulations 43 CFR 3400 & 3425 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 the Interior, to consent to the leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contains lands the surface of which is managed by the United States Department of Agriculture, Forest Service – Manti-La Sal National Forest.

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 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.

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.

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 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.

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.

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 modifications to existing developments to examine alternatives and mitigate conflicts.

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 land forms and vegetative landscape features will be avoided.

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.

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.

9. Except at locations specifically approved by the Authorized Officer, with concurrence of the Forest Service, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that

NOTE: For lease administrative purposes, any FONSI stipulations cited above that require specific approval have been be caveated with the following clarification "by the Authorized Officer, with concurrence of the Forest Service."

21. WASTE CERTIFICATION: The lessee shall provide on a yearly basis and prior to lease 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.

22. ABANDONMENT OF EQUIPMENT: The lessee/operator is responsible for compliance with reporting regarding toxic and hazardous material and substances under Federal Law and all associated amendments and regulations for the handling such materials on the lad surface and in underground mine workings.
The lessee/operator must remove mine equipment and materials not needed for continued operations, roof support and mine safety from underground workings prior to abandonment of mine sections. Exceptions can be approved by the Authorized Officer (BLM) in consultation with the surface management agency. Creation of a situation that would prevent removal of such material and by retreat or abandonment of mine sections without prior authorization would be considered noncompliance with lease terms and conditions and subject to appropriate penalties under the lease.

23. 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 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-site disposal of non-coal waste must comply with 30 CFR § 817.89 and must be approved by the regulatory authority responsible for the enforcement of the Surface Mining Control and Reclamation Act (30 U.S.C. 1201, et seq.).

PacifiCorp

Energy West Mining Company

Deer Creek Mine

Mill Fork West Extension Federal Coal Lease UTU-84285,
PacifiCorp, Deer Creek Mine, C/015/018

Bureau of Land Management
R_2P_2 Approval

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

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
3482
UTU-84285, ML-48258
(UT-923)

SEP 22 2006

Mr. Pete Rutledge
Office of Surface Mining
P. O. Box 46667
Denver, Colorado 80201-6667

Re: Resource Recovery and Protection Plan (R2P2), Federal Coal Lease UTU-84285, Hiawatha and Blind Canyon Seams, Deer Creek Mine

Dear Mr. Rutledge:

On September 8, 2006, the Bureau of Land Management (BLM) received a request from Interwest Mining Company to revise their existing R2P2. A new R2P2 is required for a proposed action involving a new lease. The BLM has reviewed the proposed R2P2 modification from Interwest Mining Company, and has determined the submitted material to be adequate for the new R2P2, and that no further submission is required. This letter summarizes the BLM's findings and decision regarding this new R2P2.

Interwest Mining Company's wholly owned subsidiary, Energy West Mining Company, has submitted a permit application package (PAP), with the R2P2 included, to add the newly acquired Federal coal lease areas to the Deer Creek Mine permit. The lease, called the Mill Fork West Lease, will add approximately 214 acres of Federal coal land to the permit area. This permitting action will allow the company to mine (exclusively by underground methods) approximately 333,000 tons of additional recoverable coal.

The inclusion of this lease in the permit area will allow for maximum coal extraction between the western boundary of the Mill Fork State Lease (ML-48258) and the surface location of the Joes Valley Fault. The BLM has inspected this area a number of times (including on July 21, 2006, May 23, 2006, April 27, 2006, and March 17, 2006), and agrees that the inclusion of this lease in the Mine Permit provides for the extraction of recoverable coal which would otherwise be bypassed. Bypassed coal would also include State Institutional Trust Lands coal located on an adjacent state lease.

The R2P2 addresses all the required items per 43 CFR 3482.1(b), and shows that mining is planned for all areas where potentially-minable coal is currently known to be located. All recoverable coal in the two seams will be accessed from existing mine workings on the adjacent State Lease of the Deer Creek Mine. No surface facilities are planned for this permit addition.

The planned coal extraction areas of the R2P2 were determined by the BLM to comply with the lease terms and conditions, including special lease stipulation 19, which restricts subsidence in the proximity of the surface expression of the Joes Valley Fault. 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.

Interwest proposes to mine from the existing western boundary of the State Lease to a buffer zone determined by the surface location of the Joes Valley Fault. The company's existing R2P2 grants mining up to the Mill Fork State Lease (ML-48258) boundary line. Interwest's plans for mining in the new lease include production associated primarily with the development of gateroads, bleeders, and set-up rooms. Limited longwall production (64,000 tons) is also planned. This mining will be conducted from inside the mine, and will have no surface impacts. Coal recovery will be maximized based on geologic, engineering, safety, environmental and economic factors. A change to the mine plan based on any one of these factors will be reviewed and subject to approval by the BLM.

Total development and retreat longwall mining tonnage on this Federal lease are projected to be 268,000 and 64,000 tons, respectively. An added value of these leasing and permitting actions is that they allow an estimated 1,803,000 additional tons to be recovered on the adjoining State Lease through the process of lengthening several projected longwall panels. Until the new lease is incorporated into the existing LMU, tonnages mined on the Mill Fork West Federal lease will not be applied for diligence purposes.

The BLM finds the R2P2, as submitted, to be in compliance with the Mineral Leasing Act of 1920, as amended, the lease terms and conditions, and the regulations at 43 CFR 3480. The BLM has also determined that this R2P2 (as received by BLM on September 8, 2006) will achieve maximum economic recovery (MER) of Federal coal, due in part to the pending reversion. We therefore recommend that the Secretary approve the R2P2 as part of the Federal mine plan.

If you have any questions, please contact Steve Rigby at the Price Field Office (435) 636-3604 or Jeff McKenzie of my staff at (801) 539-4038.

Sincerely,

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

UT-070, Price, Utah

Energy West Mining Company
P. O. Box 310
Huntington, Utah 84528

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-0016

July 11, 2006

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

Inset
C/015/0018

RE: PacifiCorp - "Deer Creek" Mine - Application for a Permit Revision, Mill Fork West Extension Tract, Task ID No. 2544

Dear Sir or Madam:

This is in response to the Utah Division of Oil, Gas & Mining's (UT-DOGM) June 9, 2006, 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, Mill Fork West Extension Tract, has determined that it proposes to add approximately 213 acres in new Federal lease UTU-84285 to the Deer Creek mine, Utah State permit C/015/018.

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 Mill Fork West Extension Tract 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, Mill Fork West Extension Tract, with other Federal agencies for compliance with other Federal regulations.

OSM also electronically transmitted the June 9, 2006, request to the Bureau of Land Management and the U.S. Forest Service for their review and comment.

RECEIVED
JUL 17 2006
DIV. OF OIL, GAS & MINING

TAKE PRIDE IN AMERICA

In an electronic transmittal dated June 14, 2006, the U.S. Forest Service stated in its opinion the Mill Fork West Extension Tract permit revision does 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,

Foster Kirby (acting)

Ranvir Singh
Manager, Northwest Branch

cc: BLM - Utah State Office
BLM - Price Field Office
USFS - Manti-La Sal NF
Denver Field Division