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**COPY**

*KK  
6/11/91  
Orig. Mine File  
cc: DRN  
YFB  
PBJ*

**ONE UTAH CENTER**

201 SOUTH MAIN • SUITE 2100 • SALT LAKE CITY, UTAH 84140-0021 • (801) 220-2000

June 12, 1991

Dr. Dianne R. Nielson  
Division Director  
Utah Division of Oil, Gas and Mining  
3 Triad Center, Suite 350  
Salt Lake City, UT 84180-1203

Re: Permit Renewal, PacifiCorp Electric Operations  
Des-Bee-Dove Mine, ACT/015/017, Folder #3, Emery County, Utah

Dear Dr. Nielson:

Transmitted herewith is a signed copy of the permit renewal for the Des-Bee-Dove Mine. The copy was signed by Mr. Brett Harvey as Authorized Representative of the Permittee on Monday, June 10, 1991.

Respectfully,

*J. Blake Webster*  
J. Blake Webster  
Permitting Administrator

Enclosure

cc: Bart Hyita  
Val Payne w/enclosure  
Scott Child

**RECEIVED**

JUN 17 1991

DIVISION OF  
OIL GAS & MINING

File in:

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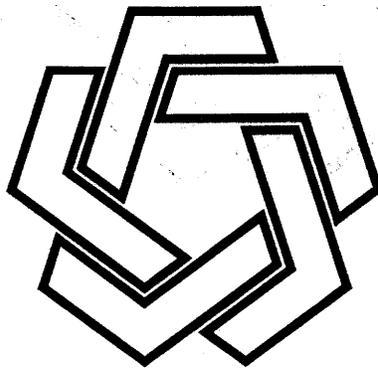
Refer to Record No 0020 Date 06/12/1991

In 015/0017 Incoming

# **STATE DECISION PACKAGE**

**Des-Bee-Dove  
PacifiCorp Electric Operations  
ACT/015/017**

**FIVE-YEAR RENEWAL  
May 31, 1991**



**STATE OF UTAH  
Department of Natural Resources  
Division of Oil, Gas & Mining**

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

PacifiCorp Electric Operations  
Des-Bee-Dove Mine  
Permit Renewal

Emery County, Utah  
ACT/015/017  
May 31, 1991

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- \* Administrative Overview
- \* Location Map
- \* Permitting Chronology
- \* Mine Plan Information Form
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- \* State Five-Year Renewal Permit
- \* Technical Analysis
- \* Cumulative Hydrologic Impact Assessment (CHIA)
- \* Affidavit of Publication

A:/SDD&TA.DBD

## **ADMINISTRATIVE OVERVIEW**

### **PacifiCorp Electric Operations Des-Bee-Dove Mine Permit Renewal ACT/015/017**

**Emery County, Utah  
May 31, 1991**

#### Background

The Des-Bee-Dove Mine Complex is one of three separate mining operations owned by PacifiCorp Electric Operations located on East Mountain about 7 miles north of Orangeville, Utah. The three operations, the Des-Bee-Dove, Cottonwood/Wilberg, and Deer Creek, contain three minable coal seams: Hiawatha, Cottonwood, and Blind Canyon. Two of the seams are located within the Des-Bee-Dove permit area and are accessed through three mine portals. The Hiawatha (lower) seam is mined through the Deseret portal. The Blind Canyon (upper) seam is mined through the Beehive and Little Dove Mines.

The anticipated life-of-mine production from the Des-Bee-Dove Mine Complex is approximately 8.3 million tons by room-and-pillar continuous mining techniques. Estimated annual production was planned to average 725,000 tons.

The Des-Bee-Dove Mine Complex closed December 1983, due to a fire in the Beehive Mine and for economic reasons. The mine complex was reopened on January 14, 1985, to provide coal to the Hunter Power Plant to partially replace production lost due to the closure of the Wilberg Mine as a result of a fire which started in the mine on December 19, 1984. The Des-Bee-Dove Mine temporarily ceased operations on February 6, 1987. No mining activity has occurred since that date. A memo to the Coal Regulatory Staff dated October 11, 1988 from Lowell P. Braxton, entitled "Guidelines for Duration of temporary Cessation of Operations", outlines that temporary cessation may extend to 15 years.

The Des-Bee-Dove/Wilberg Junction Road was constructed in 1983, in response to public concern for safety in the previous route that went through the residential streets of Orangeville, Utah. Utah Power and Light Company represented the road as a public road and failed to obtain a permit from the regulatory authority to construct the Haul Road. UDOGM issued a notice of violation to Utah Power and Light Company on July 18, 1984, that required the Haul Road be included in the PAP for a permanent program permit. On July 31, 1984, UDOGM issued a cessation order preventing the Utah Power and Light Company from using the road. The cessation order was terminated October 1, 1984. The Utah Board of Oil, Gas and Mining reopened the Haul Road under an emergency order pursuant to the approved Utah

State Program, to allow Utah Power and Light Company to resume production and delivery of coal to the Hunter Power Plant without routing trucks through the town of Orangeville.

The entire permit area, including the Junction Road, was permitted by OSM in April, 1985. The State issued a permanent program permit September 20, 1985.

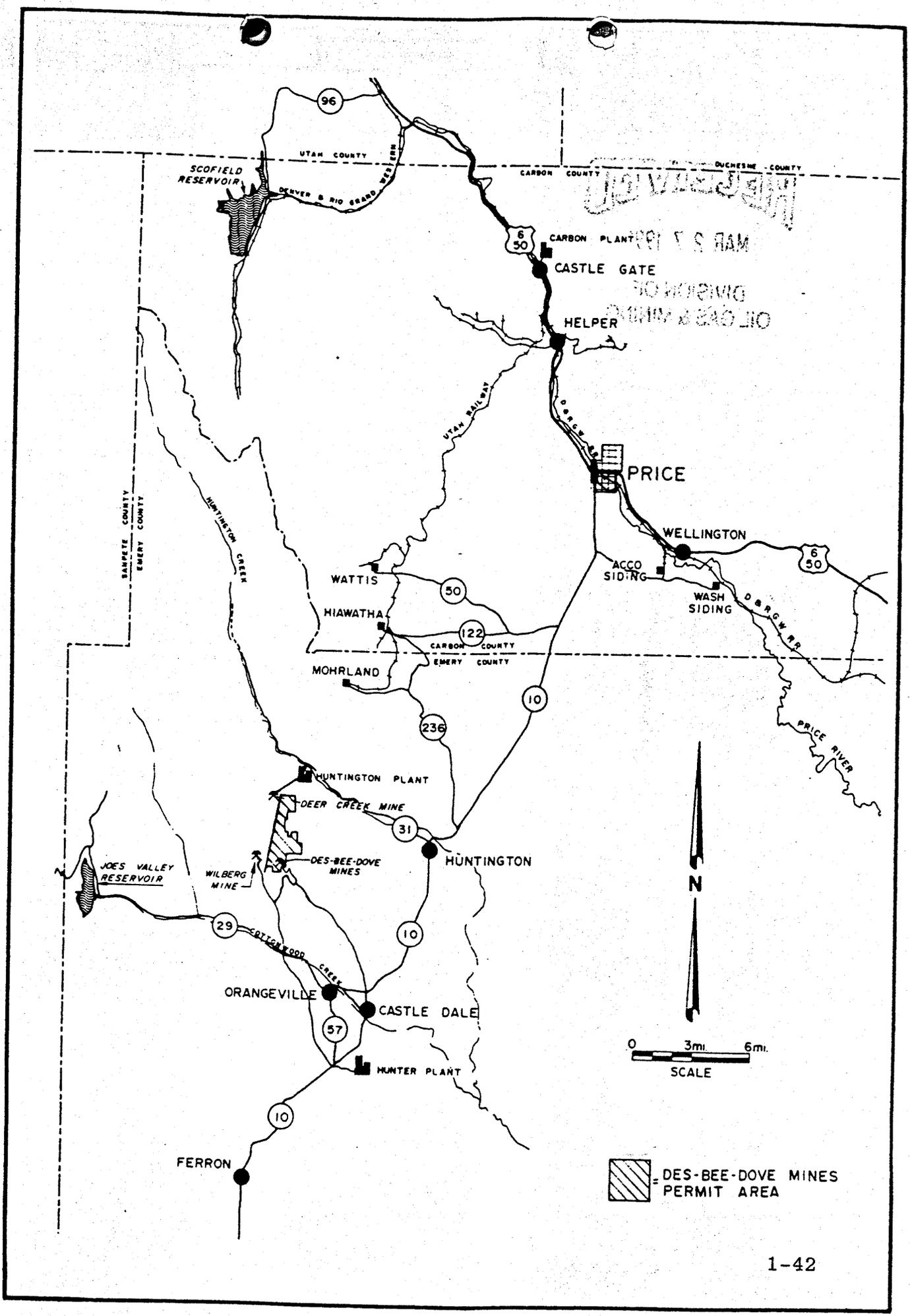
The permittee published notice for the five-year permit renewal for four consecutive weeks beginning December 4, 1990. No comments were received.

The permit was transferred from Utah Power & Light Company to PacifiCorp Electric Company on March 15, 1991.

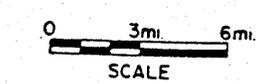
#### Recommendation for Approval

Approval for the five-year permit renewal is recommended, based in a review of the Permit Application Package, updated through May 29, 1991, with nine conditions. The permit renewal term will not exceed the original permit term of five years and will expire on September 20, 1995.

jbe  
DBDADMIO



MERRILL  
 CARBON PLANT  
 CASTLE GATE  
 HELPER  
 PRICE  
 WELLINGTON  
 ACCO SIDING  
 WASH SIDING  
 D.B.C.M.R.  
 PRICE RIVER




 DES-BEE-DOVE MINES PERMIT AREA



**PERMITTING CHRONOLOGY**  
**Des-Bee-Dove Mine**  
**ACT/015/017**

- October 11, 1988                      Guidelines for Duration of Temporary Cessation of Operations outlines four conditions for temporary cessation. (Memo to Coal Regulatory Program Personnel from Lowell P. Braxton).
- January 10, 1990                      Letter to Dave Smaldone from Pamela Grubaugh-Littig advising him of upcoming five-year renewal.
- April 27, 1990                        UP&L submits five-year renewal materials for Des-Bee-Dove Mine.
- June 25, 1990                        Initial Completeness Review issued by Division of Oil, Gas and Mining.
- June 29, 1990  
July and Aug, 1990  
(no specific dates noted)              Weekly and bi-weekly telephone conversations with Val Payne regarding timeliness and need for submittal to determine complete.
- August 14, 1990                      Letter from Lowell P. Braxton to Dee Jense regarding concern about timeliness of submittals.
- August 28, 1990                      Lowell P. Braxton, Pamela Grubaugh-Littig, and Dee Jense meet to discuss timeliness concerns.
- September 6, 1990                    A schedule is presented to the Division by UP&L as to when the Des-Bee-Dove Mine Five-Year Renewal materials will be submitted. Also, submittals for Deer Creek Five-Year Renewal Application and response to Rilda Canyon Lease Tract deficiencies.
- September 7, 1990                    Partial submittal for Des-Bee-Dove Mine Five-Year Renewal.
- September 20, 1990                   Cessation Order (#C90-20-2-1) is issued to Des-Bee-Dove Mine due to lack of completeness of permit renewal. Abatement date is January 18, 1991.
- September 27, 1990                   Submittal of responses to Initial Completeness Review by operator in rewritten format.
- November 16, 1990                    Division issues Determination of Completeness.

November 20, 1990 Cessation Order #C90-20-2-1 (part 1 of 2) is terminated due to permit renewal being determined complete.

December 4, 1990 PacifiCorp Electric Operations publishes four consecutive weeks, ending December 25, 1990.

December 14, 1990 Division issues Technical Deficiencies.

January 9, 1991 Cessation Order #C90-20-2-1 (part 2 of 2) is modified to have permit renewed by March 15, 1991, by letter of request of operator.

February 7, 1991 Operator responds to Technical Deficiencies.

March 5, 1991 Cessation Order #C90-20-2-1 (part 2 of 2) is modified to have permit renewed by March 29, 1991, by letter of request by operator.

March 15, 1991 Permit transferred from UP&L to PacifiCorp Electric Operations.

March 25, 1991 Cessation Order #C90-20-2-1 (part 2 of 2) is modified to have permit renewed by April 29, 1991 by Division request, due to increased oversight inspections.

April 29, 1991 Cessation Order #C90-20-2-1 (part 2 of 2) is modified to have permit renewed by May 31, 1991 by Division request due to increased oversight inspections.

May 29, 1991 Operator submits additional information.

May 31, 1991 Permit renewed with nine conditions. CO #C90-20-2-1 (part 2 of 2) is terminated.

MINE PLAN INFORMATION

Mine Name Des-Bee-Dove Mine State ID: ACT/015/017

Operator PacifiCorp Electric Operations County: Emery

Controlled By PacifiCorp Electric Operations

Contact Person(s) Blake Webster, Permitting Administrator

Telephone: (801) 220-4584 Fax (801) 220-4578

New/Existing Existing Mining Method Room and Pillar

Federal Lease Nos. U-02664; SL-050133; SL-066116

State Mineral Lease No. \_\_\_\_\_

Legal Descriptions \_\_\_\_\_

<u>Surface Resources</u> <u>(acres)</u>	<u>Existing</u> <u>Permit Area</u>	<u>Proposed</u> <u>Permit Area</u>	<u>Total Life</u> <u>of Mine Area</u>
Federal	_____	_____	<u>1877</u>
State	_____	_____	<u>50</u>
Private	_____	_____	<u>920</u>
Other	_____	_____	_____
TOTAL	_____	_____	<u>2847</u>

Coal Ownership (Acres)

Federal	_____	_____	<u>1520</u>
State	_____	_____	_____
Private	_____	_____	<u>1040</u>
Other	_____	_____	_____
TOTAL	_____	_____	<u>2560</u>

<u>Coal Resource Data</u>	<u>Total in Place</u> <u>Reserves</u>	<u>Total Recoverable</u> <u>Reserves</u>
Federal	<u>10.5 mmt</u>	<u>5.1</u>
State	<u>0.2</u>	<u>0.1</u>
Private	<u>6.5</u>	<u>3.1</u>
Other	_____	_____
TOTAL	<u>17.2</u>	<u>8.3</u>

May 31, 1991





# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

Norman H. Bangerter  
Governor

Dee C. Hansen  
Executive Director

Dianne R. Nielson, Ph.D.  
Division Director

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340

June 3, 1991

Mr. Blake Webster  
PacifiCorp Electric Operations  
P.O. Box 26128  
Salt Lake City, Utah 84126-0128

  
Dear Mr. Webster:

Re: Permit Renewal, PacifiCorp Electric Operations, Des-Bee-Dove Mine,  
ACT/015/017, Folder #3, Emery County, Utah

Enclosed please find two copies of the permit renewal for the Des-Bee-Dove Mine. Please sign both copies and return one to the Division.

Best Regards,

  
Dianne R. Nielson  
Director

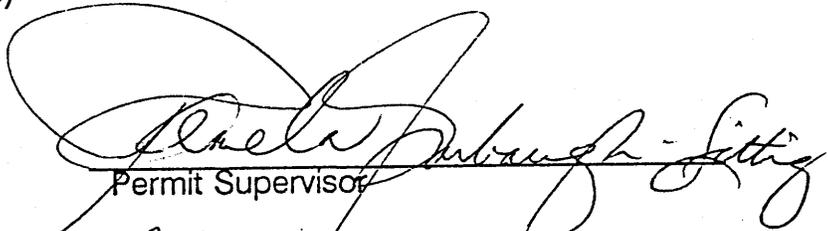
jbe  
Enclosures  
cc: L. Braxton  
P. Grubaugh-Littig  
AT015017.001

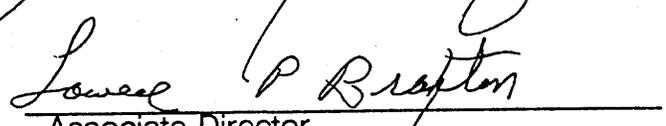
**FINDINGS  
FIVE-YEAR RENEWAL**

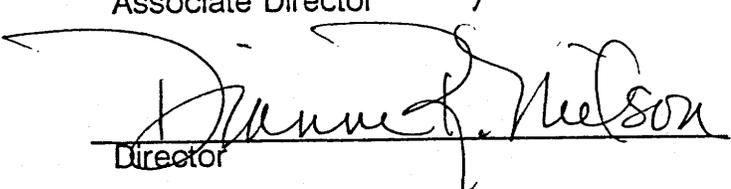
Pacificorp Electric Operations  
Des-Bee-Dove Mine  
ACT/015/017

Emery County, Utah  
May 31, 1991

1. The terms and conditions of the existing permit are being satisfactorily met. (R614-303-233.110)
2. The present coal mining and reclamation operations are in compliance with the environmental protection standards of the State Program. (R614-303-233.120)
3. The requested renewal does not substantially jeopardize the operator's continuing ability to comply with the State Program on existing permit areas. (R614-303-233.130)
4. The permittee has provided evidence of having liability insurance. (R614-303-233.140)
5. The permittee has provided evidence that a performance bond is in effect for the operation and will continue in full force and effect for the proposed period of renewal. (R614-303-233.150)

  
Permit Supervisor

  
Associate Director

  
Director

FEDERAL

PERMIT  
ACT/015/017

May 31, 1991

STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
(801) 538-5340

This permit, ACT/015/017, is being renewed for the state of Utah by the Utah Division of Oil, Gas and Mining (Division) to:

PacifiCorp Electric Operations  
324 South State Street  
P.O. Box 26128  
Salt Lake City, Utah 84126-0128

for the Des-Bee-Dove Mine. A Surety Bond is filed with the Division in the amount of \$1,837,712, payable to the State of Utah, Division of Oil, Gas and Mining and the 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.

**Sec. 2 PERMIT AREA** - The permittee is authorized to conduct underground coal mining activities on the following described lands within the permit area at the Des-Bee-Dove Mine, situated in the state of Utah, Emery County and located:

Township 17 South, Range 7 East, SLM

Section 11: E1/2, E1/2 W1/2

Section 12: W1/2 NW1/4, NW1/4 SW1/4

Section 13: SE1/4 SW1/4

Section 14: W1/2, W1/2 E1/2, NE1/4 NE1/4, SE1/4 SE1/4

Section 23: All

Section 24: W1/2, W1/2 SE1/4

Section 25: W1/2 SW1/4

Section 26: N1/2, N1/2 SE1/4, NE1/4 SW1/4

Section 35: Portions of the E1/2 E1/2

Section 36: Portions of the N1/2 NW1/4

Township 18 South, Range 7 East, SLM

Section 2: Portions of the W1/2 NE1/4, Portions of the NE1/4 SW1/4

This legal description is for the permit area of the Des-Bee-Dove Mine. The permittee is authorized to conduct underground coal mining activities and related surface activities 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 becomes effective on May 31, 1991, and expires on August 29, 1995.
- Sec. 5 ASSIGNMENT OF PERMIT RIGHTS** - The permit rights may not be transferred, assigned or sold without the prior written 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 R614-303-300.
- 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, R614-400-220, 30 CFR 842.13 and R614-400-110;
  - (b) be accompanied by private persons for the purpose of conducting an inspection in accordance with R614-400-100 and R614-400-200 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 underground coal mining activities only on those lands specifically designated as within the permit area on the maps submitted in the approved plan and approved for the term of the permit and which are subject to the performance bond.
- Sec. 8 ENVIRONMENTAL IMPACTS** - The permittee shall 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 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. 10 EXISTING STRUCTURES** - As applicable, the permittee will comply with R614-301 and R614-302 for compliance, modification, or abandonment of existing structures.

**Sec. 11 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. 12 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. 13 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. 14 PERMIT RENEWAL** - Upon expiration, this permit may be renewed for areas within the boundaries of the existing permit in accordance with the Act, the approved Utah State Program and the Federal Lands Program.

**Sec. 15 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. The Division, after coordination with OSM, shall inform the permittee of necessary actions required. The permittee shall implement the mitigation measures required by Division within the time frame specified by Division.

**Sec. 16 APPEALS** - The permittee shall have the right to appeal as provided for under R614-300-200.

**Sec. 17 SPECIAL CONDITIONS** - There are special conditions associated with this permitting action, as described in Attachment A.

The above conditions (Secs. 1-17) 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: Deanne R. Nielson

Date: 5-31-91

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

[Signature]  
Authorized Representative of  
the Permittee

Date: June 10, 1991

## ATTACHMENT A

### CONDITION R614-301-233-(1) (HS)

Within 45 days of permit renewal, the permittee must submit analyses of the five major fills within the mine area to include sampling procedures outlined on pages 4-100 through 4-102 and provide documentation of the depth of the soil mantle atop the coal waste within the tipple area.

Additionally, for the haul road between stations 165+00 through 243+18, the permittee must identify a borrow site and provide necessary information for the development and reclamation of the site or conduct field site trials to demonstrate the suitability of the Des-Bee-Dove Haul Road fill material as a plant growth medium for final reclamation.

### CONDITION R614-301-514.300-(1) (JK)

Within 45 days of permit renewal, the permittee must provide, for inclusion in the Operation Plan, a commitment to do the following:

- 1) Inspection of the sediment pond quarterly, either by a professional engineer or else by a specialist experienced in the construction of impoundments (514.310);
- 2) Certification of the quarterly report promptly after each inspection by a qualified, registered, professional engineer and to send a copy of the report to the Division (514.312); and
- 3) Annual certification of the sediment pond by a qualified, registered, professional engineer and inclusion of the certification in the Annual Report.

### CONDITION R614-301-542.300-(1) (JK)

Within 45 days of permit renewal, the permittee must revise and submit the following text and maps for inclusion in the PAP:

- 1) Map 3-10 (Existing Earthen Structures) must be modified to show, by shading, those areas which are used in estimating volumes of material which will contribute to the backfilling of highwalls, portal faceups, and the bathhouse/warehouse cut. This map must also show, by

crosshatching, highwalls, portal faceups, and other areas which will receive fill material.

- 2) Map 4-1 (Final Reclamation Map), sheet 2, must be modified to accurately show the anticipated final surface configuration of the present earthen fill structures.
- 3) Map 4-1 (Final Reclamation Map), sheet 5, must be modified to correspond to Map 3-10, i.e., it must show those areas that will receive and those that will contribute fill material with the same shading and crosshatch scheme used on Map 3-10.
- 4) Accurate cross-sections of the bathhouse/warehouse pad must be added to Map 4-1 (Final Reclamation Map), sheet 4. These cross sections must demonstrate that there is sufficient material available at the edge of the bathhouse/warehouse pad to completely backfill the pad, when that material is combined with the material that will be contributed by the other fill structures.
- 5) Earthwork quantities summarized on page 4-6 must be modified to verify the recalculated volume estimates as a result of the map and cross section changes.

CONDITION R614-301-728-(1) (TM)

Within 45 days of permit renewal, the permittee must submit a detailed plan for inclusion in the PAP, as to how the following information from the proposed test plots will be achieved, based on the following requirements:

- |                |   |
|----------------|---|
| <u>728.331</u> | Predicted sediment yield from the reclaimed haul road area;   |
| <u>728.332</u> | Acidity, total suspended and dissolved solids and other important water quality parameters of local impact from the impact of coal mining and reclamation operations; and |
| <u>728.335</u> | Characterizations required by the Division for the test plots which must include:   |

- 1) Application methodology assessment for hydromulch (i.e., treatment method-soil prewetted prior to application to allow for better absorption of stabilizers) and other treatments, implying different methods of application must be tried and evaluated;
- 2) Soil bed preparation (roughness of seedbed) in relation to erosion control; and
- 3) Runoff collection on test plots to determine water quality (i.e., TDS and TSS).

CONDITION R614-301-731-(1) (TM)

Within 45 days of permit renewal, the permittee must submit technically adequate plans, for inclusion in the PAP, for sediment control (BTCA) on all areas not being treated by the sediment pond during reclamation. The PAP must include all sediment control measures and siltation measures with design criteria, cross-sections and maps as required by rule R614-301-742.110, Sediment Control Measures.

CONDITION R614-301-731.121-(1) (TM)

Within 45 days of permit renewal, the permittee must submit a detailed BTCA plan as an appendix to the PAP which specifically addresses the following issues (this is required in addition to the current plan, to use contour furrows and berms as shown on Plate 4-1, sheet 3 of 5):

- 1) A plan for providing sediment control during construction and following construction of all stream crossings and culvert removal sites where permanent diversions will be installed;
- 2) A revised and upgraded plan for the contour furrows and berms as shown on Plate 4-1, sheet 3 of 5 to address the runoff storage capacity of these BTCA measures in relation to the 10-year, 24-hour storm runoff volume. This will verify the treatments' effectiveness in providing treatment for all areas not draining to the sediment pond. This must be included in a BTCA Appendix showing all areas treated with BTCA measures other than sediment ponds; and

- 3) The assessment of the runoff water quality must be included as a design criteria for the test plot study. The data must be interpreted and included as part of the BTCA appendix upon submittal following test plot implementation. The plan must identify the surface water quality and quantity parameters to be monitored, sampling frequency and site location.

CONDITION R614-301-731.700-(1) (TM)

Within 45 days of permit renewal, the permittee must submit certified cross-sections of the sediment pond and certify maps HM-1 and HM-5 per the requirements identified in R614-301-731.730, R614-301-731.740 and R614-301-731.750.

CONDITION R614-301-742.220-(1) (TM)

Within 45 days of permit renewal, the permittee must provide drawings (Appendix VIII) that provide consistent information regarding the sediment pond. Three as-built drawings in Appendix VII provide three different pond bottom elevations. Page 3-54 of the PAP states five feet of clearance between a full sediment load elevation and the decant elevation. None of this information is in agreement (drawing #01-52-1-015 was revised on February 24, 1989 and October 1, 1984, to show as-built plans).

In addition to accurate as-built drawings and cross-sections being provided, the following information must also be submitted:

- 1) Sediment levels and clean-out elevations marked on all cross-sections (cross-sections are not marked as-built and certified);
- 2) Decant and clean-out procedures and a sediment testing and storage plan per Division guidelines;
- 3) A discussion of how sediment levels are determined to meet the 60% clean-out elevation determination; and
- 4) Calculations to prove that the open channel spillway is of nonerodible construction and capable of maintaining sustain flows. Riprap sizing calculations for the spillway must be included in Appendix VIII.

CONDITION R614-301-742.300-(1) (TM)

Within 45 days of permit renewal, all hydrologic calculations for existing hydrologic structures at the Des-Bee-Dove Mine site must be submitted for inclusion in the PAP.

jbe  
DES-STIP.TA



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

Norman H. Bangerter  
Governor

Dee C. Hansen  
Executive Director

Dianne R. Nielson, Ph.D.  
Division Director

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340

June 14, 1991

TO: File

FROM: Pamela Grubaugh-Littig, Permit Supervisor *PL*

RE: 510(c) Check, PacifiCorp Electric Operations, Des-Bee-Dove Mine, ACT/015/017, Folder #2, Emery County, Utah

The permit transfer on March 15, 1991, from Utah Power and Light Company to PacifiCorp Electric Operations, involved a 510(c) clearance. The AVS check recommended approval (see attached).

jbe  
Attachment  
AT015017.002



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

Norman H. Bangerter  
Governor

Dee C. Hansen  
Executive Director

Dianne R. Nielson, Ph.D.  
Division Director

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340

January 25, 1991

TO: Pamela Grubaugh-Littig, Permit Supervisor *Jch / jgl*

FROM: Joseph C. Helfrich, Regulatory Program Coordinator

RE: Compliance Review for Section 510(c) Findings, PacifiCorp Electric Operations, Des-Bee-Dove Mine, ACT/015/017, Deer Creek Mine, ACT/015/018, Cottonwood/Wilberg, ACT/015/019, Folder #5, Emery County, Utah

As of the writing of this letter, there are no NOV's or CO's which are not corrected or in the process of being corrected. Any NOV's or CO's that are outstanding are in the process of administrative or judicial review. There are no finalized Civil Penalties which are outstanding and overdue in the name of Pacificorp Electric Operations.

Finally, they do 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.

jbe  
A:\510(C)

01:25

TO: Joe Helfrich, AVS Representative, UT

FROM: %

SUBJECT: OSM Recommendation

DATE: January 25, 1991

Outstanding Applications ACT015017, ACT015018 and ACT015019, PACIFICORP, have been researched, and the OSM recommendation is RESOLVED. The outstanding civil penalties on Citations N80-2-17-23 and N80-2-17-24 listed in AVS have been paid and the database will be updated to reflect this payment.

FROM: Gary Fritz, Albuquerque Field Office.

DOC ID 20:DOI370025:21392]

52E for 152G22 07:57 MST 25-Jan-91 Message 817-1728 [59]

Question?:

End for ATTention, Home to Switch : Capture Off : Numeric

**utah  
power**  
& LIGHT COMPANY  
MINING DIVISION  
P.O. Box 310  
Huntington, Utah 84528

July 31, 1990

RECEIVED  
AUG 06 1990

DIVISION OF  
OIL, GAS & MINING

Ms. Pamela Grubaugh-Littig  
Permit Supervisor  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

RE: Des Bee Dove Haul Road Reclamation Study, Utah Power and  
Light Company, Des Bee Dove Mine, ACT/015/017, Folder #2,  
Emery County, Utah

Dear Ms. Grubaugh-Littig:

Submitted in response to your letter to Mr. Smaldone dated July 25, 1990, please find the proposed schedule for the above referenced project.

PROJECT PHASES/TASKS

COMPLETION DATE

DESIGN

Literature Review	9/30/90
Identify relevant factors and options	
Grading	
Drainage	
Erosion Control	
Revegetation	
Site/Area Characterization	10/31/90
Site vs literature info	
Topography	
Soils	
Vegetation	
Drainage/Erosion Patterns	
Precipitation	
Design Development	1/5/91
Consultation	
Engineering	
Hydrology/Hydraulics	
Vegetation	
Erosion/Sediment Control	
Monitoring	

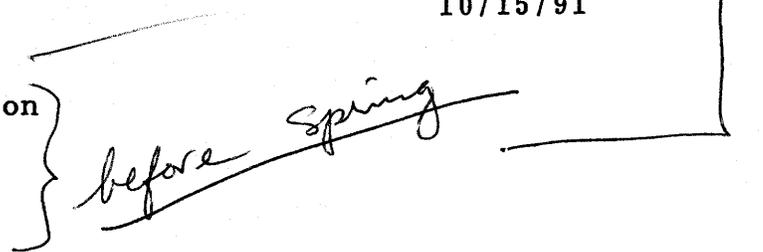
Design Review/Modification/Approval  
DOGM/OSM  
Consultant

3/15/91

IMPLEMENTATION

10/15/91

Materials Procurement  
Slope Stabilization  
Erosion Control  
Revegetation  
Seed/Plants  
Soil Amendments  
Site Preparation  
Materials Installation



MONITORING AND EVALUATION

8/15/95

Stability  
Erosion  
Sediment Production  
Precipitation  
Vegetation  
Soils

The project involves several uncontrollable factors including the schedules of various personnel (including DOGM and OSM), laboratory time, availability of materials and seasonal consideration for implementation. Therefore, I feel the proposed schedule is realistic and reasonable.

If you have questions or comments regarding this matter, please call me at 687-9821.

Sincerely,

Val Payne  
Senior Environmental Engineer

VP/do

cc: D.W. Jense  
S. Child  
G. Davis  
T. Faucheux  
M. Moon



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

Norman H. Bangertter  
Governor  
Dee C. Hansen  
Executive Director  
Dianne R. Nielson, Ph.D.  
Division Director

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340

*This is in  
regards to  
Res - Ben - Board*

October 11, 1988

TO: Coal Regulatory Staff  
FROM: Lowell Braxton, Administrator *LOB*  
RE: Guidelines for Duration of Temporary Cessation of Operations

"Temporary Cessation of Operations" (UMC 817.131) outlines the requirements of the permittee for temporary cessation of operations but does not define the length of time an operator may maintain a permitted property under a temporary cessation. The regulation could be construed that the duration is indefinite. Conversely, "Contemporaneous Reclamation" (UMC 817.100) requires reclamation be undertaken in a contemporaneous fashion.

The purpose of this memo is to outline the guidelines for "duration" of temporary cessation of operations prior to final reclamation. Four aspects should be considered in terms of "extended" temporary cessation as follows:

1. An approved reclamation permit must be maintained by the operator. An adequate bond must be posted at all times.
2. Site maintenance must be undertaken as required according to the approved permit and performance standards.
3. Significant remaining mineable coal reserves must be documented by the permittee (BLM concurrence for federal coal mines).

If an operator meets the three conditions previously noted, then the duration of temporary cessation may extend to either 15 years after initiation of temporary cessation, or up to the third five-year permit renewal, which ever occurs first. Thusly, final reclamation would be required to commence at the end of the third five-year permit term following notification of temporary cessation or 15 years after initiation of temporary cessation if no action is taken by the permittee to activate the property.

Failure to meet the three conditions noted above will result in the Division ordering immediate final reclamation.

An operator has the option of appealing to the Board if ordered to complete final reclamation by the Division.

vb  
WPOM/13-1&2

**Technical Analysis  
Des-Bee-Dove Mine  
PacifiCorp Electric Operations  
ACT/015/017  
Permit Renewal**

R614-301-100 GENERAL CONTENTS (SW)

R614-301-112 Identification of Interests

PacifiCorp is an Oregon corporation. The permit permittee is PacifiCorp Electric Operations and the mine operator is Energy West Mining Company (page 1-2). J. Blake Webster, PacifiCorp Electric Operations-Fuel Resources, is the mine's resident agent who will accept Service of Process. The names of PacifiCorp's officers and directors are found on pages 1-5 through 1-10. PacifiCorp currently has 10 coal mining and/or reclamation operations permitted in the United States (pages 1-2 through 1-4). The name and address of each owner of the surface and mineral property to be mined (page 1-39) and of each owner contiguous to the permit area (page 1-11 and 1-12) are listed in the permit application. The mine has three MSHA numbers, one assigned to each mine or portal, Deseret, Beehive and Little Dove. The permittee has no option, bid or other interest in any contiguous acreage other than within the permit areas of the Deer Creek Coal Mine and the Cottonwood Coal Mine.

R614-301-113 Violation Information

PacifiCorp has never had a federal or state coal mining permit suspended, revoked or forfeited a performance bond (page 1-13). A list of all violations received by PacifiCorp is provided on pages 1-14 through 1-28.

R614-301-114 Right-of-Entry Information

The documents upon which the permittee bases their legal right to enter and conduct coal mining and reclamation operations on is found on pages 1-29, 1-35, and 1-38 through 1-41. Surface owner consent for severance from surface and coal rights was given by the McKinnon Trust (page 1-29.1 through 1-29.2).

R614-301-115 Status of Unsuitability Claims

The permittee has consulted with federal land agencies and the Division, no lands within or adjacent to the permit area is designated or under study as unsuitable for coal mining and reclamation operations (page 1-30). No facilities or operations will be conducted within 300 feet of an occupied dwelling.

R614-301-116 through 150 Permit Term, Insurance and Maps

The permit application is for a five-year permit term (page 1-31). The Certificate of Liability Insurance is carried by Associated Electric & Gas Insurance Services Limited (pages 1-32 through 1-34). Public notice of permit renewal was made by PacifiCorp for the Des-Bee-Dove Mine (page 1-43).

The permit application package is clear, concise and filed in a format which is acceptable to the Division. A notarized signature by the Permitting Administrator stating that all information in the permit is true and correct is found on page 7.

All maps and plans are of an appropriate scale, and all applicable maps and plans distinguish between operations which occurred prior to August 3, 1977 and prior to issuance of a permit by the Division on August 29, 1985.

COMPLIANCE

The permittee is in compliance with all sections of R614-301-100.

R614-301-200 SOILS (HS)

R614-301-210 Introduction

Approximately 78 acres of disturbance is associated with the Des-Bee-Dove Mine Facility. Disturbed acreage is as follows: Mine area = 20 acres (pre-PL95-87); haul road = 50 acres; sedimentation pond and haul road = 8 acres (page 3-19). Subsoil was salvaged and stockpiled (Plate 3-7) from the sedimentation pond disturbance (page 3-53). Topsoil and/or subsoil was not separately removed from the mine area because initial construction occurred prior to the passage of PL 95-87 (page 3-22). The haul road was constructed without prior approval from the Division and therefore, no topsoil was salvaged. The permittee has proposed the use of substitute topsoil material as a plant growth medium for the reclamation of the mine area and the haul road (page 4-58).

Soil/spoil analyses of the fills within the mine facilities area is described on pages 4-59 and 4-60. Soil sample results of the adjacent undisturbed soils is on pages 2-183 through 2-188; soil sample results from the haul road on pages 2-177 and 2-178; and soil sample results of the adjacent undisturbed soils on pages 2-179 through 2-182.

### R614-301-220 Environmental Description

The soils of the Des-Bee-Dove Mine are primarily colluvium and rock outcrops derived primarily from sandstone and shale. The soils tend to be very stony or bouldery, loamy skeletal (calcareous) mixed mesic throughout the profile.

An aridic bordering on a xeric to ustic moisture regime with a mesic temperature regime prevails. Average annual precipitation is between 8-10 inches with the mean annual soil temperature higher than 8°C but lower than 15°C. The topography of the area is gently sloping to steep, ranging from 0% to vertical but typically between 50% to 80% slopes. The aspect ranges from north to south but is generally southeast facing. The soil capability classification ranges from VIIIs-sx to VIIIs-3 non-irrigated.

Under native vegetation erosion hazards associated with these soils, are moderate to severe. The erosion hazard for disturbed soils is high to severe. These soils are generally well drained and range in texture from very gravelly sandy loam to silt loam. The pH of the surface horizon ranges from neutral (7.0) to 8.4. The electrical conductivity (EC) is generally low (<4 mmhos/cm at 25°C), however, outwashes and conical slopes derived from Mancos Shale may have EC greater than or equal to 22 mmhos/cm at 25°C. The depths of reported A horizon ranges from 4-18 inches.

The Des-Bee-Dove Mine soil resource was surveyed at an unreported scale; but, the scale appears to be an Order II. The soils in the vicinity of the disturbance are as follows: lithic ustorthents; xerollic calciorthids.

The major limiting factors for the soils in the vicinity of the disturbance is extremely high growing-season temperatures, low precipitation, high exchangeable sodium, and high salt activity. Hence, the soils are low in nutrient and moisture availability and have poor physical conditions which deter water movement and root penetration.

### R614-301-221 Prime Farmland Investigation

An investigation was conducted by the Soil Conservation Service to determine if prime farmland exists within the permit area. Ferris P. Allgood, State Scientist (1983) for the U.S. Soil Conservation Service, determined that the soils in the permit area are too steep and/or above established irrigation systems and therefore, do not meet the requirements for prime farmland (pages 2-224 through 2-227).

### R614-301-230 Operational Plan

The disturbance associated with the mine area occurred prior to the passage of PL 95-87 (page 3-22). The disturbance created during the haul road construction was accomplished without prior approval from the Division. Topsoil was not separately salvaged from these areas. The permittee has proposed utilizing substitute topsoil from the surface (top 18-24 inches, page 4-62) of the five major fills of the mine area and the downcast road fill/base material from the haul road (pages 4-58 & 4-62).

As of February 6, 1987, the Des-Bee-Dive Mine was temporarily closed. The mine remains idle; however, prior to the resumption of coal mining activity, the permittee will give six months advance public notification (Page 3-1). The permittee does not anticipate new disturbance during the ensuing five-year permit term (page 3-22). The only activity planned for the next permit term is general maintenance and inspections and implementations of test plots to determine the suitability of the proposed substitute topsoil material (see R614-301-233).

### R614-301-233 Topsoil Substitutes and Supplements

The downcast material and fill along the haul road was sampled in 1985 (page 2-177 through 2-178). Results indicate a saline/sodic soil and material which is unacceptable as a plant growth medium for final reclamation when compared with adjacent undisturbed soils (i.e., potential borrow material sampled in 1990) (pages 2-179 through 2-182) and Division Guideline for the Management of Topsoil and Overburden (Table 2).

The permittee has proposed the use of the road fill material as a plant growth for final reclamation (page 4-58). The permittee has prepared and submitted a proposal (letter to Pam Grubaugh-Littig, dated July 31, 1990/Des-Bee-Dove Haul Road Reclamation Study, February 15, 1991) to conduct field site trials to determine the reclaimability of the major fill slope located between stations 131+00 and 142+00 (Plate 5-5). Division review of said proposal will continue and test plots will be implemented in the Fall of 1991.

More favorable plant growth conditions exist from stations 165+00 through 243+18. This material is primarily sandstone parent material with lower slope angles and with adjacent undisturbed pinyon-juniper overstory and greater effective precipitation. However, as indicated by the soil analysis and the poor interim revegetation success along the embankments of the road, the Division finds that additional field site trials or the identification of a borrow site is necessary to insure the reclamation of this portion (including the access road to the sedimentation pond) of the haul road.

The outcome of the aforementioned site trials will greatly influence the reclamation plan for the haul road. Successful techniques as proven by the site trials will only be incorporated into the reclamation plan after Division approval (page 4-82).

The suitability of the five major fills within the mine area (i.e., proposed substitute topsoil material) and the depth of the coal waste soil mantle within the tipple pad must be determined. The original sample set found on pages 4-59 and 4-60 is incomplete and must be compatible with the soil analysis conducted for the undisturbed soils adjacent to the mine area (pages 2-183 through 2-188).

#### CONDITION R614-301-233-(1) (HS)

Within 45 days of permit renewal, the permittee must submit analyses of the five major fills within the mine area to include sampling procedures outlined on pages 4-100 through 4-102 and provide documentation of the depth of the soil mantle atop the coal waste within the tipple area.

Additionally, for the haul road between stations 165+00 through 243+18, the permittee must identify a borrow site and provide necessary information for the development and reclamation of the site or conduct field site trials to demonstrate the suitability of the Des-Bee-Dove Haul Road fill material as a plant growth medium for final reclamation.

#### R614-301-234 Topsoil Storage

The only topsoil/subsoil stockpile on the permit area is located adjacent to the sedimentation pond (plate 3-7, sheet 3 of 3). At the time of pond construction, it was determined that no topsoil existed in sufficient quantities to warrant separate removal and storage. Therefore, only subsoil has been stockpiled. Approximately 12,650 yds<sup>3</sup> of material has been stockpiled (Map 2-13, sheet 1 of 3). The stockpile has been seeded and is protected by berms, diversions and sediment control structures (page 3-53).

The pond area (4.5 acres) will be covered with the stockpile material at an average depth of 18 inches. Revegetation will proceed as outlined for the haul road (page 4-88).

#### R614-301-240 Reclamation Plan

As stated before, the reclamation of the mine area and haul road will be contingent upon the results derived from the various revegetation test plots (page 4-7). However, the basic reclamation procedure will not vary substantially from the forthcoming narrative.

All concrete, asphalt and all coal cleaned from the surface of the mine area will be used as coarse backfill and buried against the highwalls and covered with at least four feet of nontoxic- and nonacid-forming material (pages 3-24, 3-27, 3-30, 4-1, and 4-65). Maximum final fill slopes will be equal to or less than 2h:1v (page 4-1).

All asphalt and road base from the haul road will be placed at the north end of the project area and will be covered with four feet of soil removed from the excavation of the drainage channel (page 4-7).

If fill material is suitable as a plant growth medium for final reclamation of the mine area (see R614-301-233), the upper 18-24 inches of fill will be removed and temporarily stored (page 4-62) and protect with a mulch cover (page 4-69). After final grading, the surface of the backfilled material will be in an uncompacted roughened condition. If compacted, smooth surfaces exist, the material will be ripped to eliminate slippage surfaces and promote root penetration (page 4-70). All reclaimed roads will be scarified (page 4-90). The temporarily stored substitute topsoil will be redistributed on the newly graded surface 6-12 inches deep (page 4-62). Following redistribution of topsoil, samples will be taken (2 samples/acre @ 1 foot) and analyzed (page 4-101) for fertilizer recommendation. Fertilizer will then be applied at the recommended rates (page 4-70). The site will then be hand broadcast with seed (seed mixture page 4-76) and raked to cover seed. Following seeding, the area will be covered with hay mulch (2 tons/acre) and netted or covered with erosion control blanket (page 4-77). If rills and/or gullies on regraded surfaces develop that are greater than nine inches, the channels will be filled, regraded or otherwise stabilized and the areas will be reseeded.

The revegetation plan for the haul road may be revised to incorporate the results of the test plot studies; however, reclamation will follow the techniques and methodologies outlined above, except where noted below.

The haul road Pinyon-Juniper vegetation type seed mixture and the haul road/sediment pond salt desert shrub vegetation type seed mixture are described on pages 4-82 and 4-83. After backfilling and grading and installation of contour furrows (page 4-7) the material which ends up at the surface will be treated with soil enhancer (i.e., Land Tech Irish Peat at 250 lbs/acre) (page 4-84). The area will be hydroseeded. Fertilizer will be applied at the following rate: Ammonium Nitrate - 200 lbs/acre; Triple Super Phosphate - 300 lbs/acre; Sulfur - 1000 lbs/acre. A wood fiber hydromulch with tackifier will be applied at 2000 lbs/acre and 50 gal/acre respectively.

### COMPLIANCE

The permittee is in compliance with all sections of R614-301-200, except for condition R614-301-233-(1) (HS).

R614-301-300 BIOLOGY (SW)

R614-301-320 Environmental Description

The Des-Bee-Dove Mine permit area covers five vegetative communities (page 2-159). The Pinyon-Juniper is the largest covering 1,480 acres or 53 percent of the area. The Pinyon-Juniper community is also the largest vegetative type which has been disturbed, 70 percent of the disturbance or 55 acres. There are 640 acres of sagebrush and 607 acres of mixed-Conifer communities within the permit area, although none of these vegetation typed are located within the disturbed area. The Salt-Desert shrub community, which only makes up three percent of the permit area vegetation, makes up 30 percent of the disturbed area. One small Aspen community is within the permit area, this area is only three acres in size.

The Soil Conservation Service estimated productivity of the Pinyon-Juniper and Salt-Desert shrub communities at the Des-Bee-Dove Mine area. Potential production of the Pinyon-Juniper community is 1,000 pounds per acre and only 200 pounds per acre in the Salt-Desert shrub community (page 2-154). Low productivity on these sites is not unexpected due to low rainfall amounts and the southern exposure of the mine area.

A letter from the U. S. Fish and Wildlife Service in 1980 states, "To the best of our knowledge, no endangered or threatened plant species or critical habitat or threatened or endangered wildlife species occur in the disturbed areas of the subject mining operations" (page 2-196). A letter sent to the U.S. Fish and Wildlife Service by the Division requesting current confirmation of this statement was signed on March 26, 1991. The permittee states that there has been winter sightings of Bald Eagles flying above the permit area.

The lower portion of the permit area haul road is classified as high priority deer winter range (Map 2-18). Critical elk winter range is located above the disturbed area, within the permit area on East Mountain. The entire escarpment area along East Mountain is designated as a raptor nesting zone (Map 2-178). This includes the mine disturbance area. Three golden eagle nest groups are found within the permit area.

The location and boundary of the reference areas are shown on Maps 2-12 and 2-13. These maps also delineate vegetative communities within the disturbed area boundary and within and adjacent to the permit area.

R614-301-330 Operation Plan

Most of the mine area at the Des-Bee-Dove Mine was disturbed prior to August 3, 1977. However, the permittee has stabilized all fill slopes within the mine facilities area with planting an interim seed mixture (page 4-164). The permittee has

committed to control erosion on disturbed areas by vegetative planting (page 4-66). The seed mixture, seedbed preparation, fertilizer and mulch plans for interim revegetation are found on pages 4-66 through 4-68.

Planned subsidence is expected through pillar extraction. Subsidence from both coal seams should not exceed 20 feet (page 4-150). The permittee has committed to replace any water, or any other resources, lost due to subsidence (page 4-156). Historically, the mine has had escarpment failure under the Castle Gate Sandstone (page 4-157). Future mining plans provide for greater protection of the escarpment. The golden eagle nests, 56B and 87C, are located within future proposed mining areas. Both these nest sites overlie barrier pillars which will remain unmined (page 4-161) as protection from subsidence.

Critical elk winter range and other areas on East Mountain are generally unaffected from mining disturbance (page 4-160). Subsidence monitoring is conducted annually to detect any such disturbance. No prime fisheries are located within the permit area, however hydrologic monitoring and sediment treatment continues on the properties. The transmission line to the mine provides phase-to-phase and phase-to-ground clearances to preclude electrical contact of raptors as agreed by the U. S. Fish and Wildlife Service (page 4-161). The haul road runs through high priority deer winter range. Employees are shown a video produced by the Utah Division of Wildlife Resources (UDWR) to reduce the disturbance and killing of wildlife (page 4-162). Training is also provided on how to avoid deer-vehicle collisions as well as posting signs on the haul road (page 4-163). Personnel will also be instructed on the value of snake dens and reporting such locations to UDWR.

#### R614-301-340 Reclamation Plan

The permittee has developed a revegetation schedule which should allow sufficient times to complete all tasks (page 4-75.1).

Three different seed mixtures are proposed for final reclamation. The seed mixtures are the mine site - Pinyon-Juniper vegetation type (page 4-76), haul road - Pinyon-Juniper vegetation type (page 4-82), and haul road sediment pond - Salt-Desert shrub vegetation type (page 4-83).

The mine site seed mixture will be applied by broadcasting methods. The area will be raked to cover the seed and fertilizer. Areas which have been hand broadcast seeded will be covered with 2 tons per acre mulch and netting or erosion control blanket. Following hydroseeding, 2,000 pounds mulch with tackifier will be applied. The permittee was asked to delineate where each mulch treatment would be applied. The permittee felt that the requirements of the regulation had been met without this designation (response to technical deficiency, letter dated February 7, 1991). The

spring following planting, 200 shrub and tree species per acre will be planted (pages 4-76 through 4-79).

The appropriate haul road seed mixtures will be applied with a hydroseeder. No plans are stated to try to incorporate the seed by raking. The request was made to the permittee by the Division to drill seed accessible area along the haul road. The permittee's response was that the request is not supported by the regulations (letter dated February 7, 1991). Fertilizer and sulphur will be applied by the hydromulcher. Hydromulch will then be applied at the rate of 2,000 pounds per acre (pages 4-82 through 4-84).

Final reclamation will restore drainage channels and revegetate the disturbed area. Rock piles of varying sizes will be left as small mammal habitat. Some of the revegetation seed mixture is similar to the adjacent undisturbed community. The mine site seed mixture is primarily designed for erosion control on steep slopes, and not for wildlife value. However, if sufficient plant diversity is established, sufficient food and cover for wildlife should be obtained (page 4-165).

The plan for planting trees and shrubs at the mine site calls for clumping and layering in order to optimize cover value (page 4-78). Shrubs seeded along the haul road have proven nutritional value for wildlife species, particularly deer in this high priority winter range area. Shrubs seeded in the Salt-Deseret shrub community along the haul road were primarily selected for the ability to grow in Mancos Shale. Nutritional value was also selected for in some shrubs however, test plot information will determine if the shrubs will grow in this soil type.

#### R614-301-350 Performance Standards

The proposed vegetative cover is designed to be diverse, effective, permanent and capable of stabilizing the soil surface. However, two problem areas exist in the disturbed area:

- Area 1      In final reclamation the Pinyon-Juniper mine site disturbance area will have topsoil applied of which some has been seeded with Crested Wheatgrass and Smooth Brome. This potential seed bank of Crested Wheatgrass and Smooth Brome could establish plants on the final reclaimed area. The permit (page 4-73 through 4-75) justifies the use of these species due to deep rooting depth (Smooth Brome) and drought resistance (Crested Wheatgrass). These are the characteristics which tend to make these species aggressive and out compete the native species. This could potentially reduce diversity in this area. However, the U. S. Forest Service insists that this seed mixture is consistent with the management plan for the area (page 4-66).

Area 2 The Salt-Desert shrub disturbed area along the haul road is in the Mancos Shale formation. The soil is high in clays, erosive and high in salts. Some steep slopes also occur in this area. Some success has occurred from interim seeding on gentle slopes. However, to date, no success has been achieved from interim seeding on the steeper slopes. Deep erosion gullies have formed on the road fill slopes. Currently, a test plot was installed by the operator (in 1989) to test a synthetic emulsion for erosion control and the seed mixture. Additional test plots are scheduled to be installed in the Fall of 1991.

Total vegetative cover of the Salt-Desert shrub reference area is 26 percent. If 26 percent cover is achieved on the reclaimed Mancos Shale steep slopes, this still may not be sufficient vegetative cover to control erosion. The reclaimability of this area to predisturbance conditions is yet to be proven. These areas were approved by OSM in 1985.

The disturbed areas will be seeded in the Fall. Fall is the locally accepted season of planting in this area.

Success standards for Phase II bond release will be judged by comparing the reclaimed areas to reference areas and pre-determined shrub density standards. Two reference areas were selected; a Pinyon-Juniper and Salt-Desert shrub. Reference areas are shown on Map 2-13. Baseline vegetative data for the two reference areas are detailed in a consultants report on pages 2-145 through 2-166 and 2-168. Vegetative cover, shrub and tree density and species lists were measured and compiled for these sites.

The postmining land use is for wildlife and livestock grazing. Therefore, diversity, cover productivity, and shrub stocking rates will be used to determine revegetation success using Division accepted statistical comparisons and confidence intervals (page 4-85). The period of extended responsibility will continue for a minimum of ten years. Quantitative vegetation monitoring will occur in years 2, 3, 5, 9 and 10. Productivity measurements will be taken in years 9 and 10 (pages 4-80 through 4-82 and 4-85 through 4-87) and reference area data in year 10.

### COMPLIANCE

The permittee is in compliance with all sections of R614-301-300.

R614-301-400 LAND USE AND AIR QUALITY (SW)

R614-301-411 Environmental Description

Mining began in 1898 in an unnamed canyon in which the Des-Bee-Dove mines are now located. Mining has continued off and on until the present (page 3-1). Utah Power and Light purchased the mine from the LDS church in 1972. Both the Blind Canyon Seam (map 1-3) and Hiawatha Seam (map 1-3) were mined prior to August 3, 1977. Additionally, the haul road was built without Division approval and a cessation order was issued. As such, no pre-mining productivity or land conditions are available.

However, reference areas are representative of the premining condition of the land. Productivity data is given on page 2-154, and the ecological condition of these reference areas are rated as fair. Land uses within the permit area, as described by the land use agencies, are recreation, forestry and mining, non-rangeland, grazing, and sand and gravel, as designated on map 2-17A. A discussion on livestock and wildlife stocking rates is given on pages 2-220 and 2-221.

Two cultural resource surveys were conducted for the permit area. One survey in 1980 for the general permit area (pages 2-1 through 2-131) and another for the haul road (pages 2-134 through 2-142). No significant finds were reported by the consultant. A letter from the Utah Division of State History (page 2-132), dated August 8, 1990, confirms the consultants report.

R614-301-412 Reclamation Plan

The postmining land use is grazing and wildlife habitat (page 4-106). By regrading to approximate original contour and after revegetation, the wash area should provide equivalent vegetative cover. Other areas at the mine site will be regraded to approximate original contour. However, terraces will be incorporated into the landscape where once steep, eroded slopes were located (page 4-105). These terraces will provide enhanced vegetative cover from the original area and flat areas for the wildlife and livestock. The reclamation of the road system will leave a cattle trail for access to the top of East Mountain. The cattle trail will allow continued use of the area by cattlemen, sportsmen and property owners. The trail will exclude vehicle use. The absence of water limits the potential of other uses (page 4-106).

Land surface owners are the U.S. Forest Service, Bureau of Land Management and the State of Utah Division of Lands and Forestry. The right-of-way for the surface use of these lands state that each site will be restored to their natural state (page 4-107). The permittee believes that the reclamation of these lands is in compliance with the right-of-way and postmining land usage.

## COMPLIANCE

The permittee is in compliance with all sections of R614-301-400.

### R614-301-500 ENGINEERING (JK)

#### R614-301-512 Certification (See R614-301-731.700, .730, and .740)

Most cross-sections, maps, plans and engineering designs which require certification under this section have been certified by a qualified, registered, professional engineer (page 6 and certification stamps on individual maps and plans).

#### R614-301-513 Compliance with MSHA Regulations and MSHA Approvals

There are no impoundments which meet the size or volume criteria of 30 CFR 77.216(a), no coal processing waste dams or embankments, and no refuse piles at this mine site.

The mine was idled in February of 1987. At that time, all openings to the surface from underground were temporarily sealed and posted with warning signs, in accordance with 30 CFR 75.1711 (page 3-1). All openings will be maintained in this temporarily-sealed condition throughout the permit period. The Division will be given 30 days notice if and when the mine reopens.

#### R614-301-514 Inspections

There are no excess spoil disposal facilities or structures and no refuse piles which require inspection or certification.

The permittee commits to making quarterly inspections of the sediment pond and to include these inspections in the Annual Report (page 3-20). This commitment, however, is incomplete.

### CONDITION R614-301-514.300-(1) (JK)

Within 45 days of permit renewal, the permittee must provide, for inclusion in the Operation Plan, a commitment to do the following:

- 1) Inspection of the sediment pond quarterly, either by a professional engineer or else by a specialist experienced in the construction of impoundments (514.310);

- 2) Certification of the quarterly report promptly after each inspection by a qualified, registered, professional engineer and to send a copy of the report to the Division (514.312); and
- 3) Annual certification of the sediment pond by a qualified, registered, professional engineer and inclusion of the certification in the Annual Report.

R614-301-515 Reporting and Emergency Procedures

In the event of either a slide or an impoundment hazard, the permittee is committed to notify the Division promptly and to comply with any remedial measures required to protect and ensure the public health and safety (page 3-18).

In the event that temporary cessation of operations is to extend beyond 30 days, the permittee is committed to notify the Division and to comply with all of the requirements of R614-301-513.300 (page 3-18).

R614-301-516 Prevention of Slides in Surface Coal Mining and Reclamation Activities

Not applicable.

R614-301-520 Operation Plan

R614-301-521.110 Previously Mined Areas

Maps 1-3 (Mine Permit Area with Mine Development - - Beehive/Little Dove Mine) and 1-4 (Mine Permit Area with Mine Development - - Deseret Mine) show the location and extent of known workings of active, inactive, and abandoned underground mines within the permit and adjacent areas.

R614-301-521.120 Existing Surface and Subsurface Facilities and Features

Maps 3-6 and 3-7 (Surface Facilities Location Map), and Map 3-10 (Existing Earthen Structures) correctly show the locations of buildings, facilities, features, and roads within and adjacent to the permit area.

R614-301-521.130 Landowners and Right of Entry and Public Interest Maps

Maps 1-1 (Coal Ownership Map) and 1-2 (Surface Ownership Map) correctly show the boundaries and present owners of all lands within or contiguous to the permit area as well as those lands upon which the permittee has the legal right to enter and begin coal mining operations.

R614-301-521.140 Mine Maps and Permit Area Maps

Maps 1-3 (Mine Permit Area with Mine Development - - Beehive/Little Dove Mine), 1-4 (Mine Permit Area with Mine Development - - Deseret Mine), 1-5 (Disturbed Area Boundary Map), 3-10 (Existing Earthen Structures), 4-1 (Final Reclamation Map), and 4-3 (Disturbed Area Cross Sections) correctly show all areas which will be affected by mining and reclamation operations. A planimeter check of the permit area and disturbed area as represented by the maps shows them to be very close to the respective values of 2847 acres and 74.5 acres calculated by the permittee.

R614-301-521.150 Land Surface Configuration Maps

Maps 3-6 and 3-7 (Surface Facilities Location Map), 3-8 (Surface Drainage Map), and 3-10 (Existing Earthen Structures) adequately represent the existing land surface configuration of the area affected by surface operations and facilities.

R614-301-521.160 Maps and Cross Sections of the Proposed Features for the Proposed Permit Area

Maps 1-2 (Surface Ownership Map), 1-5 (Disturbed Area Boundary Map), and 3-6 and 3-7 (Surface Facilities Location Map) show all buildings and facilities, bonded areas, coal loading and storage areas, noncoal waste storage areas, and explosive storage facilities.

R614-301-521.170 Transportation Facilities Maps

Roads and conveyors are the only transportation facilities at this mine. All are shown on Maps 3-6 and 3-7 (Surface Locations Map) and described in detail in the text of the mine plan (pages 3-43 through 3-46).

R614-301-521.200 Sign and Markers Specifications

The permittee commits to maintaining mine and permit identification signs, perimeter markers, buffer zone markers, topsoil markers, and explosive warning signs in the appropriate places. All signs will be made of thin sheet metal and each type will be of a uniform design (pages 3-17 through 3-18).

R614-301-522 Coal Recovery

The mining operation will involve only room-and-pillar methods. Pillars will be extracted, except in those areas where they may be needed for roof support. Only barrier pillars and strata control coal will be left in place. Using such mining methods, the permittee expects an overall coal recovery rate of just over 50%. The permittee

commits, moreover, to work with the Bureau of Land Management to extract the maximum amount of economically recoverable coal (pages 3-7 through 3-9).

#### R614-301-523 Mining Methods

The application contains a full description of the proposed mining operation. Room-and-pillar methods with continuous mining machinery will be employed. The mining plan will be based on a six-entry system, with 20-foot entries on 80-foot centers. Three to five entries will be driven in development sections, and these entries will be 20-feet wide and will be driven on 50-foot X 100-foot centers. Using these mining methods, the permittee expects to reach an annual production of approximately 800,000 tons (pages 3-7 through 3-17).

#### R614-301-524 Blasting and Explosives

Since the mine site is already fully developed, the permittee does not foresee the need for any surface blasting. However, should the need for explosives arise, the permittee commits to develop a blasting plan in accordance with this section (Appendix VI and page 3-46).

#### R614-301-525 Subsidence

The application contains a subsidence control plan which includes an inventory of the area likely to be affected by subsidence, a description of methods of subsidence control to be employed, plans for mitigation of subsidence-caused damage, and details of a subsidence monitoring plan (pages 4-148 through 4-160).

The area likely to be affected by subsidence contains renewable resources in the form of springs, water seeps, grazing land, timber, and wildlife. Streams in the area are all ephemeral or intermittent. No structures such as buildings, roads, powerlines, oil or gas wells, pipelines, or utility structures are found in the area (page 4-148).

Room-and-pillar mining with pillar extraction is, by definition, a method of planned and controlled subsidence. The permittee expects, therefore, that any subsidence will occur as a gradual and uniform lowering of the land surface with little effect on the resources of the area (page 4-149).

The permittee commits to mitigate any material damage caused by subsidence. Such mitigation will consist of repair of subsidence cracks, repair of fences or stock ponds, and restoration of lost or diminished water resources (pages 4-155 through 4-157).

Subsidence was originally monitored using a combination of conventional surveying and aerial photogrammetry. However, since 1987, aerial photogrammetry has been the sole method of gathering subsidence data. Subsidence data are gathered from a network of control points which are established over each panel. The data are compiled in both map and table form and are submitted to the Division in the Annual Report. Subsidence monitoring will continue until subsidence has ceased, as agreed upon by both the permittee and the Division (pages 4-150 through 4-155).

#### R614-301-526 Mine Facilities

The application contains a narrative explaining the construction, use, maintenance, and removal of all surface facilities. All facilities are listed, along with their respective dates of construction, on page 3-57. Individual descriptions of all facilities are located throughout the text of Part 3. All facilities are located on Maps 3-6 and 3-7 (Surface Facilities Location Map), and photographs of all facilities are found in Appendix IX.

The permittee commits to operating and maintaining all facilities in accordance with R614-301. All facility plans are on file and available for public inspection at PacifiCorp Electric Operations office in Salt Lake City, Utah (pages 3-19 through 3-72).

#### R614-301-527 Transportation Facilities

There are two primary roads and no ancillary roads in the permit area. The two primary roads are the mine access road and the Des-Bee-Dove/Wilberg junction road. The mine access road begins at the lower end of the mine property and ends in the area of the Beehive portal. It is approximately 6100 feet in length. The Des-Bee-Dove/Wilberg Haul Road begins near the lower end of the property, on Danish Bench, winds past the sedimentation pond, and ends at its junction with the Wilberg road. It is approximately 2.8 miles long (pages 3-43 through 3-45).

Seven conveyors are used in the coal handling and sizing process. They are (1) the Little Dove Conveyor, (2) the Transfer Reclaim Conveyor, (3) the Deseret Conveyor, (4) the Main Stockpile Feed Conveyor, (5) the Auxiliary Stockpile Feed Conveyor, (6) the Tipple Feed Conveyor, and (7) the Tipple Process Conveyor. All conveyors are 42 inches in width except for the Tipple Feed Conveyor, which is 36 inches in width.

The Little Dove Conveyor delivers coal from the Little Dove portal to the stacking tube transfer, from the base of which it is delivered to the Deseret transfer by the Transfer Reclaim Conveyor. The Deseret Conveyor delivers coal to the Deseret transfer from both the Deseret mine and the Beehive mine via an underground transfer.

Two conveyors leave the Deseret transfer: the Main Stockpile Feed Conveyor and the Auxiliary Stockpile Feed Conveyor. The Main Stockpile Feed Conveyor delivers coal from the Deseret Transfer to the Main Stockpile by way of the picking table and the large concrete surge bin. The Auxiliary Stockpile Feed Conveyor delivers coal from the Deseret transfer to the upper coal storage pile, which lies next to the Main Stockpile and on the same earthen pad.

The Tipple Feed Conveyor takes coal from the base of the Main Stockpile to the Tipple and the Tipple Process Conveyor. The Tipple Process Conveyor, of course, is simply the internal tipple conveyor system (pages 3-45 through 3-46).

R614-301-528 Handling and Disposal of Coal, Overburden, Excess Spoil, and Coal Mine Waste

Coal is carried to the tipple from the mines by the conveyor system described in Section 527 (Transportation Facilities) above. It is sized and sorted in the tipple process. It is then loaded into trucks at the tipple and carried from there to its various destinations, primarily the Hunter Power Plant (pages 3-26 through 3-27).

Little, if any, overburden or spoil is now produced at this mine. That which was produced in the past was produced before 1977 and was incorporated into the various earthen fill structures and will be used as fill in final reclamation (pages 3-22).

No coal processing waste is produced as coal is not washed at this site.

Noncoal mine waste is gathered in concrete trash bins near the mine portals and in a pile below the tipple. As required, the noncoal waste is hauled from these bins to a state landfill for disposal (page 3-28).

R614-301-529 Management of Mine Openings

This mine has been idle since February 6, 1987. All mine openings have been sealed with temporary seals. All openings have, in addition, been fenced and posted with warning signs to prevent entry by unauthorized persons or by wildlife (pages 3-1 and 3-6). This temporary closing of the portals is in accordance with 30 CFR 75.1711-3.

R614-301-530 Operational Design Criteria and Plans

R614-301-532 Sediment Control

The total disturbed area of the mine site, including the sedimentation pond, is only 74.5 acres. Because of the steep topography and lack of space, the area designed for runoff collection and sediment control is almost 300 acres.

Runoff from both disturbed and undisturbed areas is collected by the drainage system and routed to the sedimentation pond. The drainage system consists of berms and ditches which catch the runoff from the pad areas and of underground culverts which collect this runoff, carry it beneath the permit area, and discharge it into the main channel of the canyon. The runoff follows the main channel then enters a large 72-inch diameter culvert which carries it beneath the Des-Bee-Dove/Wilberg Haul Road, and discharges into the sedimentation pond just south of that road. The entire runoff collection system, including the sedimentation pond, is designed to completely handle a 10-year, 24-hour storm event (pages 3-33 through 3-42 and 3-51 through 3-55).

Sewage from the office and bathhouse is collected in a 2500-gallon septic tank just south of the office complex. Treated effluent from the septic tank goes through a 6-inch line to a leach field near the tipple (page 3-38).

Areas, the runoff from which cannot be routed to the sedimentation pond, are designated as Alternative Sediment Control Areas (ASCAs). These areas are listed in Table 7, page 3-40. The sediment control for these areas consists of silt fences, straw bales, gravel filter dikes, berms, and catch basins. The total ASCA area for the mine site is 1.24 acres (pages 3-38 through 3-40).

In addition to the sediment control measures already mentioned, the permittee commits to contemporaneous reclamation and revegetation of denuded areas (pages 3-38 through 3-42).

#### R614-301-533 Impoundments

To meet State and Federal effluent limitations, a single sedimentation pond was constructed in 1979. The pond has a capacity of 19.8 acre-feet, which is adequate to completely contain a 10-year, 24-hour storm event. The pond is partly incised and partly banked. It lies south of the mine site in the bottom of the main channel of the canyon (pages 3-52 through 3-55 and Appendix VIII).

The sediment pond was analyzed for static and seismic stability by the firm of Chen Northern, Inc. in August of 1990. Chen Northern used, for the analysis, a standard rotational failure model (Bishop's Simplified Method of Slices). The pond embankments were found to have a minimum static factor of safety of 1.65 and a minimum seismic (pseudo-static with acceleration of 0.1g) factor of safety of 1.28. These figures compare favorably with the respective required minimum values of 1.5 and 1.2 (Appendix III).

### R614-301-534 Roads

There are two primary roads and no ancillary roads in the permit area. The two primary roads are the mine access road and the Des-Bee-Dove/Wilberg junction road. The mine access road begins at the lower end of the mine property and ends in the area of the Beehive portal. It is approximately 6100 feet in length. It is paved below the office/bathhouse/warehouse pad and gravel surfaced above there. Its average grade is about 10%. Plans, profiles, and cross-sections for the mine access road are found in Map 3-9 (pages 3-43 through 3-44)

The Des-Bee-Dove/Wilberg Haul Road begins near the lower end of the property, on Danish Bench, winds past the sedimentation pond, and ends at its junction with the Wilberg road. It is approximately 2.8 miles long and is paved over its entire length. Plans, profiles, and cross-sections for the Des-Bee-Dove/Wilberg junction road are found in Appendix XIV (pages 3-43 through 3-44).

The road embankments were analyzed for static stability by the firm of Chen Northern, Inc. in August of 1990. Chen Northern used, for the analysis, a standard rotational failure model (Bishop's Simplified Method of Slices). The embankments were found to have a minimum static factor of safety of 1.72. This figure compares favorably with the required minimum value of 1.3 (Appendix III).

### R614-301-535 Spoil

No spoil is now produced at this mine. Spoil which was produced in the past was produced before 1977 and was incorporated into the various earthen fill structures and will be used as fill in final reclamation (page 3-22).

### R614-301-536 Coal Mine Waste

Coal mine waste, including sedimentation pond cleaning waste, is disposed of in a 16-acre waste rock disposal facility which lies just west of the Cottonwood/Wilberg haul road. This facility is shared with the Cottonwood/Wilberg Mine and was permitted in 1990 as a major revision of the Cottonwood/Wilberg permit (ACT/015/019).

The waste rock disposal facility is essentially a head-of-hollow fill which lies at the head of an ephemeral wash near the base of a cliff. Waste rock is placed in the fill and compacted in 10-foot lifts. As each lift is being filled, its out slopes are covered with topsoil and revegetated. This cycle of compaction and contemporaneous reclamation will continue until the design capacity of the entire facility is reached (page 3-43 and Cottonwood/Wilberg Waste Rock Storage Facility Volume, ACT/015/019).

R614-301-537 Regraded Slopes

See R614-301-533 (Backfilling and Grading) below.

R614-301-540 Reclamation Plan

R614-301-542 Narratives, Maps and Plans

542.100 Reclamation Timetable -- In accordance with this section, the PAP includes a detailed timetable for the completion of each major step in the reclamation plan. The timetable shows the time estimated for the completion of each major step in reclamation as if that step were an operation in itself. Most of the reclamation operations, however, will be conducted concurrently rather than consecutively. Thus, the initial phase of reclamation, which will involve the largest proportion of reclamation activities -- and which will include removal of facilities, portal sealing, backfilling and grading, disposal of toxic- and acid-forming materials, drainage channel installation, and revegetation -- is expected to take approximately 105 days. Reclamation of the Des-Bee-Dove/Wilberg Haul Road and the sediment pond will be accomplished five years into the reclamation period and is expected to take approximately 70 days (pages 4-109 through 4-115).

542.200 Backfilling Plan -- In accordance with this section, the PAP includes a plan for backfilling, soil stabilization, compacting and grading (see R614-301-553 "Backfilling and Grading").

542.300 Final Surface Configuration Maps -- Map 4-1 (Final Reclamation Map), which includes five sheets, shows the planned final surface configuration with contour maps (sheets 1, 2, and 3) and cross-sections (sheets 4 and 5). These sheets, however, do not accurately represent the final surfaces, or the required and available volumes of material for the various earthwork operations. In addition, Map 3-10 (Existing Earthen Structures), which is tied to Map 4-1, does not clearly show what material will be displaced. These deficiencies were discussed in a May 29, 1991 meeting between Jesse Kelley of the Division and Blake Webster of PacifiCorp Electric Operations.

CONDITION R614-301-542.300-(1) (JK)

Within 45 days of permit renewal, the permittee must revise and submit the following text and maps for inclusion in the PAP:

- 1) Map 3-10 (Existing Earthen Structures) must be modified to show, by shading, those areas which are used in estimating volumes of material which will contribute to the backfilling of highwalls, portal faceups, and the bathhouse/warehouse cut. This map must also show, by

crosshatching, highwalls, portal faceups, and other areas which will receive fill material.

- 2) Map 4-1 (Final Reclamation Map), sheet 2, must be modified to accurately show the anticipated final surface configuration of the present earthen fill structures.
- 3) Map 4-1 (Final Reclamation Map), sheet 5, must be modified to correspond to Map 3-10, i.e., it must show those areas that will receive and those that will contribute fill material with the same shading and crosshatch scheme used on Map 3-10.
- 4) Accurate cross-sections of the bathhouse/warehouse pad must be added to Map 4-1 (Final Reclamation Map), sheet 4. These cross sections must demonstrate that there is sufficient material available at the edge of the bathhouse/warehouse pad to completely backfill the pad, when that material is combined with the material that will be contributed by the other fill structures.
- 5) Earthwork quantities summarized on page 4-6 must be modified to verify the recalculated volume estimates as a result of the map and cross section changes.

542.500 Timetable and Plan for Sediment Pond Removal -- In accordance with this section, the PAP includes a plan and timetable for removal of the sediment pond. Removal of the sediment pond will take place five years after the start of the reclamation period. The pond will first be drained and allowed to dry. It will then be broken down and backfilled to achieve the original contour of the area and reestablish the original drainage (pages 4-88 through 4-89 and Map 4-1, sheet 3).

542.600 Roads -- In accordance with this section, the PAP includes plans for reclaiming all roads. There are two primary roads: the Portal Access Road and the Des-Bee-Dove/Wilberg Haul Road.

The portal access road will be reclaimed during the initial phase of reclamation. The asphalt surface will be removed and buried at the base of the bathhouse/warehouse fill (page 4-132). The road surface will then be ripped, covered with topsoil, and revegetated (pages 4-89 through 4-90). The road, in its roughened condition, will be left as a cattle trail to East Mountain as part of the postmining land use of grazing and wildlife habitat (pages 4-106 through 4-107).

The Des-Bee-Dove/Wilberg Haul Road will be left in place during the first five years of the reclamation period to provide access to the sediment pond. At the time of sediment pond removal, the road will also be reclaimed. The asphalt surface will be

removed and covered with at least four feet of inert material at the north end of the road. All culverts will then be removed and the drainages restored. The road will then be backfilled and graded with material displaced during its construction and revegetated (pages 4-7 through 4-9 and 4-126 through 4-127).

542.700 Final Abandonment of Mine Openings and Disposal Areas -- All portals have been fenced and posted to prevent entry of wildlife or unauthorized persons. During reclamation, all portals will be sealed with concrete block walls and backfilled with at least 25 feet of noncombustible fill material. Since the mine workings are down dip from the portals, no hydrologic seals or drainage structures will be necessary (page 4-1 and Figure 1 of Chapter 4).

No fills, embankments, or other structures for disposal of spoil, coal mine waste, or noncoal mine waste are present at this site. Spoil and underground development waste were incorporated into the various earthen fills when the mine was opened, which was prior to 1977. These materials will be used in the backfilling and grading of the site during final reclamation.

542.800 Reclamation Cost Estimate -- In accordance with this section, the PAP contains a detailed estimate of reclamation costs upon which the bond amount is based (pages 4-109 through 4-147). The total estimated reclamation cost is \$1,254,519 (1985 dollars). The total bond amount presently posted is \$1,837,712. Using the Means Historical Cost Index escalation factor of 1.84% (1990), the original total estimated reclamation cost of \$1,254,519 equates to \$1,505,432 (1995 dollars). Thus, the present bond amount is adequate.

The reclamation cost is complete and represents the cost of final reclamation.

#### R614-301-550 Reclamation Design Criteria and Plans

#### R614-301-551 Casing and Sealing of Underground Openings

All portals have been fenced and posted to prevent entry of wildlife or unauthorized persons. During reclamation, all portals will be sealed with concrete block walls and backfilled with at least 25 feet of noncombustible fill material (page 4-1 and Figure 1 of Chapter 4). This is consistent with MSHA, 30 CFR 75.1711 and represents sound engineering procedure.

Since the mine workings are down dip from the portals, no hydrologic seals or drainage structures will be necessary.

### R614-301-552 Permanent Features

No small depressions or impoundments of any kind will be retained after final reclamation.

### R614-301-553 Backfilling and Grading

There are eight areas where backfilling and grading will take place. They are (1) the Beehive/Little Dove Portal Area, (2) the Deseret Portal Area, (3) the Stockpile Area, (4) the Tipple Pad, (5) the Bathhouse/Warehouse/Parking Area, (6) the Portal Access Road, (7) the Des-Bee-Dove/Wilberg Haul Road, and (8) the Sediment Pond Area. These areas will be graded and/or backfilled as follows:

#### 1) Beehive/Little Dove Portal Area

This is a fill area at the head of the canyon. Material from the fill will be used to completely backfill the highwall and the portals. Some surplus material will also go into the Bathhouse/Warehouse/Parking fill. The fill will then be excavated to bedrock to restore the drainage. The maximum slope will be 2h:1v (pages 4-3, 4-4, 4-6, 4-121, Plates 3-10 and 4-1).

#### 2) Deseret Portal Area

This is a fill area just below the Beehive/Little Dove Portal Area. Material from the fill will be used to completely backfill the highwall and the portals. Some surplus material will also go into the Bathhouse/Warehouse/Parking Fill. The fill will then be removed to bedrock to restore the drainage (pages 4-3 and 4-6, Plates 3-10 and 4-1).

#### 3) Stockpile Area

This is a fill area just below the Deseret Portal Area fill. The area has no highwalls or portals. Material from the fill will be pulled back to fill the area. Some surplus material will also go into the Bathhouse/Warehouse/Parking fill (pages 4-3 and 4-6, Plates 3-10 and 4-1).

#### 4) Tipple Pad

This is the largest of the earthen fill structures. The outslope of the structure was cut back in 1984 to a slope of 2h:1v in order to improve stability and raise the factor of safety above the required 1.5 (R614-301-537.230). This fill, which was constructed before 1977, constitutes a "settled and revegetated" fill under R614-301-537.200 and, as such, will not be removed. Instead, the drainage will be established around the fill by way of a riprap channel and will descend the face of the fill by way of a large riprap fan (pages 4-4, 4-5, 4-92, Plate 3-10 and 4-1).

The material in the Tipple Area Fill will be characterized by subsurface sampling during the summer of 1991 (see Condition R614-301-233). This will serve to determine whether or not the fill is made up of acid- and toxic-forming material (pages 4-3, 4-5, 4-91, Plates 3-10 and 4-1).

5) Bathhouse/Warehouse/Parking Area

This is a large cut and fill structure that lies southwest of the Tipple Area. It will be completely backfilled and terraced using material from its outslope as well as material borrowed from the other fill structures. The maximum slope will be 3h:1v (pages 4-4, 4-5, 4-6, 4-122 through 4-125, Plate 3-10 and 4-1).

6) Portal Access Road

This is the main road through the property from the entrance gate to the Beehive/Little Dove Portal Area. It will be reclaimed during the initial phase of reclamation. The asphalt surface will be removed and buried at the base of the bathhouse/warehouse fill (page 4-132). The road surface will then be ripped, covered with topsoil, and revegetated (pages 4-89 through 4-90). The road, in its roughened condition, will be left as a cattle trail to East Mountain as part of the postmining land use of grazing and wildlife habitat (pages 4-106 and 4-107, Plates 3-10 and 4-1).

7) Des-Bee-Dove/Wilberg Haul Road

This road will be left in place during the first five years of the reclamation period to provide access to the sediment pond. At the time of sediment pond removal, the road will also be reclaimed. The asphalt surface will be removed and buried with at least four feet of inert material at the north end of the road. All culverts will then be removed and the drainages restored. The road will then be backfilled and graded with material displaced during its construction and revegetated (pages 4-7, 4-8, 4-9, 4-126, and 4-127).

8) Sediment Pond

Removal of the sediment pond will take place five years after the start of the reclamation period. The pond will first be drained and allowed to dry. It will then be broken down and backfilled to achieve the original contour of the area and reestablish the original drainage (pages 4-88, 4-89, and Plate 4-1).

The entire disturbed area will be graded and all earthen structures except the tipple pad filled or reduced to achieve approximate original contour. All highwalls (Beehive/Little Dove Area, Deseret Portal Area, and Bathhouse/Warehouse/Parking Area) will be completely eliminated and depressions will be filled. Only the Portal Access Road will be left, and it will be in a broken and roughened condition. As has

been mentioned, the Portal Access Road, as reclaimed, will serve as a cattle trail to East Mountain, constituting an enhancement of the postmining land use of grazing and wildlife habitat (Plate 4-1).

A slope stability analysis of the bathhouse/warehouse fill was performed in August of 1990 by the firm of Chen Northern, Inc. (Appendix III). The stability analysis done by Chen Northern determined the relevant characteristics of the fill material (page 4-91) and used these in a standard rotational (Bishop's Method of Slices) failure model. The static factor of safety for a 2h:1v slope was found to be at least 1.74. Since no reclaimed slope will be steeper than 2h:1v, the static factor of safety for all grading and backfilling should be at least 1.74, which compares very favorably with the required value of 1.3 (533.130).

Material used in backfilling will be minus 3 inches. Material will be placed in 18-inch lifts and compacted in constructing the fills (page 4-90). The factor of safety is acceptable, and the foundation of all fills is and will be solid bedrock. The stability of all postmining slopes meets the requirements for backfilling and grading.

## COMPLIANCE

The permittee is in compliance with all sections of R614-301-500, except condition R614-301-514.300-(1) and R614-301-542.300-(1) (JK).

### R614-301-700 HYDROLOGY (TM)

#### R614-301-710 Introduction

Existing hydrologic resources are discussed in Volume 9 (section R614-301-722) of the PAP. All springs have been identified, as well as, any perennial, intermittent or ephemeral drainage on Map HM-5. Groundwater is also discussed in Volume 9.

#### R614-301-711.300 General Requirements

The methods and calculations utilized to achieve compliance with hydrologic design criteria and plans required by R614-301-740 are found on pages 4-11 through 4-57 of the PAP.

#### R614-301-713 Inspection

Inspection of all sediment ponds will be conducted quarterly. A certified annual report will be submitted to the Division (page 3-53 of the PAP).

### R614-301-720 Environmental Description

722.100 No subsurface water has been encountered in the mine and the mine was bounded by faults on either side of the permit area leaving the area basically devoid of any aquifers.

722.200 The location of surface water bodies such as streams, lakes, ponds, and springs can be found on Map HM-5, Volume 9.

722.300 The elevations and locations of monitoring stations used to gather baseline data on water quality and quantity in preparation of the application is found on Map HM-1 of the PAP. The only surface water monitoring station is UPDES monitoring point UT-0023591-001 as shown on Map HM-1. Spring 82-51 is monitored according to accepted Division Guidelines (Volume 9).

722.400 No water wells are known to exist in the permit area or adjacent area.

### R614-301-724 Baseline Information

All information related to hydrologic baseline and operational data collection and sampling programs is delineated in Volume 9 of the PAP. The permittee has identified all surface and groundwater sampling locations, parameters sampled, and monitoring schedules in Appendix A of Volume 9 of the PAP.

### R614-301-724.400 Climatological Information

Climatological information is described in Volume 9 of the PAP. The permittee maintains a rainfall gauge and weather station above the Des-Bee-Dove Mine as shown on Map HM-1. All data from the weather station is submitted quarterly to the Division. This includes rainfall, temperature, and humidity.

### R614-301-724.500 Supplemental Information

All supplemental information regarding erosion control test plots and treatments are contained on pages 4-70 through 4-72. These plots were set up to ascertain what erosion control treatments would provide protection from erosion on Mancos Shale. In addition to the current test plots, the permittee proposes to develop some additional test plots adjacent to the existing test plots incorporating a variety of treatments and soil amendments. These test plots will help better define the use of various erosion control and planting techniques (see Reclamation Study Update dated February 15, 1991).

R614-301-724.600 Survey of Renewable Resource Lands

Discussion of renewable resources and damage due to subsidence addresses the potential for impact related to subsidence and indicates no impact will occur (page 4-149). No damage to renewable resources have been documented to date.

R614-301-725 Baseline Cumulative Impact Area Information

Necessary hydrologic and geologic information in Volumes 2 and 9 of the PAP, addresses the Cumulative Impacts on the Hydrologic Balance for the Des-Bee-Dove Permit Area.

Increase in TDS (primarily sodium, calcium magnesium, bicarbonate, and sulfate, and TSS will occur and possible diminution of spring flow due to subsidence-related effects were the two impacts identified in the initial permit issued on June 20, 1985 (see CHIAS, Appendix I).

On going water monitoring is discussed in the current PAP in regards to the spring monitoring in Volume 9. It was interpreted in the initial permit review that monitoring of springs would provide the necessary documentation to determine the effects of subsidence. Spring 82-51 will be monitored during the months of July through October and raw data submitted quarterly as referenced in Volume 9.

Reclamation studies are in progress to better define the best erosion control methods and water harvesting methods to achieve reclamation success.

R614-301-727 Alternative Water Source Information

The discussion regarding water replacement is acceptable in that the PAP provides enough detailed information on existing water rights to identify the ownership of springs identified within the permit area as shown in Table HT-4. Any loss or adverse occurrence to water rights will be reported to the Division within ten days and then meet the applicant with the Division to determine the necessary course of action.

R614-301-728 Probable Hydrologic Consequences (PHC) Determination

The PHC makes certain findings regarding the hydrologic balance, acid- or toxic-forming materials, sediment yield, water quality, flooding, and other characteristics as determined by the Division.

The original permit issued by OSM determined that the "reclamation of the Haul Road will involve removal of all culverts. Material from culvert excavation will be used to cover the remaining road sections. The ephemeral stream channels will be returned to their original condition" (OSM's Technical Analysis, Hydrologic Balance -

Surface Water, page 13). The reclamation of the Des-Bee-Dove Mine site and Haul Road are the current major issues being reviewed regarding Hydrologic Consequences. No real analysis was made regarding the long-term stability of the road reclamation and its impact on surface water in the original permit.

728.200 The PHC determination is based on baseline hydrologic geologic and other information collected for the permit application and includes data statistically representative of the site.

A determination was made in the original permit approval that reclamation could be achieved without material damage to the hydrologic balance outside the permit area (Technical Analysis, OSM, 1985). Many concerns regarding reclamation of the Des-Bee-Dove Haul Road have been raised since the operation of the haul road and subsequent erosion of hillslopes have become a major issue in regards to the success of the haul road regrading and reclamation. To date, no data has been submitted to the Division from test plots involving the proposed reclamation study submitted to the Division February 22, 1991. There is very little documentation which demonstrates that successful reclamation on Mancos Shale (i.e., haul road) can be achieved. The original permit became effective on June 20, 1985 and the original Des-Bee-Dove Haul Road was constructed in 1983 and not included in the original permit because it was considered a public road. No prior studies or baseline data were collected prior to construction of the road.

It is felt that at this point in time, the permittee has offered to use what the permittee considers to be the best techniques available regarding reclamation and stabilization of Mancos Shale as discussed on page 4-89 of the PAP. To date, no conclusive statements can be made on the appropriateness of these sediment control methods other than they have been tried and no data has been generated regarding their long term success or failure.

CONDITION R614-301-728-(1) (TM)

Within 45 days of permit renewal, the permittee must submit a detailed plan for inclusion in the PAP, as to how the following information from the proposed test plots will be achieved, based on the following requirements:

- 728.331 Predicted sediment yield from the reclaimed haul road area;
- 728.332 Acidity, total suspended and dissolved solids and other important water quality parameters of local impact from the impact of coal mining and reclamation operations; and
- 728.335 Characterizations required by the Division for the test plots which must include:

- 1) Application methodology assessment for hydromulch (i.e., treatment method-soil prewetted prior to application to allow for better absorption of stabilizers) and other treatments, implying different methods of application must be tried and evaluated;
- 2) Soil bed preparation (roughness of seedbed) in relation to erosion control; and
- 3) Runoff collection on test plots to determine water quality (i.e., TDS and TSS).

R614-301-730 Operation Plan

R614-301-731 General Requirements

The plan includes the measures to prevent, to the extent possible, additional contributions of suspended solids to streamflow within the mine area, not the haul road. Data from the test plots on the haul road have not been generated regarding success or failure of various types of erosion control. There are numerous culvert crossings and channel rebuilds planned along the remainder of the haul road (page 4-89). The permittee insists a prior Division approval is criteria for acceptance of the permittee's sediment control policy. This approval (i.e., Division letter dated November 27, 1985), however, was in reference to the Deseret sediment pond removal only.

The use of soil stabilizers, hydromulch, and contour furrows constitutes a conceptual requirement for treatment of one portion of the haul road and does not provide the Best Technology Currently Available (BTCA) for the remainder of the haul road that does not drain to the Deseret Sediment Pond.

CONDITION R614-301-731-(1) (TM)

Within 45 days of permit renewal, the permittee must submit technically adequate plans, for inclusion in the PAP, for sediment control (BTCA) on all areas not being treated by the sediment pond during reclamation. The PAP must include all sediment control measures and siltation measures with design criteria, cross-sections and maps as required by rule R614-301-742.110, Sediment Control Measures.

731.121 Surface water protection must be addressed in a comprehensive BTCA plan regarding the haul road reclamation. The main mine site must be treated by the sediment pond until it is approved for removal based in the requirements of R614-301-763, Siltation Structures.

CONDITION R614-301-731.121-(1) (TM)

Within 45 days of permit renewal, the permittee must submit a detailed BTCA plan as an appendix to the PAP which specifically addresses the following issues (this is required in addition to the current plan, to use contour furrows and berms as shown on Plate 4-1, sheet 3 of 5):

- 1) A plan for providing sediment control during construction and following construction of all stream crossings and culvert removal sites where permanent diversions will be installed;
- 2) A revised and upgraded plan for the contour furrows and berms as shown on Plate 4-1, sheet 3 of 5 to address the runoff storage capacity of these BTCA measures in relation to the 10-year, 24-hour storm runoff volume. This will verify the treatments' effectiveness in providing treatment for all areas not draining to the sediment pond. This must be included in a BTCA Appendix showing all areas treated with BTCA measures other than sediment ponds; and
- 3) The assessment of the runoff water quality must be included as a design criteria for the test plot study. The data must be interpreted and included as part of the BTCA appendix upon submittal following test plot implementation. The plan must identify the surface water quality and quantity parameters to be monitored, sampling frequency and site location.

R614-301-731.200 Water Monitoring

The permittee currently monitors one spring 82-51, T17S R7E S26, WR #93-1605-F.S., shown on Map HM-5, Volume 9. In addition to this spring, the permittee monitors the sediment pond using discharge permit #UT-0023591; expiring October 31, 1992, as described in Volume 9 of the PAP. Since all drainage is ephemeral in nature and the sediment pond sits below all mine site disturbance, it becomes the sole monitoring point of significance. A detailed BTCA plan discussing monitoring locations, sampling frequency and parameters will be submitted as part of the conditional response to R614-301-731.121.

R614-301-731.300 Acid- and Toxic-Forming Materials (TM & HS)

All acid- and toxic-forming materials will be properly identified and treated when necessary as discussed on page 4-90 of the PAP.

Waste rock disposal plans and the reclamation plans are described for the old (now reclaimed) Cottonwood/Wilberg Waste Rock Storage Site in Appendix V. If a

coal mine activities resume, a roof and floor sampling plan approved by the Division and implemented. All future waste rock and sedimentation pond waste will be disposed of in the New Cottonwood/Wilberg Waste Rock Facility (pages 3-28 and 3-55).

The permittee has committed to covering all acid- and/or toxic-forming materials with at least four feet of nonacid- and nontoxic-forming materials or disposing of said material in an approved disposal facility within a permitted area (page 4-69).

Subsequent to facility demolition and prior to backfilling and grading, the permittee will conduct a soil/spoil sampling program to identify acid- and/or toxic-forming materials. Sampling methods and techniques will follow the procedures outlined on pages 4-100 through 4-102. If analysis indicate the presence of acid- and/or toxic-forming materials, additional sampling will be conducted.

731.400 No wells have been identified within the permit area.

731.500 No discharges are permitted within the permit area.

731.521 All portal seals are designed to prevent gravity discharges from the mine.

731.600 Stream Buffer Zones are not applicable to this PAP, due to the fact that all drainage is ephemeral in nature.

731.700 All water diversions are shown on certified Plate 3-11 for the main mine site. All storm water impoundment drawings are shown in Appendix VIII.

731.730 A map showing locations and elevations of each surface water station used for monitoring, shown on Map HM-5 and HM-1 is not certified.

731.740 Map HM-5 which shows the location of the Des-Bee-Dove Sediment Pond is not certified.

731.750 Cross-sections found in Appendix VIII of the PAP which show the cross-sections of the sediment pond are not certified.

CONDITION R614-301-731.700-(1) (TM)

Within 45 days of permit renewal, the permittee must submit certified cross-sections of the sediment pond and certify maps HM-1 and HM-5 per the requirements identified in R614-301-731.730, R614-301-731.740 and R614-301-731.750.

731.800 Water Rights and Replacement

The permittee has provided a statement which commits to replace any water determined to be lost or adversely affected as a result of the permittee's mining operations (page 4-156 of the PAP).

R614-301-740 Design Criteria and Plans

R614-301-742 Sediment Control Measures

The permittee has addressed what sediment control measures will be implemented for the mine site on areas not draining to the sediment pond (page 3-40 of the PAP and shown on Plate 3-7, sheet 3 of 3). The total drainage area of 1.24 acres was calculated. Monitoring and sampling will be completed as delineated on page 3-40.

The remainder of the mine site and the surrounding area is treated by the sediment pond as shown on Plate HM-1.

The permittee provided a plan for implementing test plots as described in Des-Bee-Dove Haul Road Reclamation Study to verify the success of reclamation methodologies on the reclaimed road.

R614-301-742.220 Sedimentation Ponds

The sediment pond was designed to contain treat the 10-year, 24-hour precipitation event. The pond is decanted down to the decant elevation of 6757.0 after a 24-hour detention time is maintained by a non-clogging dewatering device as shown in Appendix VIII. All calculations, drawings, and cross-sections of the sediment pond are contained in Appendix VII and VIII, and discussions are included on pages 3-53, 3-54 and 3-55 of the PAP.

The permittee appears to be in compliance with this rule but needs to supply the following additional information to clarify the plan and to confirm compliance.

CONDITION R614-301-742.220-(1) (TM)

Within 45 days of permit renewal, the permittee must provide drawings in Appendix VIII that provide consistent information regarding the sediment pond. Three as-built drawings in Appendix VII provide three different pond bottom elevations. Page 3-54 of the PAP states five feet of clearance between a full sediment load elevation and the decant elevation. None of this information is in agreement (drawing #01-52-1-015 was revised on February 24, 1989 and October 1, 1984, to show as-built plans).

In addition to accurate as-built drawings and cross-sections being provided, the following information must also be submitted:

- 1) Sediment levels and clean-out elevations marked on all cross-sections (cross-sections are not marked as-built and certified);
- 2) Decant and clean-out procedures and a sediment testing and storage plan per Division guidelines;
- 3) A discussion of how sediment levels are determined to meet the 60% clean-out elevation determination; and
- 4) Calculations to prove that the open channel spillway is of nonerodible construction and capable of maintaining sustain flows. Riprap sizing calculations for the spillway must be included in Appendix VIII.

#### R614-301-742.300 Diversions

Diversions have been constructed on the main mine site property to minimize adverse impact to the hydrologic balance. Drawings (Plate 3-8 sheet 1 of 2 and 2 of 2) and discussions found in Appendix VII do not currently include any calculations for the existing hydrologic structures at the Des-Bee-Dove Mine Site.

#### CONDITION R614-301-742.300-(1) (TM)

Within 45 days of permit renewal, all hydrologic calculations for existing hydrologic structures at the Des-Bee-Dove Mine site must be submitted for inclusion in the PAP.

#### COMPLIANCE

The permittee is in compliance with all sections of R614-301-700, except conditions R614-301-728-(1), R614-301-731-(1), R614-301-731.121-(1), R614-301-700-(1), R614-301-742.220-(1), and R614-301-742.300-(1) (TM).

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EAST MOUNTAIN  
CUMULATIVE HYDROLOGIC IMPACT  
ASSESSMENT

Cottonwood/Wilberg Mine, ACT/015/019

Deer Creek Mine, ACT/015/018

Des-Bee-Dove Mines, ACT/015/017

Huntington #4 Mine, ACT/015/004

Crandall Canyon Mine, ACT/015/032

Emery County, Utah

July 1989

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## I. INTRODUCTION

The purpose of this report is to provide a Cumulative Hydrologic Impact Assessment (CHIA) for East Mountain, located in Emery County, Utah. This assessment encompasses the probable cumulative impacts of all anticipated coal mining in the general area on the hydrologic balance and whether the operations proposed under the application have been designed to prevent damage to the hydrologic balance outside the proposed mine plan area. This report complies with legislation passed under Utah Code Annotated 40-10-1 et seq. and the attendant State Program rules under UMC 786.19(c).

East Mountain occurs within the Wasatch Plateau Coal Field, approximately 20 miles southwest of Price, Utah (Figure 1). The eastern margin of the Wasatch Plateau forms a rugged escarpment that overlooks Castle Valley and the San Rafael Swell to the east. Elevations along the eastern escarpment of the Wasatch Plateau range from approximately 6,500 to over 9,000 feet.

Precipitation varies from 40 inches at higher elevations to less than 10 inches at lower elevations. The area encompassed by the Wasatch Plateau may be classified as semiarid to subhumid.

## GEOLOGY

Outcropping rocks of the Wasatch Plateau Coal Field range from Upper Cretaceous to Quarternary in age. The rock record reflects 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. Oscillating depositional environments within the overall regressive trend are represented by lithologies within the Blackhawk Formation. The major coal-bearing unit within the Wasatch Plateau Coal Field is the Blackhawk Formation.

## VEGETATION

Vegetation of the Wasatch Plateau area is classified within the Colorado Plateau floristic division (Cronquist et al., 1972). The area occupies parts of both the Utah Plateaus and the Canyon Lands 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.

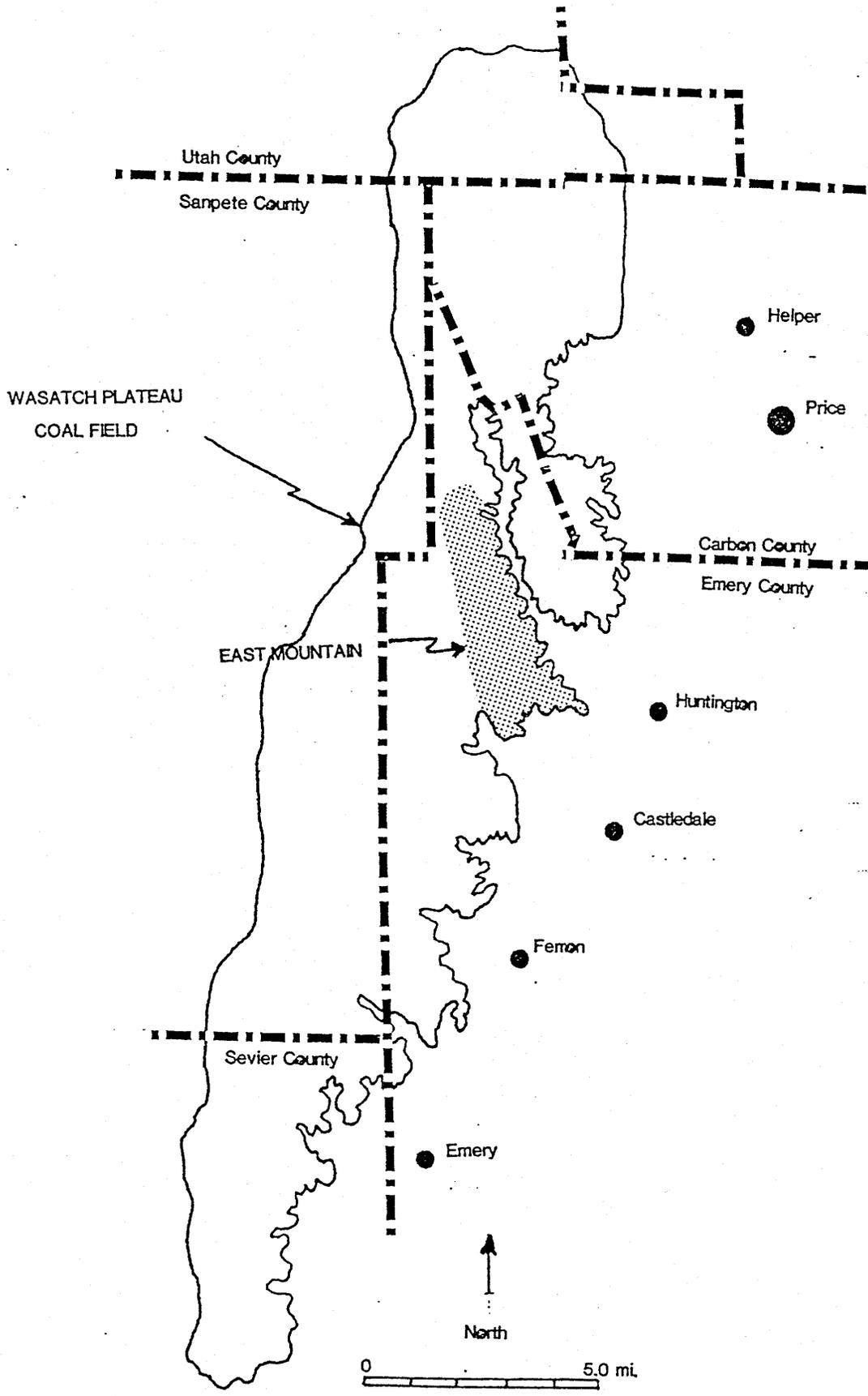


Figure 1. Wasatch Plateau Coal Field.

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 (Sarcobatus 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 woodlands occupy drier sites often with stoney to very rocky soils. Pinus edulis and Juniperus osteosperma are co-dominant in the overstory. Understory vegetation ranges from sparse to moderate ground cover on range sites in 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. Aspen stands (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 evapo-transpiration with cooler temperatures can permit a 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.

#### HYDROLOGY

Surface runoff from the Wasatch Plateau area flows either to the Price River Basin or the San Rafael River Basin. 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. The San Rafael River Basin, which includes about 2,300 square miles in three counties, is located mainly in Emery County to the south of the Price River Basin. The Price River drainage originates in the Wasatch Plateau about 12 miles west and south of Scofield

Reservoir. Downstream from the reservoir the river flows in a generally southeasterly direction. 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. 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). 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 that confluence. The San Rafael River also flows in a southeasterly direction to eventually join the Green River, after traveling from its headwaters in the Wasatch Plateau.

The water quality of both the Price River and the 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 upon the duration of contact, water quality degrades downstream to where Total Dissolved Solids (TDS) levels of 4,000 milligrams per liter (mg/l) are not uncommon. The predominant ion leached from the Mancos Shale is sulfate ( $SO_4$ ) with values over 1,000 mg/l common in the lower reaches of the Price River.

Ground water is present in all lithostratigraphic units within the Wasatch Plateau Coal Field. Ground water occurs under localized conditions that often form a system of "perched" aquifers and associated springs and/or seeps. Significant localized ground-water resources are associated with the North Horn Formation and Price River Formation. The U.S. Geological Survey has identified and formally designated the Star Point-Blackhawk aquifer as the only regional ground-water resource occurring in the Wasatch Plateau Coal Field (Danielson, et al., 1981 and Lines, 1984).

## II. CUMULATIVE IMPACT AREA (CIA)

Figure 2 delineates the CIA for current and projected mining in the East Mountain area. The CIA encompasses approximately 68 square miles and includes East Mountain. The western and eastern CIA boundaries are designated by Huntington Creek and Cottonwood Creek, whereas the southern extent is bounded by sections 8, 9 and 10, T18S, R7E, and the northern boundary is defined by a drainage divide.

### III. SCOPE OF MINING

#### COTTONWOOD/WILBERG, DEER CREEK, AND DES-BEE-DOVE MINES (Utah Power and Light Company)

The Cottonwood/Wilberg, Deer Creek, and Des-Bee-Dove Mines represent three adjacent and overlapping permit areas encompassing about 29,000 acres.

The federal coal leases that are designated in the East Mountain "Logical Mining Units" are as follows:

##### Cottonwood/Wilberg

SL-064900, U-1358, U-083066, U-040151, U-044025, U-47978, and portions of SL-070645-U-02292, U-084923, and U-084924.

##### Deer Creek

SL-064607-064621, SL-064900, U-1358, SL-070645, U-02292, U-084923, U-084924, U-083066, U-040151, U-044025, U-014275, U-024319, and U-47979. Future coal leases (not yet in permit area) are U-06039, U-024317, and SL-051221.

##### Des-Bee-Dove

U-02664, SL-050133, and SL-066116.

#### COTTONWOOD/WILBERG MINE

Coal mining operations have been in existence since the 1890's in the Wilberg area. Utah Power and Light Company (UP&L) acquired the Wilberg Mine in September 1977 from the Peabody Coal Company, which had acquired the lease in 1958. Mining had previously been conducted under the original owner, Cyrus Wilberg, beginning in 1945. With the UP&L acquisition, the Wilberg Mine was redesigned.

A tragic fire occurred in December of 1984. On July 1, 1985, it was decided to divide the Wilberg Coal Mine into two separate and independent coal mines; the Cottonwood and the Wilberg Coal Mines, each with a separate MSHA identification number. The mining and reclamation permit, however, was designated as ACT/015/019 for the Cottonwood/Wilberg Mine because the surface facilities were shared by each mine.

Longwall mining and limited room and pillar mining produces about 2.5 million tons from the Hiawatha and Blind Canyon seams. Mining is scheduled to cease around the year 2022.

Underground development waste, sediment from sedimentation ponds and trommel reject from the Des-Bee-Dove and Cottonwood/Wilberg Mines are disposed at the Cottonwood/Wilberg Waste Rock Storage area approximately 1 mile south of the Cottonwood/Wilberg Mine. This disposal structure utilizes a maximum of sixteen acres and is part of approved BLM-ROW U-37642.

#### DEER CREEK MINE

UP&L purchased the Deer Creek Mine in 1977 from Peabody Coal Company, which had acquired leases on the Deer Creek property and began operations in 1969. 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. Operations of the Deer Creek Mine overlap those of the Wilberg Mine, predominantly in the Blind Canyon Seam. The Deer Creek Mine surface facilities are located on a 25-acre site at the junction of Deer Creek Canyon and Elk Canyon.

The majority of the Deer Creek Mine utilizes the longwall mining method and produces about 2.5 million tons per year from the Hiawatha and Blind Canyon seams. All underground operations are scheduled to cease around the year 2032.

#### DES-BEE-DOVE MINE

The Des-Bee-Dove Mine complex (the Deseret, Beehive and Little Dove Mines) was acquired by UP&L in 1972 from the Deseret Coal Company, a Mormon Church enterprise. The Mormon Church and the Castle Valley Fuel Company mined the property from 1938 to 1947. From 1936 to 1938 the mine workings were operated by two men, Edwards and Broderick. Mining began in the canyon in 1898 as the Griffith Mine.

The Des-Bee-Dove Mine permit area contains two mineable coal seams - the Hiawatha and Blind Canyon. The mining plan consists of a series of room and pillar continuous mine sections.

The Des-Bee-Dove Mine ceased operations on February 6, 1987. UP&L is currently maintaining the site in an indefinite "temporary cessation" phase because if the coal market improves, this mine may be re-activated. Before UP&L temporarily ceased operations, the Des-Bee-Dove Mine produced 725,000 tons per year and projected that mining would end in the year 1998.

#### HUNTINGTON CANYON #4 (Beaver Creek Coal Company)

The Huntington Canyon #4 Mine permit area contains 1,320 acres. The underground operations utilized room and pillar mining methods in the Blind Canyon and Hiawatha coal seams in Federal Lease No. U-33454 and SL-064903. All underground mine operations ceased November 1, 1984.

Beaver Creek Coal Company reclaimed the site during the period of August 15, 1985 through September 30, 1985. Three portals and one opening were sealed, regrading and backfilling of the pad and road areas was completed, soil replaced, and reseeded done. The reclaimed site has been maintained since that time.

#### CRANDALL CANYON MINE (Genwal Coal Company)

Historically, mining had been conducted in Crandall Canyon from November of 1939 to September of 1955. Mining in Tract 1 by Genwal Coal Company began in 1983.

The permit area for the Crandall Canyon Mine contains approximately 158 acres in Huntington Canyon in Emery County, Utah. The current method of room and pillar mining for Federal Lease SL-062648 will be continued throughout Lease U-54762. Pillars will be removed upon abandonment of sections. Overall, an advance-retreat mining system is projected for the mine.

The reserves within the permit area are proposed for mining through 1994.

#### IV. STUDY AREA

##### GEOLOGY

The East Mountain CIA is characterized by cliffs, narrow canyons and high plateaus. Stratigraphic units outcropping within the area include, from oldest to youngest, the Mancos Shale, Star Point Sandstone, Blackhawk Formation, Castlegate Sandstone, Price River Formation, North Horn Formation, Flagstaff Limestone and Quaternary deposits. Lithologic descriptions and unit thickness are given in Figure 3.

Rocks in the study area strike northeast and dip from one to three degrees to the southeast. The four major structural features occurring on East Mountain are: (1) Deer Creek Fault; (2) Roans Canyon Fault Graben; (3) Pleasant Valley Fault; and (4) Straight Canyon Syncline. The Deer Creek Fault and Pleasant Valley Fault trend north - south, whereas Roan's Canyon Fault Graben and Straight Canyon Syncline trend northeast - southwest. Fault displacements range from several feet to approximately 170 feet.

System	Series	Formations and members	Thickness (feet)	Lithology and water-bearing characteristics
Quaternary	Holocene and Pleistocene		0-100	Alluvium and colluvium; clay, silt, sand, gravel, and boulders; yields water to springs that may cease to flow in late summer.
Tertiary	Eocene and Paleocene	Flagstaff Limestone	10-300	Light-gray, dense, cherty, lacustrine limestone with some interbedded thin gray and green-gray shale; light-red or pink calcareous siltstone at base in some places; yields water to springs in upland areas.
	Paleocene	North Horn Formation	800±	Variiegated shale and mudstone with interbeds of tan-to-gray sandstone; all of fluvial and lacustrine origin; yields water to springs.
Cretaceous	Upper Cretaceous	Price River Formation	600-700	Gray-to-brown, fine-to-coarse, and conglomeratic fluvial sandstone with thin beds of gray shale; yields water to springs locally.
		Castlegate Sandstone	150-250	Tan-to-brown fluvial sandstone and conglomerate; forms cliffs in most exposures; yields water to springs locally.
		Blackhawk Formation	600-700	Tan-to-gray discontinuous sandstone and gray carbonaceous shales with coal beds; all of marginal marine and paludal origin; locally scour-and-fill deposits of fluvial sandstone within less permeable sediments; yields water to springs and coal mines, mainly where fractured or jointed.
		Star Point Sandstone	350-450	Light-gray, white, massive, and thin-bedded sandstone, grading downward from a massive cliff-forming unit at the top to thin interbedded sandstone and shale at the base; all of marginal marine and marine origin; yields water to springs and mines where fractured and jointed.
		Masuk Member Mancos Shale	600-800	Dark-gray marine shale with thin, discontinuous layers of gray limestone and sandstone; yields water to springs locally.

Figure 3. Stratigraphy and Hydrogeologic characteristics of the East Mountain Area (Danielson, et al., 1981).

## HYDROLOGIC RESOURCES

### GROUND WATER

The ground-water regime within the CIA is dependent upon climatic and geologic parameters that establish systems of recharge, movement and discharge.

Snowmelt at higher elevations provides most of the ground-water recharge, particularly where permeable lithologies such as fractured or solution limestone are exposed at the surface. Vertical migration of ground water occurs through permeable rock units and/or along zones of faulting and fracturing. Lateral migration initiates when ground water encounters impermeable rocks and continues until either the land surface is intersected (and spring discharge occurs) or other permeable lithologies or zones are encountered that allow further vertical flow.

The Star Point Sandstone and lower portion of the Blackhawk Formation, Castlegate Sandstone, Price River Formation, North Horn Formation, Flagstaff Limestone, and Quarternary deposits are potential reservoirs or conduits for ground water in the CIA. Reservoir lithologies are predominantly sandstone and limestone. Sandstone reservoirs occur as channel and overbank, lenticular and tabular deposits, whereas limestone reservoirs have developed through solution processes and fracturing. Shale, siltstone and cemented sandstone beds act as aquacludes to impede ground-water movement. The Mancos Shale is considered a regional aquaclude that delimits downward flow within the CIA. Localized aquacludes include relatively thin, impermeable lithologies occurring within the stratigraphic section above the Star Point Sandstone.

The Star Point-Blackhawk aquifer is present and represents the only identified regional ground-water resource in the study area (Danielson, et al., 1981). Ground water associated with the Price River Formation and North Horn Formation may be characterized as occurring within an extensive "perched" aquifer zone and represents a significant hydrologic resource.

Faults and fractures act as effective conduits for ground water and allow unsaturated downward flow. Springs having significant discharges (10 gpm or greater) are most commonly located in proximity to north-south and northeast-southwest trending fault or fracture zones (Figure 4). In particular, the Roans Canyon Fault Graben appears to act as a significant conduit for ground water. Drilling from the Deer Creek Mine identified two major hydrogeologic units associated with the graben. Aquifer testing indicated the horizontal flow component within the graben is towards the east and suggests discharge occurs into the Huntington Creek drainages basin.

The Straight Canyon Syncline is also thought to direct ground-water movement towards the southwest into the Cottonwood Creek drainage basin.

Data from seven boreholes located within the Cottonwood/Wilberg Mine suggest that locally ground-water, in the Star Point Sandstone, is moving towards the northeast. Other, more regional data indicate ground water moves from north to south.

Approximately 160 seeps and springs occur within the CIA. Total spring discharge exceeds 1700 gpm. Spring discharge is distributed as follows:

<u>Lithologic Unit</u>	<u>Number of Springs</u>	<u>Total Discharge</u>
Flagstaff Limestone	5	20 gpm
Undifferentiated Flagstaff Limestone/North Horn Formation	5	60 gpm
North Horn Formation	42	1045 gpm
Undifferentiated North Horn Formation/Price River Formation	6	65 gpm
Price River Formation	28	140 gpm
Castlegate Sandstone	11	35 gpm
Blackhawk Formation	49	95 gpm
Star Point Sandstone	16	260 gpm

Analysis from spring samples indicate water quality progressively decreases from the Flagstaff Limestone to the Star Point Sandstone.

Mine inflow is estimated to total 1500 gpm for the Deer Creek Mine and Cottonwood/Wilberg Mine and 100 gpm in the Crandall Canyon Mine. Mine water is discharged to the Left Fork of Grimes Wash and Miller Canyon at the Cottonwood/Wilberg Mine and to the Huntington Power Plant at the Deer Creek Mine. Mine water is not discharged at the Crandall Canyon Mine or Des-Bee-Dove Mine. No discharge occurs at the reclaimed Huntington #4 Mine.

Mine water within the CIA represents ground-water depletion from storage in the Blackhawk Formation and Star Point Sandstone and interception of flow along faults/fractures.

## SURFACE WATER

The CIA has been divided into six major drainage basins representing ten sub-drainage areas. The CIA encompasses drainage to Huntington Creek and Cottonwood Creek, both draining to the San Raphael River Basin (see Figure 5).

### Crandall Canyon (1)

Crandall Canyon drainage (1) includes the disturbed area associated with the Crandall Canyon Mine. The mine exists in the lower reaches of the drainage which encompasses 3741.62 acres. The average gradient of Crandall Creek is 16 percent. Crandall Creek is perennial and flows east into Huntington Creek.

Mining is centered in the lower reaches of the drainage area and involves approximately 162 acres, of which 9.7 acres is surface disturbance. All surface disturbance is treated by maintained sediment controls.

### Little Bear Canyon and Mill Fork Canyon (2 and 3)

Approximately 4319 acres drain from Little Bear Canyon and Mill Fork Canyon combined. The Huntington #4 Mine encompasses approximately 1320 acres with these two canyons. Reclaimed surface disturbance involves 12.5 acres in Mill Fork Canyon. Little Bear Creek is considered ephemeral and Mill Creek is considered perennial in its lower reaches. The average gradient of Little Bear Creek is 30 percent and the average gradient for Mill Creek is 13 percent.

Huntington #4 Mine has been reclaimed for several years and will have maintained sediment controls in place through the bonding period.

UP & L's permit area encompasses 390 acres in Mill Fork Canyon.

### Rilda Creek (4)

Approximately 4586.8 acres drain Rilda Canyon. Rilda Creek is perennial due to several large springs found in the middle reaches of the creek. The average gradient of Rilda Creek is 11 percent.

The permit area of Utah Power and Light Company mines encompasses areas of Rilda Canyon. Previous surface disturbance was associated with the Helco Mine and North Emery Water Users have several developed springs adjacent to the Helco Mine. Reclamation of the abandoned Helco Mine is planned for the near future. U.P. & L.'s permit area encompasses 2417 acres of Rilda Canyon drainage.

### Meetinghouse Canyon and Deer Creek Canyon (5 and 6)

Approximately 4955 acres drain Meetinghouse Canyon and 3593 acres drain Deer Creek Canyon. 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. Approximately 56 acres of surface disturbance associated with the Deer Creek Mine is found in the middle of Deer Creek Canyon. The surface facilities are treated by sediment controls and all coal produced at the mine is conveyed to the Huntington Power Plant found adjacent to Huntington Creek near the bottom of Deer Creek Canyon.

Meetinghouse Canyon contains 4535 acres and Deer Creek Canyon contains 3,347 acres of U.P. & L.'s permit area.

### Maple Gulch and Danish Bench (7 and 8)

Approximately 6790 acres is associated with the drainage area of Maple Gulch and approximately 5960 acres is associated with the drainage area of Danish Bench. Both areas are primarily Mancos Shale flats draining away from the southern end of East Mountain and lack the confined canyons of some of the other drainages found in the CIA. Danish Bench drains to Cottonwood Creek and has an average gradient of 12.5 percent. Maple Gulch drains to Huntington Creek and has an average gradient of 17 percent. Permit areas of the U.P. & L. mines encompasses 837 acres of Maple Gulch and 250 acres of Danish Bench. Neither area contains any surface disturbance associated with mining.

### Grimes Wash (9)

Approximately 8412 acres is associated with Grimes Wash drainage. The Cottonwood/Wilberg Mine is situated within Grimes Wash and represents 31 acres of surface disturbance which is treated by sediment controls. The average gradient of Grimes Wash is 14 percent. U.P. & L.'s permit area encompasses 4120 acres of the Grimes Wash drainage.

### Cottonwood Creek (10)

This drainage encompasses 10,373 acres and includes all drainage to Cottonwood Creek along the western half of the CIA area. It has many small canyons and contains 12 acres of surface disturbance associated with the Cottonwood Fan Portal area of the Cottonwood/Wilberg Mine. This area is treated by sediment controls and is partially reclaimed. The portion of U.P. & L.'s permit area contained in this drainage is 5120 acres. There is also a portal in Miller Canyon which drains to Cottonwood Creek and discharges periodically due to gravity drainage from the mine.

## V. POTENTIAL IMPACTS

### GROUND WATER

Dewatering and subsidence related to mining have the greatest potential for impacting ground-water resources in the CIA. The impact of changes in vegetation on ground-water recharge should be minimal since mining will disturb less than 150 acres of the 44,000 acre CIA. 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.

Dewatering. The volume of water being discharged from mines within the CIA (1,600 gpm) approximates the amount of water that is currently being withdrawn from the ground-water system. The current and projected withdrawal values may be totalled and compared to estimates of ground-water discharge and recharge within the CIA and thereby, allow an assessment of cumulative dewatering impacts.

Approximately 38,400 acres within the CIA overlie the coal resource and represent a potential recharge area (Figure 6). Average annual precipitation is approximately 20 inches over the potential recharge area and hence, the total annual precipitation over the outcropping recharge area is 53,900 acre-feet.

Table 1A gives estimates for the total annual discharge of springs from water-bearing rock units that overlie the coal resource.

Table 1A. Precipitation and Spring Discharge Estimates for Areas Above the Coal Resource, East Mountain CIA.

<u>Lithologic Unit</u>	<u>Outcrop Area (acres)</u>	<u>Normal Annual Precipitation on Outcrop (acre-feet)</u>	<u>Total Annual Discharge of Springs (Percent of annual precipitation on outcrop)</u>
Undivided Flagstaff Limestone, North Horn Formation, Price River Formation	26,000	43,300	3%
Castlegate Sandstone	3,300	5,600	1%
Blackhawk Formation, Star Point Sandstone	9,100	5,000	3%
Total			

Discharge also occurs directly to perennial streams where channels intersect ground water within the Blackhawk Formation and Star Point Sandstone. The six perennial streams that occur within the CIA are: Crandall Creek, Mill Fork Creek, Rilda Creek, Grimes Wash Creek, Cottonwood Creek, and Huntington Creek. All of these streams intersect the lower Blackhawk Formation and Star Point Sandstone. A study conducted along Miller Creek in the adjacent Gentry Mountain area indicated streamflow substantially increased (from 8 to 115 gpm) as a result of discharge from the Blackhawk Formation and Star Point Sandstone (Cyprus-Plateau Mining Company, Star Point Mine PAP, pages 783-40). The results from the Miller Creek study suggest perennial streams that traverse the regional aquifer sustain similar ground-water discharges (or base flow recharge). Accordingly, total base flow recharge to perennial streams is estimated to be 600 gpm.

Table 1B lists estimated ground-water discharges to perennial streams and from mines.

Table 1B. Estimated Ground-Water Discharge to Perennial Streams and from Mines, East Mountain CIA.

Discharge to Perennial Streams (6 total)	<u>600</u> gpm
Discharge from Mines (3 total)	<u>1600</u> gpm
Total	<u>2200</u> gpm

Table 1C approximates the amount of ground water discharged to the atmosphere by mine ventilation systems. Psychrometric formulas were utilized to derive ventilation discharge values and extrapolated to mine elevation. Average relative humidity data from the Central Weather Station in the Manti-LaSal National Forest were also used in the psychrometric calculation.

Table 1C. Approximate Atmospheric Discharges from Active Mines, East Mountain, CIA.

<u>Mine</u>	<u>Approximate Discharge Rate (gpm)</u>
Cottonwood/Wilberg Mine	36
Deer Creek Mine	36
Crandall Canyon Mine	<u>10</u>
TOTAL	82

Total ground-water discharge within the CIA (summed from Tables 1A, 1B and 1C) is currently about 3700 gpm, where 41 percent (2100 gpm) of the total represents natural discharge to streams and springs and 59 percent (1600 gpm) results from mining activities.

Lines (1985) investigated the adjacent Trail Mountain area and indicated regional aquifer inflow to mines is derived from aquifer storage (80 percent) and aquifer discharge (20 percent). Extrapolating these percentages to the East Mountain CIA allows depletion, due to present mining activities (5200 acres mined), of regional aquifer storage and discharge to be estimated at 1280 gpm and 320 gpm, respectively. Assuming future mining encompasses 12,000 acres and will continue to encounter steady - state inflow from the regional aquifer, then depletion would increase to 2960 gpm for storage and 740 gpm for discharge.

U.P. & L. has proposed to access coal reserves for the Deer Creek Mine by driving a rock tunnel across the Roans Canyon Fault Graben. A drilling and testing program identified two water-bearing zones within the graben. The operator intends to minimize inflow by pressure grouting the water-bearing zones during development of the rock tunnel. It is not anticipated that the diversion of ground-water flow within the Roans Canyon Fault Graben will exceed a total of 100 gpm.

Future mining-induced dewatering is projected to encompass 2100 gpm and hence, the cumulative dewatering total would be approximately 3700 gpm. Following the cessation of mining, the discharge of ground water to the Left Fork of Grimes Wash, Miller Canyon, Huntington Power Plant and the atmosphere will cease and workings will begin to flood.

The impact associated with the reduction in surface flow is considered temporary. Mine flooding will conceivably recharge regional aquifer storage and re-establish the natural ground-water conduit system that was operational prior to mining. The maximum time span required for complete mine flooding may be derived by assuming the final workings (14,000 acres) will remain open (average 5 foot height) and caving will not occur. Accordingly, for workings that experience inflow (Cottonwood/Wilberg Mine, Deer Creek Mine, Crandall Canyon Mine) an upper limit of 20 years may be derived for complete mine flooding. It should be noted that complete flooding will, undoubtedly, never be achieved because the hydraulic head generated as flooding proceeds will increase until the hydraulic properties of the roof, floor and rib are exceeded and flow within the rocks initiates.

Subsidence. Subsidence impacts are largely related to extension and expansion of the existing fracture system 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. Subsurface flow diversion may cause the depletion of water in certain localized aquifers and potential loss of flow to springs that will be undermined. Increased flow rates along fractures would reduce ground-water residence time and potentially improve water quality.

Mining will occur beneath approximately 13 springs that have a combined flow in excess of 625 gpm. Overburden thickness averages more than 1000 feet beneath areas where springs are located. Diversion of spring flow is considered to be at overall low risk.

#### SURFACE WATER

The cumulative impacts associated with mining within the CIA will be summarized by individually discussing impacts associated with the Crandall Canyon Mine, Huntington #4 Mine, Deer Creek Mine, Cottonwood/Wilberg Mine and the Des-Bee-Dove Mine. Creeks and drainage areas which are referenced by (#) or discussed, are shown on Figure 5, Surface Water Drainage Map.

Cottonwood/Wilberg Mine. The Cottonwood/Wilberg Mine is located in Grimes Wash. Grimes Wash drainage quality is greatly affected by the influx of the Right Fork. The Right Fork originates in the North Horn Formation (interbedded shales, siltstones, and sandstones), which is abundant with calcareous material. As a result, the Right Fork contributes a relatively high amount of suspended solids to the Grimes Wash drainage. The greatest factor influencing the suspended solids level in the Right Fork drainage during 1988 was the sudden increase in temperature.

As reported in 1985, the TDS level increased slightly at the location below the mine. Two possible factors stated for the rise were Cottonwood/Wilberg Mine Discharge and Mancos Shale seeps. Due to the fact that no water was discharged from the mine during 1985 through 1988 (one exception in August 1986), seeps emanating from the Mancos Shale probably have the greatest influence upon the level. Periodic sampling during 1986 and early 1987 confirmed the seeps' contribution to the TDS level. The average for the four samples collected was 1,188 mg/l, representing a nearly 3.3 fold increase over the historical averages for the Right and Left Forks. (Annual Hydrologic Monitoring Report for 1988, pg. 24).

All surface facilities are treated by sediment controls and as such, there are no potential impacts from sediments generated from disturbed areas.

Waste rock generated from the Des-Bee-Dove and Cottonwood/Wilberg Coal Mines is disposed of in a series of seven interconnected storage cells which constitute the Cottonwood/Wilberg Waste Rock Storage area (Figure 4). The waste rock storage site is located at 6,800 feet elevation; 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 expected waste rock encountered will be approximately 70 percent sandstone, 20 percent interbedded mudstone and siltstone, and 10 percent boney 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. Additionally, roof and floor analyses indicate high pyritic/marcasite levels (%FeS<sub>2</sub> Mean=8.15, Standard Deviation=10.82). The colluvium and Mancos Shale which underlies the waste rock storage area is calcareous and should be sufficient to neutralize drainage or seepage from areas within the waste rock storage site, which could potentially form acid.

Although most water associated with the Cottonwood/Wilberg Waste Rock Storage Area will evaporate, some water will inevitably percolate through the storage cells and underlying colluvium deposits. Eventually seepage would contact the Mancos Shale and further degradation (increased TDS and EC) of water quality would take place. Accordingly, drainage from the waste rock storage site would have little down-gradient effect.

Deer Creek Mine. Referencing Table 1D, 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 affected by the Mancos Shale and is dominated by chloride, sulfate and sodium.

Table 1D. Deer Creek Water Quality.

		Calcium	Chloride	Conductivity	Magnesium	Sodium	Sulfate	TDS	TSS
Above	Max	82.0	176.0	1580	183.9	111.6	255.0	897	3592.0
Mine	Mean	49.5	19.2	581	37.5	27.5	63.8	335.0	124.9
Below	Max	112	420.0	2300	122.8	233.8	500.0	1544	20540.0
Mine	Mean	73	120.4	1153	67.0	114.9	215.8	684	490.9

Deer Creek sediment pond discharge has been historically within UPDES limits, but discharges high Total Dissolved Solids degrading downstream water quality.

All surface drainage facilities are designed to safely control water and sediment runoff from all disturbed areas. In addition, all surface water originating from undisturbed lands upstream of the facilities area will be controlled and diverted around the operation. Storm runoff from within the mine facilities area is collected in a system of open ditches, bermed roadways and culverts, and is discharged to Deer Creek below the facilities area.

The sediment pond is designed to detain the 10-year, 24-hour storm event. It should be noted that when the design event is exceeded (i.e. storms larger than the 10-year, 24-hour storm), sediment detention times will be reduced, leading to a slightly higher sediment load in Deer Creek.

Runoff from 25 acres of disturbed land will be temporarily detained in the Deer Creek Mine sediment pond and will be released to Deer Creek within UPDES limitations. The surface-water impact associated with the Deer Creek Mine operations will be minimal.

Reclamation of the drainage at the Deer Creek Mine will consist of removing the temporary drainage system, diversion and sedimentation pond. Permanent channels will be constructed over the fill and into a splash basin. The Utah program regulations currently require all diversions to be routed away from fill. However, the applicant's proposal has been determined to be sound engineering design and acceptable as a state-of-the-art experimental practice under UMC 785.13. 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 and is in an indefinite "temporary cessation". The mine is a dry mine and all surface drainage is treated by a sediment pond and released to an ephemeral wash. Since all surface water is treated by a maintained sediment pond, the effects of the Des-Bee-Dove Mine operations or the hydrologic balance are negligible.

Huntington #4 Mine. The major aquatic habitats within the permit area are Mill Fork and Little Bear Creek. All reclaimed mine lands are within Mill Fork Canyon. Based on benthic macroinvertebrate and aquatic habitat surveys conducted by the operator and on data provided by the Utah Division of Wildlife Resources, neither creek supports game or non-game fish and both lack sufficient flow in most years to provide spawning sites. However, these streams probably contribute some invertebrate food items and a small amount of surface flow to Huntington Creek, an important fishery in the region.

The mine is currently reclaimed and all surface structures have been removed and all disturbed areas reseeded. Sediment controls are in place (i.e. sediment ponds) and there is no anticipated impact to Mill Creek from the Huntington #4 Mine due to the lack of potential sources of impact.

Crandall Canyon Mine. Crandall Canyon Mine is located in Crandall Canyon. The U.S. Geological Survey established a gaging station at the mouth of Crandall Canyon Creek in 1978. Flow data collected at the gaging station are not complete for the winter in most years, due presumably to data acquisition problems. However, the limited data indicate that most of the flow of Crandall Canyon Creek occurs in the period of May through July. Assuming an average of 30 acre-feet per month for the period when records were missing, the average annual flow for the six year period of data was 2740 acre-feet.

Surface water quality data collected from Crandall Canyon Creek by Genwal Coal Company for the Tract 1 Lease from 1985 indicate that the dominant ions in Crandall Canyon Creek are calcium and bicarbonate. Total dissolved solids concentrations in the stream have varied from 180 to 286 milligrams per liter, with lower concentrations normally occurring during the high flow season. Total suspended solids concentrations in Crandall Canyon Creek have varied during the period of record from 0.5 to 208.0 milligrams per liter. As expected, the highest suspended solids concentrations generally occur during periods of highest flow.

The main concern in terms of impact to surface water is water quality deterioration downstream from the minesite, primarily in the form of suspended sediments. Typically the suspended sediment concentration in Crandall Canyon Creek since 1983 varied from approximately 205 mg/l to 0.5 mg/l. Low suspended sediment values are associated with natural climactic and geologic process although a proportion may be attributed to surface disturbances from roads and the mine pad area. Sediment controls do exist for the disturbed surface areas. Therefore, the impact associated with mining in Crandall Canyon is minimized by surface controls (i.e., sediment pond, diversions, etc.).

## VI. SUMMARY

Mine operations within the CIA currently intercept regional aquifer flow at an approximate rate of 1,600 gpm. Of this total, approximately 1586 gpm are consumptively lost to mine ventilation (86 gpm) and cooling/evaporation at a power plant (1,500 gpm). The remaining 14 gpm are discharged, without interbasin transfer of water to streams. Mine water discharge meet required effluent limitations.

Future mining operations are designed to avoid interception of fault conduit flow and accordingly, inflow from the regional aquifer is estimated to increase from 1,600 gpm to 3700 gpm. Approximately 80 percent of the flow will be derived from storage and 20 percent from discharge. Consumptive use is not anticipated to increase. Mine water discharge (1500 gpm) and ventilation losses (86 gpm) will be discontinued upon cessation of mining. Concomitantly, flooding of abandoned workings will initiate. An upper limit of 20 years has been estimated for complete flooding of workings and re-establishment of the premining ground-water system.

Diversion of spring flow is considered to be at overall low risk.

Sediment control measures have been and will be designed and implemented to reduce and stabilize contamination of surface waters.

Following cessation of mining, waste rock storage areas will be adequately covered with topsoil and all disturbed areas will be stabilized and revegetated to prevent surface water contamination.

The designs proposed for all anticipated mining operations within the CIA are herein determined to be consistent with preventing damage to the hydrologic balance outside the proposed mine plan areas.

AT99/1-24

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## FINDINGS

### APPENDIX I

#### Cumulative Hydrologic Impact Assessment Summary Des-Bee-Dove Mine Complex

##### Surface-Water Hydrology

The Des-Bee-Dove Mine Complex is located on an unnamed tributary to Grimes Wash, approximately 4 miles upstream of its confluence with Cottonwood Creek. Cottonwood Creek is a perennial stream entering the San Rafael River approximately 18 miles southeast of the mine. No perennial or intermittent streams exist within the Des-Bee-Dove Mine Complex permit boundary. The disturbed areas associated with the Des-Bee-Dove facilities and sedimentation ponds are located on an unnamed ephemeral tributary to Grimes Wash. There are two small springs located within the permit area.

Approximately 65 percent of the streamflow of Cottonwood Creek occurs during the April-June snowmelt runoff period. Average annual precipitation ranges from 14 inches at the Des-Bee-Dove Mine Complex to over 30 inches on East Mountain. The water quality in Grimes Wash reflects the presence of carbonate rocks which cap the ridges and peaks in the basin. Total dissolved solids (TDS) concentrations range from 200 to 400 mg/L (milligrams per liter). Downstream of the cumulative impact area (below a USGS stream gage), water quality is degraded by natural runoff and irrigation return flows which pass over Mancos Shale-derived soils. The gypsiferous Mancos Shale contributes substantial concentrations of salts to the surface-water system. TDS concentrations in the San Rafael River, 28 miles southeast of the Des-Bee-Dove Mine Complex, typically average from 2,000 to 4,000 mg/L. Wilberg mine discharge water, which is pumped to the mine complex, contains approximately 550 mg/L TDS, based on four years of discharge data. The other mine within the Cottonwood Creek drainage, Trail Mountain, discharges little mine water to the surface drainages.

##### Geologic Setting

The lowermost stratum of importance in the area is the Masuk Shale Member of the Mancos Shale Formation, which crops out downstream of the Des-Bee-Dove Mine Complex. Above the Masuk Shale member are the Star Point Sandstone, the coal-bearing Blackhawk Formation, the Castlegate Sandstone, the Price River Formation, and the North Horn Formation. Faults known to exist within the permit boundary include the Deer Creek, Bear Canyon, and Maple Gulch Faults. No igneous intrusions are known to exist within the permit area.

There are two mineable coal seams in the area: the Hiawatha seam at the base of the Blackhawk, and the Blind Canyon seam approximately 90 feet above the Hiawatha seam.

The Des-Bee-Dove mining operations are separated from the Deer Creek and Wilberg mines by the Deer Creek Fault in the western portion of the permit area. Both mineable seams are extracted by Des-Bee-Dove operations.

The Hiawatha seam is accessed through the Deseret mine; the Blind Canyon seam is accessed through the Beehive and Little Dove mines. Although the Des-Bee-Dove permit area spans the Huntington Creek and Cottonwood Creek drainage basins, all surface disturbance is confined to the Cottonwood Creek basin. The Des-Bee-Dove Mine Complex is a relatively "dry" mine, and has intercepted virtually no ground water during its history. For this reason, ground-water impacts to the Huntington Creek basin are negligible and the cumulative hydrologic impact discussion is confined to the effects of mining on the Cottonwood Creek basin.

There is some overlap between the Wilberg mine operations in the Cottonwood Creek basin and the Deer Creek mine operations in the Huntington Creek basin. The Wilberg mine operates in the lower coal seam; the Hiawatha, and the Deer Creek Mine operates in the upper coal seam, the Blind Canyon; therefore the mining operations of the Deer Creek mine partially overlap the operations of the Wilberg mine. The overlap of these mining operations occurs at the boundary between the Huntington Creek and Cottonwood Creek drainages. The surface-water drainage boundary is assumed to be the same as the ground-water basin divide. Mine inflows from Wilberg will be discharged into the Cottonwood Creek drainage and mine inflows from the Deer Creek mine will be discharged into the Huntington Creek basin. The overlap of the Wilberg mine into the Huntington Creek basin is insignificant, whereas the overlap of the Deer Creek mine into the Cottonwood drainage is larger. However, since all intercepted ground water in the Deer Creek mine will be discharged into Huntington Creek, there is no significant surface-water impact (quantity) related to the interaction.

Some interbasin transfer of ground water will occur between the two basins as a result of these two mines overlapping. Wilberg will intercept ground water from the Huntington Creek basin and Deer Creek will intercept (a relatively larger amount of) ground water from the Cottonwood Creek basin. The net effect will be a slightly higher volume of intercepted Cottonwood Creek ground water being discharged into the Huntington Creek basin. Since Des-Bee-Dove intercepts minimal ground water, no mine-water discharges are anticipated. The effects of this mine will be overshadowed by the hydrologic impacts of its neighbors. Below the confluence of Cottonwood Creek with the San Rafael River (which is also below the confluence of Huntington Creek with the San Rafael), the net effect of all interbasin transfer of ground water will be negligible.

#### Ground-water Hydrology

Ground water occurs under perched water table and confined conditions in the general area of the Des-Bee-Dove Mine Complex. Numerous springs have been identified on East Mountain west of the Des-Bee-Dove permit area.

These springs range from ephemeral seeps to perennial springs. Most of the springs originate in the upper portion of the North Horn Formation as perched springs. Only two springs have been identified in the Des-Bee-Dove permit area. Both springs are associated with faults and neither discharges significant quantities of water.

At present, ground water enters the Wilberg mine at flow rates up to 4 cfs with the potential for more water to be encountered intermittently as mining operations extend further and intercept both fault zones and saturated fluvial channel sandstones. The upper limit of potential future mine discharges (ground-water inflow less internal mine consumption) has been estimated to be approximately 4 cfs. Given the hydrogeologic conditions in the area and the historical mine water inflow at the mine, such a value is considered a worst-case situation.

The Des-Bee-Dove Mine Complex operations have not intercepted significant quantities of ground water. The applicant reports two incidents of major ground-water interception. In one incident, the working face crossed a fault hydrologically connected to an in-mine sump. In the second instance, the mining operation intercepted less than 10 gpm inflow in the fall of 1983. The "leaker" ceased by the second quarter of 1984.

Ground-water quality is characterized as a calcium-magnesium-bicarbonate type, and is similar to that of the surface water in the area. TDS concentrations range from 254 mg/L to 695 mg/L, but consistently average 372 mg/L. Such values are similar to concentrations observed in the surface waters.

#### Anticipated Mining

Coal mining operations have been in existence in the Des-Bee-Dove area since the 1890's. All anticipated mining within the area includes Trail Mountain, Wilberg, and Des-Bee-Dove mines in the Cottonwood Creek basin, and the Deer Creek mine in the Huntington Creek basin.

#### Delineation of the Cumulative Impact Area (CIA)

##### Surface Water

Small parts of the Des-Bee-Dove and Wilberg mining operations overlap into the Huntington Creek drainage basin; similarly, a small part of the Deer Creek mine cumulative impact area overlaps into the Cottonwood Creek basin. The compound effect on the two is insignificant. Therefore, the cumulative impact area for the Des-Bee-Dove Mine Complex includes the Cottonwood Creek basin only. Below the confluence of Grimes Wash and Cottonwood Creek, stream discharges are of sufficient magnitude that it is unlikely that mining-related impacts can be detected. Therefore, the CIA for the assessment of material damage has been defined as the drainage area contributing to Cottonwood Creek above this confluence. All present and anticipated mining in this basin occurs in the lower one-third of the basin.

## Ground water

The lack of piezometric data in the various water-bearing units within the Cottonwood Creek basin does not allow precise determination of ground-water divides in the area. However, the assumption that the ground-water basin coincides with the surface-water basin is well within the limitations and accuracy of the data and assumption inherent to this analysis. The Pleasant Valley, Joe's Valley, and Trail Canyon Faults may act as conduits for interbasin movement of ground water into or out of Cottonwood Creek basin; however, there is little evidence to support this concept. The outcropping of the low-permeability Masuk Shale within the downstream limits of the CIA effectively limits the amount of ground water which could leave the basin as underflow. This is the single most important hydrogeologic control and allows delineation of the ground-water CIA. Since the overlap into the Huntington Creek drainage basin is insignificant with respect to surface water, it is also considered insignificant with respect to ground water. Therefore, the ground-water CIA is considered within the drainage of the Cottonwood Creek.

## Summary of Cumulative Hydrologic Impacts

The hydrologic impacts of present and future coal mining activity within the Des-Bee-Dove Mine Complex CIA have been addressed both quantitatively and qualitatively. Quantitative assessments (see Cottonwood CHIA) focused primarily on surface-water impacts which result from the discharge of intercepted ground water at the Wilberg mine. The analysis utilized average monthly water quality and discharge records from Cottonwood Creek and the Wilberg mine in combination with anticipated mine inflows to predict future quality and quantity impacts.

In the Cottonwood CHIA, the Wilberg mine dominated the analysis because of an extensive data base, the large volume of mine water inflow relative to the other general area mines, and Wilberg's greater area of disturbance. The Des-Bee-Dove Mine Complex has intercepted minimal ground water and has no recorded discharges. Some intercepted ground water from the Wilberg mine is imported to the Des-Bee-Dove Mine Complex for in-mine use.

Qualitative analysis of the effect of mine dewatering and subsidence on the ground-water system has been presented in the CHIA, with particular emphasis on the potential for diminution of spring flows. Because of the complex nature of the hydrogeology, the unknown vertical and horizontal extent of subsidence effects, and the relationship between precipitation and spring discharge, a prediction of future impacts to the ground-water system based on analytical methods was not attempted. However, based on the available data and information, the probable impacts have been predicted.

Impacts to surface-water quality of Cottonwood Creek are expected to gradually increase over the next 20 years as underground mining operations advance beneath East Mountain (Wilberg, Des-Bee-Dove, and Deer Creek mines) and Trail Mountain (Trail Mountain mine). The primary impact is associated with the discharge of intercepted ground water, which is expected to reach a maximum between the years 2000 and 2005. Impacts are quantified by flow-weighting the estimated TDS concentrations of the mine discharge water with that of the average monthly water quality and discharge of Cottonwood Creek. The maximum predicted impacts for this period indicate that the highest concentration of TDS is expected to occur in the month of March, reaching 375 mg/L. This represents an increase of 53 mg/L over the background TDS concentration, or approximately 16.5 percent. This contrasts with the increase of over 1,500 mg/L TDS resulting from irrigation return flows in Cottonwood Creek immediately downstream of the CIA.

The Utah Division of Health specifies a maximum recommended TDS concentration of 1,200 mg/L for agricultural use (irrigation and stockwatering). TDS limitations for other uses are adjusted on a case-by-case basis. The U.S. Public Health Service provides guidelines for drinking water standards which recommend a maximum TDS concentration of 500 mg/L for primary standards and 1,000 mg/L for secondary standards. Additionally, the U.S. Environmental Protection Agency (EPA) has published recommended limits for various irrigation hazards and industrial uses.

As a result of all anticipated mining, a maximum TDS increase of 53 mg/L in Cottonwood Creek (yielding a TDS value of 375 mg/L) will not degrade or preclude anticipated uses below the CIA. This is in contrast to the marked degradation which presently occurs downstream of the mined area due to irrigation activity on Mancos Shale soils. This activity increases TDS concentrations to levels which exceed the recommended limits for almost every use.

The maximum increase in the discharge of Cottonwood Creek can be estimated by assuming that all of the ground water which is intercepted by mining activities is "new" water to the basin (i.e., that which would not be present normally). The assumption is overly conservative, but serves to define an upper limit on the magnitude of the potential increase.

Similarly, the maximum decrease in streamflow during the hydrogeologic resaturation period following the cessation of mining can be estimated. By assuming that the diminution of natural streamflow during this period is equal to the peak rate of mine dewatering (ground-water recharge and storage components), the upper limit of potential streamflow reduction can be estimated.

The greatest percent change occurs during the non-irrigation season, November through April. Changes to the average monthly flow of Cottonwood Creek during the growing season are less than five percent. Thus, even if changes to the ground-water system were as great as these conservative estimates indicate, the timing of the impacts within the yearly cycle is such that minimal impacts would occur during the period of greatest demand, May through October. This is due to a combination of effects: the natural hydrologic cycle; regulation of Joe's Valley Reservoir; and, the anticipated amounts of future mine dewatering based on present inflow rates, basin characteristics, and seasonal effects.

After mining is completed, strata at Deer Creek and Wilberg mines, which were dewatered during the mining process, will start to resaturate. This will result in a reduction of base flow in Cottonwood Creek on the order of 4.0 cfs. This represents 4 percent of the mean daily flow rate of Cottonwood Creek. Seasonally, the largest percent depletion of discharge during retreat mining will occur during the non-irrigation period, November through April, where average monthly flows may experience depletions of 20 to 30 percent. Since the Des-Bee-Dove Mine Complex will intercept little ground water, insignificant base flow diminution will be attributable to the Des-Bee-Dove Mine Complex.

Des-Bee-Dove is essentially a dry mine, drained by ephemeral washes. Within the permit area there are two relatively insignificant ephemeral springs that together produce an average yearly peak flow which ranges from 3 to 20 gpm. Since minimal ground water has been intercepted by the underground workings, there has been no mine-water discharge to the surface drainage system. Surface water collected on site and ground water intercepted by the Wilberg mine is transferred to the Des-Bee-Dove operations for in-mine use. The effects of the Des-Bee-Dove mine operations on the hydrologic balance are negligible.

#### Impacts Associated With Subsidence

The results of a U.S. Bureau of Mines subsidence study above longwall panels at the Deer Creek mine immediately adjacent to the Des-Bee-Dove Mine Complex indicate that topographic modification due to subsidence may occur over 1,500 feet above longwall-mine areas. Subsidence effects at the USBM study location have been limited to topographic modification in the form of a broad, swale-like trough with no subsidence cracking or mass movement evident. The factors limiting cracking and mass movement are as follows:

- a. the presence of the massive Castlegate Sandstone which is resistant to caving and which separates the mine workings from the major spring-bearing strata, and

- b. the presence of substantial thicknesses of clay shales in the overlying Blackhawk Formation, that deform to internal tension cracks.

Where the Castlegate Sandstone is absent, a greater potential exists for subsidence to alter the hydrologic balance of the area. Tension cracks have a greater opportunity to extend to the surface, thus rerouting surface- and sub-surface water flow into the mine workings. Topographic modification of surface features may result locally in increased erosion rates, increased stream gradients, or other undesirable surface effects. Risk of damage to the hydrologic system decreases in proportion to increasing overburden thickness.

Diminution of spring flow due to subsidence may occur within the permit area. These springs are located along the Deer Creek Fault and discharge from the Price River Formation (as mapped by Utah Power and Light Company). It is not possible to predict the amount of potential damage, if any, which may occur to either of these springs. The CHIA recognizes only the potential risk to these resources. Because of the complex geological, hydrological, structural, and climatic interdependence, continual monitoring will be required to accurately assess hydrologic damage. The most promising avenue of approach in this regard appears to be the use of discharge recession curves for selected springs to document deviations in spring-flow characteristics.

#### Cumulative Impacts

Increase in TDS (primarily sodium, calcium, magnesium, bicarbonate, and sulfate) and TSS will occur; however, it has been determined that these increases do not cause material damage to the surrounding hydrologic balance. The Des-Bee-Dove Mine Complex will contribute minimal, if any, impact.

Possible diminution of spring flow due to subsidence-related effects may occur. Post-mining base-flow diminution will result as resaturation of dewatered strata occurs once retreat of the mining operations commences in the Wilberg and Deer Creek mines. Diminution of base flow in Cottonwood Creek will continue until such time as the strata resaturate and the ground-water system has achieved equilibrium. Worst-case base-flow diminution is estimated to be approximately 4 cfs, or 4 percent of the mean daily flow rate of Cottonwood Creek. Seasonally, the largest percent depletion will occur during the non-irrigation period from November through April, when this impact will be least felt by downstream users. The Des-Bee-Dove Mine Complex will contribute minimal, if any, effect.

#### Finding

An assessment of the probable cumulative hydrologic impacts with respect to the Des-Bee-Dove Mine Complex and all anticipated mining in the area has been made. The proposed Des-Bee-Dove mining operation and all other anticipated mining operations have been found to be designed to prevent material damage to the hydrologic balance outside the permit area.

**PACIFIC POWER • UTAH POWER**

324 South State  
P.O. Box 26128  
Salt Lake City, Utah 84126-0128

**PACIFICORP**  
ELECTRIC OPERATIONS GROUP

January 4, 1991

*Copy PAM*  
*ACT/015/017 #3*

**RECEIVED**  
JAN 04 1991

DIVISION OF  
OIL, GAS & MINING

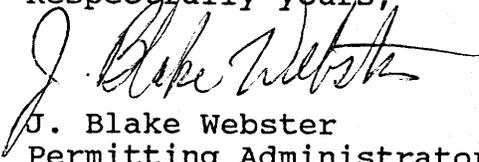
Ms. Pamela Grubaugh-Littig  
Permit Supervisor  
Utah Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

Re: Public Notice, Proof of Publication, Five-Year Permit Renewal,  
PacifiCorp Electric Operations (UP&L), Des-Bee-Dove Mine  
ACT/015/017, Folder #3, Emery County, Utah

Dear Ms. Littig:

Please find enclosed a copy of the notarized Affidavit of  
Publication for the above-referenced renewal from the Emery County  
Progress dated December 25, 1990. Two pages were required for a  
single complete copy of the Notice due to the manner in which the  
Notice was folded and attached to the Affidavit.

Respectfully yours,

  
J. Blake Webster  
Permitting Administrator

cc: Val Payne  
Scott Child  
File

JBW001

### AFFIDAVIT OF PUBLICATION

STATE OF UTAH)  
County of Emery, ss.

I, Dan Stockburger, on oath, say that I am the Publisher of the  
The Emery County Progress, a weekly newspaper of general cir-  
culation, published at Castle Dale, State and County aforesaid,  
and that a certain notice, a true copy of which is hereto attached,  
was published in the full issue of such newspaper  
for Four (4) consecutive issues, and that the first  
publication was on the

4th day of December, 1990.....

and that the last publication of such notice was in the issue of such  
newspaper dated the

25th day of December, 1990.....

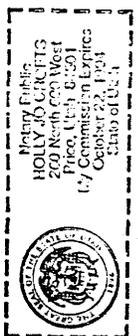
*[Signature]*

Subscribed and sworn to before me this  
25th day of December, 1990.....

*[Signature]*  
Notary Public.

My Commission expires October 22, 1994  
Residing at Price, Utah

Publication fee, \$ 422.40.....



### NOTICE

PacifiCorp Electric Operations (successor in interest to Utah Power & Light Company), PO Box 26128, Salt Lake City, Utah 84126-0128, hereby announces its intent to file an application for renewal of a Coal Mining Permit for the Bee Dove Mine with the Division of Oil, Gas and Mining under the laws of the State of Utah and the Office of Surface Mining.

A copy of the complete application is available for public inspection at the Emery County Recorder's Office, Emery County Courthouse, Castle Dale, Utah, 84513.

Written comments on the application should be submitted to the State of Utah, Division of Oil, Gas and Mining, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

The area to be mined is contained on the U.S.G.S. 7.5-minute "Red Point" quadrangle map.

Lease No. SL-066116  
Issued to Samuel K. Howard 6/1/55

Section 11 E1/2  
Section 14 N1/2NE1/4

Section 12 W1/2NW1/4, NW1/4SW1/4  
Township 17 South, Range 7 East, SLM

Utah, containing 520 acres  
OWNERS OF COAL TO BE MINED OTHER THAN THE UNITED STATES

Description of Land:  
Section 11 SE1/4NW1/4, E1/2SW1/4

Section 14 E1/2NW1/4, SW1/4

Section 23 NW1/4, SE1/4, NW1/4NE1/4, S1/2NE1/4

Section 26 NE1/4, NW1/4SE1/4  
Township 17 South, Range 7 East, SLM

Utah, containing 1,000 acres  
Owner:  
PacifiCorp Electric Operations (successor in interest to Utah Power & Light Company)  
324 South State Street  
PO Box 26128  
Salt Lake City, Utah 84126-0128

Description of Land:  
Section 14 W1/2NW1/4

Section 11 W1/2SW1/4

That part lying East of the Deer Creek Fault

Township 17 South, Range 7 East, SLM, Utah  
Owner:  
The Malcolm McKinnon Estate  
Zions First National Bank Trustee  
Salt Lake City, Utah 84111

SURFACE OWNERS OF RECORD WITHIN THE PERMIT AREA

Description of Land:  
Section 11 SE1/4NW1/4, E1/2SW1/4

Section 14 SW1/4

Section 23 NW1/4, SE1/4, NW1/4NE1/4, S1/2NE1/4

Section 26 NE1/4, NW1/4SE1/4  
Township 17 South, Range 7 East, SLM Utah

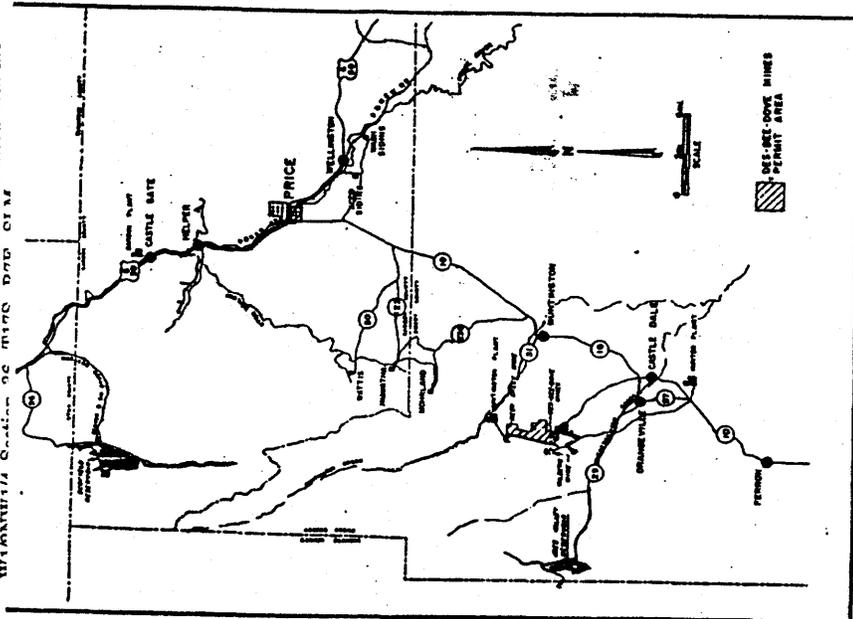
Owner:  
PacifiCorp Electric Operations (successor in interest to Utah Power & Light Company)  
324 South State Street  
PO Box 26128  
Salt Lake City, Utah 84126-0128

The remaining surface is controlled by:  
The United States of America  
Department of Agriculture  
US Forest Service  
The Manti-LaSal National Forest  
599 West Price River Dr.  
Price, Utah 84501

ADDITIONAL LANDS TO BE AFFECTED BY MINING  
State of Utah Special Use Lease Agreement No. 436 utilized for a sedimentation pond located in NW1/4NW1/4, Section 36, T17S, R7E, SLM.

State of Utah Road Right-of-Way No. 2470 (49.34 acres) utilized for the location of the Junction Haul Road located within Section 36, T17S, R7E, SLM and Section 2, T18S, R7E, SLM.

State of Utah Road Right-of-Way No. 3137 utilized for the location of the Sediment Pond Access Road located with the NW1/4NW1/4, Section 36, T17S, R7E, SLM.



Published in the Emery County Progress December 4, 11, 18 and 25, 1990.

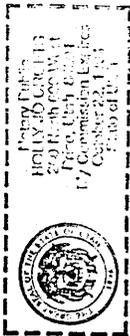
**AFFIDAVIT OF PUBLICATION**

STATE OF UTAH) ss. County of Emery,)

I, Dan Stockburger, on oath, say that I am the Publisher of the The Emery County Progress, a weekly newspaper of general circulation, published at Castle Dale, State and County aforesaid, and that a certain notice, a true copy of which is hereto attached, was published in the full issue of such newspaper for Four (4) consecutive issues, and that the first publication was on the 25th day of December, 1990 and that the last publication of such notice was in the issue of such newspaper dated the 25th day of December, 1990

Subscribed and sworn to before me this 25th day of December, 1990. Notary Public.

My Commission expires October 22, 1994 Residing at Price, Utah Publication fee, \$ 422.40



**NOTICE**

PacificCorp Electric Operations (successor in interest to Utah Power & Light Company), PO Box 26128, Salt Lake City, Utah 84126-0128, hereby announces its intent to file an application for renewal of a Coal Mining Permit for the Bee Dove Mine with the Division of Oil, Gas and Mining under the laws of the State of Utah and the Office of Surface Mining.

A copy of the complete application is available for public inspection at the Emery County Recorder's Office, Emery County Courthouse, Castle Dale, Utah 84513.

Written comments on the application should be submitted to the State of Utah, Division of Oil, Gas and Mining, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

The area to be mined is contained on the U.S.G.S. 7.5-minute "Red Point", quadrangle map. The approximately 2,760 acres contained in the permit area involve all or part of the following federal coal/leases and fee lands:

The following federal coal leases, upon which the Applicant bases its right to perform coal mining in the permit area, have all been subleased or assigned to PacificCorp Electric Operations (successor in interest to Utah Power & Light Company). Lease No. U-02664

Issued to Corporation of the Presiding Bishop of the LDS Church 1/1/57

- Section 13 SE1/4SW1/4
- Section 23 NE1/4NE1/4, SW1/4
- Section 24 W1/2
- Section 26 NW1/4, NE1/4SW1/4 and
- Section 14 SW1/4NE1/4, W1/2SE1/4, SE1/4SE1/4

Added by Modification 10/31/79 Township 17 South, Range 7 East, SLM Utah, containing 920 acres

Lease No. SL-050133 Issued to Bertha Christensen 8/1/33

Section 24 W1/2SE1/4 Township 17 South, Range 7 East, SLM Description of Land: Section 14 W1/2NW1/4 Section 11 W1/2SW1/4 That part lying East of the Deer Creek Fault Township 17 South, Range 7 East, SLM Utah

Owner: The Malcolm McKinnon Estate Zions First National Bank Trustee Salt Lake City, Utah 84111 SURFACE OWNERS OF RECORD WITHIN THE PERMIT AREA

Description of Land: Section 11 SE1/4NW1/4, E1/2SW1/4 Section 14 SW1/4 Section 23 NW1/4, SE1/4, NW1/4NE1/4, S1/2NE1/4 Section 26 NE1/4, NW1/4SE1/4 Township 17 South, Range 7 East, SLM Utah

Owner: PacificCorp Electric Operations (successor in interest to Utah Power & Light Company) 324 South State Street PO Box 26128 Salt Lake City, Utah 84126-0128

The remaining surface is controlled by: The United States of America Department of Agriculture US Forest Service The Manti-LaSal National Forest 599 West Price River Dr. Price, Utah 84501

ADDITIONAL LANDS TO BE AFFECTED BY MINING State of Utah Special Use Lease Agreement No. 436 utilized for a sedimentation pond located in NW1/4NW1/4, Section 36, T17S, R7E, SLM.

State of Utah Road Right-of-Way No. 2470 (49.34 acres) utilized for the location of the Junction Haul Road located within Section 36, T17S, R7E, SLM and Section 2, T18S, R7E, SLM.

State of Utah Road Right-of-Way No. 3137 utilized for the location of the Sediment Pond Access Road located with the W1/2NW1/4 Section 36, T17S, R7E, SLM.

BLM Right-of-Way Grant U-37642 utilized for waste rock disposal, 48.62 acres located in the east half of Section 34 and the southwest quarter of Section 35, T17S, R7E, SLM.

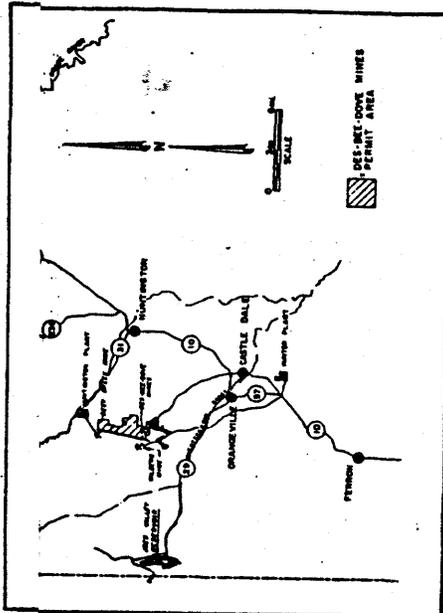
BLM Right-of-Way Grant U-50148 (28.29 acres) utilized for the location of the Junction Haul Road located with E1/2E1/2 Section 35, T17S, R7E, SLM.

BLM Right-of-Way Grant U-57134 (.37 acres) utilized for the location of the Sediment Pond Access Road located within the E1/2NE1/4 Section 35, T17S, R7E, SLM.

BLM Right-of-Way Grant UTU-65027 (25.49 acres) utilized for Waste Rock Disposal located within the SE1/4 Section 34, T17S, R7E, SLM.

United States Forest Service Special Use Permit for surface facilities, 100 acres located in Section 25 and 26, T17S, R7E, SLM.

United States Forest Special Use Permit of 8.95 acres utilized for the location of the Junction Haul Road located within the SW1/4SW1/4 Section 25 and the SE1/4SE1/4 Section 26, T17S, R7E, SLM.



Published in the Emery County Progress December 4, 11, 18 and 25, 1990.