



October 29, 1997

Utah Coal Regulatory Program  
Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
Salt Lake City, Ut. 84114-5801

Attn: Pam Grubaugh-Littig

Re: Midterm Review Requirements, PacifiCorp, Trail Mountain Mine, ACT/015/009, #2  
Folder #3, Emery County, Utah.

PacifiCorp, by and through its wholly-owned subsidiary, Energy West Mining Company ("Energy West") as mine operator, hereby submits an information regarding the above subject matter. Each of the items are listed and addressed below:

*Midterm Items (italic)*

***Response (bold italic)***

1. *An AVS check to ensure that Ownership and Control information is current and correct. (The Division is aware that the current plan still list Val Payne as the Resident Agent and this needs to be corrected).*

***Ownership and Control information:*** Energy West submitted an amendment on June 01, 1996 (D.O.G.M. project identification number 96b) to revise the ownership and control information. This was approved and incorporated in the MRP on September 06, 1997(see attachment No. 1).

***Resident Agent Designation:*** Energy West submitted an amendment on December 12, 1996 (D.O.G.M. project identification number 96i) to revise the resident agent designation from Val Payne to Charles A. Semborski. This was approved on January 9, 1997, and incorporated in the MRP on February 10, 1997 (see attachment No. 2).

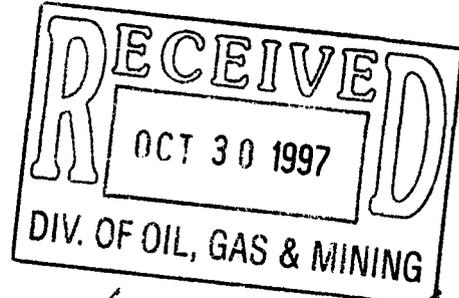
2. *A review of the bond to ensure that it is in order and that the cost estimate is accurate and is escalated to the appropriate year dollars.*

***Surety bond/reclamation section of the permit has been revised including the escalated dollars figures (see attachment No. 3).***

Huntington Office:  
(801) 687-9821  
Fax (801) 687-2695  
Purchasing Fax (801) 687-9092

Deer Creek Mine:  
(801) 381-2317  
Fax (801) 381-2285

Cottonwood Mine:  
(801) 748-2319  
Fax (801) 748-2380



*Copy handed PAM (cover letter)*  
*File - alt*  
*Midterm file (entire Package)*

3. *A review of any outstanding permitting actions. You were notified in a letter dated June 9, 1997 that outstanding Forest Service issues would be incorporated into the midterm review.*

*Forest Service Issues:*

1. *The PHC calculates water inflow based on the area of mining. This should be supplemented with data on the amount of water currently being produced and the current area of mining.*

***Chapter 7 - Hydrology Section (7.1.4.2 "Mine Dewatering" page 7-13) and the Probable Hydrologic Consequences - Appendix 7-10 (page 2-4) have been updated to include the following statement: "Intercepted groundwater will be monitored, quantified and reported annually in the Hydrologic Monitoring Report (see attachments No. 4)".***

*Comment: As discussed in the Hydrologic Section and the PHC, the amount of intercepted groundwater will gradually increase as mining proceeds downdip towards the axis of the Straight Canyon Syncline, and this has been the case experienced in mining the western portion of Lease U-64375. Intercepted groundwater has steadily increased to a point where discharge from the mine has occurred on an intermittent basis since June 1997. As indicated above, PacifiCorp will report the quality and quantity of intercepted groundwater in the Annual Hydrologic Monitoring Report. In addition to the Annual Hydrologic Monitoring Report, discharge quality and quantity are monitored and reported monthly in the "UPDES - Discharge Monitoring Reports".*

2. *The PHC predicts a reduction in the annual flow of Cottonwood Creek "assuming that none of the inflowing water is used underground." ..... Data must be provided to show if the flow in Straight Canyon would be diminished, and if water would be diverted from Straight Canyon to Cottonwood Creek.*

***The Probable Hydrologic Consequences - Appendix 7-10 (pages 2-9 through 2-11) have been revised to clarify the potential impacts to Straight Canyon and Cottonwood Creek (see attachments No. 5).***

3. *The PHC predicts a cone of depression produced by 50 years of mining may impact spring (D-18-6) 5abd-S1, which has a measured discharge rate of 180-200 gallons per minute.... A description of the predicted impacts to the spring, and an estimate of the recovery time after mining is complete, are necessary.*

***The Probable Hydrologic Consequences - Appendix 7-10 (pages 2-9 through 2-11) have been revised to include the potential impacts to spring (D-18-6) 5abd-S1 (see attachments No. 5).***

As we discussed last week, Energy West is committed to completely revising and updating the Trail Mountain MRP. This process was initiated during early 1997 by converting MRP maps from manual system to a electronic format. During the midterm review process, several areas of the MRP were found to be outdated. In discussion with the Federal Agencies (U.S.F.S. and B.L.M.), the Appendices Volume was found to be incomplete compared to the approved MRP. Also, an amendment which effects the total disturbed area is pending Division approval (Project Number AM97C). With all of these factors considered, Energy West will submit a revised MRP to the Division by January 30, 1998 to including the following:

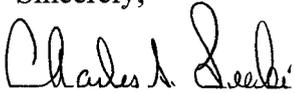
- ▶ Convert the current MRP to conform with R645 regulations
- ▶ Revise the Appendices Volume to reflect current operations
- ▶ Incorporate amendment AM97C (1993 Exploration Reclamation Request for Removal From Disturbed Area)
- ▶ Energy West contracted Mayo & Associates to conduct a comprehensive hydrologic study of East & Trail mountains, including isotopic analysis to support PHC conclusions. The PHC will be revised to include the findings of this study.

D.O.G.M. - Trail Mountain Midterm Review  
October 29, 1997  
Page Four

► Submit Trail Mountain MRP on a interactive "CD" format

Thank you for your assistance in Trail Mountain midterm review process. If you have any questions or concerns, please call Richard Northrup at 687-4822 or Bob Willey at 687-4722.

Sincerely,



Charles A. Semborski  
Geology/Permitting Supervisor

enclosure

CC Barbra Adams (file)  
Carl Pollastro  
Chuck Semborski  
Blake Webster

Vol.II/Pcommon/Eng/Environm/Trail/Amendmnt/1997/midterm.o97

**PacifiCorp**  
**Trail Mountain**  
**ACT/015/009**  
**Midterm Review**

**ATTACHMENT No. 1**

**REDLINE COPY FOR REVIEW**

<b>Chapter 2</b>	<b>List of Officers</b>	<b>pages 2-4 through 2-9</b>
<b>Chapter 2</b>	<b>List of NOV's</b>	<b>pages 2-14 through 2-15</b>

PACIFICORP OFFICERS

NAME

ADDRESS

Fred W. Buckman  
Date Position Assumed 2/1/94  
President and Chief Executive Officer  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Verl R. Topham  
Date Position Assumed 5/27/94  
Sr. Vice President and General Counsel  
201 South Main, Suite 2300  
Salt Lake City, Utah 84140

John A. Bohling  
Date Position Assumed 2/17/93  
Sr. Vice President  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Shelly R. Faigle  
Date Position Assumed 2/17/92  
Sr. Vice President  
920 SW Sixth Ave. Suite 1000  
Portland, OR 97204

Paul G. Lorenzini  
Date Position Assumed 5/27/94  
Sr. Vice President  
920 SW Sixth Ave. Suite 1000  
Portland, OR 97204

Daniel L. Spalding  
Date Position Assumed 5/1/80  
Sr. Vice President  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Dennis P. Steinberg  
Date Position Assumed 5/11/94  
Sr. Vice President  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Sally A. Nofziger  
Date Position Assumed 5/17/89  
Vice President and Corp. Secretary  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

William C. Brauer  
Date Position Assumed 2/19/92  
Vice President  
201 South Main, 2300 OUC  
Salt Lake City, UT 84140

David F. Hoffman  
Date Position Assumed 5/11/94  
Vice President  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

INCORPORATED  
EFFECTIVE:  
REVISED 6/1/96  
2-4  
*ALB*

Michael C. Henderson  
Date Position Assumed  
11/8/95

Vice President  
825 NE Multnomah, Suite 775  
Portland, Oregon 97232

Thomas J. Imeson  
Date Position Assumed  
11/28/90

Vice President  
700 NE Multomah, Suite 1600  
Portland, OR 97232-4116

Robert F. Lanz  
Date Position Assumed  
1/1/94

Vice President  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Richard T. O'Brien  
Date Position Assumed  
8/9/95

Senior Vice President & Chief  
Financial Officer  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Michael J. Pittman  
Date Position Assumed  
5/19/93

Vice President  
920 SW Sixth Avenue, Suite 1100  
Portland, OR 97204

Ernest E. Wessman  
Date Position Assumed  
5/19/93

Vice President  
201 South Main, Suite 2300  
Salt Lake City, UT 84140

William E. Peressini  
Date Position Assumed  
1-1-94

Treasurer  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Jacqueline S. Bell  
Date Position Assumed  
5/17/89

Controller  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Lenore M. Martin  
Date Position Assumed  
7/8/87

Assistant Secretary  
700 NE Multnomah, Suite 700  
Portland, OR 97232-4116

Marsha E. Carroll  
Date Position Assumed  
8/19/92

Assistant Secretary  
700 NE Multomah, Suite 700  
Portland, OR 97232-4116

John Detjens III  
Date Position Assumed  
7/10/85

Assistant Secretary  
700 NE Multnomah, Suite 950  
Portland, OR 97232-4116

CORPORATED  
EFFECTIVE:  
SEP 0 1996  
940B  
NEW BRUNSWICK OIL, GAS & CHEMICALS

Revised 8/30/96

John M. Schweitzer  
Date Position Assumed  
6/13/84

Assistant Secretary  
700 NE Multnomah, Suite 950  
Portland, OR 97232-4116

John R. Stageberg  
Date Position Assumed  
8/15/90

Assistant Treasurer  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

Bruce N. Williams  
Date Position Assumed  
8/15/90

Assistant Treasurer  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

C. K. Ferguson  
Date Position Assumed  
5/10/95

Assistant Secretary  
570 Lloyd Center Tower  
Portland, or 97232

Thomas W. Forsgren  
Date Position Assumed  
5/10/95

Vice President  
201 South Main, 2300 OUC  
Salt Lake City, Utah 84140

John F. Fryer  
Date Position Assumed  
2/8/95

Assistant Treasurer  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116

J. Brett Harvey  
Date Position Assumed  
11/9/94

Vice President  
201 South Main, 2300 OUC  
Salt Lake City, Utah 84140

Thomas A. Lockhart  
Date Position Assumed  
5/10/95

Vice President  
1607 Cy Avenue, P O Box 720  
Casper, Wyoming 82602

John E. Mooney  
Date Position Assumed  
11/9/94

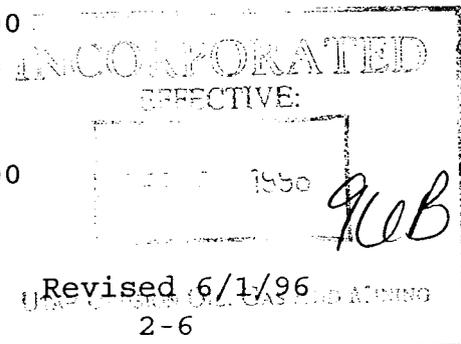
Senior Vice President  
201 South Main, 2300 OUC  
Salt Lake City, Utah 84140

Edwin J. O'Mara  
Date Position Assumed  
12/1/94

Vice President  
920 SW Sixth, Suite 1500  
Portland, Oregon 97204

Paul N. Pechersky  
Date Position Assumed  
1/6/95

Vice President  
920 SW Sixth, Suite 1500  
Portland, OR 97204



H. Arnold Wagner  
Date Position Assumed  
5/10/95

Controller of Utah Power & Light  
Assit. Secretary of PacifiCorp  
201 South Main, Suite 700  
Salt Lake City, Utah 84140

Richard D. Westerberg  
Date Position Assumed  
5/10/95

2484 Washington Blvd. Suite 400  
Ogden, Utah 84401

INCORPORATED  
EFFECTIVE:  
1996  
Revised 8/30/96  
2-7  
96B

DIRECTORS OF PACIFICORP

Frederick W. Buckman  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116  
Date Position Assumed 2/9/94

Don M. Wheeler  
Wheeler Machinery  
4901 West 2100 South  
Salt Lake City, Utah 84120  
Date Position Assumed 1/11/89

Verl R. Topham  
201 South Main, Suite 2300  
Salt Lake City, Utah 84140  
Date Position Assumed 5/27/94

Kathryn A. Braun  
Western Digital Corporation  
8105 Irvine Center Drive  
Irvine, California 92718  
Date Position Assumed 11/9/94

Peter I. Wold  
Wold Oil & Gas Co.  
139 West Second St. P O Box 114  
Casper, Wyoming 82602  
Date Position Assumed 5/9/95

C. Todd Conover  
3 Polo Field Land  
Denver, CO. 80202  
Date Position Assumed 8/21/91

Keith R. McKennon  
Chairman of the Board  
825 NE Multnomah, Suite 1055  
Portland, OR 97232  
Date Position Assumed 2/9/94

Richard C. Edgley  
Church of Jesus Christ of  
Latter-Day Saints  
50 East North Temple  
Salt Lake City UT 84150  
Date Position Assumed 10/14/87

Nancy Wilgenbusch,  
President  
Marylhurst College  
Marylhurst, OR 97036  
Date Position Assumed 10/8/86

Nolan E. Karras  
Investment Management &  
Research, Inc.  
4695 South 11900 West #3  
Roy, UT 84067  
Date Position Assumed 2/17/93

Robert G. Miller  
P O Box 42121  
Portland, OR 97242  
Date Position Assumed 8/10/94

PACIFICORP  
EFFECTIVE:  
AUG 30 1996  
9/10/96  
Wold Oil & Gas Co.

RESIGNED/RETIRED OFFICERS

Stanley K. Hathaway  
Hathaway, Speight, Kunz & Trautwein  
P O Box 1208  
Cheyenne, WY 82003-1208  
**Retired 8/10/94**

John C. Hampton  
Hampton Resources, Inc.  
9400 SW Barnes RD.  
Suite 400  
Portland, OR 97725  
**Retired 2/14/96**

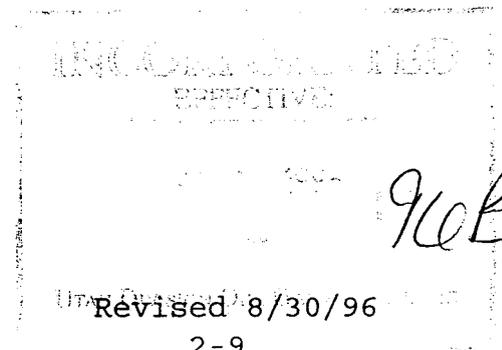
C. M. Bishop Jr.  
Pendleton Woolen Mills  
P O box 3030  
Portland, OR 97208  
**Retired 02/09/95**

A. M. Gleason  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116  
**Resigned 05/01/95**

William J. Glasgow  
Senior Vice President  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116  
**Resigned 2/28/95**

Harry Haycock  
Senior Vice President  
PacifiCorp  
One Utah Center  
201 South Main, Suite 2300  
Salt Lake City, UT 84140-0021  
**Resigned 6/94**

Stan M. Marks  
Vice President  
700 NE Multnomah, Suite 1600  
Portland, OR 97232-4116  
**Resigned 8/1/94**



Interwest Mining Company NOV Information  
Last Revised  
10/29/97

Company	NOV Date	Pit/Mine	Permit #	NOV #	Agency	Nature of NOV	Assessment	Status	Status Date	Comments	MSHA # and Date of Issuance
Bridger Coal Company	7/22/92	Jim Bridger Mine	338-T2	2399- 92	WDEQ/ A QD	Failure to control dust			01/06/93	Remediation plan approved	48-00677
Bridger Coal Company	9/3/92	Jim Bridger Mine	338-T2	100300	WDEQ/LQ D	Contaminated ground water and soil		Pending	10/12/92	Remedial action is progressing	48-00677
Bridger Coal Company	11/19/92	Jim Bridger Mine	338-T2	100309 Pt.1	WDEQ/LQ D	Failure to strip topsoil before affecting area		Terminated	12/19/92	Remedial action completed	48-00677
Bridger Coal Company	11/19/92	Jim Bridger Mine	338-T2	100309 Pt.2	WDEQ/LQ D	Failure to route all surface runoff from stockpiled coal		Terminated	12/19/92	Remedial action completed	48-00677
Bridger Coal Company	6/3/93	Jim Bridger Mine	338-T3	100263	WDEQ/LQ D	Failure to control sediment	\$1,000.00	Terminated	01/06/93	Sediment removed	48-00677
Bridger Coal Company	10/22/93	Jim Bridger Mine	338-T3	100274	WDEQ/LQ D	Operating off permit	\$3,000.00	Abated	01/06/93	IBR submitted	48-00677
Bridger Coal Company	6/20/95	Jim Bridger Mine	338-T3	100323	WDEQ/LQ D	Surface water diversion channel failed.	\$1,000.00	Terminated	7/11/95	Abated 6/28/95	48-00677
Bridger Coal Company	8/12/96	Jim Bridger Mine	338-T3	100535	WDEQ/LQ D	Failure to submit checkdam design for approval.	No fine	Pending	8/27/96	Design submitted	48-00677
Bridger Coal Company	8/15/96	Jim Bridger Mine	338-T3	100335	WDEQ/LQ D	Flyrock on undisturbed ground	\$2,000.00	Terminated	9/15/96	Flyrock removed	48-00677
Bridger Coal Company	4/1/97	Jim Bridger Mine	338-T3	100338	WDEQ/LQ D	Failure to install sediment control structure	\$3,000.00	Abated	4/3/97	Check Dam installed	48-00677
Centralia Mining Company	9/15/93	Centralia	WA-000IC	93-011-392-2 (1 of 2)	OSM	Failure to respond to revision order	\$700.00	Terminated	8/26/94		45-00416 (6/77)
Centralia Mining Company	9/15/93	Centralia	WA-000IC	93-011-392-2 (2 of 2)	OSM	Static Safety Factor	\$1,200.00	Vacated	5/9/94	Penalty Vacated	45-00416 (6/77)
Centralia Mining Company	12/12/96	Centralia	WA-0001D	96-141-244-1	OSM	Failure to provide required info in Blasting Notice	None	Terminated	1/31/96	Published Notice	45-00416 (6/77)
Energy West Mining Company	4/9/92	Des-Bee-Dove	ACT/015/017	92-26-1-1	DOG M	Failure to maintain road drainage	\$360.00	Terminated	5/19/92	Final Assessment \$280	42-00988 (12/72)
Energy West Mining Company	9/24/92	Deer Creek	ACT/015/018	92-7-3-1	DOG M	Failure to maintain sediment control	\$100.00	Terminated	10/22/92	Remedial action required by 10/21/92	42-00122 (6/77)
Energy West Mining Company	10/2/92	Cottonwood/Wil berg	ACT/015/019	92-34-1-1	DOG M	Failure to conduct mining in accordance with approved PAP	\$640.00	Terminated	10/22/92	Submit plans for mine discharge by 10/20/92	42-01944 (7-85)
Energy West Mining Company	9/16/93	Deer Creek	ACT/015/018	93-7-1-3	DOG M	Failure to conduct mining activities in accordance with approved plan - Lower terrace	\$500.00	Modified	12/20/93	Abatement submitted	42-00121 (6/77)

Interwest Mining Company NOV Information  
Last Revised  
10/29/97

Company	NOV Date	Pit/Mine	Permit #	NOV #	Agency	Nature of NOV	Assessment	Status	Status Date	Comments	MSHA # and Date of Issuance
Energy West Mining Company	12/2/93	Des-Bee-Dove	ACT/015/017	93-020-190-05	DOGM	Failure to control erosion		Abatement	01/13/94		42-00988 (12/72)
Energy West Mining Company	7/7/95	Deer Creek	ACT/015/018	95-35-01-01	DOGM	Failure to obtain a permit prior to conducting coal mining activities.	None	Vacated	8/21/95	Facts appealed to DOGM	42-00120 (6/77)
Energy West Mining Company	9/15/95	Hunter Prep Plant	None	94-020-370-002	DOGM	Failure to permit Prep Plant	OSM Restrained FDC Order 12/19/94	Administrative Appeal	08/04/95	Appealed to IBLA	42-02052
Energy West Mining Company	8/20/96	Trail Mt.	ACT/015/009	96-26-2-1	DOGM	Non-coal waste designation	\$180.00	Terminated			42-01211
Energy West Mining Company	2/13/97	Des-Bee-Dove	ACT/015/017	97-41-3-1	DOGM	Failure to maintain road drainage	\$500.00	Vacated	6/10/97	Informal Conference 5/15/97	42-00988
Energy West Mining Company	8/23/95	Deer Creek	ACT/015/018	95-35-02-01	DOGM	Failure to comply to permit placement of fill material untested (Rilda)	\$560.00	Terminated	5/17/96		42-00121
Glenrock Coal Company	1/17/95	Dave Johnston Mine	291-T4	100530	LQD	Inadequate pre-strip of top soil. Unprotected top soil.	\$1,000.00	Terminated	1/17/95	Penalty Vacated 6/7/95	48-00085 (3/9/73)

**PacifiCorp**  
**Trail Mountain**  
**ACT/015/009**  
**Midterm Review**

**ATTACHMENT No. 2**

**Copy of Approved Amendment 96I**

PacifiCorp  
Trail Mountain Mine

2.2.5 Operator. The operator, if the operator is a person different from the applicant, including his or her telephone number:

The operator is:

Energy West Mining Company, a wholly owned subsidiary of PacifiCorp  
PO Box 310  
Huntington, Utah 84528  
(801) 687-9821

2.2.6 Resident Agent. The resident agent of the applicant who will accept service of process, including his or her telephone number:

Charles A. Semborski  
PO Box 310  
Huntington, Utah 84528  
(801) 687-4720

2.2.7 Business Designation. A statement of whether the applicant is a corporation, partnership, single proprietorship, association or other business entity:

PacifiCorp, an Oregon Corporation, with an office located at One Utah Center, Suite 2100, 201 South Main Salt Lake City, Utah 84140-0021, telephone number (801) 220-4618, will be responsible for the payment of the reclamation fee. Due to the fact that PacifiCorp is a corporation no one person or entity can be held responsible for payment of the reclamation fee.

2.2.7.1 Officers and Directors of the Applicant. The names and addresses of every officer, partner, director, or other person performing a function similar to a director of the applicant:

INCORPORATED EFFECTIVE: JAN -9 1997 <i>96I</i> UTAH DIVISION OIL, GAS AND MINING 213 FIELD OFFICE
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Revised 12/12/96

**PacifiCorp**  
**Trail Mountain**  
**ACT/015/009**  
**Midterm Review**

**ATTACHMENT No. 3**

**REDLINE COPY FOR REVIEW**

**Chapter 3**

**pages 3-72 through 3-81**

SURETY BOND ESTIMATE  
TABLE 3-4

ITEM	AMOUNT LABOR MAN/SHIFT <sup>1,8</sup>	COST/MAN SHIFT	LABOR COST	EQUIPMENT REQUIREMENTS <sup>3</sup>	MATERIAL <sup>4</sup> EQUIPMENT SHIFT/COST <sup>5</sup>	MATERIAL EQUIPMENT TOTAL/COST	TOTAL LABOR MATERIALS EQUIPMENT <sup>11</sup>	
<b>SURFACE FACILITY REMOVAL</b>								
Substation, Powerline & Power Poles (23 ea.)	1	5	160	800	Truck	(13) \$ 250	\$ 1,250	\$ 2,050
	1	5	160	800	Crane	\$ 381	\$ 1,905	\$ 2,705
	2	5	120	1,200	None			\$ 1,200
Debris					(250cy)(35%)(\$5.76/cy)			\$ 504
						Sub-Total		\$ 6,459
Office/Shop/Bathouse/ Warehouse	1	10	160	1,600	Truck	11 \$ 250	\$ 2,750	\$ 2,750
	2	5	120	1,200	Backhoe/loader	10 \$ 225	\$ 2,250	\$ 3,850
	4	5	160	3,200	None			\$ 1,200
								\$ 3,200
					Track Hoe	1 \$ 567	\$ 567	\$ 567
					5DT Crane	1 \$ 445	\$ 445	\$ 445
					10 YD. Dump Truck	1 \$ 226	\$ 226	\$ 226
Debris					(6600cy)(35%)(\$5.76/cy)			\$ 13,306
						Sub-Total		\$ 25,544
Water Treatment, Tanks and Fuel System	1	5	160	800	Truck	5 \$ 250	\$ 1,250	\$ 2,050
	1	2	160	320	Backhoe/loader	2 \$ 225	\$ 450	\$ 770
	1	2	160	320	Crane	2 \$ 381	\$ 762	\$ 1,082
	2	5	120	1,200	Laborers			\$ 1,200
						Sub-Total		\$ 5,102
Sewer System/Collection Pumping Station	1	1.5	120	180	Pump and Plug Septic Tanks	1.5 \$ 100	\$ 150	\$ 330
	2	4	123	984	Utility Truck	2 \$ 70	\$ 140	\$ 1,124
	2	3	123	738	25 Ton Crane	3 \$ 297	\$ 891	\$ 1,629
					235 Hyd. Excavator	1 \$ 567	\$ 567	\$ 567
						Sub-Total		\$ 3,650
Concrete Pads	1	6	160	960	235 Trackhoe	6 \$ 567	\$ 3,402	\$ 4,362
	1	6	160	960	10yd Rock Truck	6 \$ 226	\$ 1,356	\$ 2,316
					Pickup	3 \$ 70	\$ 210	\$ 210
	2	9	120	2,160	Laborers			\$ 2,160
						Sub-Total		\$ 9,048

SURETY BOND ESTIMATE  
TABLE 3-4

ITEM	AMOUNT		COST/MAN SHIFT	LABOR COST	EQUIPMENT REQUIREMENTS <sup>3</sup>	MATERIAL <sup>4</sup> EQUIPMENT SHIFT/COST <sup>5</sup>		MATERIAL EQUIPMENT TOTAL/COST		TOTAL LABOR	
	MAN/SHIFT <sup>1,8</sup>									MATERIALS EQUIPMENT <sup>11</sup>	
Concrete Pumphouse Pad	1	0.5	160	80	235 Trackhoe	0.5	\$ 567	\$ 284	\$	364	
	1	0.5	160	80	10 yd Rock Truck	0.5	\$ 226	\$ 113	\$	193	
					Pickup	0.5	\$ 70	\$ 35	\$	35	
	2	0.5	120	120	Laborers				\$	120	
										Sub-Total	\$ 712
Non Coal Waste Bunker	1	1.5	160	240	235 Trackhoe	1.5	\$ 567	\$ 851	\$	1,091	
	1	1.5	160	240	10 yd Rock Truck	1.5	\$ 226	\$ 339	\$	579	
					Pickup	1.5	\$ 70	\$ 105	\$	105	
	2	1.5	120	360	Laborers				\$	360	
										Sub-Total	\$ 2,135
Truck Loadout Silo <sup>22</sup>	1	15	160	2,400	Truck	15	\$ 250	\$ 3,750	\$	6,150	
	1	15	160	2,400	Crane	15	\$ 381	\$ 5,715	\$	8,115	
	2	15	120	3,600	None				\$	3,600	
Debris					(1780cy)(20%)(\$5.76/cy)				\$	2,050	
										Sub-Total	\$ 19,915
Chute and Trusses from Crusher to #1022	1	3	160	480	Truck	3	\$ 250	\$ 750	\$	1,230	
	1	3	160	480	Crane	3	\$ 381	\$ 1,143	\$	1,623	
	1	3	120	360	None	-	-	-	\$	360	
										Sub-Total	\$ 3,213
Main Fan	1	7	160	1,120	Truck	7	\$ 250	\$ 1,750	\$	2,870	
	1	4	160	640	Crane	4	\$ 381	\$ 1,524	\$	2,164	
	1	2	160	320	Backhoe/Loader	2	\$ 250	\$ 500	\$	820	
										Sub-Total	\$ 5,854
Storage Shed	3	1	160	480	Backhoe/Loader	1	\$ 250	\$ 250	\$	730	
										Sub-Total	\$ 730

SURETY BOND ESTIMATE  
TABLE 3-4

ITEM	AMOUNT LABOR MAN/SHIFT <sup>1,8</sup>		COST/MAN SHIFT	LABOR COST	EQUIPMENT REQUIREMENTS <sup>3</sup>	MATERIAL <sup>4</sup> EQUIPMENT SHIFT/COST <sup>5</sup>	MATERIAL EQUIPMENT TOTAL/COST	TOTAL LABOR MATERIALS EQUIPMENT <sup>11</sup>
Pump and Generator	1	2	160	320	Truck	2 \$ 250	\$ 500	\$ 820
House/Water Tank	1	2	160	320	Crane	2 \$ 381	\$ 762	\$ 1,082
	3	2	120	720	None	-		\$ 720
Debris					(476cy)(35%)(\$5.76/cy)			\$ 959
							Sub-Total	\$ 3,581
ROM Transfer								
Building <sup>2</sup>								
Operator	2	2	127	508	25 Ton Crane	2 \$ 297	\$ 594	\$ 1,102
					Truck Trailer	2 \$ 267	\$ 534	\$ 534
Laborer	2	3	123	738	2 YD. Hyd. Excavator	0.5 \$ 424	\$ 212	\$ 950
Foreman	1	3	137	411	2.5 YD. Loader	0.5 \$ 293	\$ 147	\$ 558
					16 Ton Dump Truck	1 \$ 227	\$ 227	\$ 227
					Torch, gas and air	3 \$ 40	\$ 120	\$ 120
Debris					(1320cu)(35%)(\$5.76/cy)			\$ 2,661
							Sub-Total	\$ 6,152
Tipple /Electrical Facility								
Operator	3	2	127	762	25 Ton Crane	0.75 \$ 297	\$ 223	\$ 985
					Truck Trailer	0.75 \$ 267	\$ 200	\$ 200
Laborer	1	2	123	246	2 YD. Hyd. Excavator	1 \$ 424	\$ 424	\$ 670
Forman	1	2	137	274	2.5 YD. Loader	1 \$ 293	\$ 293	\$ 567
					16 Ton Dump Truck	1 \$ 227	\$ 227	\$ 227
					Torch, gas and air	2 \$ 40	\$ 80	\$ 80
Debris					(222cy)(35%)(\$5.76/cy)			\$ 448
							Sub-Total	\$ 3,177

SURETY BOND ESTIMATE  
TABLE 3-4

ITEM	AMOUNT LABOR MAN/SHIFT <sup>1,8</sup>		COST/MAN SHIFT	LABOR COST	EQUIPMENT REQUIREMENTS <sup>3</sup>	MATERIAL <sup>4</sup> EQUIPMENT SHIFT/COST <sup>5</sup>	MATERIAL EQUIPMENT TOTAL/COST	TOTAL LABOR MATERIALS EQUIPMENT <sup>11</sup>
ROM Overland Tube Conveyor <sup>22</sup>								
(Tube Removal)								
Operator	2	2	127	508	80 Ton Crane	1.5 \$ 864	\$ 1,296	\$ 1,804
					25 Ton Crane	2 \$ 297	\$ 594	\$ 594
Laborer	3	2	123	738	Utility Truck	2 \$ 70	\$ 140	\$ 878
Foreman	1	2	137	274	Tractor/Flatbed	2 \$ 260	\$ 520	\$ 794
							Sub-Total	\$ 4,070
(Suports and Footers)								
Operator	3	0.5	127	191	245 Hyd. Excavator	0.5 \$ 567	\$ 284	\$ 474
Laborer	1	0.5	123	62	10 YD. Dump Truck	1 \$ 226	\$ 226	\$ 288
					Utility Truck	0.5 \$ 70	\$ 35	\$ 35
							Sub-Total	\$ 797
Conveyor Structure and Crusher Station	1	5	160	800	Truck	5 \$ 250	\$ 1,250	\$ 2,050
	1	5	160	800	Crane	5 \$ 381	\$ 1,905	\$ 2,705
	1	5	120	600	None	-		\$ 600
Debris					(498cy)(35%)(5\$ 76cy)			\$ 1,004
							Sub-Total	\$ 6,359
Loading Dock	1	1	160	160	Truck	1 \$ 250	\$ 250	\$ 410
	1	1	160	160	Loader	1 \$ 225	\$ 225	\$ 385
							Sub-Total	\$ 795
Coal Pile and Retaining Wall	1	0.5	160	80	Jeffery	0.5 \$ 500	\$ 250	\$ 330
	1	0.5	160	80	Dozer	0.5 \$ 703	\$ 352	\$ 432
	1	1	160	160	Truck	1 \$ 250	\$ 250	\$ 410
	1	1	160	160	Backhoe	1 \$ 250	\$ 250	\$ 410
							Sub-Total	\$ 1,582

SURETY BOND ESTIMATE  
TABLE 3-4

ITEM	AMOUNT LABOR MAN/SHIFT <sup>1,8</sup>		COST/MAN SHIFT	LABOR COST	EQUIPMENT REQUIREMENTS <sup>3</sup>	MATERIAL <sup>4</sup> EQUIPMENT SHIFT/COST <sup>5</sup>	MATERIAL EQUIPMENT TOTAL/COST	TOTAL LABOR MATERIALS EQUIPMENT <sup>11</sup>
Sediment Pond	1	2	160	320	Dozer	2 \$ 500	\$ 1,000	\$ 1,320
	1	2	160	320	Loader	2 \$ 225	\$ 450	\$ 770
							Sub-Total	\$ 2,090
Seal Portals <sup>23</sup> (5 each)	3	10	630	6,300	Concrete Block	10 \$ 720	\$ 7,200	\$ 13,500
						Sub-Total	\$ 13,500	
Culverts <sup>24</sup>	1	29	160	4,640	Truck	29 \$ 250	\$ 7,250	\$ 11,890
	1	29	160	4,640	Crane	29 \$ 381	\$ 11,049	\$ 15,689
	2	29	120	6,960	None	-	\$	\$ 6,960
	1	14	160	2,240		14 \$ 567	\$ 7,938	\$ 10,178
							Sub-Total	\$ 44,717
Portal Liners <sup>20</sup>	1	6	160	960	235 Track Hoe	6 \$ 567	\$ 3,402	\$ 4,362
	1	3	160	480	10 Yd Rock Truck	3 \$ 226	\$ 678	\$ 1,158
	1	3	160	480	D4 Dozer	3 \$ 297	\$ 873	\$ 1,353
					Pickup	6 \$ 70	\$ 420	\$ 420
	2	6	120	1,440	Laborers		\$	\$ 1,440
							Sub-Total	\$ 8,733
Gunite Removal <sup>22</sup>	1	10	160	1,600	235 Track Hoe	10 \$ 567	\$ 5,670	\$ 7,270
	1	10	160	1,600	D4 Dozer	10 \$ 226	\$ 2,260	\$ 3,860
					Pickup	10 \$ 70	\$ 700	\$ 700
	2	10	160	2,400	Laborers		\$	\$ 2,400
						Sub-Total	\$ 14,230	
Rock Dust Silo	1	1	160	160	25 Ton Crane	1 \$ 297	\$ 297	\$ 457
	1	1	160	160	Truck/Trailer	1 \$ 250	\$ 250	\$ 410
					Pickup	1 \$ 70	\$ 70	\$ 70
	1	1	120	120	Laborer		\$	\$ 120
						Sub-Total	\$ 1,057	

SURETY BOND ESTIMATE  
TABLE 3-4

ITEM	AMOUNT LABOR MAN/SHIFT <sup>1,8</sup>	COST/MAN SHIFT	LABOR COST	EQUIPMENT REQUIREMENTS <sup>3</sup>	MATERIAL <sup>4</sup> EQUIPMENT SHIFT/COST <sup>5</sup>	MATERIAL EQUIPMENT TOTAL/COST	TOTAL LABOR MATERIALS EQUIPMENT <sup>11</sup>	
Concrete Storage Pads 20 (South of Silo)	1	0.5	160	80	235 Track Hoe	0.5 \$ 567 \$	284 \$ 364	
	1	0.5	160	80	10 yd rock truck	0.5 \$ 226 \$	113 \$ 193	
	1	1	160	160	D4 Dozer	1 \$ 291 \$	291 \$ 451	
					Pickup	1 \$ 70 \$	70 \$ 70	
						Sub-Total	\$ 1,078	
Concrete (Jersey) Barriers <sup>26</sup>	1	2	160	320	Loader/Fork Lift	2 \$ 225 \$	450 \$ 770	
	1	2	160	320	LHD Loader	2 \$ 225 \$	450 \$ 770	
					Pickup	2 \$ 70 \$	140 \$ 140	
						Sub-Total	\$ 1,680	
Fence Removal (780 ft.)	1	2	160	320	Loader	2 \$ 225 \$	450 \$ 770	
	1	2	160	320	Flatbed	2 \$ 250 \$	500 \$ 820	
	2	2	120	480	Laborers		\$ 480	
					Pickup	2 \$ 170 \$	140 \$ 140	
						Sub-Total	\$ 2,210	
						SUB-TOTAL	\$ 198,169	
EARTH MOVING AND RECONTOURING <sup>(10,12)</sup>								
	<sup>(14,17)</sup> 1	25	160	4,000	Dozer	25 \$ 703 \$	17,575 \$ 21,575	
	<sup>(15)</sup> 1	62	160	9,920	988 Loader	62 \$ 971 \$	60,202 \$ 70,122	
	<sup>(16)</sup> 1	15	160	2,400	Track Excavator	15 \$ 954 \$	14,310 \$ 16,710	
	6	3	160	2,880	235 Hyd Exc.	3 \$ 567 \$	1,701 \$ 4,581	
					2.5 Yd. Loader	3 \$ 293 \$	879 \$ 879	
					10 yd Dump Truck-4	3 \$ 226 \$	2,712 \$ 2,712	
							SUB-TOTAL	\$ 116,579 \$ 116,579

SURETY BOND ESTIMATE  
TABLE 3-4

ITEM	AMOUNT LABOR MAN/SHIFT <sup>1,8</sup>		COST/MAN SHIFT	LABOR COST	EQUIPMENT REQUIREMENTS <sup>3</sup>	MATERIAL <sup>4</sup> EQUIPMENT SHIFT/COST <sup>5</sup>	MATERIAL EQUIPMENT TOTAL/COST	TOTAL LABOR MATERIALS EQUIPMENT <sup>11</sup>	
RIPRAP <sup>(19)</sup>	1	12	160	1,920	Truck	12 \$ 250	\$ 3,000	\$ 4,920	
	1	12	160	1,920	Backhoe/Loader	12 \$ 225	\$ 2,700	\$ 4,620	
	1	12	120	1,440	None	-	-	\$ 1,440	
	2	1.5	160	480	235 Track Hoe	1.5 \$ 850		\$ 1,330	
					10Yd Dump Truck	1.5 \$ 339		\$ 339	
						<b>SUB-TOTAL</b>	\$ 12,649	\$ 12,649	
REVEGETATION									
Fertilization	1	4	160	640	Dozer	4 \$ 703	\$ 2,812	\$ 3,452	
					Spreader	4 \$ 55	\$ 220	\$ 220	
					Fertilizer	10 30	\$ 300	\$ 300	
						* (arces)	<b>Sub-Total</b>		\$ 3,972
Seedbed Preparation ^C (Grassland-Shrub)	1	4	160	640	Dozer	4 \$ 703	\$ 2,812	\$ 3,452	
					Spreader	2 \$ 55	\$ 110	\$ 110	
					Seed	7 \$ 388	\$ 2,716	\$ 2,716	
						* (arces)			
					Land Imprinter	2 \$ 200	\$ 400	\$ 400	
						<b>Sub-Total</b>		\$ 6,678	
Seedbed Preparation (Riparian)	1	3	160	480	Dozer	3 \$ 703	\$ 2,109	\$ 2,589	
					Spreader	1 \$ 55	\$ 55	\$ 55	
					Fertilizer	1 \$ 55	\$ 55	\$ 55	
					Disk	1 \$ 55	\$ 55	\$ 55	
					Harrow	1 \$ 55	\$ 55	\$ 55	
					Seed	3 \$ 236	\$ 708	\$ 708	
						* (arces)	<b>Sub-Total</b>		\$ 3,517

SURETY BOND ESTIMATE  
TABLE 3-4

ITEM	AMOUNT LABOR		COST/MAN SHIFT	LABOR COST	EQUIPMENT REQUIREMENTS <sup>3</sup>	MATERIAL <sup>4</sup> EQUIPMENT SHIFT/COST <sup>5</sup>		MATERIAL EQUIPMENT TOTAL/COST		TOTAL LABOR MATERIALS EQUIPMENT <sup>11</sup>	
	MAN/SHIFT <sup>1,8</sup>										
Contour Trenching	1	5	160	800	Dozer	5	\$ 703	\$ 3,515	\$ 4,315		
								Sub-Total		\$ 4,315	
Mulch, Park, Etc.	10	21	120	25,200	Erosion Mat combined with Fertilizer, Seed, Mulch and Trees	10	\$ 1,100	\$ 11,000	\$ 36,200		
	2	1	320	320				\$ 400	\$ 400		
								Sub-Total		\$ 36,600	
Plant Materials	2	3	120	720	Plant Materials	-	-	\$ 694	\$ 1,414		
								Sub-Total		\$ 1,414	
								SUB-TOTAL	\$	56,496	
MISCELLANEOUS											
Hand tools	N/A <sup>(7)</sup>	N/A <sup>(7)</sup>	N/A	N/A	Cutting Torch, etc	N/A	\$ 2,000	\$ 2,000	\$ 2,000		
Soil Analyses (Pregrade)	N/A <sup>(18)</sup>	N/A <sup>(18)</sup>	N/A	N/A	Handtools, Backhoe	N/A	\$ 600	\$ 600	\$ 600		
Soil Analyses (Postgrade)	N/A	N/A	N/A	N/A	Handtools, Bags	N/A	\$ 920	\$ 920	\$ 920		
Supervision <sup>(8)</sup>	1	122	200	24,400	N/A	N/A	N/A	N/A	\$ 24,400		
Mobilization	N/A	N/A	N/A	N/A	Miscellaneous Equipment	N/A	\$ 2,000	\$ 2,000	\$ 2,000		
Monitoring Maintenance	1	10 <sup>(9)</sup>	200	40,000	See Handtools	N/A	\$ 1,000	\$ 1,000	\$ 41,000		
								SUBTOTAL	\$	70,920	\$ 70,920
								TOTAL	\$	454,813	\$ 454,813

**REFERENCE FOR BOND ESTIMATE TABLE**

1. Based on 8 hour shifts, overhead included.
2. Cost estimates from: Means 1984 Cost Construction Data. 1983. 42nd Annual Edition. Robert Snow Means Company, Inc., 100 Constuction Plaza, Kingston, MA 02364.
3. For description to the equipment listed, refer to Table 1.
4. For a description of plant materials, refer to text.
5. Cost estimates from: Rental Rate Blue Book Construction Equipment. 1983. Data quest., San Jose, Calif. Equipment rates includes operation and maintenance costs.
6. Daily charge based on weekly rental rate of all equipment except dump, dozer and front loader (which were based on monthly rates). All rates include operation and maintenance costs.
7. N/A designates " non-applicable". Labor costs for these items were included in previous crew charges.
8. Estimate based on 4-man working crew and 8-hour shifts. Laborer = \$15/hr.,  
Equipment Operator = \$20/hr.
9. Farm implements prices based on Swains John Deere Farm Equipment, Salt Lake City, UT.
10. For cut and fill quantities, calculations and cross-sections, refer to text.
11. Cost estimates assume no salvageable value or surface structures and facilities.
12. Earth moving and recontouring estimates also include material haulage.
13. Example:  $3/280 = 3$  shifts @ \$250/shift.
- 14.\* Number of shifts based on 12,000 yds' to be moved at production rate of 98 yds/hr determined from maximum production rate of 410 yds/hr, corrected by .42 for 30% working slope, corrected by .75 for average operator efficiency, corrected by .83 for 50 min. hour, corrected by .90 for moderately hard to drift material.
- 15.\* Number of shifts based on 24,000 yds' to be moved at production rate of 2,000 yds'/shift (6 hrs. production, 2 hrs. move time/shift) determined from maximum production rate of 420 yds/hr with 2 cycles/min. corrected for 50 min. hour, assuming average operator efficiency and medium digging difficulty.

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\*Production rates above are somewhat conservative to allow 10 to 15 percent swell factor and occasional large rock.

- 17. Estimates include backfilling portal entrances.
- 18. Labor and equipment costs for soil sampling are included under "Monitoring and Maintenance". Equipment used for soil sampling may also be necessary for rills and gullies and other maintenance procedures, therefore equipment will be available.
- 19. Additional riprapping costs were included in Item "Culverts".

20. Concrete will be backfilled inside the mine portals.

21. Demolition debris from means: \$.21/c.f. = \$5.67/cy.

22. As stated in Note 11, no salvage value has been allowed, all steel structure will be backfilled in the portals, thus no off-property hauling has been estimated.

23	Material	Labor	Equipment
	Blocks: 400 @ .61 ea = \$244	1 block la 1 block @\$28.45	1 flatbed truck @ \$178/day
	Motor: 1 lot = 16	1 helper	1 crawler tractor @ \$702/day
	Soil backfill = 300	1 equip. opr. @ 28.45	
	150 cy @\$2/cy (On-site material)		
	<b>Total</b> = \$560	<b>Total</b> \$ 78.85/hr	<b>Total</b> \$880/day
	Note: 2 shifts per seal		

24. Culverts will be removed as excavation or fills progress. 330' of 12", 1900' of 66" 38' of 96", 85' of 16", 350' of 48", 105' of 24" and 60' of 18". Total of 2868 ft. Average 100 ft. recovery per shift for a total of 29 shifts.

25. There is approximately 10,700 s.f. of gunite sprayed on the slopes by the portal areas. Removal and disposal on site will average 1,000 sf/day.

26. There is approximately 450 ft. of barriers on the site. These concrete barriers will be backfilled in the portals. (10 ft. lengths).

TABLE 3-5

RECLAMATION COST BREAKDOWN FOR RECLAMATION BOND

1.	Surface Facility Removal	\$198,169
2.	Earth Moving and Recontouring	\$116,579
3.	Rip-Rap	\$12,649
4.	Revegetation	\$56,496
5.	Miscellaneous*	\$70,920
	<b>SUBTOTAL (1984 Dollars)</b>	<b>\$454,813</b>
+ 10%	Contingency	\$45,481
	<b>SUBTOTAL</b>	<b>\$500,294</b>
+ 5%	Reclamation Management	\$25,515
	<b>TOTAL (1984 Dollars)</b>	<b>\$525,809 (1984 DOLLARS)</b>

<u>YEAR</u>	<u>ESCALATION FACTOR***</u>	<u>ESCALATED TOTAL</u>	<u>YEAR</u>	<u>ESCALATION FACTOR</u>	<u>ESCALATED TOTAL</u>
1985	1.20%	\$532,119	1986	1.80%	\$541,697
1987	2.00%	\$552,531	1988	1.80%	\$562,477
1989	1.50%	\$570,914	1990	2.20%	\$583,474
1991	1.27%	\$590,884	1992	2.21%	\$603,943
1993	2.54%	\$619,283	1994	3.21%	\$639,162
1995	1.93%	\$651,498	1996	2.58%	\$668,306
1997	2.58%	\$685,548	1998	2.58%	\$703,236
1999	2.58%	\$721,379	2000	2.58%	\$739,991

**TOTAL SURETY ESTIMATE 2000 Dollars)**

\$739,991

\*\*1993 Exploration Drilling

144,266

**SUGGESTED SURETY ESTIMATE**

\$884,257

\*Miscellaneous costs include all monitoring and maintenance related costs for successful reclamation establishments.

\*\*Total includes +10% Contingency = 12,622 and +4.3% Reclamation Management = 5,427. Original Cost 1994 Dollars = 126,217.

This item will be removed pending the Division's approval.

\*\*\*Escalated Factors taken from Means©

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**Chapter 7 - Hydrology**  
**Appendix 7**

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#### **7.1.4.2 Mine Dewatering**

Generally water encountered within the mine has been in the form of roof leakers through bolt holes and tension cracks positioned parallel to the working face of the mine. As mining progresses downdip, leakers further than 500 feet updip of the working face generally dry up. Only a limited amount of water is made within the mine. Water produced within the mine is used for dust suppression and fire protection within the mine and for the operation of in-mine machinery. Occasionally mine water production will exceed usage because of inactivity of the mine operation, shortlived surges of inflow, etc. As a result, a system has been constructed to allow for discharge of the mine water from the sump to Cottonwood Creek, with an option of routing the discharge through the sediment pond if necessary. This discharge point is approved under an UPDES Discharge Permit and is fitted with a flow meter for accurate quantity measurement. Intercepted groundwater will be monitored, quantified and reported annually in the Hydrologic Monitoring Report.

#### **7.1.5 Effects of Mining on the Groundwater Hydrologic Balance**

As has been noted, the occurrence and quality water in any region is highly controlled by geology. A structural feature known as the Straight Canyon Syncline may influence the groundwater hydrology in the northwestern corner of the permit area. The axis of the syncline, plunging NE-SW at approximately 3.5°, passes just to the northwest of the permit boundary and is visible on outcrop at the Joe's Valley dam. The syncline is a prominent feature and could provide a conduit from groundwater migration from NE-SW. The only data for this area has been obtained from exploration holes which have been drilled near the syncline axis. No unusual or persistent sources of groundwater at the coal seam horizon were noted in holes TMX-2, TMX-6, and TMX-7 (see

available (Freeze and Cherry, 1979), the results of Lines' modeling efforts are considered adequate for inflow and drawdown estimation.

Lines assumed that the Blackhawk-Star Point aquifer could be simulated with three layers (two in the Blackhawk and one in the Star Point) and that the aquifer was isotropic and infinite in areal extent. Drawdown effects were modeled for various mine widths, mine lengths, premining hydraulic gradients, and hydraulic conductivities.

Figure 2-1 shows the effect of mine size on expected inflow rates as determined by Lines (1985). Results presented in this figure are based on hydraulic conductivities of 0.01 feet per day for the Blackhawk Formation and 0.02 feet per day for the Star Point Sandstone. These values are very similar to the laboratory hydraulic conductivities reported by Lines (1985) for sandstone units within the Blackhawk Formation and for the Star Point Sandstone, respectively. They are also similar to the hydraulic conductivities calculated in Section 2.1.1 for the Blackhawk-Star Point aquifer from transmissivity and thickness data reported by Lines (1985) from local aquifer tests. Thus, the results are considered representative of local conditions.

According to Figure 7-3 of the PAP, the projected mine workings will have a maximum length of 12,000 feet. Figure 2-2 was prepared from Figure 2-1 using this mine length, showing potential mine inflows for various mine widths and two premining hydraulic gradients.

Comparing Figure 7-3 of the PAP with Figure 7-1 of the PAP and Figure 5 of Lines (1985), the maximum width of the potentially saturated projected mine workings will be 12,000 feet. Utilizing a premining hydraulic gradient of 0.041 feet per foot as being most representative of local conditions, Figure 2-2 indicates a potential steady-state inflow of approximately 80 gallons per minute. Using a premining hydraulic gradient of 0.065 feet per foot to represent a worst case scenario, Figure 2.2 indicates a potential steady-state inflow of about 170 gallons per minute. Inflow rates are likely to be more near the lower end of the range except perhaps in the western portion of the permit area where hydraulic gradients are steeper and heads are greater.

If areas of significant fracturing are encountered in the saturated portion of the mine workings, inflows to the mine would increase; however, as noted previously, no significant fracturing that would result in increased inflows above the predicted range is known to exist in the mine area. Intercepted groundwater will be monitored, quantified and reported annually in the Hydrologic Monitoring Report.

Future mining within the Trail Mountain Mine (beyond Tract 2 Lease UTU-64373) could conceivably extend approximately 8000 feet to the west of Tract 2 and 4000 feet south of tracts 1 and 2. Mining to the south should not significantly increase potential inflows to the mine workings since much of this area is unsaturated (based on a comparison of Figure 7-1 of the PAP with Figure 5 of Lines, 1985); however, mining to the west would continue into the saturated zone, thus increasing potential mine inflows. By extrapolation of the curves in Figure 2-2, increasing the width of the mine from 6000 to 14,000 feet should increase inflows by less than 25 gallons per minute under either premining hydraulic gradient condition.

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**Appendix 7 - 10**

**pages 2-9 through 2-11**

Springs (D-18-6) 4bbc-S1 and (D-18-6) 5abd-S1 (both discussed by Lines, 1985) issue in the bottom of Straight Canyon immediately downstream from Joes Valley Reservoir. These springs also contribute to the base flow of Cottonwood Creek via Straight Canyon. Lines (1985) reported that the flow of the former spring has been less than 2 gallons per minute during the period of observation. The latter spring had measured discharge rates of 180 and 200 gallons per minute during two observations in 1982. These two springs are located in the upper portion of the Blackhawk Formation approximately two miles west of the Trail Mountain permit boundary. It has been documented through surface exploration and mining within the Trail Mountain and surrounded areas that the saturated portion of the Star Point Sandstone is not directly connected to the upper portion of the Blackhawk Formation. PacifiCorp developed a water monitoring well (TM-3) in Straight Canyon just west of the mine permit boundary to evaluate hydrologic characteristics of the Star Point Sandstone. Similar to wells completed in Cottonwood Canyon, saturated strata was first encountered when the drilling penetrated the Spring Canyon member of the Star Point Sandstone (the upper portion of the Blackhawk Formation was unsaturated). Recharge to springs (D-18-6) 4bbc-S1 and (D-18-6) 5abd-S1 is thought to be controlled by fracture permeability associated with the Joe's Valley fault system.

The impacts associated with mining and dewatering of the intercepted groundwater in the Trail Mountain Mine will result in depressurization of the Star Point Sandstone (monitoring of TM-3 in Straight Canyon will verify the amount of depressurization). Prior to mining, the elevation of the potentiometric level in TM-3 was 6900 feet. The top of the Spring Canyon Member of the Star Point Sandstone is exposed in Straight Canyon 1.7 miles southeast of TM-3 at an elevation of 6500 feet. Because the Spring Canyon Member outcrops below the potentiometric level reflected by TM-3, there is a hydrodynamic potential for the water to discharge from the Spring Canyon Member to Straight Canyon. However, we believe that very little, if any, groundwater discharges to Straight Canyon from this horizon and therefore depressurization of the Spring Canyon Member will not decrease the flow in Straight Canyon. Two lines of evidence support this conclusion. First, natural groundwater discharge would be indicated by springs in the Spring Canyon Member, however no springs have been identified in this unit in vicinity of Straight Canyon. Second, we have calculated a maximum potential discharge of 1 gallon per minute based on the assumptions described below. This discharge rate was calculated using Darcy's law:

$$Q = K I A,$$

where,

Q = discharge rate

K = hydraulic conductivity

I = gradient

A = cross sectional area.

PacifiCorp calculated a hydraulic conductivity of  $4.3 \times 10^{-6}$  feet  $\text{sec}^{-1}$  for the Spring Canyon Member from a recovery test conducted on well TM-3. A gradient of 0.05 was calculated from the difference between the pre-mining elevation of the potentiometric level in TM-3 (6900 feet) and the outcrop elevation of the Spring Canyon Member in Straight Canyon (6450 feet) divided by the distance

separating these two points (9000 feet). A cross sectional area of 10,000 ft<sup>2</sup> was calculated using the thickness of the Spring Canyon Member (100 feet) and a 100-foot exposure width.

2.1.3 Potential Subsidence Impacts. The maximum area of the potential surface expression of subsidence due to mining in the is presented in Figure 7-1 of the PAP. Nine springs exist within this area. Data presented in Appendix 7-1 of the PAP documents the geologic occurrence of each spring. All of the springs emanate from the North Horn Formation except T-14 (17-25-1) which issues from the Price River Formation.

Springs within and surrounding the mine plan area were inventoried in June, 1981 and October 1985. Experience gained from the data collected at nearby mines and from the general area has provided vital information regarding the possible effect of mining on springs.

Plate 7-1 shows the location of all water sources found during the hydrologic inventory of the mine plan and adjacent area. As shown, only a limited number of springs/seeps was found on the east face of Trail Mountain. The springs located were mainly confined to the west slopes of the mountain. Based on the data collected by PacifiCorp (Volume 9 Hydrologic Section, East Mountain Permit Area) and the Bureau of Mines (IC 9405 Response of Springs to Longwall Coal Mining at the Deer Creek and Cottonwood Mines, Wasatch Plateau, UT) on the adjacent East Mountain property, mining induced impacts have not been identified. As discussed in Chapter 11, subsidence is expected to have no impact on bedrock-aquifer springs in the vicinity of the Trail Mountain Mine.

As was previously discussed, no significant impacts to the groundwater system are expected from the mining operation. The groundwater monitoring plan (discussed in Chapter 7) will provide a means to follow the possible effect of the mining activities on the groundwater system.

Any roads, fences, stock ponds, earth dams, or water troughs which are materially damaged by subsidence will be repaired and regraded to restore them to their pre-subsidence usefulness. Should significant subsidence impacts occur, the applicant will restore, to the extent technologically and economically feasible, those surface lands that were reduced in reasonably foreseeable use as a result of such subsidence to a condition capable of supporting reasonable foreseeable uses that such lands were capable of supporting before subsidence.

In order to restore any land affected by Applicant's mining operations to a condition capable of supporting the current and postmining land uses stated herein, the Applicant will replace water determined to have been lost or adversely affected as a result of Applicant's mining operations if such loss or adverse impact occurs prior to final bond release. The water will be replaced from an alternative source in sufficient quantity and quality to maintain the current and postmining land uses as stated herein.

During the course of regular monitoring activities required by the permit, or as the Applicant otherwise acquires knowledge, the Applicant will advise the Division of the loss or adverse occurrence discussed above, within ten working days of having determined that it has occurred. Within ten days after the Division notifies Applicant, in writing, that it has determined that the water loss is the result of the Applicant's mining operation, the Applicant will meet with the Division to determine if a plan for replacement is necessary and, if so, establish a schedule for submittal of a

plan to replace the affected water. Upon acceptance of the plan by the Division, the plan shall be implemented. Applicant reserves the right to appeal the Division's water loss determinations as well as the proposed plan and schedule for water replacement as provided by Utah Code Ann. 40-10-22(3)(a).

According to data presented by Lines (1985), water quality is similar in all aquifers in the Trail Mountain area. Thus, subsidence should not degrade the quality of groundwater. Some improvement of groundwater quality may even occur since flow rates through the bedrock would increase and residence time in the bedrock would decrease, thereby decreasing dissolution and lowering the dissolved concentrations of various constituents below current concentrations.

## 2.2 Groundwater Monitoring Plan

A groundwater monitoring plan has been developed for the Trail Mountain permit area and adjacent areas which includes monitoring of selected springs, in-mine sources and monitoring wells. Details of this plan can be found in Appendix 7-1 of the PAP.