

CHAPTER 1

LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
110 MINIMUM REQUIREMENTS FOR LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION	1-1
111 Introduction	1-1
112 Identification of Interests	1-2
112.100 Business Entity	1-2
112.200 Applicant and Operator	1-2
112.300 Officers of the Applicant	1-3
112.400 Coal Mining and Reclamation Operation Owned or Controlled ...	1-12
112.500 Legal or Equitable Owner of the Surface and Mineral Properties	1-18
112.600 Owners of Record of Property Contiguous to Proposed Permit Area	1-18
112.700 MSHA Numbers	1-19
112.800 Interest in Contiguous Lands	1-20
112.900 Certification of Submitted Information	1-20
113 Violation Information	1-21
114 Right-of-Entry Information	1-21
115 Status of Unsuitability Claims	1-27
116 Permit Term	1-27
117 Insurance, Proof of Publication, and Facilities and Structures Used in Common	1-27
118 Filing Fee	1-28
120 PERMIT APPLICATION FORMAT AND CONTENTS	1-28
130 REPORTING OF TECHNICAL DATA	1-28
140 MAPS AND PLANS	1-28
150 COMPLETENESS	1-28

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1-1 Coal Mining and Reclamation Operations	
1-2 Three Year Violation History June 2000 - 2003	

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1-1 Corporate Structure	

LIST OF PLATES

<u>Plate</u>	
1-1 Surface Ownership	
1-2 Coal Ownership	
1-3 Surface Ownership Along County Road	
1-4 Dugout Canyon Mine Permit Area	

LIST OF APPENDICES

<u>Appendix</u>	
1-1 Coal Lease Documents	
1-2 Insurance and Proof of Publication	
1-3 Surface Lease Documents	
1-4 Disturbed Area Legal Description	

CHAPTER 1
LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

110 MINIMUM REQUIREMENTS FOR LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

111 Introduction

The permit is presently held by Canyon Fuel Company, LLC, a Delaware limited liability company ("CFC"). Under the Purchase and Sale Agreement dated as of March 22, 1998, closed effective June 1, 1998, Arch Western Resources, LLC, a Delaware limited liability company, purchased the 65% membership interest of Arco Uinta Coal Company, a fully owned subsidiary of Atlantic Richfield Company, in CFC. Itochu Coal International, Inc., a fully owned subsidiary of Itochu Corporation, retained its ownership of the remaining 35% membership interest. The common membership interests in Arch Western Resources, LLC, are in turn owned 99% by Arch Western Acquisition corporation, a Delaware corporation fully owned by Arch Coal, Inc., also a Delaware corporation, and 1% by Delta Housing, Inc., a Delaware corporation fully owned by Atlantic Richfield Company, a Delaware corporation. Soldier Creek Coal Company became Soldier Canyon Mine through the merge and subsequent sale of Coastal Coal, Inc. on or about December 20, 1996.

Soldier Canyon Mine (SCM) will provide in this chapter all information pertaining to the Dugout Canyon Mine required by R645-301-100 and provide the information required by R645-301-112 and R645-301-113 in a format prescribed by OSM.

Where possible the Mining and Reclamation Plan has been updated to reflect the legal and financial information associated with Canyon Fuel Company, LLC (CFC). Other portions of the Mining and Reclamation Plan remain unmodified. Any charts, maps, drawings,

diagrams, exhibits, tables, and so forth in the unmodified portions of the Mining and Reclamation Plan bearing the name(s) Coastal States Energy Company, and/or Soldier Creek Coal Company should be read with the name Canyon Fuel Company, LLC substituting for any and all of these other entities, which have been merged into Canyon Fuel Company.

112 Identification of Interests

112.100 Business Entity

The Dugout underground coal mining operation will be located in Carbon County, Utah. The surface facilities for the Dugout Canyon Mine will be within Section 23, Township 13 South, Range 12 East, SLBM approximately 11 miles northeast of Wellington, Utah.

Canyon Fuel Company, LLC is a Limited Liability Company organized under the laws of Delaware in December 1996 and now owned 65% by Arch Western Resources, LLC, a Delaware limited liability company, and 35% by Itochu Coal International Inc., a Delaware Corporation. Itochu Coal International Inc. is a wholly owned subsidiary of Itochu Corporation, a Japanese Corporation. Arch Western Resources, LLC, is owned 99% by Arch Western Acquisition Corporation, a Delaware corporation wholly owned by Arch Coal, Inc., a Delaware corporation, and 1% by Delta Housing, Inc., a Delaware corporation wholly owned by Atlantic Richfield Company, a Delaware corporation.

112.200 Applicant and Operator

APPLICANT : Operations, Administration, Permit Revisions, and Amendments

Canyon Fuel Company, LLC
6955 South Union Park Center
Suite 540
Midvale, UT 84047
Telephone: (801) 569-4700
EMPLOYER ID: 87-0567183

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
~~January 2004-September 10, 2003~~

OPERATOR: Canyon Fuel Company, LLC
6955 South Union Park Center, Suite 540
Midvale, UT 84047
Telephone: (801) 569-4700

RESIDENT AGENT: C.T. Corporation Systems
50 West Broadway
Salt Lake City, UT 84104
Telephone: (801) 531-7090

CONTACT PERSON: Richard D. Pick
Canyon Fuel Company, LLC
6955 South Union Park Center, Suite 540
Midvale, UT 84047
Telephone: (801) 569-4700

PERSON WHO WILL PAY ABANDONED MINE RECLAMATION FEES:

Richard D. Pick
Canyon Fuel Company, LLC
6955 South Union Park Center, Suite 540
Midvale Utah 84047

112.300 Officers of the Applicant

This section identifies those persons who own or control Canyon Fuel Company, LLC. Canyon Fuel Company, LLC, is a Delaware limited liability company with two members; Arch Western Resources, LLC holding 65% interest, and Itochu Coal International, Inc. holding 35% interest.

Arch Western Resources, LLC, is owned 99% by Arch Western Acquisition Corporation, a wholly owned subsidiary of Arch Coal, Inc., and 1% by Delta Housing, Inc., a wholly owned subsidiary of Atlantic Richfield Company.

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
January 2004 ~~September 10, 2003~~

ADDRESS:

Arch Western Resources, LLC
City Place One, Suite 300
St. Louis, MO 63141-7056

EMPLOYER IDENTIFICATION:

43-1811130

ADDRESS:

Arch Western Acquisition Corporation
City Place One, Suite 300
St. Louis, MO 63141-7056

EMPLOYER IDENTIFICATION:

43-1811084

ADDRESS:

Arch Coal, Inc.
CityPlace One, Suite 300
St. Louis, MO 63141-7056

EMPLOYER IDENTIFICATION:

43-0921172

ADDRESS:

Delta Housing, Inc.
515 South Flower Street
Los Angeles, CA 90071

EMPLOYER IDENTIFICATION:

94-2314688

ADDRESS:

Atlantic Richfield Company
515 South Flower Street
Los Angeles, CA 90071

EMPLOYER IDENTIFICATION:

23-0371610

Itochu Coal International, Inc. is a wholly owned subsidiary of Itochu Corporation, a Japanese corporation.

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
~~January 2004~~ September 10, 2003

ADDRESS:

Itochu Coal International, Inc.
555 17th Street, Suite 845
Denver, Colorado 80202

EMPLOYER IDENTIFICATION: 52-2003963

ADDRESS:

Itochu Corporation, 5-1
Kita-Aoyama 2-Chome
Minato-ku, Tokyo 107-77, Japan

EMPLOYER IDENTIFICATION: 98-0053818

The following lists describe the officers and directors of Canyon Fuel Company, LLC, Arch Western Resources, LLC, Arch Coal, Inc., Itochu Corporation, and Itochu Coal International, Inc. The addresses for the officers, directors, representatives to the management board listed are the same as those of the respective business entities as listed above, for which the individuals are officers, directors or representatives. Social Security numbers for the officers and directors are no longer required to be disclosed according to Bonnie Edens of the Office of Surface Mining (e-mail from Bonnie Edens, January 10, 2003, 6:25am).

CANYON FUEL COMPANY, LLC:

(9/12/03)

Directors:

Robert W. Shanks Chairman
Effective: 06/01/1998

Masayoshi Araya
Effective: 06/01/2001

Yuzo Hirono
Effective: 12/14/1999

Steven F. Leer
Effective: 06/01/1998

Kenneth G. Woodring
Effective: 12/01/2000

John W. Eaves
Effective: 12/01/2000

Joe Y. Nakazawa
Effective: 06/01/2001

Tsutomu Niwa
Effective: 10/09/2001

Alternative Representative

Alternative Representative

Alternative Representative

Officers

Richard D. Pick
Effective: 06/01/1998

President, Chief Executive Officer and General Manager

Robert G. Messey
Effective: 10/09/2001

Chief Financial Officer

James E. Florczak
Effective: 05/25/1999

Vice President, Finance

John W. Eaves
Effective: 06/23/1998

Vice President, Marketing

Robert G. Jones
Effective: 03/08/2000

Vice President, General Counsel and Assistant Secretary

Janet L. Horgan
Effective: 10/11/2000

Secretary

William H. Rose
Effective: 06/01/1998

Assistant Secretary

ARCH COAL, INC.:

(9/12/03)

Directors:

James R. Boyd
Effective: 07/01/1997

Chairman

David B. Peugh
Effective: 07/01/1997

Vice President - Business Development

Robert W. Shanks
Effective: 07/01/1997

Vice President - Operations

~~William H. Rose
Effective: 04/22/1998~~

~~Vice President - Tax Planning~~

Robert J. Messey
Effective: 12/1/2000

Senior Vice President, Chief Financial Officer

Robert G. Jones
Effective: 10/16/2000 and 3/01/2000

Vice President, General Counsel and Secretary

James E. Florczak
Effective: 08/17/1998

~~Vice President, Finance, Treasurer~~

Deck S. Slone
Effective: 04/26/2001

Vice President, **Investor and Public Relations**

Bradley M. Allbritten
Effective: 03/1/2000

Vice President, **Marketing**

Shiela B. Feldman
Effective: 02/03/2003

Vice President, Human Resources

Janet L. Horgan
Effective: 10/16/2000

Assistant Secretary **and Counsel**

John W. Lorson
Effective: 04/9/1999

Comptroller

Charles David Steele
Effective: **04/24/2003**

Vice President, Tax Panning

**Bennett K. Hatfield
Effective: 04/24/2003**

Vice President

Arch Western Resources, LLC, Representatives to the Management Board:

Name: Steven F. Leer
Effective: 06/01/98

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
~~January 2004-September 10, 2003~~

Name: Robert W. Shanks
Effective: 06/01/98

Alternate:

Name: Kenneth G. Woodring
Effective: 06/01/98

Itochu Coal International, Inc. Representatives to the Management Board:

Board:

Akio Shigetomi
Effective: 11/30/1996

Masayoshi Araya
Effective: 11/30/1996

Yuzo Hirono
Effective: 12/31/1999

Alternates:

Yutaka Nakazawa
Effective: 12/20/1996

Tsutomu Niwa
Effective: 6/01/2001

ARCH WESTERN RESOURCES, LLC

(9/12/03)

Directors:

Patrick A. Kriegshauser
Effective: 05/07/98

David B. Peugh
Effective: 05/07/98

Jeffry N. Quinn
Effective: 05/07/98

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
~~January 2004~~ September 10, 2003

Thomas A. Lockhart
Effective: 02/24/2003

Officers:

Robert W. Shanks
Effective: 06/28/98

President - Operations

David B. Peugh
Effective: 05/17/98

Vice President

William H. Rose
Effective: 05/07/98

Assistant Secretary

Robert G. Jones
Effective: 03/01/00 and 6/2/98

Vice President and Assistant Secretary

Janet L. Horgan
Effective: 3/17/98

Secretary

James E. Florczak
Effective: 05/15/98 and 9/15/98

Vice President, Finance, Treasurer

ITOCHU CORPORATION

<u>Name</u>	<u>Title</u>	<u>Date of Appointment</u>
Minoru Murofushi	Chairman	April 1998
Masahisa Naitoh	Vice Chairman	April 2000
Uichiro Niwa	President, CEO	April 1998
Hiroshi Sumie	Executive Vice President	April 2000
Makoto Kato	Executive Vice President	April 2001
Yushin Okazaki	Executive Vice President	April 2001
Sumitaka Fujita	Executive Vice President	April 2001
Mitsuaki Fukuda	Sr. Managing Director	April 2000

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
~~September 10, 2003~~
January 2004

Akira Yokota	Sr. Managing Director	April 2001
Kiyomi Yamada	Managing Director	April 2001
Motonori Toyota	Managing Director	June 2001
Kouhei Wantanabe	Managing Director	April 2002
Hiroshi Ueda	Managing Director	April 2002

ITOCHU COAL INTERNATIONAL INC.

Masayoshi Araya	Chairman of the Board	Dec. 1999
Yuzo Hirono	President and Chief Executive Officer	Dec. 1999
Tsutomu Niwa	Chief Financial Officer	June 1996
Dietz Fry	Vice President, Finance and Administration	March 1997
Yutaka Nakazawa	Vice President Commercial and Secretary	Dec. 1996
Hiroshi Akiba	Assistant Secretary	Feb. 2000

112.400 Coal Mining and Reclamation Operation Owned or Controlled

The following list describes all permits held by Canyon Fuel Company, LLC, all pending applications for permits, and any permit recognized as necessary in the future for which no application has been filed. Identification numbers of applications or permits are contained in the following list. Many of the agencies listed, however, have review responsibility only and may not have submitted a numbered permit.

<u>Permit</u>	<u>Issuing Authority</u>	<u>Approval Status/ Identification No.</u>
Mining and Reclamation Permit ACTC /007/039	State of Utah Department of Natural Resources Division of Oil, Gas and Mining	Approved

	Department of Interior U.S. Geological Survey and Office of Surface Mining	
	Department of Agriculture U.S. Forest Service Manti La Sal National Forest	
U.P.D.E.S. Permit UT-6-640020 UTG-040020	Environmental Protection Agency and Utah D.E.Q.	Approved
Business License	Carbon County	Approved
Mine Health and Safety Permits 42-01890 and 42-01888, 1211-UT-09-01890-01	Mine Safety and Health Administration - Utah	Approved
Radio Permits	Federal Communications Commission	Approved
Certificate of Insurance and Authorization to do Business in State	State Industrial Development Commission	Approved
Road Agreement	Carbon County	Approved
Air Quality Approval Order	State of Utah Utah Air Conservation Committee Department of Health Division of Environmental Health	Approved
Stream Channel Alteration Permit	State Engineer	Approved

The Canyon Coal Company, LLC mining permits and operations are:

SUFCO Mine	C/041/002
Skyline Mine	C/007/005
Soldier Canyon Mine	C/007/018
Banning Loadout	C/007/034

Dugout Canyon Mine

C/007/039

The issuing authority for the Canyon Fuel Company permits is the UDOGM.

Permits and operations held by subsidiary companies of Arch Coal, Inc. are set forth in Table 1-1.

Neither Arch Coal, Inc. nor any of its subsidiaries owns or controls any other coal mining or reclamation operation. Itochu Corporation does not own or control any interest, direct or indirect, in any other entity having coal mining operations in the United States. None of the executive officers of Itochu Corporation are directors or officers of any other entity that owns or controls an interest, direct or indirect, in any entity having coal mining operations in the United States.

The corporate structure is presented in **Figure 1-1**. below:

112.500 Legal or Equitable Owner of the Surface and Mineral Properties

The legal and equitable owners of the surface and mineral properties to be affected by this mining operation during the duration of the permit period are the State of Utah, Bureau of Land Management and Canyon Fuel Company, LLC. Refer to Refuse Pile Amendment for additional ownership information.

Canyon Fuel Company, LLC
6955 South Union Park Center
Suite 540
Salt Lake City, UT 84047
Telephone: (801)569-4700

Milton & Ardith Thayne Trust
Sunnyside Star Route
Price, Utah 84501

State of Utah
School and Institutional
Trust Lands Administration
675 East 500 South
Salt Lake City, Utah 84102-2818

George & Alice Conover Etal
2701 Georgia Way
Sandy, Utah 84092

United States of America
Department of Interior
Bureau of Land Management
Price Coal Office
125 South 600 West
Price, Utah 84501

No area within the lands to be affected by surface operations and facilities or within the area of coal to be mined is under a real estate contract.

112.600 Owners of Record of Property Contiguous to Proposed Permit Area

Owners of record for surface and mineral properties contiguous to the proposed permit area are shown on Plate 1-1 and 1-2, with the names and addresses listed below.

United States of America
Department of Interior
Bureau of Land Management
Price Coal Office
125 South 600 West
Price, Utah 84501

State of Utah
School and Institutional Trust Lands Admin.
675 East 500 South
Salt Lake City, Utah 84102-2818

KFJ Ranch Partnership
C/O Kerwin Jensen
Cleveland, Utah 84518

George & Alice Conover Etal
2701 Georgia Way
Sandy, Utah 84092

Milton & Ardith Thayne Trust
Sunnyside Star Route
Price, Utah 84501

Surface ownership along the county road is shown on Plate 1-3. In addition refer to the Refuse Pile Amendment for additional information.

112.700 MSHA Numbers

The Dugout Canyon Mine MSHA numbers are:

MSHA No. 42-01890 Rock Canyon seam (west side of canyon)

MSHA No. 42-01888 Gilson seam (west side of canyon)

MSHA No. 1211-UT-09-01890-01 Dugout Canyon Mine Refuse Pile

112.800 Interest in Contiguous Lands

A State Institutional Trust Lands coal tract is contiguous to the east of the Dugout Canyon Mine permit boundary. **Upon approval by UDOGM**, Canyon Fuel Company, LLC ~~does not~~ intends to **begin mining** the coal reserves in this lease during the current ~~five-year~~ term of this permit application.

112.900 Certification of Submitted Information

The undersigned hereby attests that the information contained in this Notice of Change in Ownership and Contract Information is true and correct to the best of the undersigned's information and belief.

On behalf of CANYON FUEL COMPANY, LLC

Richard D. Pick
Its: President, Chief Executive Officer and General Manager

STATE OF UTAH)
 : ss

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
~~January 2004-September 10, 2003~~

COUNTY OF SALT LAKE)

Subscribed and sworn before me this ____ day of _____, 1998.

Notary Public
Residing at _____

(SEAL)

My Commission Expires:

113 Violation Information

Neither Canyon Fuel Company, LLC nor any major stockholder of the company having any interest, either legal or equitable, in Canyon Fuel Company, LLC have had a State or Federal mining permit suspended or revoked or a security deposited in lieu of a bond revoked. Neither Canyon Fuel Company, LLC, any of its mining operations, nor any person who owns or controls Canyon Fuel Company has any unabated cessation orders or unabated air or water quality violation notices.

As a newly formed entity, Canyon Fuel Company, LLC received no violations within the three years prior to filing of this application. The company mines, however, have been operating for several years and have received some NOV's. The violations for the Canyon Fuel Company, LLC operations, including the SUFCO Mine, ACT/041/002; Skyline Mine, ACT/007/005; Soldier Canyon Mine, ACT/007/018; Banning Loadout, ACT/007/034 are set forth below in Table 1-2.

114 Right-of-Entry Information

The right to enter the leaseholds conveyed by the State coal leases is conferred to the lessee by the Mineral Leasing Act of 1920 and the leases themselves. Copies of State coal leases

ML-42648 and ML-42649, and Federal Lease U07064-027821 which grant CFC the right to enter and conduct underground mining operations, are presented in Appendix 1-1.

The legal description of the CFC leases is:

State Lease ML-42648 - (3640 acres) - Approved

T. 13 S., R. 12 E., SLBM, Utah

Section 8: E1/2

Section 10: S1/2

Section 11: S1/2

Sections 14 and 15: All

Section 17: NE1/4; E1/2SW1/4; SE1/4

Section 20: E1/2NW1/4; SW1/4NW1/4; N1/2NE1/4

Section 21: N1/2NW1/4; NE1/4

Section 22: N1/2; N1/2S1/2

Section 23: W1/2NW1/4

State Lease ML-42649 - (2212 acres) - Approved

T. 13 S., R. 12 E., SLBM, Utah

Section 3: Lots 1, 2, 3, 4, S1/2 (all)

Section 4: Lots 1, 2, 3, 4, S1/2 (all)

Section 5: Lots 1, 2, SE1/4

Section 9: All

Section 10: N1/2

Section 11: N1/2

Federal Coal Lease U-07064-027821 - (2,416.14 acres) - Approved 1 January 1957

T. 13 S., R. 12 E., SLBM, Utah

Section 13: S1/2

Section 23: E1/2E1/2, W1/2SE1/4, NE1/4SW1/4

Section 24: All

Section 25: N1/2N1/2

Section 26: N1/2NE1/4

T. 13 S., R. 13 E., SLBM, Utah

Section 18: Lots 3, 4, E1/2SW1/4; SE1/4

Section 19: Lots 1-4, E1/2W1/2, NE1/4, NW1/4SE1/4

Section 30: Lot 1

Federal BLM Right-of-Way UTU-76601 - (10 acres) - Sept. 1998

T. 13S., R. 12 E., SLBM, Utah

Section 23: NE1/4NW1/4NW1/4SW1/4, N1/2NE1/4NW1/4SW1/4,
SE1/4NW1/4NW1/4SW1/4

Fee land owned by CFC as described below: (800 acres)

T. 13 S., R. 12 E., SLBM, Utah

Section 16: All

Section 23: E1/2NW1/4; W1/2NE1/4

BLM Rt-of-Way UTU-77985 - (57.5 acres)

T13 S., R12E., SLBM, Utah

Section: 22: NE1/4SW1/4SW1/4SE1/4, S1/2SW1/4SW1/4SE1/4,
N1/2SE1/4SW1/4SE1/4, SE1/4NE1/4SW1/4SE1/4,
S1/2NW1/4SE1/4SE1/4, SW1/4NE1/4SE1/4SE1/4,
N1/2NE1/4SE1/4SE1/4

Section 23: NW1/4SW1/4NW1/4SW1/4, S1/2NW1/4NW1/4SW1/4,
NE1/4NW1/4NW1/4SW1/4, N1/2NE1/4NW1/4SW1/4

Section 27: NE1/4SE1/4NE1/4NW1/4, S1/2SE1/4NE1/4NW1/4,

SE1/4NE1/4NE1/4NW 1/4, W1/2 NW1/4NW1/4NE1/4

BLM Parcel (2.5 acres)

T13 S., R12E., SLBM, Utah

Section: 23: NW1/4NW1/4NW/4SW1/4

State Lease ML-48435-OBA - (2,560 acres)

T13 S., R13 E., SLBM, Utah

Section 17: SW 1/4, SW1/4SE1/4

Section 19: NE1/4SE1/4, S1/2SE1/4

Section 20: All

Section 21: SW1/4NW1/4, SW1/4

Section 28: NW1/4, N1/2SW1/4, SW1/4SW1/4

Section 29: All

Section 30: E1/2, E1/2W1/2

Waste Rock Storage Facility

T. 14 S., R. 12 E., SLBM, Utah (Approximately 26.8 acres)

Section 18: Portions of NE1/4, SW1/4 and SE1/4 of the NE1/4

All of Lease ML-42648, except the E1/2 of Section 8 and the NE1/4 of Section 17, is included within the Dugout Canyon Mine permit boundary. However, only the S1/2 SE1/4 of Section 9 from Lease ML-42649 is within the permit boundary. **The ten acres described in UTU-76601 are also described in UTU-77985.** The U.S. Department of Interior, Bureau of Land Management (BLM) right-of-way application UTU-76601 is included in Appendix 1-3.

The disturbed area encompasses 20.31 acres (Mine Facility area, including Gilson well pad and small substation), **2.2 acres (G-2 and G-3 Degas Well)**, 1.8 acres (Leachfield/pipeline area), and 26.8 acres (Refuse Pile area) totally ~~49.9~~ **51.1** acres. That acreage includes a pre- and post

mining road with an area of 1.6 acres and 2.03 acres of undisturbed land within the mine facilities disturbed area and 11.2 acres within the refuse pile disturbed area.

The permit boundary encompasses approximately 9,471 acres which includes the following surface ownership and acreage: 10 acres in the BLM right-of-way, approximately 567 acres of other federal lands, 920 acres of state lands, and fee acreage of approximately 7,974 acres (Plate 1-1 and RA Plate 1-1).

Coal ownership acreage within the permit area includes approximately 2,804 acres of federal coal, approximately ~~3,225~~5840 acres of state coal, and 827 acres of fee coal (Plate 1-2 and RA1-1B). ~~The difference between the surface and coal ownership acreage is within the surface subsidence area and the refuse pile and leachfield areas which will not be mined (approximately 670 acres).~~ Approximately 670 745 acres which include the surface subsidence area, refuse pile and leach field areas will not be mined although their acreage is included in the surface and coal ownership acreage totals.

A legal description of the permit boundary includes:

T. 13 S., R. 12 E., SLBM, Utah
Section 9: S1/2SE1/4
Section 10: S1/2
Section 11: S1/2
Section 13: All except N1/2N1/2
Section 14: All
Section 15: All
Section 16: All
Section 17: E1/2SW1/4; SE1/4
Section 20: E1/2NW1/4; SW1/4NW1/4; N1/2NE1/4
Section 21: N1/2NW1/4; NE1/4
Section 22: N1/2; N1/2S1/2; ~~Portion of N1/2NE1/4SE1/4SE1/4;~~
~~Portion of SW1/4NE1/4SE1/4SE1/4;~~
~~Portion of the S1/2NW1/4SE1/4SE1/4;~~
~~Portion of SW1/4NE1/4SW1/4SE1/4;~~
~~Portion of N1/2SE1/4SW1/4SE1/4;~~
~~Portion of NE1/4SW1/4SW1/4SE1/4;~~

- Section 23: **Portion of S1/2SW1/4SW1/4SE1/4**
NW1/4; NE1/4; SE1/4; NE1/4SW1/4; NW1/4NW1/4SW1/4;
S1/2NE1/4NW1/4SW1/4; NW1/4SW1/4NW1/4SW1/4;
- Section 24: All
- Section 25: N1/2N1/2
- Section 26: N1/2NE1/4
- Section 27: Portion of W1/2NW1/4NW1/4NE1/4**
Portion of SW1/4NE1/4NE1/4NW1/4
Portion of E1/2SW1/4NE1/4NW1/4
Portion of SW1/4SW1/4NE1/4NW1/4

T. 13 S., R. 13 E., SLBM, Utah

- Section 17 **SW1/4; SW1/4NW1/4; SW1/4SE1/4**
- Section 18 All except N1/2N1/2
- Section 19 All
- Section 20 All
- Section 21 SW1/4; SW1/4NW1/4**
- Section 28 NW1/4; N1/2SW1/4; SW1/4SW1/4**
- Section 29 All**
- Section 30 NW1/4NW1/4; **E1/2; E1/2W1/2**

T. 14 S., R. 12 E., SLBM, Utah

- Section 18 Portion N1/2NE1/4

Topsoil is being stored in T14S, R12E, Section 8, a storage area permitted to Soldier Canyon Mine. See Chapter 2 for additional details concerning the topsoil storage.

Acreage has been added to the permit area which is in excess of the Federal lease acreage to act as a subsidence buffer zone. This acreage has been added in T13S, R12E Section 13 and T13S, R13E Sections 17 **and 18** ~~through 20~~.

The refuse pile will be located on property owned by Canyon Fuel Company, LLC. The property is located approximately 6.5 miles southwest of the Dugout Canyon Mine in portions of the NE1/4, SW 1/4 and SE 1/4 of the NE 1/4, in a portion of the NW 1/4 of the SE1/4, and in the NW1/4 of the NE 1/4 of Section 18, Township 14 South, Range 12 East, Salt Lake Base Meridian.

BLM Right-of-Way UTU-77985 grants the right-of-entry for the leach field and associated pipeline. Refer to the right-of-way description above.

115 Status of Unsuitability Claims

To the best knowledge of Canyon Fuel Company, LLC, no portion of the area to be permitted is designated, or under study for being designated, unsuitable for mining.

CFC does not propose to conduct coal mining or reclamation operations within 300 feet of any occupied dwelling. A description of operations to be conducted within 100 feet of a public road is provided in Chapter 5 of this M&RP, together with a discussion of plans to protect the interests of the public.

116 Permit Term

The anticipated mining progression during operation of the Dugout Canyon Mine is outlined on Plate 5-7. Rates of production for the permit term are presented in Section 523. Reclamation operations are discussed in Chapters 2, 3, 5, 7, and 8.

117 Insurance, Proof of Publication, and Facilities and Structures Used in Common

Certificates of Insurance issued to Canyon Fuel Company, LLC are located in Appendix 1-2.

The newspaper advertisement and the verification of the advertisement appearing in the appropriate newspapers are included in Appendix 1-2.

118 Filing Fee

The permit application was accompanied by a \$5.00 filing fee. UDOGM retains a record of filing fee payments in their office in Salt Lake City, Utah.

120 PERMIT APPLICATION FORMAT AND CONTENTS

This permit application will comply with R645-301-120.

130 REPORTING OF TECHNICAL DATA

All technical data submitted in the permit application will be accompanied by the name or organization responsible for the collection and analysis of data, dates of collection and descriptions of methodology used. Technical analyses will be planned by or under the direction of a qualified professional in the subject to be analyzed.

140 MAPS AND PLANS

The maps and plans in the Mining and Reclamation Plan will correspond with the requirements in R645-301-140.

150 COMPLETENESS

CFC believes the information in this permit application to be complete and correct.

TABLE 1-1
COAL MINING AND RECLAMATION OPERATIONS

Facility	State	Parent Mailing Address	Permit Number	Issuing Authority
SUFCO Mine	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/041/002	Utah Division of Oil, Gas and Mining
Skyline Mines	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/007/005	Utah Division of Oil, Gas and Mining
Soldier Canyon Mine	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/007/018	Utah Division of Oil, Gas and Mining
Banning Loadout	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/007/034	Utah Division of Oil, Gas and Mining
Dugout Canyon Mine	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/007/039	Utah Division of Oil, Gas and Mining

TABLE 1-2
THREE YEAR VIOLATION HISTORY June 2000 - 2003
MINING AND RECLAMATION OPERATIONS

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Dugout Canyon Mine	Canyon Fuel Company, LLC 6955 South Union Park Center, Suite 540 Midvale, UT 84047	ACT/007/039	7/1/03	N03-46-3-1 Failure to minimize contributions of sediment to runoff outside the permit area.	Terminated 7/30/03, Assessment Paid
Skyline Mine		ACT/007/005	9/06/01	N01-39-1-1 Release of coal fines to Eccles Creek.	Terminated 12/10/01, Assessment Paid
Soldier Canyon Mine		ACT/007/018	None		
Banning Loadout		ACT/007/034	None		
SUFCO Mine		ACT/041/002	None		
Black Thunder Mine	Thunder Basin Coal Company, LLC P.O. Box 406 Wright, Wyoming 82732	233-T5 00977	7/11/01	100163 Flyrock on topsoil.	Abated 8/16/01
			4/25/02	100164 Ground vibration at a pipeline.	Abated 5/20/02
			5/7/03	100172 Location of TC diversion 3 and sediment control for diversion.	Abated 7/16/03
			6/20/03	100147 Removal of dragline crossing culverts and low pH soils in diversion.	Abated 7/22/03
Coal Creek Mine		483-T3	None		

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
West Elk Mine	Mountain Coal Company West Elk Mine P.O. Box 591 Somerset, CO 81434	C-80-007	None		
Gordon Creek No. 2, 7, 8		ACT/007/016	None		
Gordon Creek No. 3, 6		ACT/007/017	BOND RELEASED		
Huntington Canyon No. 4 Mine		ACT/015/004	BOND RELEASED		
Medicine Bow Mine	Arch of Wyoming P.O. Box 460 Hanna, WY 82327	377-T5	5/03/02	MV 400028 Failure to mark a topsoil stockpile with a sign.	Terminated 6/5/02
		378-T3	8/8/00	100541 Erosion of designated drainage.	Terminated 9/8/00

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Apogee Coal Company	Arch of West Virginia HC 61, Box 156 Yolyn, WV 25654	S-75-85	7/23/02	29 - Failed to minimize air pollution.	Terminated 8/8/02
		S-5006-91	7/1/00	24 - Failure to clean out sediment structure.	Terminated 9/8/00
		S-5005-93	10/5/00	22 - Exceeded airblast level.	Terminated 10/5/00
			3/7/01	23 - Failure to protect off site areas.	Terminated 6/1/01
			5/23/01	24 - Material placed downslope.	Terminated 6/22/01
			8/9/01	25 - Failure to protect off site areas.	Terminated 10/18/01
			11/29/01	26 - Failure to record information in blast record.	Terminated 11/29/01
			1/17/02	27 - Failure to protect off site areas.	Terminated 3/14/02
			1/23/02	28 - Failure to protect off site areas.	Terminated 5/30/02
			3/12/02	29 - Exceeded airblast level.	Terminated 3/21/02
			8/1/02	30 - Failed to maintain drainage system.	Terminated 10/3/02
3/13/03	31 - Failure to protect off site areas.	Terminated 5/7/03			

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Apogee Coal Company	Arch of West Virginia HC 61, Box 156 Yolyn, WV 25654	S-5079-86	12/14/00	39 - Placed debris on downslope.	Terminated 1/10/01
			8/02/01	40 - Failure to protect off site areas.	Terminated 8/9/01
			4/11/02	41 - Failure to protect off site areas.	Terminated 5/2/02
			11/2/02	42 - Failure to protect off site areas.	Terminated 11/20/02
			1/29/03	43 - Failure to protect off site areas.	Terminated 2/27/03
			3/6/03	44 - Failure to protect off site areas.	Terminated 3/13/03
			3/25/03	45 - Exceeded airblast level.	Terminated 4/17/03
			6/17/03	46 - Failed to maintain haul road.	Terminated 7/10/03
		O-163-83	8/2/02	15 - Disturbance to hydrologic balance.	Terminated 11/20/02
		S-5007-001	4/10/03	1 - Failed to follow ground water plan.	Terminated 4/24/03
			4/10/03	2 - Failed to follow permit conditions.	Terminated 4/24/03
			4/22/03	3 - Failed to follow permit conditions.	Terminated 5/6/03

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Coal Mac Inc	P.O. Box 436 Williamson, WV 25661	S-5019-94	2/23/01	9 - Failure to maintain sediment control.	Terminated 3/27/01
			2/27/01	10 - Failed to monitor NPDES outfalls.	Terminated 4/16/01
			6/6/02	11 - Access road damaged.	Terminated 8/23/02
			6/6/02	12 - Spillway washed out.	Terminated 11/7/02
			6/6/02	13 - Failed to clean pond.	Terminated 11/7/02
			12/17/02	14 - Off site slide damage.	Terminated 3/27/01
		S-5016-93	2/27/01	9 - Failed to monitor NPDES outfall.	Terminated 4/16/01
			3/1/01	10 - Fly rock damage.	Terminated 4/23/01
			5/23/01	11 - Failure to maintain diversions.	Terminated 5/23/01
			5/23/01	12 - Failure to maintain diversions.	Terminated 6/4/01
			9/28/01	13 - Filled ditch with debris.	Terminated 10/29/01

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Coal Mac Inc	P.O. Box 436 Williamson, WV 25661	S-5016-93	9/28/01	14 - Failed to guard shot.	Terminated 9/28/01
			11/16/01	15 - Fly rock damage.	Terminated 1/31/02
			1/30/02	16 - Sediment control failure.	Terminated 1/31/02
			3/18/02	17 - Sediment pond repair.	Terminated 4/2/02
			5/29/02	18 - Off site erosion.	Terminated 8/21/02
			10/01/02	19 - Off site erosion.	Terminated 10/16/02
			11/19/02	20 - Failure to record static groundwater levels.	Terminated 11/21/02
			11/19/02	21 - Incorrect blasting logs.	Terminated 2/26/03
			11/20/02	22 - Erosion.	Vacated

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Coal Mac Inc	P.O. Box 436 Williamson, WV 25661	S-5066-92	2/27/01	7 - Failed to monitor NPDES outfall.	Terminated 4/16/01
			2/27/01	8 - Failed to maintain pond.	Terminated 5/22/01
			11/27/01	9 - Debris downslope.	Terminated 11/27/01
			3/26/02	10 - Groundwater static levels not recorded.	Terminated 5/22/02
			3/26/02	11 - Iron staining below pond.	Terminated 7/24/02
			6/03/02	12 - Sediment Pond damage.	Terminated 8/23/02
			7/8/02	13 - Pond spillway damaged.	Terminated 8/23/02
		S-5019-98	12/11/01	1 - Cast fly rock off permit area.	Terminated 1/23/02
			12/17/02	2 - Failed to do pre-blast survey.	Terminated 1/14/03
			4/28/03	3 -Debris downslope.	Terminated 6/9/03
		P-609	11/04/02	54 - Groundwater static levels not recorded.	Terminated 12/4/02
			6/16/03	55 - Failed to submit permit renewal.	Terminated 6/16/03

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Coal Mac Inc.	P.O. Box 436 Williamson, WV 25661	S-5074-92	2/21/03	8 - Erosion on hollow fills.	Terminated 3/11/03
		S-5015-98	7/21/03	1 - Failed to protect off site areas.	Pending
			7/21/03	2 - Disturbed hydrologic balance.	Pending
			4/13/02	3 - Failed to protect hydrologic balance.	Terminated 8/1/02
			6/12/03	4 - Failed to protect hydrologic balance.	Terminated 6/12/03
			7/28/03	3 - Discharge to stream	Pending
Mingo Logan Coal Company	1000 Mingo Logan Avenue Wharmcliffe, WV 25651	O-5013-91	9/6/01	40 - Disturbed to off site hydrologic balance.	Terminated 9/28/01
			9/6/01	41 - Failure to notify landowners.	Terminated 9/6/01
			10/9/02	42 - Disturbed to off site hydrologic balance.	Terminated 1/15/03
		U - 5073-88	8/7/02	6 - Failure to protect off site areas.	Pending
			8/13/02	7 - Failed to protect hydrologic balance.	Terminated 12/31/02

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Mingo Logan Coal Company	1000 Mingo Logan Avenue Wharncliffe, WV 25651	U-5038-97	12/1/00	1 - Drill cuttings flowed into channel.	Terminated 12/5/00
			6/12/03	4 - Failed to protect hydrologic balance.	Terminated 6/12/03
		U-5044-91	5/7/03	2 - Material discarded outside designated area.	Terminated 6/11/03
		U-5038-97	7/28/03	3 - Untreated water discharged to stream.	Pending
		S-4013-95	8/22/00	6 - Failure to clean sediment pond.	Terminated 8/29/00
		S-5019-94	2/27/01	10 - Failed to monitor and report NPDES outfalls.	Terminated 9/28/01
		S-5066-92	2/27/01	8 - Outfall bypassed spillway.	Terminated 5/22/01
		S-5016-93	9/8/00	7 - Failure to clean sediment pond.	Terminated 10/10/00
Lone Mountain Processing	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	1201390	3/21/02	CDB0002723 Failed to do water monitoring.	Terminated 3/21/02
Catenary Coal Company		S-3035-93	06/26/00	18 - Failure to clean sediment structure.	Terminated
			06/26/00	19 - Failure to provide pre-blast survey.	Withdrawn

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Catenary Coal Company	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	S-3035-93	7/9/01	20 - Failure to protect off site areas.	Abated 7/10/01
			7/9/01	21 - Failure to protect off site areas.	Abated 7/10/01
		S-5007-90	9/27/00	9 - Failed to submit NPDES renewal.	Abated
			9/27/00	10 - Failed to submit drainage certificates.	Abated
		S-3004-95	10/13/00	8 - Failed to provide pre-blast survey.	Abated
		U-3001-98	10/27/00	1 - Placed spoil on downslope.	Abated
		S-6012-87	3/30/01	17-Failure to maintain drainage.	Abated
			3/30/01	18 - Failure to place refuse in a controlled manner.	Abated
		S-3023-90	4/11/01	1 - Failure to provide sediment control.	Abated
		U -3001-98	3/30/01	2 - Failure to construct and maintain drainage.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Catenary Coal Company	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	O-3012-98	5/7/01	1 - Air pollution control failure.	Abated
		S- 3023-90	5/17/01	2 - Failure to maintain sediment controls.	Abated
		O-3017-93	5/17/01	6 - Failure to meet effluent limits.	Abated
		S-3004-95	6/11/01	9 - Failure to comply with approved plan.	Abated
			7/10/01	10 - Placed spoil on downslopes.	Abated
			9/19/01	11 - Failure to protect off site areas.	Abated
			5/9/03	12 - Failed to maintain drainage system.	Pending
			5/29/03	13 - Placed spoil on downslopes.	Pending
		P-574	7/26/01	16 - Discharged water disturbed hydrologic balance.	Abated
		O-6009-86	12/7/01	10 - Failure to protect off site areas.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status		
Catenary Coal Company	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	S-3020-90	8/10/01	3 - Failure to properly construct valley fill.	Withdrawn		
			3/5/02	3 - Failure to protect off site areas.	Withdrawn		
			2/21/03	5 - Placed spoil on downslopes.	Pending		
				S -6012-87	1/28/02	19 - Failed to follow approved permit.	Abated
				O-3012-98	2/21/02	2 - Failed to maintain effluent limits.	Abated
					1/13/03	3 - Failed to maintain effluent limits.	Abated
				S-3010-00	3/25/02	1 - Failed to follow approved permit.	Abated
					8/14/02	2 - Failure to construct to approved plan.	Abated
					2/21/03	3 - Placed spoil on downslopes.	Pending
					5/29/03	4 - Placed spoil on downslopes.	Pending
					5/29/03	5 - Water Quality cessation order.	Pending

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Catenary Coal Company	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	S-3024-90	4/1/02	32 - Failure to protect off site areas.	Abated
			3/19/03	33 - Placed spoil on downslope.	Pending
Cumberland River Coal Company		1601486	11/27/00	RDS1953 - Placed spoil on downslope	Abated 3/16/01
			2/21/01	RDS2114 - Disturbance outside permitted area.	Abated 3/9/01
			4/25/01	RDS2242 - Placed spoil on downslope.	Abated 5/30/01
			8/21/01	RDS2468 - Placed spoil on downslope.	Abated 1/29/02
		1301533	3/21/02	RDS2800 - Exceeded water quality limits.	Abated 3/21/02
		1301561	12/06/00	RDS2002 - Exceeded slurry solids level.	Abated 3/23/01
			2/25/01	RDS2112 - Sediment pond not certified.	Abated 5/25/01
		1301623	7/24/01	RDS2436 - Under drain not functioning properly.	Abated 9/25/01
		867-0382	7/21/03	001 - Pond reached capacity.	Pending

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Jullian Tipple (IDLE)	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	None			
Hobet Mining, Inc		S-5003-96	10/17/00	12 - Violated air blast regulation.	Abated
			10/17/00	13 - Violated air blast regulation.	Abated
			6/29/01	14 - Failure to comply with reclamation plan.	Abated
			6/29/01	15 - Failure to construct according to plan.	Abated
			9/14/01	16 - Failure to maintain sediment control.	Abated
			1/31/02	17 - Violated air blast regulation.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5003-96	3/27/02	18 - Failure to meet effluent standards.	Abated
			7/12/02	19 - Blasting poundage in excess.	Abated
			8/21/02	20 - Failed to protect off site areas.	Abated
			1/3/03	21 - Spoil material outside permit area.	Abated
			2/18/03	22 - Spoil material slide.	Abated
			2/24/03	23 -Placed spoil downslope.	Abated
			3/26/03	24 -Placed spoil downslope.	Abated
			3/26/03	25 - Overshot permit area.	Abated
			3/26/03	26 - Erosion.	Abated
			3/26/03	27 - Failure to report groundwater standards.	Abated
5/22/03	28 - Failure to meet effluent standards.	Abated			

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5003-96	6/26/03	29 -Failure to inform occupants of blasting.	Abated
			7/9/03	30 - Untreated discharge to stream.	Pending
			7/9/03	31 -Untreated discharge to stream.	Pending
			7/31/03	32 - Air blast accedence.	Pending
		S-5020-95	11/9/00	13 - Failure to establish a permanent vegetation.	Abated
			11/9/00	14 - Failure to clean pond.	Withdrawn
			6/29/01	15 - Placed spoil on downslope.	Abated
			9/18/01	16 - Failed to protect off site areas.	Abated
			6/13/02	17 - Failed to protect off site areas.	Abated
			6/16/02	18 - Failure to maintain drainage system.	Abated
			7/10/02	19 - Placed spoil on downslope.	Vacated
			10/21/02	20 - Failure to certify sediment structures.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5020-95	10/21/02	21 - Failed to construct or maintain drainage.	Abated
			11/6/02	22 - Failure to follow permit conditions.	Abated
			3/13/03	23 - Sediment Pond structure not certified.	Abated
		S-5062-86	10/25/00	26 - Failed to minimize disturbance to hydrologic balance.	Abated
		O-5056-92	6/23/00	12 - Failed to protect off site areas.	Abated
			3/12/03	13 - Failed to protect off site areas.	Abated
		S-5024-86	10/31/00	58 - Failed to construct or maintain pond.	Withdrawn
			10/31/00	59 - Ceased reclamation activities for more than 30 days.	Abated
		O-13-81	6/21/01	30 - Failed to follow permit conditions.	Abated
		S-5063-91	7/31/01	46 - Failed to minimize impact to hydrologic balance.	Abated
			5/13/03	47 - Failed to compact and stabilize fill.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5070-91	5/21/01	8 - Failure to treat discharge water.	Abated
		128-78	11/26/01	26 - Failed to perform water monitoring.	Abated
		U-5007-98	11/14/01	1 - Caused off site damage.	Abated
		S-5052-86	11/2/01	9 - Failure to eliminate highwall.	Abated
		O-5010-97	11/28/01	1 - Stockpiled coal outside permit area.	Abated
			8/8/02	2 - Dust suppression.	Abated
			8/19/02	3 - Failed diversion ditch.	Withdrawn
			8/19/02	4 - Contributed suspended solids to stream.	Abated
		P-495	6/15/02	10 - Slurry line break.	Terminated
			6/11/02	11 - Failure to clean sediment structure.	Abated
			6/11/02	12 - Failed to maintain sediment system.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5016-92	10/21/02	11 - Failed to control or prevent erosion.	Withdrawn
		U-5088-86	9/10/02	11 - Failed to manage opening.	Abated
		O-6-81	12/19/02	15 - Failed to protect slopes.	Abated
		R-405	3/13/03	1 - Failure to compact refuse material.	Withdrawn
		S-5052-86	5/9/03	10 - Failure to give notice.	Abated
		O-5105-86	7/30/01	4 - Failed to reclaim road.	Abated
		S-5011-01	7/3/03	1 - Failed to construct approved drainage system.	Pending
		H-695	6/26/03	13 - Failed to protect off site areas.	Pending

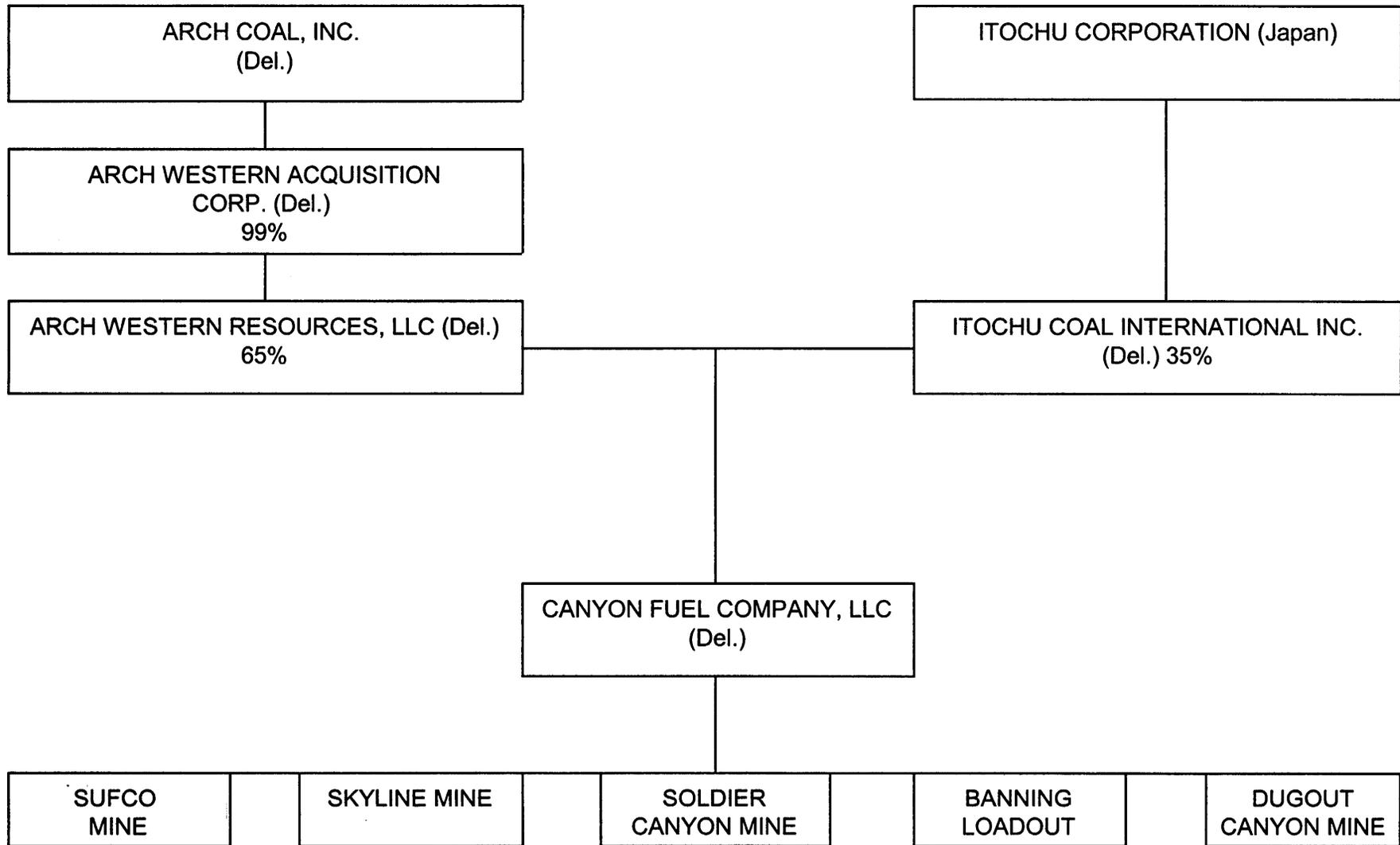


FIGURE 1-1. CORPORATE STRUCTURE.

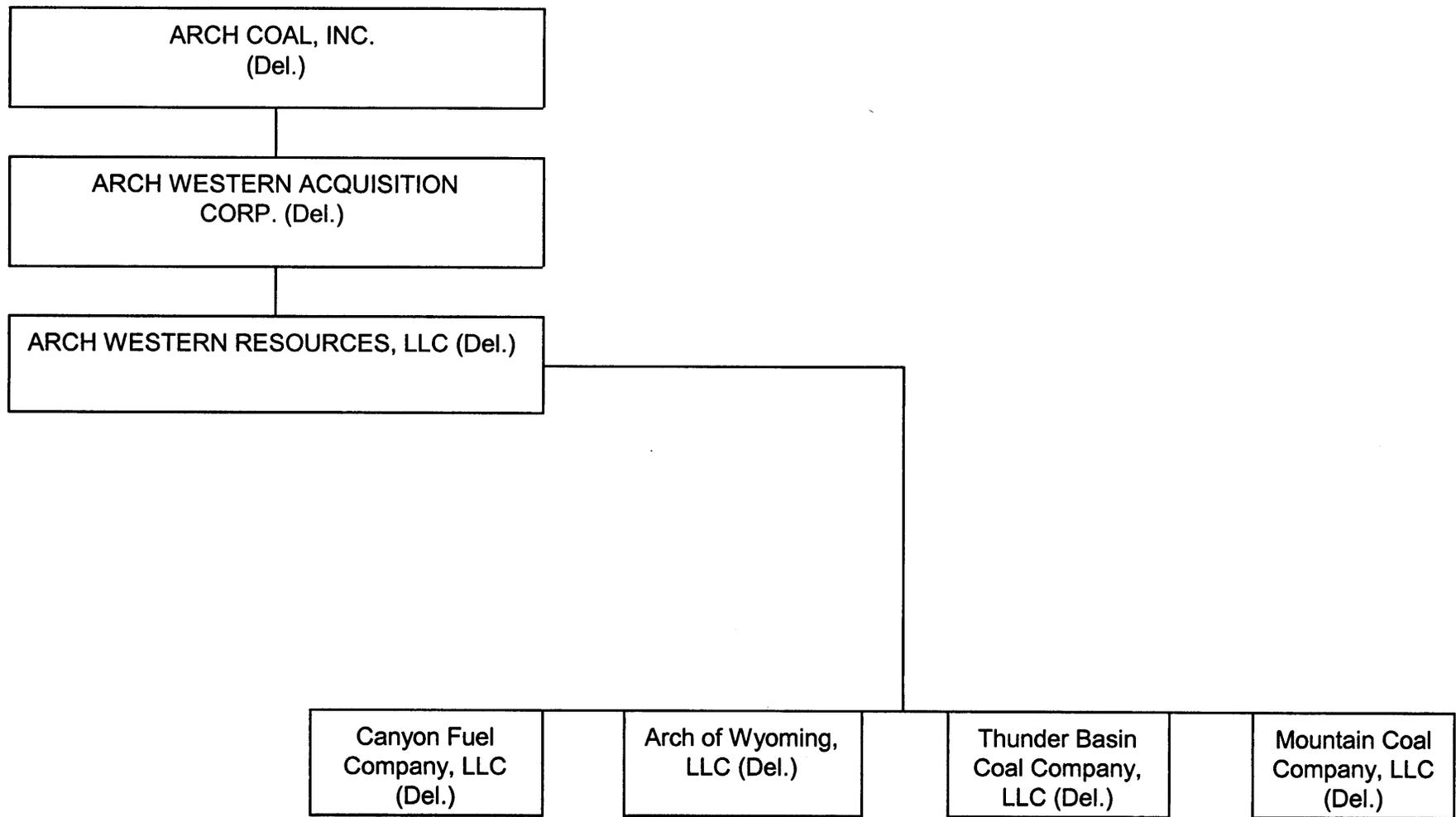


FIGURE 1-1. CORPORATE STRUCTURE (Continued).

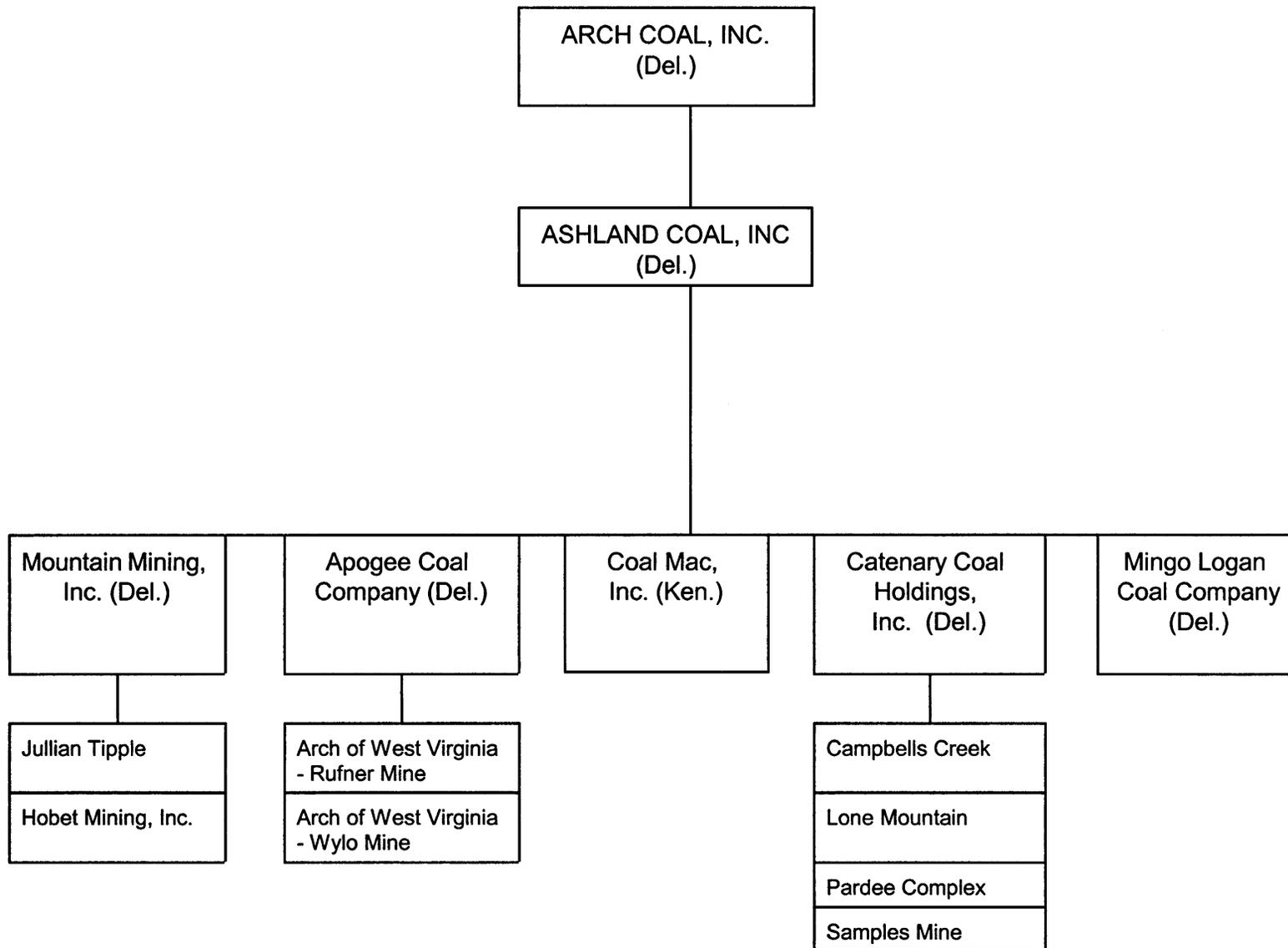


FIGURE 1-1. CORPORATE STRUCTURE (Continued).

CHAPTER 1

LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
110 MINIMUM REQUIREMENTS FOR LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION	1-1
111 Introduction	1-1
112 Identification of Interests	1-2
112.100 Business Entity	1-2
112.200 Applicant and Operator	1-2
112.300 Officers of the Applicant	1-3
112.400 Coal Mining and Reclamation Operation Owned or Controlled ..	1-11
112.500 Legal or Equitable Owner of the Surface and Mineral Properties	1-13
112.600 Owners of Record of Property Contiguous to Proposed Permit Area	1-14
112.700 MSHA Numbers	1-15
112.800 Interest in Contiguous Lands	1-15
112.900 Certification of Submitted Information	1-15
113 Violation Information	1-16
114 Right-of-Entry Information	1-16
115 Status of Unsuitability Claims	1-21
116 Permit Term	1-22
117 Insurance, Proof of Publication, and Facilities and Structures Used in Common	1-22
118 Filing Fee	1-22
120 PERMIT APPLICATION FORMAT AND CONTENTS	1-22
130 REPORTING OF TECHNICAL DATA	1-22
140 MAPS AND PLANS	1-23
150 COMPLETENESS	1-23

LIST OF TABLES

Table

- 1-1 Coal Mining and Reclamation Operations
- 1-2 Three Year Violation History June 2000 - 2003

LIST OF FIGURES

Figure

- 1-1 Corporate Structure

LIST OF PLATES

Plate

- 1-1 Surface Ownership
- 1-2 Coal Ownership
- 1-3 Surface Ownership Along County Road
- 1-4 Dugout Canyon Mine Permit Area

LIST OF APPENDICES

Appendix

- 1-1 Coal Lease Documents
- 1-2 Insurance and Proof of Publication
- 1-3 Surface Lease Documents
- 1-4 Disturbed Area Legal Description

CHAPTER 1
LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

110 MINIMUM REQUIREMENTS FOR LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

111 Introduction

The permit is presently held by Canyon Fuel Company, LLC, a Delaware limited liability company ("CFC"). Under the Purchase and Sale Agreement dated as of March 22, 1998, closed effective June 1, 1998, Arch Western Resources, LLC, a Delaware limited liability company, purchased the 65% membership interest of Arco Uinta Coal Company, a fully owned subsidiary of Atlantic Richfield Company, in CFC. Itochu Coal International, Inc., a fully owned subsidiary of Itochu Corporation, retained its ownership of the remaining 35% membership interest. The common membership interests in Arch Western Resources, LLC, are in turn owned 99% by Arch Western Acquisition corporation, a Delaware corporation fully owned by Arch Coal, Inc., also a Delaware corporation, and 1% by Delta Housing, Inc., a Delaware corporation fully owned by Atlantic Richfield Company, a Delaware corporation. Soldier Creek Coal Company became Soldier Canyon Mine through the merge and subsequent sale of Coastal Coal, Inc. on or about December 20, 1996.

Soldier Canyon Mine (SCM) will provide in this chapter all information pertaining to the Dugout Canyon Mine required by R645-301-100 and provide the information required by R645-301-112 and R645-301-113 in a format prescribed by OSM.

Where possible the Mining and Reclamation Plan has been updated to reflect the legal and financial information associated with Canyon Fuel Company, LLC (CFC). Other portions of the Mining and Reclamation Plan remain unmodified. Any charts, maps, drawings, diagrams, exhibits, tables, and so forth in the unmodified portions of the Mining and Reclamation Plan bearing the name(s) Coastal States Energy Company, and/or Soldier Creek Coal Company should be read with the name

Canyon Fuel Company, LLC substituting for any and all of these other entities, which have been merged into Canyon Fuel Company.

112 Identification of Interests

112.100 Business Entity

The Dugout underground coal mining operation will be located in Carbon County, Utah. The surface facilities for the Dugout Canyon Mine will be within Section 23, Township 13 South, Range 12 East, SLBM approximately 11 miles northeast of Wellington, Utah.

Canyon Fuel Company, LLC is a Limited Liability Company organized under the laws of Delaware in December 1996 and now owned 65% by Arch Western Resources, LLC, a Delaware limited liability company, and 35% by Itochu Coal International Inc., a Delaware Corporation. Itochu Coal International Inc. is a wholly owned subsidiary of Itochu Corporation, a Japanese Corporation. Arch Western Resources, LLC, is owned 99% by Arch Western Acquisition Corporation, a Delaware corporation wholly owned by Arch Coal, Inc., a Delaware corporation, and 1% by Delta Housing, Inc., a Delaware corporation wholly owned by Atlantic Richfield Company, a Delaware corporation.

112.200 Applicant and Operator

APPLICANT : Operations, Administration, Permit Revisions, and Amendments

Canyon Fuel Company, LLC
6955 South Union Park Center
Suite 540
Midvale, UT 84047
Telephone: (801) 569-4700
EMPLOYER ID: 87-0567183

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
January 2004

OPERATOR: Canyon Fuel Company, LLC
6955 South Union Park Center, Suite 540
Midvale, UT 84047
Telephone: (801) 569-4700

RESIDENT AGENT: C.T. Corporation Systems
50 West Broadway
Salt Lake City, UT 84104
Telephone: (801) 531-7090

CONTACT PERSON: Richard D. Pick
Canyon Fuel Company, LLC
6955 South Union Park Center, Suite 540
Midvale, UT 84047
Telephone: (801) 569-4700

PERSON WHO WILL PAY ABANDONED MINE RECLAMATION FEES:

Richard D. Pick
Canyon Fuel Company, LLC
6955 South Union Park Center, Suite 540
Midvale Utah 84047

112.300 Officers of the Applicant

This section identifies those persons who own or control Canyon Fuel Company, LLC. Canyon Fuel Company, LLC, is a Delaware limited liability company with two members; Arch Western Resources, LLC holding 65% interest, and Itochu Coal International, Inc. holding 35% interest.

Arch Western Resources, LLC, is owned 99% by Arch Western Acquisition Corporation, a wholly owned subsidiary of Arch Coal, Inc., and 1% by Delta Housing, Inc., a wholly owned subsidiary of Atlantic Richfield Company.

Canyon Fuel Company, LLC
SCM/Dugout Canyon Mine

Mining and Reclamation Plan
January 2004

ADDRESS:

Arch Western Resources, LLC
City Place One, Suite 300
St. Louis, MO 63141-7056

EMPLOYER IDENTIFICATION:

43-1811130

ADDRESS:

Arch Western Acquisition Corporation
City Place One, Suite 300
St. Louis, MO 63141-7056

EMPLOYER IDENTIFICATION:

43-1811084

ADDRESS:

Arch Coal, Inc.
CityPlace One, Suite 300
St. Louis, MO 63141-7056

EMPLOYER IDENTIFICATION:

43-0921172

ADDRESS:

Delta Housing, Inc.
515 South Flower Street
Los Angeles, CA 90071

EMPLOYER IDENTIFICATION:

94-2314688

ADDRESS:

Atlantic Richfield Company
515 South Flower Street
Los Angeles, CA 90071

EMPLOYER IDENTIFICATION:

23-0371610

Itochu Coal International, Inc. is a wholly owned subsidiary of Itochu Corporation, a Japanese corporation.

ADDRESS:

Itochu Coal International, Inc.
555 17th Street, Suite 845
Denver, Colorado 80202

EMPLOYER IDENTIFICATION: 52-2003963

ADDRESS:

Itochu Corporation, 5-1
Kita-Aoyama 2-Chome
Minato-ku, Tokyo 107-77, Japan

EMPLOYER IDENTIFICATION: 98-0053818

The following lists describe the officers and directors of Canyon Fuel Company, LLC, Arch Western Resources, LLC, Arch Coal, Inc., Itochu Corporation, and Itochu Coal International, Inc. The addresses for the officers, directors, representatives to the management board listed are the same as those of the respective business entities as listed above, for which the individuals are officers, directors or representatives. Social Security numbers for the officers and directors are no longer required to be disclosed according to Bonnie Edens of the Office of Surface Mining (e-mail from Bonnie Edens, January 10, 2003, 6:25am).

CANYON FUEL COMPANY, LLC: (9/12/03)

Directors:

Robert W. Shanks Chairman
Effective: 06/01/1998

Masayoshi Araya
Effective: 06/01/2001

Yuzo Hirono
Effective: 12/14/1999

Steven F. Leer
Effective: 06/01/1998

Kenneth G. Woodring
Effective: 12/01/2000

John W. Eaves
Effective: 12/01/2000

Joe Y. Nakazawa
Effective: 06/01/2001

Tsutomu Niwa
Effective: 10/09/2001

Alternative Representative

Alternative Representative

Alternative Representative

Officers

Richard D. Pick
Effective: 06/01/1998

President, Chief Executive Officer and General Manager

Robert G. Messey
Effective: 10/09/2001

Chief Financial Officer

James E. Florczak
Effective: 05/25/1999

Vice President, Finance

John W. Eaves
Effective: 06/23/1998

Vice President, Marketing

Robert G. Jones
Effective: 03/08/2000

Vice President, General Counsel and Assistant Secretary

Janet L. Horgan
Effective: 10/11/2000

Secretary

William H. Rose
Effective: 06/01/1998

Assistant Secretary

ARCH COAL, INC.:

(9/12/03)

Directors:

James R. Boyd
Effective: 07/01/1997

Chairman

David B. Peugh Effective: 07/01/1997	Vice President - Business Development
Robert W. Shanks Effective: 07/01/1997	Vice President - Operations
Robert J. Messey Effective: 12/1/2000	Senior Vice President, Chief Financial Officer
Robert G. Jones Effective: 10/16/2000 and 3/01/2000	Vice President, General Counsel and Secretary
James E. Florczak Effective: 08/17/1998	Treasurer
Deck S. Slone Effective: 04/26/2001	Vice President, Investor and Public Relations
Bradley M. Allbritten Effective: 03/1/2000	Vice President, Marketing
Shiela B. Feldman Effective: 02/03/2003	Vice President, Human Resources
Janet L. Horgan Effective: 10/16/2000	Assistant Secretary and Counsel
John W. Lorson Effective: 04/9/1999	Comptroller
Charles David Steele Effective: 04/24/2003	Vice President, Tax Planning
Bennett K. Hatfield Effective: 04/24/2003	Vice President

Arch Western Resources, LLC, Representatives to the Management Board:

Name: Steven F. Leer
Effective: 06/01/98

Name: Robert W. Shanks
Effective: 06/01/98

Alternate:

Name: Kenneth G. Woodring
Effective: 06/01/98

Itochu Coal International, Inc. Representatives to the Management Board:

Board:

Akio Shigetomi
Effective: 11/30/1996

Masayoshi Araya
Effective: 11/30/1996

Yuzo Hirono
Effective: 12/31/1999

Alternates:

Yutaka Nakazawa
Effective: 12/20/1996

Tsutomu Niwa
Effective: 6/01/2001

ARCH WESTERN RESOURCES, LLC

(9/12/03)

Directors:

Patrick A. Kriegshauser
Effective: 05/07/98

David B. Peugh
Effective: 05/07/98

Jeffry N. Quinn
Effective: 05/07/98

Thomas A. Lockhart
Effective: 02/24/2003

Officers:

Robert W. Shanks Effective: 06/28/98	President - Operations
David B. Peugh Effective: 05/17/98	Vice President
William H. Rose Effective: 05/07/98	Assistant Secretary
Robert G. Jones Effective: 03/01/00 and 6/2/98	Vice President and Assistant Secretary
Janet L. Horgan Effective: 3/17/98	Secretary
James E. Florczak Effective: 05/15/98 and 9/15/98	Vice President, Finance, Treasurer

ITOCHU CORPORATION

<u>Name</u>	<u>Title</u>	<u>Date of Appointment</u>
Minoru Murofushi	Chairman	April 1998
Masahisa Naitoh	Vice Chairman	April 2000
Uichiro Niwa	President, CEO	April 1998
Hiroshi Sumie	Executive Vice President	April 2000
Makoto Kato	Executive Vice President	April 2001
Yushin Okazaki	Executive Vice President	April 2001
Sumitaka Fujita	Executive Vice President	April 2001
Mitsuaki Fukuda	Sr. Managing Director	April 2000
Akira Yokota	Sr. Managing Director	April 2001
Kiyomi Yamada	Managing Director	April 2001

Motonori Toyota	Managing Director	June 2001
Kouhei Wantanabe	Managing Director	April 2002
Hiroshi Ueda	Managing Director	April 2002

ITOCHU COAL INTERNATIONAL INC.

Masayoshi Araya	Chairman of the Board	Dec. 1999
Yuzo Hirono	President and Chief Executive Officer	Dec. 1999
Tsutomu Niwa	Chief Financial Officer	June 1996
Dietz Fry	Vice President, Finance and Administration	March 1997
Yutaka Nakazawa	Vice President Commercial and Secretary	Dec. 1996
Hiroshi Akiba	Assistant Secretary	Feb. 2000

112.400 Coal Mining and Reclamation Operation Owned or Controlled

The following list describes all permits held by Canyon Fuel Company, LLC, all pending applications for permits, and any permit recognized as necessary in the future for which no application has been filed. Identification numbers of applications or permits are contained in the following list. Many of the agencies listed, however, have review responsibility only and may not have submitted a numbered permit.

<u>Permit</u>	<u>Issuing Authority</u>	<u>Approval Status/ Identification No.</u>
Mining and Reclamation Permit C/007/039	State of Utah Department of Natural Resources Division of Oil, Gas and Mining	Approved

Department of Interior
U.S. Geological Survey and
Office of Surface Mining

Department of Agriculture
U.S. Forest Service
Manti La Sal National Forest

U.P.D.E.S. Permit UTG-040020 and Utah D.E.Q.	Environmental Protection Agency	Approved
Business License	Carbon County	Approved
Mine Health and Safety Permits 42-01890 and 42-01888, 1211-UT-09-01890-01	Mine Safety and Health Administration - Utah	Approved
Radio Permits	Federal Communications Commission	Approved
Certificate of Insurance and Authorization to do Business in State	State Industrial Development Commission	Approved
Road Agreement	Carbon County	Approved
Air Quality Approval Order	State of Utah Utah Air Conservation Committee Department of Health Division of Environmental Health	Approved
Stream Channel Alteration Permit	State Engineer	Approved

The Canyon Coal Company, LLC mining permits and operations are:

SUFCO Mine	C/041/002
Skyline Mine	C/007/005
Soldier Canyon Mine	C/007/018
Banning Loadout	C/007/034

Dugout Canyon Mine

C/007/039

The issuing authority for the Canyon Fuel Company permits is the UDOGM.

Permits and operations held by subsidiary companies of Arch Coal, Inc. are set forth in Table 1-1.

Neither Arch Coal, Inc. nor any of its subsidiaries owns or controls any other coal mining or reclamation operation. Itochu Corporation does not own or control any interest, direct or indirect, in any other entity having coal mining operations in the United States. None of the executive officers of Itochu Corporation are directors or officers of any other entity that owns or controls an interest, direct or indirect, in any entity having coal mining operations in the United States.

The corporate structure is presented in Figure 1-1.

112.500 Legal or Equitable Owner of the Surface and Mineral Properties

The legal and equitable owners of the surface and mineral properties to be affected by this mining operation during the duration of the permit period are the State of Utah, Bureau of Land Management and Canyon Fuel Company, LLC. Refer to Refuse Pile Amendment for additional ownership information.

Canyon Fuel Company, LLC
6955 South Union Park Center
Suite 540
Salt Lake City, UT 84047
Telephone: (801)569-4700

Milton & Ardith Thayne Trust
Sunnyside Star Route
Price, Utah 84501

State of Utah
School and Institutional
Trust Lands Administration
675 East 500 South
Salt Lake City, Utah 84102-2818

George & Alice Conover Etal
2701 Georgia Way
Sandy, Utah 84092

United States of America
Department of Interior
Bureau of Land Management
Price Coal Office
125 South 600 West
Price, Utah 84501

No area within the lands to be affected by surface operations and facilities or within the area of coal to be mined is under a real estate contract.

112.600 Owners of Record of Property Contiguous to Proposed Permit Area

Owners of record for surface and mineral properties contiguous to the proposed permit area are shown on Plate 1-1 and 1-2, with the names and addresses listed below.

United States of America
Department of Interior
Bureau of Land Management
Price Coal Office
125 South 600 West
Price, Utah 84501

State of Utah
School and Institutional Trust Lands Admin.
675 East 500 South
Salt Lake City, Utah 84102-2818

KFJ Ranch Partnership
C/O Kerwin Jensen
Cleveland, Utah 84518

George & Alice Conover Etal
2701 Georgia Way
Sandy, Utah 84092

Milton & Ardith Thayne Trust
Sunnyside Star Route
Price, Utah 84501

Surface ownership along the county road is shown on Plate 1-3. In addition refer to the Refuse Pile Amendment for additional information.

112.700 MSHA Numbers

The Dugout Canyon Mine MSHA numbers are:

MSHA No. 42-01890 Rock Canyon seam (west side of canyon)

MSHA No. 42-01888 Gilson seam (west side of canyon)

MSHA No. 1211-UT-09-01890-01 Dugout Canyon Mine Refuse Pile

112.800 Interest in Contiguous Lands

A State Institutional Trust Lands coal tract is contiguous to the east of the Dugout Canyon Mine permit boundary. Upon approval by UDOGM, Canyon Fuel Company, LLC intends to begin mining the coal reserves in this lease during the current term of this permit application.

112.900 Certification of Submitted Information

The undersigned hereby attests that the information contained in this Notice of Change in Ownership and Contract Information is true and correct to the best of the undersigned's information and belief.

On behalf of CANYON FUEL COMPANY, LLC

Richard D. Pick
Its: President, Chief Executive Officer and General Manager

STATE OF UTAH)
 : ss
COUNTY OF SALT LAKE)

Subscribed and sworn before me this ____ day of _____, 1998.

Notary Public
Residing at _____

(SEAL)

My Commission Expires:

113 Violation Information

Neither Canyon Fuel Company, LLC nor any major stockholder of the company having any interest, either legal or equitable, in Canyon Fuel Company, LLC have had a State or Federal mining permit suspended or revoked or a security deposited in lieu of a bond revoked. Neither Canyon Fuel Company, LLC, any of its mining operations, nor any person who owns or controls Canyon Fuel Company has any unabated cessation orders or unabated air or water quality violation notices.

As a newly formed entity, Canyon Fuel Company, LLC received no violations within the three years prior to filing of this application. The company mines, however, have been operating for several years and have received some NOV's. The violations for the Canyon Fuel Company, LLC operations, including the SUFCO Mine, ACT/041/002; Skyline Mine, ACT/007/005; Soldier Canyon Mine, ACT/007/018; Banning Loadout, ACT/007/034 are set forth below in Table 1-2.

114 Right-of-Entry Information

The right to enter the leaseholds conveyed by the State coal leases is conferred to the lessee by the Mineral Leasing Act of 1920 and the leases themselves. Copies of State coal leases ML-42648 and ML-42649, and Federal Lease U07064-027821 which grant CFC the right to enter and conduct underground mining operations, are presented in Appendix 1-1.

The legal description of the CFC leases is:

State Lease ML-42648 - (3640 acres) - Approved

T. 13 S., R. 12 E., SLBM, Utah

Section 8: E1/2

Section 10: S1/2

Section 11: S1/2

Sections 14 and 15: All

Section 17: NE1/4; E1/2SW1/4; SE1/4

Section 20: E1/2NW1/4; SW1/4NW1/4; N1/2NE1/4

Section 21: N1/2NW1/4; NE1/4

Section 22: N1/2; N1/2S1/2

Section 23: W1/2NW1/4

State Lease ML-42649 - (2212 acres) - Approved

T. 13 S., R. 12 E., SLBM, Utah

Section 3: Lots 1, 2, 3, 4, S1/2 (all)

Section 4: Lots 1, 2, 3, 4, S1/2 (all)

Section 5: Lots 1, 2, SE1/4

Section 9: All

Section 10: N1/2

Section 11: N1/2

Federal Coal Lease U-07064-027821 - (2,416.14 acres) - Approved 1 January 1957

T. 13 S., R. 12 E., SLBM, Utah

Section 13: S1/2

Section 23: E1/2E1/2, W1/2SE1/4, NE1/4SW1/4

Section 24: All

Section 25: N1/2N1/2

Section 26: N1/2NE1/4

T. 13 S., R. 13 E., SLBM, Utah

Section 18: Lots 3, 4, E1/2SW1/4; SE1/4

Section 19: Lots 1-4, E1/2W1/2, NE1/4, NW1/4SE1/4
Section 30: Lot 1

Federal BLM Right-of-Way UTU-76601 - (10 acres) - Sept. 1998

T. 13S., R. 12 E., SLBM, Utah

Section 23: NE1/4NW1/4NW1/4SW1/4, N1/2NE1/4NW1/4SW1/4,
SE1/4NW1/4NW1/4SW1/4

Fee land owned by CFC as described below: (800 acres)

T. 13 S., R. 12 E., SLBM, Utah

Section 16: All
Section 23: E1/2NW1/4; W1/2NE1/4

BLM Rt-of-Way UTU-77985 - (57.5 acres)

T13 S., R12E., SLBM, Utah

Section: 22: NE1/4SW1/4SW1/4SE1/4, S1/2SW1/4SW1/4SE1/4,
N1/2SE1/4SW1/4SE1/4, SE1/4NE1/4SW1/4SE1/4,
S1/2NW1/4SE1/4SE1/4, SW1/4NE1/4SE1/4SE1/4,
N1/2NE1/4SE1/4SE1/4

Section 23: NW1/4SW1/4NW1/4SW1/4, S1/2NW1/4NW1/4SW1/4,
NE1/4NW1/4NW1/4SW1/4, N1/2NE1/4NW1/4SW1/4

Section 27: NE1/4SE1/4NE1/4NW1/4, S1/2SE1/4NE1/4NW1/4,
SE1/4NE1/4NE1/4NW 1/4, W1/2 NW1/4NW1/4NE1/4

BLM Parcel (2.5 acres)

T13 S., R12E., SLBM, Utah

Section: 23: NW1/4NW1/4NW1/4SW1/4

State Lease ML-48435-OBA - (2,560 acres)

T13 S., R13 E., SLBM, Utah

- Section 17: SW 1/4, SW1/4SE1/4
- Section 19: NE1/4SE1/4, S1/2SE1/4
- Section 20: All
- Section 21: SW1/4NW1/4, SW1/4
- Section 28: NW1/4, N1/2SW1/4, SW1/4SW1/4
- Section 29: All
- Section 30: E1/2, E1/2W1/2

Waste Rock Storage Facility

T. 14 S., R. 12 E., SLBM, Utah (Approximately 26.8 acres)

Section 18: Portions of NE1/4, SW1/4 and SE1/4 of the NE1/4

All of Lease ML-42648, except the E1/2 of Section 8 and the NE1/4 of Section 17, is included within the Dugout Canyon Mine permit boundary. However, only the S1/2 SE1/4 of Section 9 from Lease ML-42649 is within the permit boundary. The ten acres described in UTU-76601 are also described in UTU-77985. The U.S. Department of Interior, Bureau of Land Management (BLM) right-of-way application UTU-76601 is included in Appendix 1-3.

The disturbed area encompasses 20.31 acres (Mine Facility area, including Gilson well pad and small substation), 2.2 acres (G-2 and G-3 Degas Well), 1.8 acres (Leach field/pipeline area), and 26.8 acres (Refuse Pile area) totally 51.1 acres. That acreage includes a pre- and post mining road with an area of 1.6 acres and 2.03 acres of undisturbed land within the mine facilities disturbed area and 11.2 acres within the refuse pile disturbed area.

The permit boundary encompasses approximately 9,471 acres which includes the following surface ownership and acreage: 10 acres in the BLM right-of-way, approximately 567 acres of other federal lands, 920 acres of state lands, and fee acreage of approximately 7,974 acres (Plate 1-1 and RA Plate 1-1).

Coal ownership acreage within the permit area includes approximately 2,804 acres of federal coal, approximately 5840 acres of state coal, and 827 acres of fee coal (Plate 1-2 and RA1-1B). Approximately 745 acres which include the surface subsidence area, refuse pile and leach field areas will not be mined although their acreage is included in the surface and coal ownership acreage totals.

A legal description of the permit boundary includes:

T. 13 S., R. 12 E., SLBM, Utah

- Section 9: S1/2SE1/4
- Section 10: S1/2
- Section 11: S1/2
- Section 13: All except N1/2N1/2
- Section 14: All
- Section 15: All
- Section 16: All
- Section 17: E1/2SW1/4; SE1/4
- Section 20: E1/2NW1/4; SW1/4NW1/4; N1/2NE1/4
- Section 21: N1/2NW1/4; NE1/4
- Section 22: N1/2; N1/2S1/2; Portion of N1/2NE1/4SE1/4SE1/4;
Portion of SW1/4NE1/4SE1/4SE1/4;
Portion of the S1/2NW1/4SE1/4SE1/4;
Portion of SW1/4NE1/4SW1/4SE1/4;
Portion of N1/2SE1/4SW1/4SE1/4;
Portion of NE1/4SW1/4SW1/4SE1/4;
Portion of S1/2SW1/4SW1/4SE1/4
- Section 23: NW1/4; NE1/4; SE1/4; NE1/4SW1/4; NW1/4NW1/4SW1/4;
S1/2NE1/4NW1/4SW1/4; NW1/4SW1/4NW1/4SW1/4;
- Section 24: All
- Section 25: N1/2N1/2
- Section 26: N1/2NE1/4
- Section 27: Portion of W1/2NW1/4NW1/4NE1/4
Portion of SW1/4NE1/4NE1/4NW1/4
Portion of E1/2SW1/4NE1/4NW1/4
Portion of SW1/4SW1/4NE1/4NW1/4

T. 13 S., R. 13 E., SLBM, Utah

- Section 17 SW1/4; SW1/4NW1/4; SW1/4SE1/4
- Section 18 All except N1/2N1/2
- Section 19 All

Section 20	All
Section 21	SW1/4; SW1/4NW1/4
Section 28	NW1/4; N1/2SW1/4; SW1/4SW1/4
Section 29	All
Section 30	NW1/4NW1/4; E1/2; E1/2W1/2

T. 14 S., R. 12 E., SLBM, Utah
Section 18 Portion N1/2NE1/4

Topsoil is being stored in T14S, R12E, Section 8, a storage area permitted to Soldier Canyon Mine. See Chapter 2 for additional details concerning the topsoil storage.

Acreage has been added to the permit area which is in excess of the Federal lease acreage to act as a subsidence buffer zone. This acreage has been added in T13S, R12E Section 13 and T13S, R13E Sections 17 and 18.

The refuse pile will be located on property owned by Canyon Fuel Company, LLC. The property is located approximately 6.5 miles southwest of the Dugout Canyon Mine in portions of the NE1/4, SW 1/4 and SE 1/4 of the NE 1/4, in a portion of the NW 1/4 of the SE1/4, and in the NW1/4 of the NE 1/4 of Section 18, Township 14 South, Range 12 East, Salt Lake Base Meridian.

BLM Right-of-Way UTU-77985 grants the right-of-entry for the leach field and associated pipeline. Refer to the right-of-way description above.

115 Status of Unsuitability Claims

To the best knowledge of Canyon Fuel Company, LLC, no portion of the area to be permitted is designated, or under study for being designated, unsuitable for mining.

CFC does not propose to conduct coal mining or reclamation operations within 300 feet of any occupied dwelling. A description of operations to be conducted within 100 feet of a public road is

provided in Chapter 5 of this M&RP, together with a discussion of plans to protect the interests of the public.

116 Permit Term

The anticipated mining progression during operation of the Dugout Canyon Mine is outlined on Plate 5-7. Rates of production for the permit term are presented in Section 523. Reclamation operations are discussed in Chapters 2, 3, 5, 7, and 8.

117 Insurance, Proof of Publication, and Facilities and Structures Used in Common

Certificates of Insurance issued to Canyon Fuel Company, LLC are located in Appendix 1-2.

The newspaper advertisement and the verification of the advertisement appearing in the appropriate newspapers are included in Appendix 1-2.

118 Filing Fee

The permit application was accompanied by a \$5.00 filing fee. UDOGM retains a record of filing fee payments in their office in Salt Lake City, Utah.

120 PERMIT APPLICATION FORMAT AND CONTENTS

This permit application will comply with R645-301-120.

130 REPORTING OF TECHNICAL DATA

All technical data submitted in the permit application will be accompanied by the name or organization responsible for the collection and analysis of data, dates of collection and descriptions

of methodology used. Technical analyses will be planned by or under the direction of a qualified professional in the subject to be analyzed.

140 MAPS AND PLANS

The maps and plans in the Mining and Reclamation Plan will correspond with the requirements in R645-301-140.

150 COMPLETENESS

CFC believes the information in this permit application to be complete and correct.

TABLE 1-1

COAL MINING AND RECLAMATION OPERATIONS

Facility	State	Parent Mailing Address	Permit Number	Issuing Authority
SUFCO Mine	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/041/002	Utah Division of Oil, Gas and Mining
Skyline Mines	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/007/005	Utah Division of Oil, Gas and Mining
Soldier Canyon Mine	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/007/018	Utah Division of Oil, Gas and Mining
Banning Loadout	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/007/034	Utah Division of Oil, Gas and Mining
Dugout Canyon Mine	Utah	Canyon Fuel Company LLC 6995 South Union Park Center Suite 550 Midvale, UT 84047	C/007/039	Utah Division of Oil, Gas and Mining

TABLE 1-2
THREE YEAR VIOLATION HISTORY June 2000 - 2003
MINING AND RECLAMATION OPERATIONS

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Dugout Canyon Mine	Canyon Fuel Company, LLC 6955 South Union Park Center, Suite 540 Midvale, UT 84047	ACT/007/039	7/1/03	N03-46-3-1 Failure to minimize contributions of sediment to runoff outside the permit area.	Terminated 7/30/03, Assessment Paid
Skyline Mine		ACT/007/005	9/06/01	N01-39-1-1 Release of coal fines to Eccles Creek.	Terminated 12/10/01, Assessment Paid
Soldier Canyon Mine		ACT/007/018	None		
Banning Loadout		ACT/007/034	None		
SUFCO Mine		ACT/041/002	None		
Black Thunder Mine	Thunder Basin Coal Company, LLC P.O. Box 406 Wright, Wyoming 82732	233-T5 00977	7/11/01	100163 Flyrock on topsoil.	Abated 8/16/01
			4/25/02	100164 Ground vibration at a pipeline.	Abated 5/20/02
			5/7/03	100172 Location of TC diversion 3 and sediment control for diversion.	Abated 7/16/03
			6/20/03	100147 Removal of dragline crossing culverts and low pH soils in diversion.	Abated 7/22/03
Coal Creek Mine		483-T3	None		

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
West Elk Mine	Mountain Coal Company West Elk Mine P.O. Box 591 Somerset, CO 81434	C-80-007	None		
Gordon Creek No. 2, 7, 8		ACT/007/016	None		
Gordon Creek No. 3, 6		ACT/007/017	BOND RELEASED		
Huntington Canyon No. 4 Mine		ACT/015/004	BOND RELEASED		
Medicine Bow Mine	Arch of Wyoming P.O. Box 460 Hanna, WY 82327	377-T5	5/03/02	MV 400028 Failure to mark a topsoil stockpile with a sign.	Terminated 6/5/02
		378-T3	8/8/00	100541 Erosion of designated drainage.	Terminated 9/8/00

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Apogee Coal Company	Arch of West Virginia HC 61, Box 156 Yolyn, WV 25654	S-75-85	7/23/02	29 - Failed to minimize air pollution.	Terminated 8/8/02
		S-5006-91	7/11/00	24 - Failure to clean out sediment structure.	Terminated 9/8/00
		S-5005-93	10/5/00	22 - Exceeded airblast level.	Terminated 10/5/00
			3/7/01	23 - Failure to protect off site areas.	Terminated 6/1/01
			5/23/01	24 - Material placed downslope.	Terminated 6/22/01
			8/9/01	25 - Failure to protect off site areas.	Terminated 10/18/01
			11/29/01	26 - Failure to record information in blast record.	Terminated 11/29/01
			1/17/02	27 - Failure to protect off site areas.	Terminated 3/14/02
			1/23/02	28 - Failure to protect off site areas.	Terminated 5/30/02
			3/12/02	29 - Exceeded airblast level.	Terminated 3/21/02
			8/1/02	30 - Failed to maintain drainage system.	Terminated 10/3/02
3/13/03	31 - Failure to protect off site areas.	Terminated 5/7/03			

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Apogee Coal Company	Arch of West Virginia HC 61, Box 156 Yolyn, WV 25654	S-5079-86	12/14/00	39 - Placed debris on downslope.	Terminated 1/10/01
			8/02/01	40 - Failure to protect off site areas.	Terminated 8/9/01
			4/11/02	41 - Failure to protect off site areas.	Terminated 5/2/02
			11/2/02	42 - Failure to protect off site areas.	Terminated 11/20/02
			1/29/03	43 - Failure to protect off site areas.	Terminated 2/27/03
			3/6/03	44 - Failure to protect off site areas.	Terminated 3/13/03
			3/25/03	45 - Exceeded airblast level.	Terminated 4/17/03
			6/17/03	46 - Failed to maintain haul road.	Terminated 7/10/03
		O-163-83	8/2/02	15 - Disturbance to hydrologic balance.	Terminated 11/20/02
		S-5007-001	4/10/03	1 - Failed to follow ground water plan.	Terminated 4/24/03
			4/10/03	2 - Failed to follow permit conditions.	Terminated 4/24/03
			4/22/03	3 - Failed to follow permit conditions.	Terminated 5/6/03

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Coal Mac Inc	P.O. Box 436 Williamson, WV 25661	S-5019-94	2/23/01	9 - Failure to maintain sediment control.	Terminated 3/27/01
			2/27/01	10 - Failed to monitor NPDES outfalls.	Terminated 4/16/01
			6/6/02	11 - Access road damaged.	Terminated 8/23/02
			6/6/02	12 - Spillway washed out.	Terminated 11/7/02
			6/6/02	13 - Failed to clean pond.	Terminated 11/7/02
			12/17/02	14 - Off site slide damage.	Terminated 3/27/01
		S-5016-93	2/27/01	9 - Failed to monitor NPDES outfall.	Terminated 4/16/01
			3/1/01	10 - Fly rock damage.	Terminated 4/23/01
			5/23/01	11 - Failure to maintain diversions.	Terminated 5/23/01
			5/23/01	12 - Failure to maintain diversions.	Terminated 6/4/01
			9/28/01	13 - Filled ditch with debris.	Terminated 10/29/01

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Coal Mac Inc	P.O. Box 436 Williamson, WV 25661	S-5016-93	9/28/01	14 - Failed to guard shot.	Terminated 9/28/01
			11/16/01	15 - Fly rock damage.	Terminated 1/31/02
			1/30/02	16 - Sediment control failure.	Terminated 1/31/02
			3/18/02	17 - Sediment pond repair.	Terminated 4/2/02
			5/29/02	18 - Off site erosion.	Terminated 8/21/02
			10/01/02	19 - Off site erosion.	Terminated 10/16/02
			11/19/02	20 - Failure to record static groundwater levels.	Terminated 11/21/02
			11/19/02	21 - Incorrect blasting logs.	Terminated 2/26/03
			11/20/02	22 - Erosion.	Vacated

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Coal Mac Inc	P.O. Box 436 Williamson, WV 25661	S-5066-92	2/27/01	7 - Failed to monitor NPDES outfall.	Terminated 4/16/01
			2/27/01	8 - Failed to maintain pond.	Terminated 5/22/01
			11/27/01	9 - Debris downslope.	Terminated 11/27/01
			3/26/02	10 - Groundwater static levels not recorded.	Terminated 5/22/02
			3/26/02	11 - Iron staining below pond.	Terminated 7/24/02
			6/03/02	12 - Sediment Pond damage.	Terminated 8/23/02
			7/8/02	13 - Pond spillway damaged.	Terminated 8/23/02
		S-5019-98	12/11/01	1 - Cast fly rock off permit area.	Terminated 1/23/02
			12/17/02	2 - Failed to do pre-blast survey.	Terminated 1/14/03
			4/28/03	3 -Debris downslope.	Terminated 6/9/03
		P-609	11/04/02	54 - Groundwater static levels not recorded.	Terminated 12/4/02
			6/16/03	55 - Failed to submit permit renewal.	Terminated 6/16/03

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Coal Mac Inc.	P.O. Box 436 Williamson, WV 25661	S-5074-92	2/21/03	8 - Erosion on hollow fills.	Terminated 3/11/03
		S-5015-98	7/21/03	1 - Failed to protect off site areas.	Pending
			7/21/03	2 - Disturbed hydrologic balance.	Pending
			4/13/02	3 - Failed to protect hydrologic balance.	Terminated 8/1/02
			6/12/03	4 - Failed to protect hydrologic balance.	Terminated 6/12/03
			7/28/03	3 - Discharge to stream	Pending
Mingo Logan Coal Company	1000 Mingo Logan Avenue Whamcliffe, WV 25651	O-5013-91	9/6/01	40 - Disturbed to off site hydrologic balance.	Terminated 9/28/01
			9/6/01	41 - Failure to notify landowners.	Terminated 9/6/01
			10/9/02	42 - Disturbed to off site hydrologic balance.	Terminated 1/15/03
		U - 5073-88	8/7/02	6 - Failure to protect off site areas.	Pending
			8/13/02	7 - Failed to protect hydrologic balance.	Terminated 12/31/02

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Mingo Logan Coal Company	1000 Mingo Logan Avenue Wharmcliffe, WV 25651	U-5038-97	12/1/00	1 - Drill cuttings flowed into channel.	Terminated 12/5/00
			6/12/03	4 - Failed to protect hydrologic balance.	Terminated 6/12/03
		U-5044-91	5/7/03	2 - Material discarded outside designated area.	Terminated 6/11/03
		U-5038-97	7/28/03	3 - Untreated water discharged to stream.	Pending
		S-4013-95	8/22/00	6 - Failure to clean sediment pond.	Terminated 8/29/00
		S-5019-94	2/27/01	10 - Failed to monitor and report NPDES outfalls.	Terminated 9/28/01
		S-5066-92	2/27/01	8 - Outfall bypassed spillway.	Terminated 5/22/01
		S-5016-93	9/8/00	7 - Failure to clean sediment pond.	Terminated 10/10/00
Lone Mountain Processing	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	1201390	3/21/02	CDB0002723 Failed to do water monitoring.	Terminated 3/21/02
Catenary Coal Company		S-3035-93	06/26/00	18 - Failure to clean sediment structure.	Terminated
			06/26/00	19 - Failure to provide pre-blast survey.	Withdrawn

TABLE 1-2 (Continued)

Facility	Mailing Address	Permit Number	Date	Violation Description	Status
Catenary Coal Company	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	S-3035-93	7/9/01	20 - Failure to protect off site areas.	Abated 7/10/01
			7/9/01	21 - Failure to protect off site areas.	Abated 7/10/01
		S-5007-90	9/27/00	9 - Failed to submit NPDES renewal.	Abated
			9/27/00	10 - Failed to submit drainage certificates.	Abated
		S-3004-95	10/13/00	8 - Failed to provide pre-blast survey.	Abated
		U-3001-98	10/27/00	1 - Placed spoil on downslope.	Abated
		S-6012-87	3/30/01	17-Failure to maintain drainage.	Abated
			3/30/01	18 - Failure to place refuse in a controlled manner.	Abated
		S-3023-90	4/11/01	1 - Failure to provide sediment control.	Abated
		U -3001-98	3/30/01	2 - Failure to construct and maintain drainage.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Catenary Coal Company	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	O-3012-98	5/7/01	1 - Air pollution control failure.	Abated
		S- 3023-90	5/17/01	2 - Failure to maintain sediment controls.	Abated
		O-3017-93	5/17/01	6 - Failure to meet effluent limits.	Abated
		S-3004-95	6/11/01	9 - Failure to comply with approved plan.	Abated
			7/10/01	10 - Placed spoil on downslopes.	Abated
			9/19/01	11 - Failure to protect off site areas.	Abated
			5/9/03	12 - Failed to maintain drainage system.	Pending
			5/29/03	13 - Placed spoil on downslopes.	Pending
		P-574	7/26/01	16 - Discharged water disturbed hydrologic balance.	Abated
		O-6009-86	12/7/01	10 - Failure to protect off site areas.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Catenary Coal Company	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	S-3020-90	8/10/01	3 - Failure to properly construct valley fill.	Withdrawn
			3/5/02	3 - Failure to protect off site areas.	Withdrawn
			2/21/03	5 - Placed spoil on downslopes.	Pending
		S -6012-87	1/28/02	19 - Failed to follow approved permit.	Abated
		O-3012-98	2/21/02	2 - Failed to maintain effluent limits.	Abated
			1/13/03	3 - Failed to maintain effluent limits.	Abated
		S-3010-00	3/25/02	1 - Failed to follow approved permit.	Abated
			8/14/02	2 - Failure to construct to approved plan.	Abated
			2/21/03	3 - Placed spoil on downslopes.	Pending
			5/29/03	4 - Placed spoil on downslopes.	Pending
			5/29/03	5 - Water Quality cessation order.	Pending

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Catenary Coal Company	Catenary Coal Holding, Inc P.O. Box 109 Appalachia, VA 24216	S-3024-90	4/1/02	32 - Failure to protect off site areas.	Abated
			3/19/03	33 - Placed spoil on downslope.	Pending
Cumberland River Coal Company		1601486	11/27/00	RDS1953 - Placed spoil on downslope	Abated 3/16/01
			2/21/01	RDS2114 - Disturbance outside permitted area.	Abated 3/9/01
			4/25/01	RDS2242 - Placed spoil on downslope.	Abated 5/30/01
			8/21/01	RDS2468 - Placed spoil on downslope.	Abated 1/29/02
		1301533	3/21/02	RDS2800 - Exceeded water quality limits.	Abated 3/21/02
		1301561	12/06/00	RDS2002 - Exceeded slurry solids level.	Abated 3/23/01
			2/25/01	RDS2112 - Sediment pond not certified.	Abated 5/25/01
		1301623	7/24/01	RDS2436 - Under drain not functioning properly.	Abated 9/25/01
		867-0382	7/21/03	001 - Pond reached capacity.	Pending

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Jullian Tipple (IDLE)	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	None			
Hobet Mining, Inc		S-5003-96	10/17/00	12 - Violated air blast regulation.	Abated
			10/17/00	13 - Violated air blast regulation.	Abated
			6/29/01	14 - Failure to comply with reclamation plan.	Abated
			6/29/01	15 - Failure to construct according to plan.	Abated
			9/14/01	16 - Failure to maintain sediment control.	Abated
			1/31/02	17 - Violated air blast regulation.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5003-96	3/27/02	18 - Failure to meet effluent standards.	Abated
			7/12/02	19 - Blasting poundage in excess.	Abated
			8/21/02	20 - Failed to protect off site areas.	Abated
			1/3/03	21 - Spoil material outside permit area.	Abated
			2/18/03	22 - Spoil material slide.	Abated
			2/24/03	23 -Placed spoil downslope.	Abated
			3/26/03	24 -Placed spoil downslope.	Abated
			3/26/03	25 - Overshot permit area.	Abated
			3/26/03	26 - Erosion.	Abated
			3/26/03	27 - Failure to report groundwater standards.	Abated
5/22/03	28 - Failure to meet effluent standards.	Abated			

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5003-96	6/26/03	29 -Failure to inform occupants of blasting.	Abated
			7/9/03	30 - Untreated discharge to stream.	Pending
			7/9/03	31 -Untreated discharge to stream.	Pending
			7/31/03	32 - Air blast accedence.	Pending
		S-5020-95	11/9/00	13 - Failure to establish a permanent vegetation.	Abated
			11/9/00	14 - Failure to clean pond.	Withdrawn
			6/29/01	15 - Placed spoil on downslope.	Abated
			9/18/01	16 - Failed to protect off site areas.	Abated
			6/13/02	17 - Failed to protect off site areas.	Abated
			6/16/02	18 - Failure to maintain drainage system.	Abated
			7/10/02	19 - Placed spoil on downslope.	Vacated
10/21/02	20 - Failure to certify sediment structures.	Abated			

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5020-95	10/21/02	21 - Failed to construct or maintain drainage.	Abated
			11/6/02	22 - Failure to follow permit conditions.	Abated
			3/13/03	23 - Sediment Pond structure not certified.	Abated
		S-5062-86	10/25/00	26 - Failed to minimize disturbance to hydrologic balance.	Abated
		O-5056-92	6/23/00	12 - Failed to protect off site areas.	Abated
			3/12/03	13 - Failed to protect off site areas.	Abated
		S-5024-86	10/31/00	58 - Failed to construct or maintain pond.	Withdrawn
			10/31/00	59 - Ceased reclamation activities for more than 30 days.	Abated
		O-13-81	6/21/01	30 - Failed to follow permit conditions.	Abated
		S-5063-91	7/31/01	46 - Failed to minimize impact to hydrologic balance.	Abated
			5/13/03	47 - Failed to compact and stabilize fill.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5070-91	5/21/01	8 - Failure to treat discharge water.	Abated
		128-78	11/26/01	26 - Failed to perform water monitoring.	Abated
		U-5007-98	11/14/01	1 - Caused off site damage.	Abated
		S-5052-86	11/2/01	9 - Failure to eliminate highwall.	Abated
		O-5010-97	11/28/01	1 - Stockpiled coal outside permit area.	Abated
			8/8/02	2 - Dust suppression.	Abated
			8/19/02	3 - Failed diversion ditch.	Withdrawn
			8/19/02	4 - Contributed suspended solids to stream.	Abated
		P-495	6/15/02	10 - Slurry line break.	Terminated
			6/11/02	11 - Failure to clean sediment structure.	Abated
			6/11/02	12 - Failed to maintain sediment system.	Abated

TABLE 1-2 (Continued)

Facility	Parent Mailing Address	Permit Number	Date	Violation Description	Status
Hobet Mining, Inc	Mountain Mining, Inc P.O. Box 305 Madison, WV 25130	S-5016-92	10/21/02	11 - Failed to control or prevent erosion.	Withdrawn
		U-5088-86	9/10/02	11 - Failed to manage opening.	Abated
		O-6-81	12/19/02	15 - Failed to protect slopes.	Abated
		R-405	3/13/03	1 - Failure to compact refuse material.	Withdrawn
		S-5052-86	5/9/03	10 - Failure to give notice.	Abated
		O-5105-86	7/30/01	4 - Failed to reclaim road.	Abated
		S-5011-01	7/3/03	1 - Failed to construct approved drainage system.	Pending
		H-695	6/26/03	13 - Failed to protect off site areas.	Pending

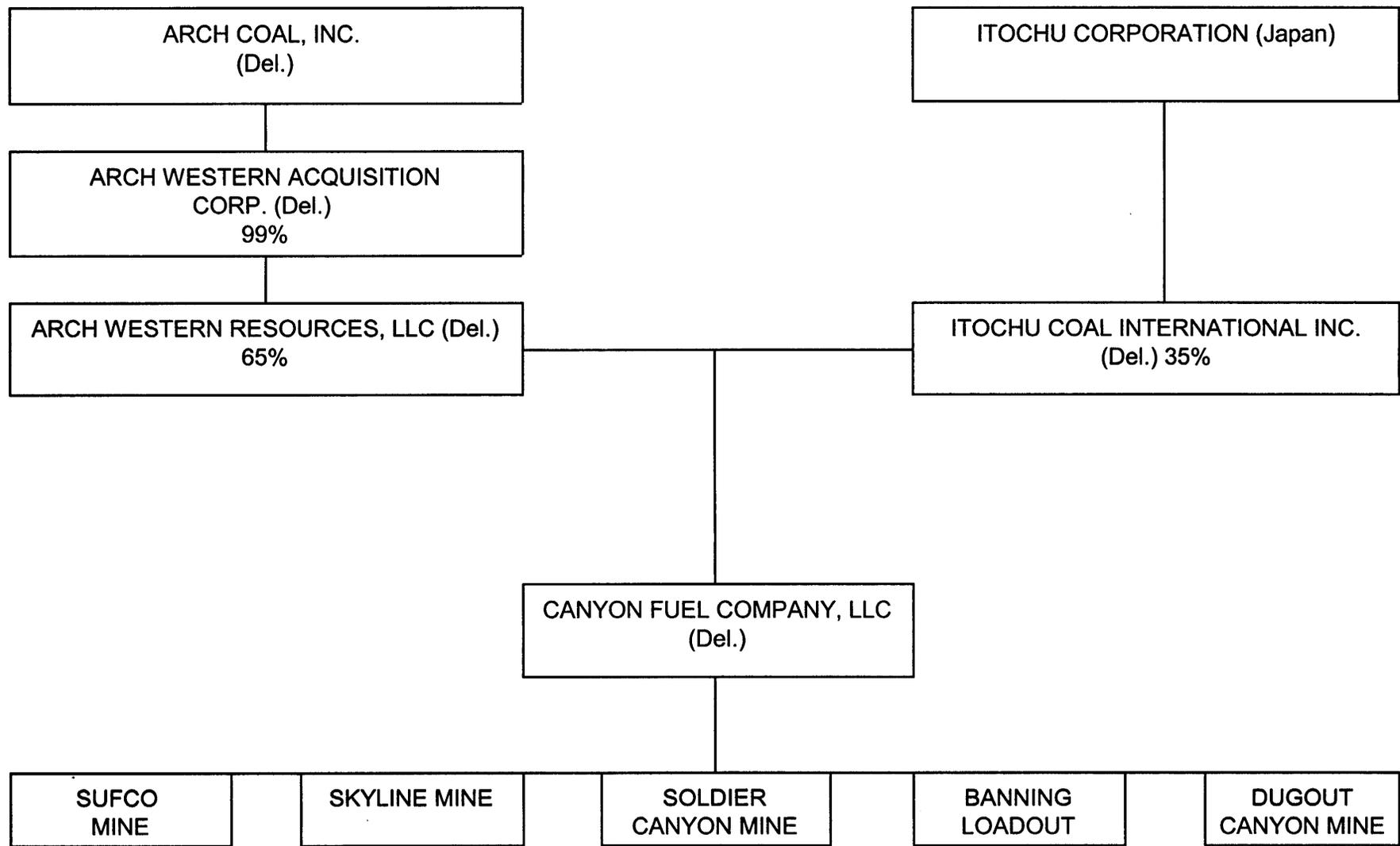


FIGURE 1-1. CORPORATE STRUCTURE.

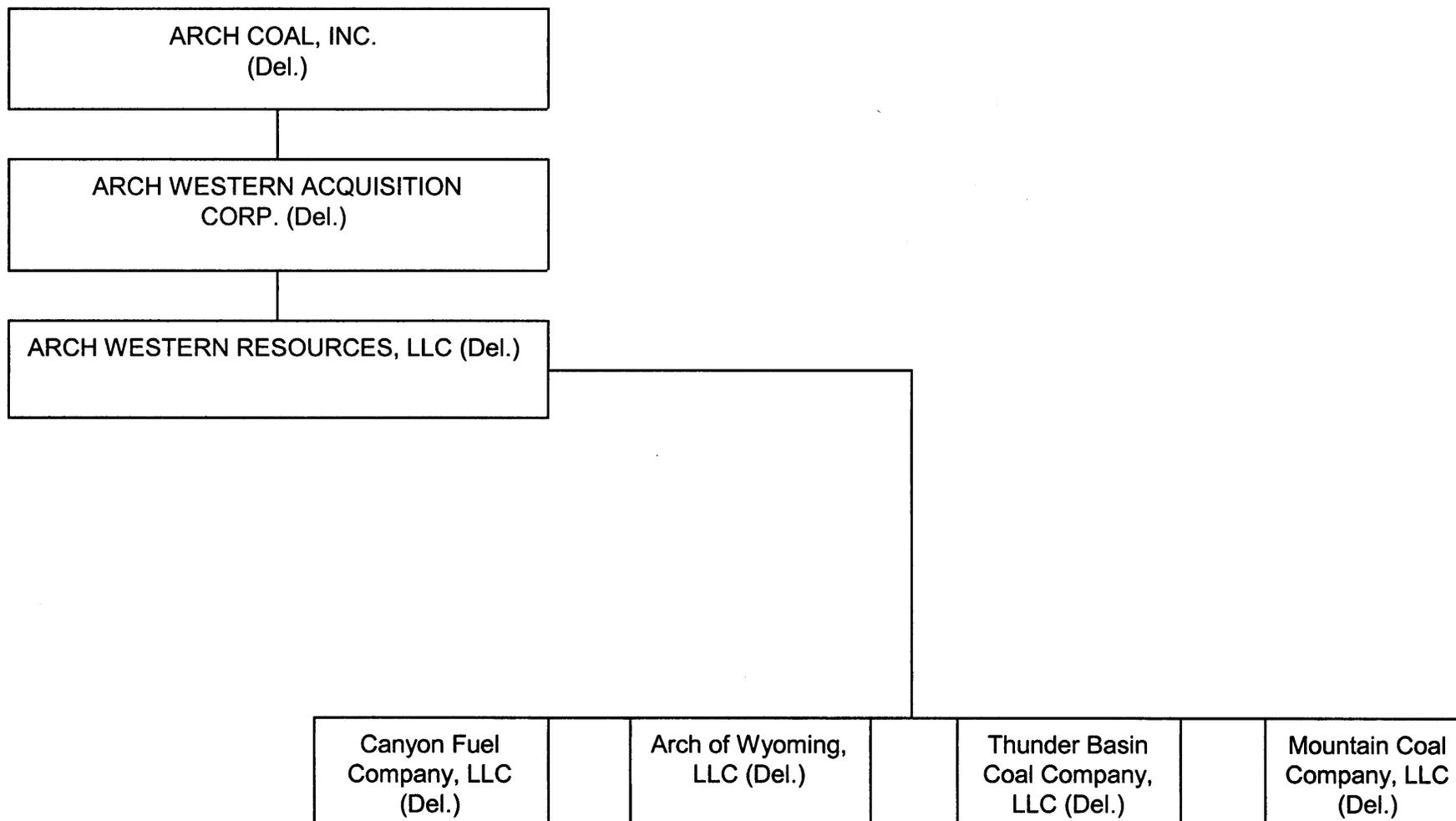


FIGURE 1-1. CORPORATE STRUCTURE (Continued).

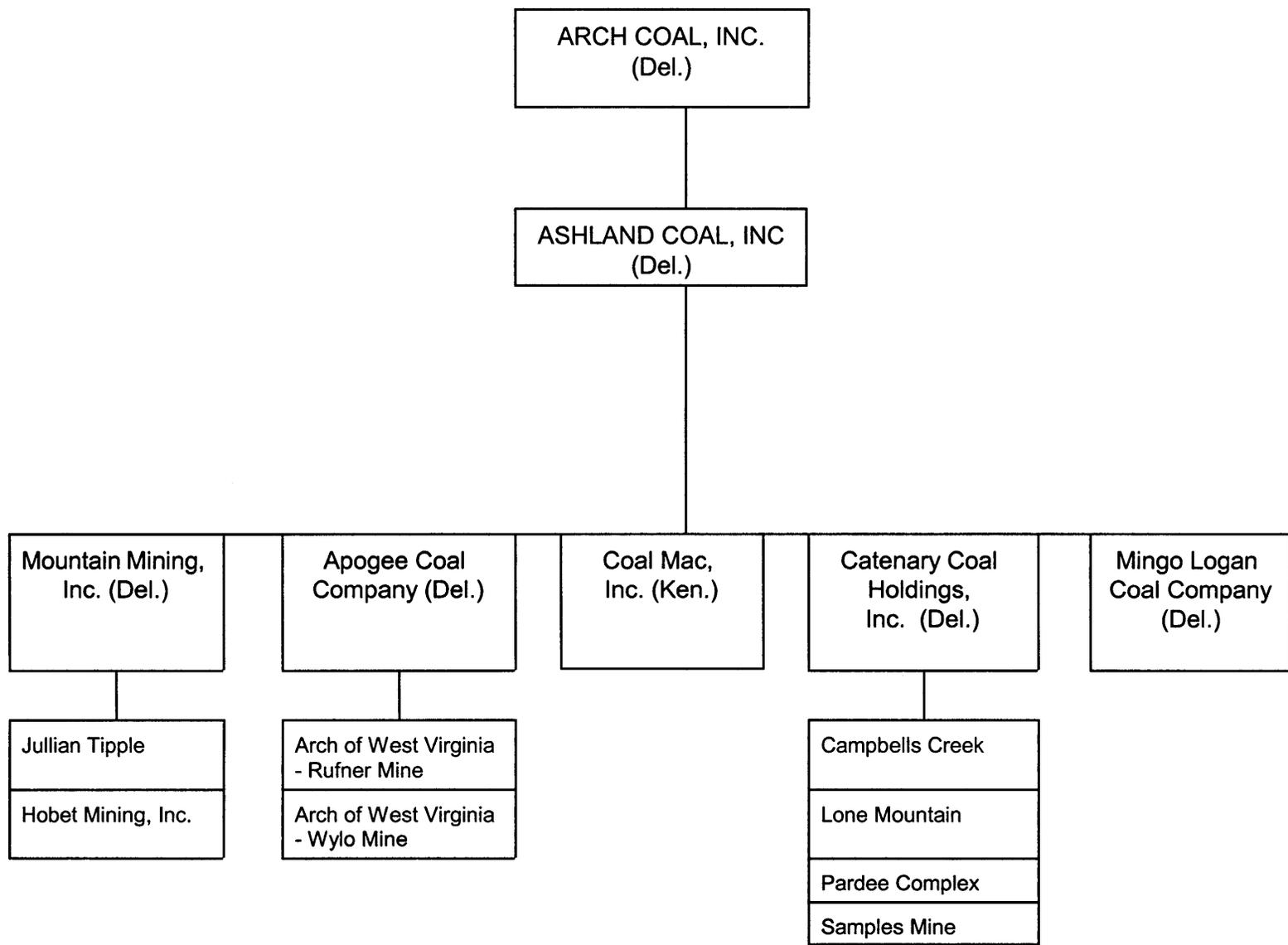


FIGURE 1-1. CORPORATE STRUCTURE (Continued).

CHAPTER 2

SOILS

CHAPTER 2 SOILS

210 INTRODUCTION

This chapter and associated appendices of this M&RP contain all pertinent information relating to identification, management, and reclamation activities associated with the soil resources present in the disturbed area of the Dugout Canyon Mine. The information has been compiled from the previously approved soil sections for the Sage Point-Dugout Canyon Mine and Soldier Canyon Mine permits, ACT/007/009 and Act/007/018, respectively, as well as new soil survey information gathered as part of this permit application. The soil studies were conducted in accordance with the Utah Division of Oil, Gas, and Mining guidelines that were in effect at the time each study was conducted. All previous surveys fulfilled the requirements established by the U.S. Soil Conservation Service (SCS). The site specific soil survey conducted for this permit application was conducted in accordance with the standards set by the National Cooperative Soil Survey and analyzed by horizon according to Table 1 of the Division's "Guidelines for the Management of Topsoil and Overburden for Underground and Surface Coal Mining" (Leatherwood, 1988).

Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

A base map of the soils in the permit area has been created by compiling maps from the "Soil Survey of Carbon Area, Utah" prepared by the SCS (Jensen, 1988). The base map illustrates the locations and areal extent of the endemic soil resources within the permit area at an Order III level (Plate 2-1). In the disturbed area of the permit area, an Order I survey was conducted. The locations and areal extent of the endemic soil resources within the disturbed area identified during the Order I survey are illustrated on Plate 2-2.

This chapter provides a description of the pre-mining resources as specified under R645-301-221. Topsoil and subsoil to be saved under R645-301-232 will be removed and segregated from other material. After removal, topsoil will be immediately redistributed in accordance with R645-301-242, stockpiled pending redistribution under R645-301-234, or if demonstrated that an alternative procedure will provide equal or more protection for the topsoil, the Applicant will seek approval from the Division.

220 ENVIRONMENTAL DESCRIPTION

The Dugout Canyon Mine is located in the northern Book Cliffs - Roan Plateau region. More specifically, the mine is located within Dugout Canyon. The majority of the disturbed area is located on the northwest side of the canyon (Plate 2-1). The elevation of the disturbed area ranges between approximately 7000 and 7150 feet above MSL. Soils in the mine area are not cultivated due to their thin nature and relatively steep slopes on which they lie. These soils have formed in colluvium derived from sandstone and shale. Soils in the area are usually shallow and consist predominantly of stony to gravelly sandy loams with moderate permeability. The soils are highly susceptible to water erosion. Rock outcrops consist of alternating layers of sandstone and shale. Subordinate amounts of coal are also present.

221 Prime Farmland Investigation

As part of the application for the Sage Point-Dugout Canyon Mine permit, ACT/007/009, a reconnaissance of the disturbed areas was conducted in 1980 to determine if prime farmland was present, and if present, whether it would be impacted by mining activities. The reconnaissance included the presently-proposed disturbed area within the Dugout Canyon Mine permit area. Copies of the applicable pages from the prime farmland investigation for the Sage Point-Dugout Canyon Mine permit and correspondence with the Soil Conservation Service have been included as Appendix 2-1. One area within the previous area of investigation was determined to potentially be prime farmland. However, this area was located near the mouth of Soldier Creek Canyon, outside of the presently proposed permit area. No prime farmland was found in Dugout Canyon or anywhere else within the presently-proposed permit area during the previous investigation.

As part of this permit application, a survey of the disturbed area of the Dugout Canyon Mine was conducted to determine whether the soils could be considered as prime farmland. The Dugout Canyon Mine disturbed area lies within the Rock outcrop-Rubbleland-Travessilla complex and Croydon loam soils area (Plates 2-1 and 2-2). Neither of these soils are considered suitable prime farmland as described by the SCS (Jensen, 1988). No evidence of past cultivation of the soils in the disturbed area was found during the site investigation. Hence, based on the results of both detailed investigations conducted within the area, it is concluded that no prime farmland exists within the proposed permit area.

222 Soil Survey

Soil survey information for those portions of the permit area to be affected by surface operations at the Dugout Canyon Mine is presented in Sections 222.100 through 222.300.

222.100 Soils Map

A map delineating the areal extent of the endemic soils resources within the permit area at an Order III survey level is presented on Plate 2-1. A description of these soils has been reproduced from the SCS "Soil Survey of the Carbon County Area" (Jensen, 1988), and has been included as Appendix 2-2. An Order I soil survey was conducted of the Dugout Canyon Mine disturbed area in October and November 1995. Plate 2-2 illustrates the areal extent of the soils studied as part of the Order I soil survey, the location of the soil test pits excavated during the survey, and the extent of the identified soils.

222.200 Soil Identification

Following is a list of the soils found in **and adjacent to** the permit area. Their corresponding map units as illustrated on Plate 2-1 are also listed.

<u>Map Unit</u>	<u>Soil Identification</u>
3	Badland-Rubbleland-Rock outcrop complex

- 6 Beje-Comodore complex
- 7 Beje-Trag complex
- 13 Cabba family-Guben-Rock outcrop complex
- 21 Croydon loam, 8 to 30 percent slopes
- 23 **Curecanti family - Pathead complex**
- 32 Frandsen-Gullied land complex
- 33 Gerst-Badland-Rubbleland complex, 15 to 50 percent slopes
- 36 **Gerst-Strych-Badland complex, 3 to 50 percent slopes**
- 37 Gerst-Strych-Badland complex, 50 to 70 percent slopes
- 46 Guben-Pathead extremely stony loams
- 47 Guben-Rock outcrop complex
- 50 Haverdad loam, moist, 1 to 5 percent slopes
- 52 Hernandez family, 3 to 8 percent slopes
- 53 Hernandez family, moist, 1 to 6 percent slopes
- 62 Midfork family-Comodore complex
- 66 Mivida gravelly fine sandy loam, 3 to 8 percent slopes
- 72 **Pathead-Corecanti family association**
- 75 Perma family, 15 to 40 percent slopes
- 81 Persayo-Greybull complex
- 84 Podo-Rock outcrop complex
- 86 **Rabbitex-Doney family-Midfork family complex**
- 88 Rabbitex family-Datino Variant complex
- 96 Rock outcrop-Rubbleland-Travessilla complex
- 97 Rottulee family-Trag complex
- 100 Senchert loam, 3 to 15 percent slopes
- 101 Senchert loam, 30 to 50 percent slopes
- 103 Senchert-Toza family complex
- 105 **Senchert family-Senchert complex**
- 107 **Supert-Winetti complex**
- 109 **Silas-Brycan loams**
- 113 Strych very stony loam, 3 to 15 percent slopes

According to the SCS (Jensen, 1988), soils present on the east facing slopes of Dugout Canyon are part of the Rock outcrop-Rubbleland-Travessilla complex while those on the west facing slopes are part of the Croydon loam and Midfork family-Comodore complex.

However, observation of the soils present on the west and northwest facing slopes suggest that inclusions of the Comodore-Datino Variant complex are prevalent throughout. The conclusion that Comodore-Datino Variant complex soils are present in this area is based on the presence of characteristics typical of these soils such as: 40 to 60 percent slopes, elevations of slopes between 6800 and 8100 feet, 40 to 60 percent slopes, Douglas-fir and

safety hazards during culvert installation. Decisions regarding the removal of soil from steep slopes will be made in the field by a qualified soils scientist in agreement with the construction supervisor. This decision will be made based on the steepness of the slope, the potential for slope failure uphill of the disturbed area if soils are removed at the slope toe, and the timing within the construction sequence (i.e. can backfill be placed against the slope immediately after topsoil is removed to support the slope). Additional information regarding the location of the steep slopes and the areas of soil removal associated with the construction of the Dugout Creek culvert is provided in Appendix 2-5. After construction of the culvert, an as-built map will be submitted illustrating the locations where steep slope soils were removed.

In areas where topsoil thicknesses of less than 6 inches are encountered, the topsoil and underlying unconsolidated materials will be removed and stockpiled together. The entire mixture will be treated as topsoil in compliance with R614-201-234.300. The recovery of topsoil and substitute topsoil will be maximized in both disturbed and undisturbed soils.

The substitute topsoil generated during mine construction, as discussed in Section 224, will be treated as topsoil and stored accordingly.

No facilities will be constructed and no soil disturbance is planned in conjunction with the incorporation of the SITLA lease (T13S R13E, Section 29, Portions of Section 17, 20, 21, 28 and 30) into the Dugout Canyon Mine permit area.

231.200 Suitability of Topsoil Substitutes/Supplements

See Section 233.200.

231.300 Testing of Topsoil Handling and Reclamation Procedures Regarding Revegetation

SCM will exercise care to guard against erosion during and after application of topsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes. Erosion control measures will include surface roughing and erosion mat placement on slope areas thought

to be unstable. SCM will fill, regrade, or otherwise stabilize any rills or gullies deeper than nine (9) inches which form in areas which have been regraded and topsoiled. The areas adjacent to any rills or gullies which have been filled, regraded or otherwise stabilized, will be reseeded or stabilized accordingly.

Methods used to evaluate success of Revegetation and stabilization are discussed in Chapters 3 and 5.

231.400 Construction, Modification, Use, and Maintenance of Topsoil Storage Piles

Topsoil and substitute topsoil removed from the Dugout Canyon Mine will be transported and stockpiled at the Soldier Canyon Mine soils stockpile area (Plate 2-3). The estimated volumes of topsoil and substitute topsoil to be stockpiled are presented in Table 2-2.

It is anticipated that the pile will be constructed in horizontal lifts of 1.5 to 2.0 feet. Tracked equipment will be used to reduce compaction. As described in Section 231.100, the stockpile will be graded to a maximum slope of 2:1 and seeded to promote surface stabilization. Some of the vegetation removed during the construction of the Dugout Canyon Mine will be incorporated into or placed on top of the stockpile. The interim reclamation seed mix described in Chapter 3 will be used for this purpose. Volume calculations for the amount of topsoil to be removed and placed in the storage pile are included in Appendix 2-6.

The Dugout Canyon Mine topsoil will be labeled and kept separate from the Soldier Canyon Mine soils. A description of the Soldier Canyon Mine topsoil stockpile area can be found in that M&RP. The Soldier Canyon Mine M&RP will be modified to allow for the storage of Dugout Canyon Mine substitute topsoil prior to the transport of the soil. The stockpiles will be isolated from the main surface area to protect the material from contaminants and unnecessary compaction that would interfere with vegetation. A sign will be installed at the base of each stockpile to identify it as a topsoil storage area. The stockpiles will be protected from wind and water erosion by being revegetated with a quick growing vegetative cover (proposed interim reclamation seed mix) and by installing berms and/or silt fence below the stockpiles to help trap sediment coming off the stockpile. These stockpiled soils will not be moved or disturbed until required for redistribution during final reclamation.

CHAPTER 2

SOILS

CHAPTER 2 SOILS

210 INTRODUCTION

This chapter and associated appendices of this M&RP contain all pertinent information relating to identification, management, and reclamation activities associated with the soil resources present in the disturbed area of the Dugout Canyon Mine. The information has been compiled from the previously approved soil sections for the Sage Point-Dugout Canyon Mine and Soldier Canyon Mine permits, ACT/007/009 and Act/007/018, respectively, as well as new soil survey information gathered as part of this permit application. The soil studies were conducted in accordance with the Utah Division of Oil, Gas, and Mining guidelines that were in effect at the time each study was conducted. All previous surveys fulfilled the requirements established by the U.S. Soil Conservation Service (SCS). The site specific soil survey conducted for this permit application was conducted in accordance with the standards set by the National Cooperative Soil Survey and analyzed by horizon according to Table 1 of the Division's "Guidelines for the Management of Topsoil and Overburden for Underground and Surface Coal Mining" (Leatherwood, 1988).

Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

A base map of the soils in the permit area has been created by compiling maps from the "Soil Survey of Carbon Area, Utah" prepared by the SCS (Jensen, 1988). The base map illustrates the locations and areal extent of the endemic soil resources within the permit area at an Order III level (Plate 2-1). In the disturbed area of the permit area, an Order I survey was conducted. The locations and areal extent of the endemic soil resources within the disturbed area identified during the Order I survey are illustrated on Plate 2-2.

This chapter provides a description of the pre-mining resources as specified under R645-301-221. Topsoil and subsoil to be saved under R645-301-232 will be removed and segregated from other material. After removal, topsoil will be immediately redistributed in accordance with R645-301-242, stockpiled pending redistribution under R645-301-234, or if demonstrated that an alternative procedure will provide equal or more protection for the topsoil, the Applicant will seek approval from the Division.

220 ENVIRONMENTAL DESCRIPTION

The Dugout Canyon Mine is located in the northern Book Cliffs - Roan Plateau region. More specifically, the mine is located within Dugout Canyon. The majority of the disturbed area is located on the northwest side of the canyon (Plate 2-1). The elevation of the disturbed area ranges between approximately 7000 and 7150 feet above MSL. Soils in the mine area are not cultivated due to their thin nature and relatively steep slopes on which they lie. These soils have formed in colluvium derived from sandstone and shale. Soils in the area are usually shallow and consist predominantly of stony to gravelly sandy loams with moderate permeability. The soils are highly susceptible to water erosion. Rock outcrops consist of alternating layers of sandstone and shale. Subordinate amounts of coal are also present.

221 Prime Farmland Investigation

As part of the application for the Sage Point-Dugout Canyon Mine permit, ACT/007/009, a reconnaissance of the disturbed areas was conducted in 1980 to determine if prime farmland was present, and if present, whether it would be impacted by mining activities. The reconnaissance included the presently-proposed disturbed area within the Dugout Canyon Mine permit area. Copies of the applicable pages from the prime farmland investigation for the Sage Point-Dugout Canyon Mine permit and correspondence with the Soil Conservation Service have been included as Appendix 2-1. One area within the previous area of investigation was determined to potentially be prime farmland. However, this area was located near the mouth of Soldier Creek Canyon, outside of the presently proposed permit area. No prime farmland was found in Dugout Canyon or anywhere else within the presently-proposed permit area during the previous investigation.

As part of this permit application, a survey of the disturbed area of the Dugout Canyon Mine was conducted to determine whether the soils could be considered as prime farmland. The Dugout Canyon Mine disturbed area lies within the Rock outcrop-Rubbleland-Travessilla complex and Croydon loam soils area (Plates 2-1 and 2-2). Neither of these soils are considered suitable prime farmland as described by the SCS (Jensen, 1988). No evidence of past cultivation of the soils in the disturbed area was found during the site investigation. Hence, based on the results of both detailed investigations conducted within the area, it is concluded that no prime farmland exists within the proposed permit area.

222 Soil Survey

Soil survey information for those portions of the permit area to be affected by surface operations at the Dugout Canyon Mine is presented in Sections 222.100 through 222.300.

222.100 Soils Map

A map delineating the areal extent of the endemic soils resources within the permit area at an Order III survey level is presented on Plate 2-1. A description of these soils has been reproduced from the SCS "Soil Survey of the Carbon County Area" (Jensen, 1988), and has been included as Appendix 2-2. An Order I soil survey was conducted of the Dugout Canyon Mine disturbed area in October and November 1995. Plate 2-2 illustrates the areal extent of the soils studied as part of the Order I soil survey, the location of the soil test pits excavated during the survey, and the extent of the identified soils.

222.200 Soil Identification

Following is a list of the soils found in and adjacent to the permit area. Their corresponding map units as illustrated on Plate 2-1 are also listed.

<u>Map Unit</u>	<u>Soil Identification</u>
3	Badland-Rubbleland-Rock outcrop complex

6	Beje-Comodore complex
7	Beje-Trag complex
13	Cabba family-Guben-Rock outcrop complex
21	Croydon loam, 8 to 30 percent slopes
23	Curecanti family - Pathead complex
32	Frandsen-Gullied land complex
33	Gerst-Badland-Rubbleland complex, 15 to 50 percent slopes
36	Gerst-Strych-Badland complex, 3 to 50 percent slopes
37	Gerst-Strych-Badland complex, 50 to 70 percent slopes
46	Guben-Pathead extremely stony loams
47	Guben-Rock outcrop complex
50	Haverdad loam, moist, 1 to 5 percent slopes
52	Hernandez family, 3 to 8 percent slopes
53	Hernandez family, moist, 1 to 6 percent slopes
62	Midfork family-Comodore complex
66	Mivida gravelly fine sandy loam, 3 to 8 percent slopes
72	Pathead-Corecanti family association
75	Perma family, 15 to 40 percent slopes
81	Persayo-Greybull complex
84	Podo-Rock outcrop complex
86	Rabbitex-Doney family-Midfork family complex
88	Rabbitex family-Datino Variant complex
96	Rock outcrop-Rubbleland-Travessilla complex
97	Rottulee family-Trag complex
100	Senchert loam, 3 to 15 percent slopes
101	Senchert loam, 30 to 50 percent slopes
103	Senchert-Toza family complex
105	Senchert family-Senchert complex
107	Supert-Winetti complex
109	Silas-Brycan loams
113	Strych very stony loam, 3 to 15 percent slopes

According to the SCS (Jensen, 1988), soils present on the east facing slopes of Dugout Canyon are part of the Rock outcrop-Rubbleland-Travessilla complex while those on the west facing slopes are part of the Croydon loam and Midfork family-Comodore complex.

However, observation of the soils present on the west and northwest facing slopes suggest that inclusions of the Comodore-Datino Variant complex are prevalent throughout. The conclusion that Comodore-Datino Variant complex soils are present in this area is based on the presence of characteristics typical of these soils such as: 40 to 60 percent slopes, elevations of slopes between 6800 and 8100 feet, 40 to 60 percent slopes, Douglas-fir and

safety hazards during culvert installation. Decisions regarding the removal of soil from steep slopes will be made in the field by a qualified soils scientist in agreement with the construction supervisor. This decision will be made based on the steepness of the slope, the potential for slope failure uphill of the disturbed area if soils are removed at the slope toe, and the timing within the construction sequence (i.e. can backfill be placed against the slope immediately after topsoil is removed to support the slope). Additional information regarding the location of the steep slopes and the areas of soil removal associated with the construction of the Dugout Creek culvert is provided in Appendix 2-5. After construction of the culvert, an as-built map will be submitted illustrating the locations where steep slope soils were removed.

In areas where topsoil thicknesses of less than 6 inches are encountered, the topsoil and underlying unconsolidated materials will be removed and stockpiled together. The entire mixture will be treated as topsoil in compliance with R614-201-234.300. The recovery of topsoil and substitute topsoil will be maximized in both disturbed and undisturbed soils.

The substitute topsoil generated during mine construction, as discussed in Section 224, will be treated as topsoil and stored accordingly.

No facilities will be constructed and no soil disturbance is planned in conjunction with the incorporation of the SITLA lease (T13S R13E, Section 29, Portions of Section 17, 20, 21, 28 and 30) into the Dugout Canyon Mine permit area.

231.200 Suitability of Topsoil Substitutes/Supplements

See Section 233.200.

231.300 Testing of Topsoil Handling and Reclamation Procedures Regarding Revegetation

SCM will exercise care to guard against erosion during and after application of topsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes. Erosion control measures will include surface roughing and erosion mat placement on slope areas thought to be unstable. SCM

will fill, regrade, or otherwise stabilize any rills or gullies deeper than nine (9) inches which form in areas which have been regraded and topsoiled. The areas adjacent to any rills or gullies which have been filled, regraded or otherwise stabilized, will be reseeded or stabilized accordingly.

Methods used to evaluate success of Revegetation and stabilization are discussed in Chapters 3 and 5.

231.400 Construction, Modification, Use, and Maintenance of Topsoil Storage Piles

Topsoil and substitute topsoil removed from the Dugout Canyon Mine will be transported and stockpiled at the Soldier Canyon Mine soils stockpile area (Plate 2-3). The estimated volumes of topsoil and substitute topsoil to be stockpiled are presented in Table 2-2.

It is anticipated that the pile will be constructed in horizontal lifts of 1.5 to 2.0 feet. Tracked equipment will be used to reduce compaction. As described in Section 231.100, the stockpile will be graded to a maximum slope of 2:1 and seeded to promote surface stabilization. Some of the vegetation removed during the construction of the Dugout Canyon Mine will be incorporated into or placed on top of the stockpile. The interim reclamation seed mix described in Chapter 3 will be used for this purpose. Volume calculations for the amount of topsoil to be removed and placed in the storage pile are included in Appendix 2-6.

The Dugout Canyon Mine topsoil will be labeled and kept separate from the Soldier Canyon Mine soils. A description of the Soldier Canyon Mine topsoil stockpile area can be found in that M&RP. The Soldier Canyon Mine M&RP will be modified to allow for the storage of Dugout Canyon Mine substitute topsoil prior to the transport of the soil. The stockpiles will be isolated from the main surface area to protect the material from contaminants and unnecessary compaction that would interfere with vegetation. A sign will be installed at the base of each stockpile to identify it as a topsoil storage area. The stockpiles will be protected from wind and water erosion by being revegetated with a quick growing vegetative cover (proposed interim reclamation seed mix) and by installing berms and/or silt fence below the stockpiles to help trap sediment coming off the stockpile. These stockpiled soils will not be moved or disturbed until required for redistribution during final reclamation.

APPENDIX 2-2

Soil Conservation Survey Descriptions of the Permit Area Soils

is mainly Douglas-fir, pinyon, Salina wildrye, bluebunch wheatgrass, snowberry, and serviceberry.

Typically, the surface layer is brown extremely stony fine sandy loam about 9 inches thick. The subsoil is brown very stony loam about 7 inches thick. The substratum to a depth of 60 inches or more is pale brown very stony fine sandy loam. A layer of calcium carbonate accumulation is at a depth of about 16 inches.

Permeability of the Datino Variant soil is moderate. Available water capacity is about 4 to 6 inches. Water supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is high.

This unit is used as wildlife habitat and woodland.

The potential vegetation on the Comodore and Datino Variant soils includes an overstory of Rocky Mountain Douglas-fir and pinyon with a canopy of 50 percent. The understory vegetation is 40 percent grasses, 15 percent forbs, and 45 percent shrubs. Among the important plants are Salina wildrye, slender wheatgrass, birchleaf mountainmahogany, and snowberry.

This unit is limited for harvesting wood products because of the steepness of slope, stones and boulders on the surface, and the areas of Rock outcrop.

This unit is not grazeable by livestock because of the steepness of slope.

This unit is in capability subclass VIIe, nonirrigated, and in the Mountain Very Steep Stony Loam (Douglas-fir) woodland site.

21—Croydon loam, 8 to 30 percent slopes. This deep, well drained, moderately slowly permeable soil is on foot slopes. It is between Winter Quarts Canyon and Boardinghouse Canyon, south of Scofield. It formed in alluvium derived dominantly from shale and sandstone. Slopes are about 300 to 400 feet long, are concave to convex, and mostly have east aspect. The present vegetation in most areas is mainly quaking aspen, blue wildrye, slender wheatgrass, peavine, bearded wheatgrass, and silver sagebrush. Elevation is 7,800 to 9,500 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 34 to 38 degrees F, and the average freeze-free period is 40 to 60 days.

Typically, the surface layer is dark yellowish brown and yellowish brown loam about 16 inches thick. The subsurface layer is very pale brown loam about 7 inches thick. The subsoil to a depth of 48 inches is light yellowish brown clay loam over weathered sandstone. Depth to weathered sandstone ranges from 40 to 60 inches or more.

Included in this unit are 5 percent soils that are similar to this Croydon soil but has about 25 percent cobbles in the surface layer and 5 percent Croydon loam that has slopes of 30 to 50 percent.

Permeability of this Croydon soil is moderately slow. Available water capacity is 7 to 9 inches. Water supplying capacity is 16 to 18 inches. Effective rooting depth is 40 to 60 inches or more. The organic matter content of the surface layer is 5 to 10 percent. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland, woodland, and wildlife habitat and for urban development.

The potential vegetation on the Croydon soil includes an overstory of aspen with a canopy of 40 percent. The understory vegetation is 65 percent grasses, 15 percent forbs, and 20 percent shrubs. Among the important plants are slender wheatgrass, Columbia needlegrass, Thurber fescue, and quaking aspen.

This unit is well suited to the production of aspen. The site index for aspen ranges from 60 to 80. Production of aspen is about 40 cubic feet per year. Minimizing the risk of erosion is essential in harvesting timber. The main limitation for the harvesting of wood products is the steepness of slope.

The suitability of this unit for grazing is good. Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, burning can be used to improve the rangeland vegetation.

The suitability for rangeland seeding is poor. The main limitation is competition from aspen.

This map unit is in capability subclass VIe, nonirrigated, and in High Mountain Loam (Aspen) woodland site.

22—Croydon loam, 30 to 50 percent slopes. This deep, well drained, moderately slowly permeable soil is on mountain slopes in the vicinity of Pleasant Valley. It formed in alluvium and colluvium derived dominantly from sandstone and shale. Slopes are 100 to 200 feet long, are concave to convex, and have north and east aspects. The present vegetation in most areas is mainly quaking aspen, snowberry, blue wildrye, slender wheatgrass, and peavine. Elevation is 7,800 to 9,500 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 34 to 38 degrees F, and the average freeze-free season is 40 to 60 days.

Typically, the surface layer is dark yellowish brown and yellowish brown loam about 16 inches thick. The subsurface layer is very pale brown loam about 7 inches thick. The subsoil to a depth of 48 inches is light yellowish brown clay loam over weathered sandstone. Depth to sandstone ranges from 40 to 60 inches or more.

Included in this unit are about 5 percent Uinta family soils under conifers and small areas of a soil that is about 10 inches thick over sandstone. Also included are small areas of Croydon loam that has slopes of 8 to 30 percent and Trag stony loam.

Permeability of this Croydon soil is moderately slow. Available water capacity is about 7 to 9 inches. Water supplying capacity is 16 to 18 inches. Effective rooting depth is 40 to 60 inches or more. The organic matter content of the surface layer is 5 to 10 percent. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland, woodland, and wildlife habitat.

The vegetation on the Croydon soil includes an overstory of aspen with a canopy of 60 percent. The understory vegetation is 65 percent grasses, 15 percent forbs, and 20 percent shrubs. Among the important plants are slender wheatgrass, Columbia needlegrass, Thurber fescue, and quaking aspen.

This unit is well suited to the production of aspen. The site index for aspen ranges from 60 to 80. Production of aspen is about 40 cubic feet per acre per year. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion. If wood products are harvested, care should be taken to minimize the risk of erosion. Proper design of road drainage systems is essential.

The suitability of this unit for grazing is good. Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, burning can be used to improve the rangeland vegetation.

The suitability of this unit for rangeland seeding is poor because of the steepness of slope and competition from aspen.

This unit is in capability subclass VIIe, nonirrigated, and in High Mountain Loam (Aspen) woodland site.

23—Curecanti family-Pathead complex. This map unit is on mountain slopes in the area of Price Canyon. Slopes are 40 to 70 percent, 300 to 400 feet long, and plane to concave. Elevation is 7,000 to 9,000 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days.

This unit is 30 percent Curecanti family loam, 50 to 70 percent slopes; 25 percent Pathead extremely bouldery fine sandy loam, 40 to 70 percent slopes; 25 percent Pathead extremely stony loam, 50 to 70 percent slopes; and 20 percent other soils. About 10 percent of the unit has slopes of 40 to 50 percent. The Curecanti family soil is southwest and southeast aspects and is along small stabilized drainageways, and the other soils are intermingled throughout the unit.

Included in this unit are about 10 percent Perma family soils in drainageways, 7 percent Midfork family soils that have slopes of 50 to 70 percent and are in the deeper drainageways, and small areas of Senchert family soils in concave areas.

The Curecanti family soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. The present vegetation is mainly Gambel oak, snowberry, slender wheatgrass, and Sandberg bluegrass.

Typically, the upper part of the surface layer is dark grayish brown loam about 7 inches thick and the lower part is brown very stony loam about 8 inches thick. The subsurface layer is very pale brown very stony loam about 5 inches thick. The subsoil to a depth of 60 inches or more is pale brown very stony loam.

Permeability of the Curecanti family soil is moderate. Available water capacity is about 5.0 to 6.5 inches. Water supplying capacity is 8 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is severe.

The Pathead extremely bouldery fine sandy loam is moderately deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. The present vegetation is mainly curleaf mountainmahogany, Salina wildrye, and Gambel oak.

Typically, the surface layer is pale brown extremely bouldery fine sandy loam about 4 inches thick. The underlying material to a depth of 38 inches is pale brown and very pale brown very stony fine sandy loam. Depth to hard sandstone ranges from 20 to 40 inches.

Permeability of this Pathead soil is moderate. Available water capacity is about 1.3 to 3.0 inches. Water supplying capacity is 4.0 to 8.5 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is slight.

The Pathead extremely stony loam is moderately deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. The present vegetation is mainly Salina wildrye, black sagebrush, and winterfat.

Typically, the surface layer is brown extremely stony loam about 3 inches thick. The underlying material to a depth of 26 inches is pale brown very cobbly loam. Sandstone is at a depth of 20 to 40 inches.

Permeability of this Pathead soil is moderate. Available water capacity is about 1 to 2 inches. Water supplying capacity is 3.5 to 5.5 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is slight.

This unit is used as rangeland, wildlife habitat, and recreation areas.

The potential plant community on the Curecanti family soil is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Among the important plants are Gambel oak, snowberry, and bluegrass.

This soil is not grazeable by livestock because of the steepness of slope.

The potential vegetation on the Travessilla soil includes an overstory of pinyon and Utah juniper with a canopy of 60 percent. The understory vegetation is 15 percent grasses, 10 percent forbs, and 75 percent shrubs. Among the important plants are pinyon, Utah juniper, birchleaf mountainmahogany, and Mexican cliffrose.

The site index for pinyon and Utah juniper is 32. Average yield is 4 cords of wood per acre. The potential for production of posts or Christmas trees is poor.

This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion. If wood products are harvested, the slash should be left scattered on the surface to protect the soil from erosion.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the pinyon and Utah juniper are thinned, the desirable plants present can be expected to increase for a short period before the pinyon and Utah juniper revegetate the unit.

The suitability of this soil for rangeland seeding is very poor because of the shallow soil depth. It is not practical to revegetate large areas of rangeland. For critical erosion control, small areas can be mechanically treated and seeded.

The Nelman and Travessilla soils are in capability subclass VII, nonirrigated, and Rock outcrop is in capability subclass VIII. The Nelman soil is in the Upland Loam (Basin Big Sagebrush) range site. The Travessilla soil is in the Upland Shallow Loam (Pinyon-Utah Juniper) woodland site. Rock outcrop is not placed in a range or woodland site.

71—Pathead extremely bouldery fine sandy loam, 40 to 70 percent slopes. This moderately deep, well drained soil is on mountain slopes and canyon sides. It is in the areas of Range Creek, Rock Creek, Whitmore Canyon, and Price Canyon. It formed in colluvium derived dominantly from sandstone and shale. Slopes are 100 to 200 feet long and have south aspects. The present vegetation in most areas is mainly curlleaf mountainmahogany, pinyon, juniper, Salina wildrye, and serviceberry. Elevation is 7,500 to 9,000 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days.

Typically, the surface layer is pale brown extremely bouldery fine sandy loam about 4 inches thick. The underlying material to a depth of 38 inches is pale brown and very pale brown very stony fine sandy loam. Depth to bedrock ranges from 20 to 40 inches.

Included in this unit are about 15 percent Perma soils that have slopes of 60 to 80 percent; 10 percent Comodore soils; and small areas of Senchert loam and Rock outcrop. The soils are in concave areas.

Permeability of this Pathead soil is moderate. Available water capacity is about 1.5 to 3.0 inches. Water supplying capacity is 4.0 to 8.5 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland, wildlife habitat, and recreation areas.

The potential plant community on the Pathead soil is 35 percent grasses, 15 percent forbs, and 50 percent shrubs. Among the important plants are curlleaf mountainmahogany, Salina wildrye, and snowberry.

This unit is not grazeable by livestock because of the steepness of slope.

This map unit is in capability subclass VIIe, nonirrigated, and in the Mountain Very Steep Stony Loam (Curlleaf Mountainmahogany) range site.

72—Pathead-Curecanti family association. This map unit is on mountain slopes. It is in the Spring Canyon and Gordon Creek areas, west of Helper. Slopes are 50 to 70 percent, 300 to 400 feet long, and convex. Elevation is 6,800 to 9,000 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 100 days.

This unit is 40 percent Pathead extremely stony loam, 50 to 70 percent slopes; 30 percent Curecanti family loam, 50 to 70 percent slopes; and 30 percent other soils and miscellaneous areas. The Pathead soil is on ridges and shoulders, and the Curecanti family soil generally has north aspects and is in drainageways.

Included in this unit are about 8 percent Podo cobbly loam, 7 percent Midfork family soils, and small areas of Pathead extremely bouldery fine sandy loam, Podo very bouldery sandy loam, Senchert loam, and Rock outcrop.

The Pathead soil is moderately deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. The present vegetation is mainly Salina wildrye, low gray sage, and winterfat. Typically, the surface layer is brown extremely stony loam about 3 inches thick. The underlying material is pale brown very cobbly loam to a depth of 26 inches. Sandstone is at a depth of 20 to 40 inches.

Permeability of the Pathead soil is moderate. Available water capacity is about 1 to 2 inches. Water supplying capacity is 3.5 to 6.5 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

The Curecanti family soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale. The present vegetation is mainly Gambel oak, snowberry, Kentucky bluegrass, and aspen peavine. Typically, the upper part of the surface layer is dark grayish brown loam about 7 inches thick and the lower part is brown very stony loam about 8 inches thick.

The subsurface layer is very pale brown very stony loam about 5 inches thick. The subsoil to a depth of 60 inches or more is pale brown very stony loam.

Permeability of the Curecanti family soil is moderate. Available water capacity is about 5.0 to 6.5 inches. Water supplying capacity is 8 to 12 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 3 to 5 percent. Runoff is rapid, and the hazard of water erosion is high.

This unit is used as wildlife habitat and rangeland.

The potential plant community on the Pathead soil is 60 percent grasses, 15 percent forbs, and 25 percent shrubs. Among the important plants are Salina wildrye, prairie junegrass, bluegrass, and snowberry.

This soil is not grazeable by livestock because of the steepness of slope and the hazard of erosion.

The potential plant community on the Curecanti family soil is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Among the important plants are Gambel oak, snowberry, serviceberry, and bluegrass.

This soil is not grazeable by livestock because of the steepness of slope.

This map unit is in capability subclass VIIe, nonirrigated. The Pathead soil in the Mountain Very Steep Loam (Saline Wildrye) range site, and the Curecanti family soil is in the Mountain Very Steep Loam (Oak) range site.

73—Penoyer Variant loam, 1 to 3 percent slopes.

This very deep, well drained soil is on valley floors. It is near Helper, Price, Wellington, and Miller Creek. It formed in alluvium derived dominantly from sandstone and shale. Slopes are about 300 to 400 feet long and are slightly concave to convex. The vegetation in areas not cultivated is mainly Indian ricegrass, galleta, and shadscale. Elevation is 5,400 to 6,000 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 48 to 50 degrees F, and the average freeze-free period is 115 to 140 days.

Typically, the surface layer is light brownish gray loam about 9 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray very fine sandy loam, loam, and silt loam.

Included in this unit are small areas of a soil, mainly near Hiawatha Junction, that is similar to this Penoyer Variant soil but has a silty clay loam surface layer and small areas of soils that are similar to this Penoyer Variant soil but have gravelly loam below a depth of 20 to 30 inches or have a gravelly loam surface layer.

Permeability of this Penoyer Variant soil is moderate. Available water capacity is about 10 to 12 inches. Water supplying capacity is 4 to 5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly for irrigated crops and as rangeland. It is also used for homesite and urban development.

The potential plant community on the Penoyer Variant soil is 50 percent grasses, 10 percent forbs, and 40 percent shrubs. Among the important plants are galleta, Indian ricegrass, shadscale, and winterfat.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. Severe drought may adversely affect the production of the perennial vegetation. Partial or total removal of livestock from the range may be necessary.

It is not practical to revegetate large areas of this unit because of the low annual precipitation. For critical erosion control, small areas can be mechanically treated and seeded. Plants that may be suitable for critical area seedings are adapted native plants.

If areas of this unit are irrigated, suitable management practices include conservation cropping systems with rotations of alfalfa hay, small grain, and corn. To maintain production, crop residue should be incorporated into the soil and fertilizer should be applied.

Irrigation water can be applied by the sprinkler or flood method. Fields can be leveled.

This map unit is in capability unit IIe-2, irrigated, and in capability subclass VIIe, nonirrigated. It is in the Desert Loam range site.

74—Penoyer Variant loam, 3 to 6 percent slopes.

This very deep, well drained soil is on alluvial fans and valley floors. It is along the Price River, extending from Helper to Wellington. It formed in alluvium derived dominantly from sandstone and shale. Slopes are 200 to 300 feet long and are concave to convex. The vegetation in areas not cultivated is mainly Indian ricegrass, galleta, and shadscale. Elevation is 5,400 to 5,900 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 48 to 50 degrees F, and the average freeze-free period is 115 to 140 days.

Typically, the surface layer is light brownish gray loam about 9 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray very fine sandy loam, loam, and silt loam.

Included in this unit are small areas of soils that are similar to this Penoyer Variant soil but have gravelly loam below a depth of 20 to 30 inches or have a gravelly loam surface layer.

Permeability of this Penoyer Variant soil is moderate. Available water capacity is about 10 to 12 inches. Water supplying capacity is 4 to 5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. This soil is subject to sheet erosion. Rills and shallow gullies are in many areas. The hazard of soil blowing is moderate.

The potential plant community on the Senchert family soil is 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Among the important plants are Thurber fescue, mountain brome, slender wheatgrass, aspen peavine, and mountain big sagebrush.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, brush management and seeding can be used to improve the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of the Senchert family soil for rangeland seeding is good. Plants suitable for seeding include adapted native plants and smooth brome, regar brome, alfalfa, and bitterbrush.

This map unit is in capability subclass VIe, nonirrigated. The Senchert soil is in the High Mountain Stony Loam (Engelmann Spruce) woodland site. The Senchert family soil is in the High Mountain Loam (Thurber Fescue) range site.

103—Senchert-Toze family complex. This map unit is on north, east, and west aspects of mountain slopes. It is in the vicinity of the Patmos Head, Mount Bartles, and Jump Creek. Slopes are 15 to 35 percent. The present vegetation is mainly aspen, white fir, and Douglas-fir. Elevation is 7,500 to 9,500 feet. The average annual precipitation is about 20 to 25 inches, the average annual air temperature is 36 to 38 degrees F, and the average freeze-free period is 40 to 60 days.

This unit is 50 percent Senchert loam, clayey substratum, 15 to 30 percent slopes; 30 percent Toze family loam, 15 to 35 percent slopes; and 20 percent other soils. The Senchert soil is in plane areas, and the Toze family soil is in concave areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent soils that are similar to the Senchert soil but are 40 to 60 inches thick; 5 percent Podo gravelly sandy loam, dry, 8 to 30 percent slopes, on canyon rims; 5 percent Trag clay loam in small sagebrush parks; and 5 percent soils that are similar to the Toze family soil but have slopes of 35 to 50 percent.

The Senchert soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone and shale. Slopes are 300 to 400 feet long and are concave. Typically, the surface is covered with a mat of partially decomposed leaves, twigs, and needles about 1 inch thick. The surface layer is very dark grayish brown loam 4 inches thick. The subsoil is grayish brown clay loam about 14 inches thick. The substratum to a depth of 25 inches is light brownish gray silty clay over calcareous sandstone. Depth to sandstone ranges from 20 to 40 inches.

Permeability of the Senchert soil is moderately slow. Available water capacity is about 3.5 to 5.0 inches. Water supplying capacity is 8.5 to 12.0 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is slow, and the hazard of water erosion is moderate.

The Toze family soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone, siltstone, and shale. Slopes are 200 to 400 feet long and are concave. Typically, the surface is covered with a mat of leaves, twigs, and needles about 1 inch thick. The upper 3 inches of the surface layer is dark grayish brown loam, and the lower 22 inches is dark grayish brown loam and gravelly silt loam. The next layer is grayish brown gravelly silt loam about 8 inches thick. Below this to a depth of 60 inches or more is pale brown very gravelly fine sandy loam. A layer of calcium carbonate accumulation is at a depth of about 24 inches.

Permeability of the Toze family soil is moderate. Available water capacity is about 6 to 9 inches. Water supplying capacity is 11 to 18 inches. The organic matter content of the surface layer is 3 to 5 percent. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, wildlife habitat, and recreation areas.

The potential vegetation on the Senchert and Toze family soils includes an overstory of Douglas-fir with a canopy of 60 percent. The understory vegetation is 10 percent grasses, 5 percent forbs, and 85 percent shrubs. Among the important plants are sedges, mountainlover, snowberry, Oregon-grape, and quaking aspen.

The site index for aspen is 50. Average yield is about 27,200 board feet per acre of trees 12 inches in diameter or more. The unit is moderately limited for producing and harvesting wood products because of the steepness of slope, the hazard of erosion, and plant competition during the regeneration of Douglas-fir.

Management practices that maintain or improve the rangeland vegetation on this unit include proper grazing use, a planned grazing system, and proper location of water developments. The suitability for grazing is poor because of the low forage production. If the Douglas-fir is thinned, the desirable plants present can be expected to increase for a short period before Douglas-fir revegetates the unit.

This map unit is in capability subclass VIIe, nonirrigated, and in the High Mountain Loam (Douglas-fir) range site.

104—Senchert family, 3 to 15 percent slopes. This moderately deep, well drained soil is on rolling ridges and plateaus. It is near Steer Ridge, Bruin Point, and Patmos Head. It formed in residuum and alluvium derived dominantly from sandstone and shale. Slopes are 3 to 15 percent, 200 to 300 feet long, and slightly concave to convex. The present vegetation is mainly

mountain big sagebrush and Thurber fescue. Elevation is 8,800 to 9,700 feet. The average annual precipitation is about 20 to 30 inches, the average annual air temperature is 36 to 38 degrees F, and the average freeze-free period is 40 to 60 days.

Typically, the surface layer is dark grayish brown loam about 11 inches thick. The subsoil to a depth of 35 inches is dark grayish brown loam and clay loam over sandstone. Depth to sandstone ranges from 20 to 40 inches.

Included in this unit are about 5 percent Beje fine sandy loam intermingled throughout the unit, 5 percent soils that are similar to this Senchert family soil but are more than 40 inches deep to bedrock and are intermingled throughout the unit, 5 percent Senchert loam, 3 to 15 percent slopes, and 5 percent Toze family loam.

Permeability of this Senchert family soil is moderately slow. Available water capacity is about 5 to 7 inches. Water supplying capacity is 12 to 16 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is slow, and the hazard of water erosion is moderate.

This unit is used as rangeland and wildlife habitat.

The potential plant community on the Senchert family soil is 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Among the important plants are Thurber fescue, mountain brome, slender wheatgrass, aspen peavine, and mountain big sagebrush.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, brush management and seeding can be used to improve the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of this unit for rangeland seeding is good. Plants suitable for seeding include adapted native plants and smooth brome, regar brome, alfalfa, and bitterbrush.

This map unit is in capability subclass VIe, nonirrigated, and in the High Mountain Loam (Thurber Fescue) range site.

105—Senchert family-Senchert complex. This map unit is on mountain slopes. It is east of Scofield Reservoir. Slopes are 30 to 40 percent, 100 to 200 feet long, and concave to convex. Elevation is 8,000 to 9,100 feet. The average annual precipitation is about 20 to 30 inches, the average annual air temperature is 36 to 38 degrees F, and the average freeze-free period is 40 to 60 days.

This unit is 40 percent Senchert family very fine sandy loam, 30 to 50 percent slopes; 35 percent Senchert loam, 30 to 50 percent slopes; and 25 percent other soils. The components of this unit are so intricately

intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 15 percent Podo cobbly loam and 10 percent soils that are similar to the Senchert soil but have 35 percent rock fragments and are under oak.

The Senchert family soil is moderately deep and well drained. It formed in alluvium and residuum derived dominantly from calcareous sandstone. The present vegetation is mainly mountain big sagebrush, vetch, and Columbia needlegrass. Typically, the surface layer is brown very fine sandy loam about 8 inches thick. The subsoil is brown clay loam about 16 inches thick. The substratum to a depth of 27 inches is very pale brown clay loam over calcareous sandstone. Depth to sandstone ranges from 20 to 40 inches.

Permeability of the Senchert family soil is moderate. Available water capacity is about 4.0 to 5.5 inches. Water supplying capacity is 9 to 13 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Senchert soil is moderately deep and well drained. It formed in colluvium and residuum derived dominantly from sandstone. The present vegetation is mainly aspen, snowberry, and western coneflower. Typically, the surface layer is very dark grayish brown loam about 4 inches thick. The upper part of the subsoil is brown loam about 12 inches thick, and the lower part to a depth of 35 inches is brown clay loam over sandstone. Depth to sandstone ranges from 20 to 40 inches.

Permeability of the Senchert soil is moderate. Available water capacity is about 5 to 6 inches. Water supplying capacity is 12 to 17 inches. Effective rooting depth is 20 to 40 inches. The organic matter content of the surface layer is 5 to 10 percent. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, wildlife habitat, recreation areas, and watershed.

The potential vegetation on the Senchert family soil is 60 percent grasses, 25 percent forbs, and 15 percent shrubs. Among the important plants are Thurber fescue, mountain brome, slender wheatgrass, mountain big sagebrush, and aspen peavine.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, brush management and seeding can be used to improve the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of this soil for rangeland seeding is good. Plants suitable for seeding include adapted native

plants and smooth brome, regar brome, alfalfa, and bitterbrush.

The vegetation on the Senchert soil includes an overstory of aspen with a canopy of 40 percent. The understory vegetation is 65 percent grasses, 15 percent forbs, and 20 percent shrubs. Among the important plants are slender wheatgrass, Columbia needlegrass, Thurber fescue, and quaking aspen.

This soil is well suited to the production of aspen. The site index for aspen ranges from 60 to 80. The unit can produce about 40 cubic feet of aspen wood products per acre per year. This unit is severely limited for the harvesting of wood products because of the steepness of slope and the hazard of erosion.

The suitability of this soil for grazing is only fair because of the steepness of slope. Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, burning can be used to improve the rangeland vegetation.

The suitability of this soil for rangeland seeding is poor. The main limitations are competition from aspen and steepness of slope.

This map unit is in capability subclass VIIe, nonirrigated. The Senchert family soil is in the High Mountain Loam (Thurber Fescue) range site. The Senchert soil is in the High Mountain Loam (Aspen) woodland site.

106—Sheepcan-Podo-Rock outcrop complex. This map unit is on mountain slopes along the northern side of Minniemaud Creek. Slopes are 40 to 60 percent. Elevation is 7,000 to 8,500 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 70 to 100 days.

This unit is 35 percent Sheepcan stony loam, 40 to 70 percent slopes, eroded, in the lower lying areas; 25 percent Podo gravelly loam, dry, 40 to 60 percent slopes, eroded, in the higher lying areas; 15 percent Rock outcrop intermingled with the areas of the Podo soil; and 25 percent other soils and miscellaneous areas. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 8 percent Pathead gravelly loam; 5 percent Guben extremely bouldery fine sandy loam, 50 to 80 percent slopes; 5 percent Shupert gravelly loam; and small areas of Datino Variant extremely stony fine sandy loam, Cabba family bouldery loam, 40 to 70 percent slopes, and Badland.

The Sheepcan soil is very deep and well drained. It formed in colluvium derived dominantly from sandstone and shale of the Green River Formation. About 20 percent of this soil has slopes of 40 to 50 percent. Slopes are 100 to 200 feet long, are concave to convex,

and have south aspect. The present vegetation in most areas is mainly big sagebrush, Utah juniper, Rocky mountain juniper, and antelope bitterbrush. Typically, the surface layer is light yellowish brown stony loam about 9 inches thick. The upper 19 inches of the underlying material is light gray and pale yellow gravelly clay loam and cobbly clay loam, and the lower part to a depth of 60 inches or more is white very cobbly clay loam.

Permeability of the Sheepcan soil is moderately slow. Available water capacity is 6.0 to 7.5 inches. Water supplying capacity is 8.5 to 11.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 inches. Runoff is medium, and the hazard of water erosion is high.

The Podo soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from shale of the Green River Formation. About 20 percent of this soil has slopes of 40 to 50 percent. Slopes are 200 to 300 feet long, are concave to convex, and have south aspect. The present vegetation in most areas is mainly Salina wildrye, curleaf mountainmahogany, Utah juniper, pinyon, and Douglas-fir. Typically, the surface layer is pale brown gravelly loam about 1 inch thick. The underlying material to a depth of 8 inches is pale brown gravelly loam over hard shale. Depth to bedrock ranges from 8 to 20 inches.

Permeability of the Podo soil is moderately rapid. Available water capacity is about 1 to 2 inches. Water supplying capacity is 2 to 4 inches. Effective rooting depth is 8 to 20 inches. The organic matter content of the surface layer is 1 to 3 percent. Runoff is rapid, and the hazard of water erosion is high.

Rock outcrop consists of exposures of bedrock in the form of steep and very steep escarpments and ridges. The rock is sandstone, siltstone, and shale. These areas are mostly barren; however, enough soil material has collected in small depressional areas, crevices, and cracks to support some grasses and stunted trees and shrubs.

This unit is used as rangeland, woodland, wildlife habitat, and recreation areas.

The potential plant community on the Sheepcan soil is 60 percent grasses, 15 percent forbs, and 25 percent shrubs. Among the important plants are Salina wildrye, prairie junegrass, snowberry, and serviceberry.

This soil is not grazeable by livestock because of the steepness of slope and the hazard of erosion.

The potential vegetation on the Podo soil includes an overstory of pinyon, Utah juniper, and Douglas-fir with a canopy of 30 percent. The understory vegetation is 10 percent grasses, 15 percent forbs, and 75 percent shrubs. Among the important plants are birchleaf mountainmahogany, Utah serviceberry, bluegrass, and Salina wildrye.

The site index for pinyon and Utah juniper is 37. Average yield is 6 cords of wood per acre. The potential for the production of posts or Christmas trees is poor.

Harvesting of wood products is severely limited by the steepness of slope, the hazard of erosion, and rock fragments on the surface.

This soil is not grazeable by livestock because of the steepness of slope and the stoniness of the surface layer.

The Sheepcan and Podo soils are in capability subclass VIIe, nonirrigated, and the Rock outcrop is in capability subclass VIIIs. The Sheepcan soil is in the Mountain Very Steep Loam (Saline Wildrye) range site, and the Podo soil is in the Upland Very Steep Shallow Loam (Pinyon-Utah Juniper) woodland site. The Rock outcrop is not placed in a range site or a woodland site.

107—Shupert-Winetti complex. This map unit is on narrow valley and canyon floors in the Book Cliffs and in an area northwest of Price and east of Sunnyside. Slopes are 1 to 8 percent, 100 to 200 feet long, and concave. The present vegetation in most areas is mainly basin big sagebrush, rabbitbrush, cheatgrass, needleandthread, and dropseed. Elevation ranges from 4,600 to 7,200 feet but commonly is 5,200 to 6,400 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 43 to 45 degrees F, and the average freeze-free period is 80 to 100 days.

This unit is 40 percent Shupert gravelly loam, 1 to 8 percent slopes; 35 percent Winetti bouldery sandy loam, 1 to 8 percent slopes; and 25 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 15 percent Haverdad loam on toe slopes, 5 percent Glenberg family very fine sandy loam on toe slopes at lower elevations, and 5 percent soils that are similar to the Winetti soil but are along the stream channels and support riparian vegetation.

The Shupert soil is very deep and well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is pale brown gravelly loam about 3 inches thick. The next layer is pale brown clay loam about 6 inches thick. Below this to a depth of 60 inches or more is light brownish gray and light yellowish brown clay loam.

Permeability of the Shupert soil is moderately slow. Available water capacity is about 10.0 to 11.5 inches. Water supplying capacity is 6.5 to 10.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is moderate. This soil is subject to flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Winetti soil is very deep and well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is grayish brown bouldery sandy loam about 6 inches thick. The next layer

is pale brown loam about 5 inches thick. The next layer is pale brown and brown very bouldery loam about 23 inches thick. Below this to a depth of 60 inches or more is pale brown very gravelly sandy loam.

Permeability of the Winetti soil is moderately rapid. Available water capacity is about 4.0 to 5.5 inches. Water supplying capacity is 4.5 to 8.0 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 3 percent. Runoff is slow, and the hazard of water erosion is slight. This soil is subject to flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as rangeland and wildlife habitat. It is also used for irrigated crops.

The potential plant community on the Shupert and Winetti soils is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are basin wildrye, western wheatgrass, basin big sagebrush, and rubber rabbitbrush.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments. If the desirable forage plants are mostly depleted, brush management and rangeland seeding can be used to improve the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of this unit for rangeland seeding is good. Plants suitable for seeding include adapted native plants and Russian wildrye, crested wheatgrass, and ladak alfalfa.

This map unit is in capability unit IIIe-3, irrigated, and in capability subclass VIIe, nonirrigated. It is in the Loamy Bottom range site.

108—Silas loam. This very deep, somewhat poorly drained soil is in narrow alluvial valleys. It is in Pleasant Valley, north of Scofield, and in Emma Park, near Willow Creek. It formed in alluvium derived dominantly from sandstone and shale of the Price River and Black Hawk Formations. Slopes are 0 to 3 percent, 100 to 200 feet long, and concave to convex. The present vegetation in most areas is mainly Kentucky bluegrass, wiregrass, carex, and arrowgrass. Elevation is 7,200 to 7,700 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 80 days.

Typically, the surface layer is dark grayish brown loam about 28 inches thick. The next layer is grayish brown loam about 15 inches thick. Below this to a depth of 60 inches or more is light brownish gray sandy clay loam. Mottles are at a depth of 28 to 60 inches.

Included in this unit are about 10 percent tuffaceous material that originated from the sulfur spring in the area where the railroad crosses the highway and extends north to Scofield Reservoir and about 5 percent Brycan

loam on alluvial fans at the foot of the mountain slopes. Also included are small areas of soils that are similar to this Silas soil but are poorly drained and are adjacent to Scofield Reservoir and in low areas.

Permeability of this Silas soil is moderate. Available water capacity is about 9 to 11 inches. Effective rooting depth is 60 inches or more for water-tolerant plants but is limited to 20 to 40 inches for non-water-tolerant plants. The organic matter content of the surface layer is 5 to 10 percent. Runoff is slow, and the hazard of water erosion is none.

This unit is used for irrigated pasture, grass hay, rangeland, and wildlife habitat.

The potential plant community on the Silas soil is 65 percent grasses, 15 percent forbs, and 20 percent shrubs. Among the important plants are sedges, tufted hairgrass, willow, shrubby cinquefoil, and clover.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

The suitability of this unit for grazing is good. The main limitations are the high water table and potential water pollution. Livestock grazing should be managed to protect the streambanks from excessive erosion.

This map unit is in capability subclass VIw, nonirrigated, and in the Mountain Meadow range site.

109—Silas-Brycan loams. This map unit is in narrow alluvial valleys and fans. It is in Pleasant Valley, along Mud Creek; along the Price River, below Scofield Reservoir; along Beaver Creek; and at the head of Jump Creek. Slopes are 0 to 8 percent. Elevation is 7,700 to 8,600 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 38 to 45 degrees F, and the average freeze-free period is 60 to 80 days.

This unit is 65 percent Silas loam, wet, 0 to 3 percent slopes; 20 percent Brycan loam, 3 to 8 percent slopes; and 15 percent other soils. The Silas soil is in low areas adjacent to the stream channel, and the Brycan soil is on alluvial fans adjacent to the narrow alluvial valleys. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are small areas of soils that are similar to the Silas soil but are poorly drained; soils that are similar to the Silas soil but have slopes of 3 to 6 percent; flooded areas of soils, adjacent to streams, that have a loamy very fine sand surface layer 8 to 12 inches thick; and soils that are similar to the Brycan soil but are about 30 percent pebbles throughout.

The Silas soil is very deep and somewhat poorly drained. It formed in alluvium derived dominantly from sandstone and shale of the Black Hawk Formation. Slopes are 300 to 500 feet long and are plane to concave. The present vegetation in most areas is mainly

silver sagebrush, bluegrasses, sedges, wiregrass, and scattered Colorado blue spruce. Typically, the surface layer is dark grayish brown loam about 28 inches thick. The next layer is grayish brown loam about 15 inches thick. Below this to a depth of 60 inches or more is light brownish gray sandy clay loam. Mottles are at a depth of 28 to 60 inches. A water table fluctuates between depths of 20 and 25 inches in spring and between depths of 35 and 45 inches during the drier season. In some areas this soil is about 20 percent pebbles and cobbles at a depth of 36 inches. In some areas this soil is stratified. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Permeability of the Silas soil is moderate. Available water capacity is about 9 to 11 inches. Effective rooting depth is 60 inches or more for water-tolerant plants but is limited to 18 to 24 inches for non-water-tolerant plants. The organic matter content of the surface layer is 5 to 10 percent. Runoff is slow, and the hazard of water erosion is none.

The Brycan soil is very deep and well drained. It formed in alluvium derived dominantly from sandstone and shale of the Black Hawk Formation. Slopes are 100 to 200 feet long and are plane to convex. The present vegetation in most areas is mainly mountain big sagebrush and rabbitbrush. Typically, the surface layer is dark grayish brown and brown loam 12 inches thick. The subsoil is brown loam 20 inches thick. The substratum to a depth of 60 inches or more is brown silt loam.

Permeability of the Brycan soil is moderately slow. Available water capacity is about 9.0 to 10.5 inches. Water supplying capacity is 10 to 16 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate.

Most areas of this unit are used for irrigated pasture, rangeland, and wildlife habitat. A few areas are used for urban development.

The potential plant community on the Silas soil is 65 percent grasses, 15 percent forbs, and 20 percent shrubs. Among the important plants are sedges, tufted hairgrass, willow, shrubby cinquefoil, and clover.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

The suitability of the Silas soil for grazing is good. The main limitations are the fluctuating water table and the potential for pollution of water. Livestock grazing should be managed to protect the streambanks from erosion. If possible no other revegetation practices should be applied because this soil is a critical wildlife area.

The potential plant community on the Brycan soil is 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Among the important plants are bluebunch

wheatgrass, Letterman needlegrass, Salina wildrye, mountain big sagebrush, and snowberry.

If the desirable forage plants are mostly depleted, brush management and rangeland seeding can be used to improve the rangeland vegetation. Suitable brush management practices include prescribed burning, chemical spraying, and mechanical treatment.

The suitability of the Brycan soil for rangeland seeding is good. Plants suitable for seeding include those native to the soil and intermediate wheatgrass, smooth brome, regar brome, slender wheatgrass, and alfalfa. The suitability of this soil for grazing is good.

This map unit is in capability subclass VIw, nonirrigated. The Silas soil is in the Mountain Meadow range site. The Brycan soil is in the Mountain Loam (Saline Wildrye) range site.

110—Stormitt gravelly sandy clay loam, 3 to 10 percent slopes. This very deep, well drained soil is on benches near Helper, Price, and the Carbon-Emery county line. It formed in glacial outwash derived dominantly from sandstone, quartzite, and shale. Slopes are 200 to 400 feet long and are concave to convex. The present vegetation in most areas is mainly galleta, shadscale, black sagebrush, and Indian ricegrass. Elevation is 5,450 to 6,200 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 47 to 49 degrees F, and the average freeze-free period is 110 to 135 days.

Typically, the surface layer is pale brown gravelly sandy clay loam about 1 inch thick. The subsoil is light yellowish brown and brownish yellow gravelly sandy clay loam about 8 inches thick. The substratum to a depth of 60 inches or more is very pale brown very cobbly sandy clay loam. In some areas the surface layer has been lost through erosion.

Included in this unit are about 5 percent Minchey loam in draws and 5 percent soils that are similar to this Stormitt soil but are 20 to 40 inches deep to sandstone and are on ridges.

Permeability of this Stormitt soil is moderate. Available water capacity is about 5 to 7 inches. Water supplying capacity is 3.5 to 5.5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is moderate, and the hazard of water erosion is slight. In places shallow gullies have formed.

This unit is used as rangeland in spring and fall.

The potential plant community on the Stormitt soil is 35 percent grasses, 10 percent forbs, and 55 percent shrubs. Among the important plants are Wyoming big sagebrush, Indian ricegrass, galleta, and needleandthread.

Management practices that maintain or improve the rangeland vegetation include proper grazing use, a planned grazing system, and proper location of water developments.

The suitability of this unit for rangeland seeding is poor. The main limitations are the stoniness of the soil and the low annual precipitation. Plants suitable for seeding include those native to the unit and crested wheatgrass, pubescent wheatgrass, and prostrate kochia.

This map unit is in capability subclass VIIs, nonirrigated, and in the Semidesert Gravelly Loam (Wyoming Big Sagebrush) range site.

111—Stormitt-Minchey complex. This map unit is on benches and mesas near Price, Wellington, and the Carbon-Emery county line. Slopes are 1 to 10 percent. The present vegetation in most areas is mainly galleta, shadscale, Wyoming big sagebrush, and Indian ricegrass. Elevation is 5,500 to 6,000 feet.

This unit is 55 percent Stormitt gravelly sandy clay loam, 3 to 10 percent slopes, eroded; 35 percent Minchey loam, 1 to 3 percent slopes; and 10 percent other soils. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Mivida very fine sandy loam.

The Stormitt soil is very deep and well drained. It formed in glacial outwash derived dominantly from sandstone, shale, and quartzite. Slopes are 100 to 300 feet long and are concave to convex. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 47 to 49 degrees F, and the average freeze-free period is 110 to 135 days. Typically, the surface layer is pale brown gravelly sandy clay loam about 1 inch thick. The subsoil is light yellowish brown and brownish yellow gravelly sandy clay loam about 8 inches thick. The substratum to a depth of 60 inches or more is very pale brown very cobbly sandy clay loam. In some areas the surface layer has been lost through erosion.

Permeability of the Stormitt soil is moderate. Available water capacity is about 5 to 7 inches. Water supplying capacity is 4 to 5 inches. Effective rooting depth is 60 inches or more. The organic matter content of the surface layer is 1 to 2 percent. Runoff is moderate, and the hazard of water erosion is medium. In places shallow gullies have formed.

The Minchey soil is very deep and well drained. It formed in moderately fine textured glacial outwash derived dominantly from sandstone, quartzite, and shale. Slopes are 200 to 400 feet long and are convex. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 48 to 50 degrees F, and the average freeze-free period is 115 to 140 days. Typically, the surface layer is pale brown loam 3 inches thick. The next layer is brown, pale brown, or very pale brown clay loam or sandy clay loam about 29 inches thick. Below this to a depth of 60 inches or more is pale

CHAPTER 3

BIOLOGY

CHAPTER 3 BIOLOGY

310 INTRODUCTION

This chapter presents a description of the biological resources found on the Dugout Canyon permit and adjacent areas. **Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.**

The data used in preparation of this chapter have been gathered from the Sage Point-Dugout Canyon Mining and Reclamation Plan, Soldier Creek Coal Company Mining and Reclamation Plan, Environmental Research and Technology, Inc., Utah Division of Wildlife Resource (UDWR), Utah State Fish and Game, Eureka Energy Company (Nicolas Temnikov and Christopher A. Slaboszewicz), Soil Survey of Carbon Area, Utah, aerial photography, and Natural Gas Corporation of California.

311 Vegetative, Fish and Wildlife Resources

Vegetative, fish, and wildlife resource conditions in and adjacent to the proposed Dugout Canyon Mine are discussed in Section 320.

312 Potential Impact to Vegetative, Fish and Wildlife Resources

Potential impacts to vegetative, fish, and wildlife resources and the associated mitigation plan are presented in Sections 330 and 340 of this chapter.

313 Description of Reclamation Plan

The reclamation plan used to restore the vegetative, fish and wildlife resources to a condition suitable for the postmining land use is presented in Section 340.

CHAPTER 3

BIOLOGY

310 INTRODUCTION

This chapter presents a description of the biological resources found on the Dugout Canyon permit and adjacent areas. Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

The data used in preparation of this chapter have been gathered from the Sage Point-Dugout Canyon Mining and Reclamation Plan, Soldier Creek Coal Company Mining and Reclamation Plan, Environmental Research and Technology, Inc., Utah Division of Wildlife Resource (UDWR), Utah State Fish and Game, Eureka Energy Company (Nicolas Temnikov and Christopher A. Slaboszewicz), Soil Survey of Carbon Area, Utah, aerial photography, and Natural Gas Corporation of California.

311 Vegetative, Fish and Wildlife Resources

Vegetative, fish, and wildlife resource conditions in and adjacent to the proposed Dugout Canyon Mine are discussed in Section 320.

312 Potential Impact to Vegetative, Fish and Wildlife Resources

Potential impacts to vegetative, fish, and wildlife resources and the associated mitigation plan are presented in Sections 330 and 340 of this chapter.

313 Description of Reclamation Plan

The reclamation plan used to restore the vegetative, fish and wildlife resources to a condition suitable for the postmining land use is presented in Section 340.

CHAPTER 4

LAND USE AND AIR QUALITY

CHAPTER 4 LAND USE AND AIR QUALITY

410 LAND USE

This section of the permit application includes descriptions of the premining and proposed postmining land use(s). Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

411 Environmental Description

A statement of the conditions and capabilities of the land to be affected by coal mining and reclamation operations follows in this section.

411.100 Premining Land Use

The permit area has been primarily utilized as rangeland for livestock and wildlife habitat. Some crops related to the livestock industry have been developed along the creek bottoms adjacent to Soldier Creek Road. However, no crops have been raised within the permit area. Recreational use of the permit area is limited due to lack of access through private property.

The predisturbed area boundary outlined on Plate 5-4 reflects disturbance prior to 1965. The boundary was compiled from a 1980 map of the pre-mining topography prepared by Eureka Energy Company. According to historical data the Dugout Canyon area was last mined in 1964.

411.110 Land Use Map

Plate 4-1 designates the prominent land uses within and adjacent to the permit boundary.

as detailed within this M&RP will be completed in a manner to provide lands able to parallel the premining land use. In areas where surface disturbance will result from mining operations, soil reclamation and revegetation will restore the areas to wildlife habitat and livestock grazing capabilities.

The activities associated with the mining operation will follow accepted standards or proven techniques. Erosion hazards will be minimized and, where possible, eliminated. Evidence of abandoned improvements will be removed. Reclamation will restore the land and vegetation to as near a natural and productive condition as possible.

Efforts to restore wildlife habitat are discussed in Chapter 3 of this M&RP. Specific periods of habitation by wildlife species of the disturbed and adjacent area are discussed in Appendices 3-2 and 3-3. Since the disturbed area is privately owned the timing and extent of use for grazing will be made after reclamation by the landowner.

412.200 Land Owner or Surface Manager Comments

The land surface within the permit boundary is owned by various entities, including the State of Utah and Canyon Fuel Company, LLC (CFC). The disturbed area is on surface lands owned by both CFC and the State.

The leases contained in Appendix 1-1 list responsibilities accepted by CFC in regard to the State of Utah's lands within the permit boundary. The leases contain requirements concerning use and maintenance of their administered lands. CFC is obligated by these leases to notify the Division for their determination as to whether this mining operation will be detrimental to the State of Utah's interest. By submitting this M&RP, CFC is indicating that the operation will not be detrimental to the State's interests and the obligation is being met. A letter of affirmation from the State of Utah concerning proposed land use is included in Appendix 4- 2.

The Bureau of Land Management (BLM) Right-of-Way application (UTU-76601) in Appendix 1-3 lists the responsibilities accepted by CFC concerning the BLM lands included in the permit

CHAPTER 4
LAND USE AND AIR QUALITY

CHAPTER 4

LAND USE AND AIR QUALITY

410 LAND USE

This section of the permit application includes descriptions of the premining and proposed postmining land use(s). Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

411 Environmental Description

A statement of the conditions and capabilities of the land to be affected by coal mining and reclamation operations follows in this section.

411.100 Premining Land Use

The permit area has been primarily utilized as rangeland for livestock and wildlife habitat. Some crops related to the livestock industry have been developed along the creek bottoms adjacent to Soldier Creek Road. However, no crops have been raised within the permit area. Recreational use of the permit area is limited due to lack of access through private property.

The predisturbed area boundary outlined on Plate 5-4 reflects disturbance prior to 1965. The boundary was compiled from a 1980 map of the pre-mining topography prepared by Eureka Energy Company. According to historical data the Dugout Canyon area was last mined in 1964.

411.110 Land Use Map

Plate 4-1 designates the prominent land uses within and adjacent to the permit boundary.

as detailed within this M&RP will be completed in a manner to provide lands able to parallel the premining land use. In areas where surface disturbance will result from mining operations, soil reclamation and revegetation will restore the areas to wildlife habitat and livestock grazing capabilities.

The activities associated with the mining operation will follow accepted standards or proven techniques. Erosion hazards will be minimized and, where possible, eliminated. Evidence of abandoned improvements will be removed. Reclamation will restore the land and vegetation to as near a natural and productive condition as possible.

Efforts to restore wildlife habitat are discussed in Chapter 3 of this M&RP. Specific periods of habitation by wildlife species of the disturbed and adjacent area are discussed in Appendices 3-2 and 3-3. Since the disturbed area is privately owned the timing and extent of use for grazing will be made after reclamation by the landowner.

412.200 Land Owner or Surface Manager Comments

The land surface within the permit boundary is owned by various entities, including the State of Utah and Canyon Fuel Company, LLC (CFC). The disturbed area is on surface lands owned by both CFC and the State.

The leases contained in Appendix 1-1 list responsibilities accepted by CFC in regard to the State of Utah's lands within the permit boundary. The leases contain requirements concerning use and maintenance of their administered lands. CFC is obligated by these leases to notify the Division for their determination as to whether this mining operation will be detrimental to the State of Utah's interest. By submitting this M&RP, CFC is indicating that the operation will not be detrimental to the State's interests and the obligation is being met. A letter of affirmation from the State of Utah concerning proposed land use is included in Appendix 4- 2.

The Bureau of Land Management (BLM) Right-of-Way application (UTU-76601) in Appendix 1-3 lists the responsibilities accepted by CFC concerning the BLM lands included in the permit

CHAPTER 5
ENGINEERING

CHAPTER 5 ENGINEERING

510 INTRODUCTION

This chapter provides a discussion of general engineering aspects, an operation plan, a reclamation plan, design criteria, and performance standards related to the Dugout Canyon Mine. The proposed coal mining and reclamation activities associated with the mine have been or will be designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plans.

Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

511 General Requirements

This permit application includes descriptions of the proposed coal mining and reclamation operations together with the appropriate maps, plans, and cross sections. Potential environmental impacts as well as methods and calculations utilized to achieve compliance with the design criteria are also presented.

512 Certification

Where required by the regulations, cross sections and maps in this permit application have been prepared by or under the direction of, and certified by, qualified registered professional engineers or land surveyors. As appropriate, these persons were assisted by experts in the fields of hydrology, geology, biology, etc.

512.100 Cross Sections and Maps

Previously Mined Areas. A certified map showing the location of previously mined areas within the permit and adjacent areas is provided as Plate 5-1.

Surface Facilities. Underground development waste which is generated at the Dugout Canyon Mine will be disposed of either:

- Underground within the Dugout Canyon Mine (without bringing this waste to the surface), **at the approved waste-rock disposal facility at the Dugout Canyon Mine;**
- At the approved waste-rock disposal facility at the SUFCo Mine (a sister operation of SCM); or
- At the approved waste-rock disposal facility at the Skyline Mine (also a sister operation of SCM).

Copies of the Division correspondence approving the SUFCo and Skyline waste-rock disposal facilities for receipt of Dugout Canyon waste rock are provided in Appendix 5-2.

Certified maps and cross sections concerning the disposal of underground development waste at the SUFCo and Skyline Mines are provided in the respective Mining and Reclamation Plans (M&RPs) for those mines. A certified map showing the proposed location of ~~non-coal (non-waste rock) waste storage~~, coal storage and loading areas, and explosive storage and handling facilities, is provided as Plate 5-2. Cross sections of the proposed facilities area are provided on Plate 5-3.

A map of the existing topography prior to disturbance by SCM is provided as Plate 5-4. Also noted on Plate 5-4 is the area of disturbance which was mapped to exist at the site in 1980. Since mining ceased at the site in 1964 (as noted in section 521.100 of this M&RP), this

boundary represents the area of pre-SMCRA disturbance. Plate 5-4 also shows areas of non-mining disturbance which occurred after 1980 but prior to 1996. These disturbances were created by logging activities in the area and are not subject to the requirements of R645-301 through R645-302. No areas shown on Plate 5-4 are subject to the requirements of R645-200 through R645-203.

A certified map showing the location of the topsoil stockpile is provided as Plate 2-3.

The proposed location of the sedimentation pond is noted on Plate 5-2. No water treatment facilities will exist at the site other than the sedimentation pond.

The following facilities or activities will not exist or occur within the permit area:

- Coal preparation plant,
- Coal cleaning,
- Coal processing waste banks, dams, or embankments,
- Disposal of non-coal (non-waste rock) waste other than durable rock-type construction materials such as cinder block, and
- Air pollution control facilities.

Hence, certified maps or cross sections of these facilities are not provided in this plan. The durable rock-type construction materials will be disposed of in locations designated to receive underground development waste. ~~(i.e., either in underground workings within the Dugout Canyon Mine without bringing this waste to the surface or at the approved waste-rock disposal/storage facilities associated with the SUFCo or Skyline Mines).~~

Surface Configurations. Certified maps and cross sections showing the proposed final (post-reclamation) surface configuration of the Dugout Canyon disturbed area are provided on Plates 5-5 and 5-6, respectively.

Hydrology. Certified maps and cross sections associated with the hydrology of the Dugout Canyon Mine area are provided in Chapter 7.

Geology. Certified maps and cross sections associated with the geology of the Dugout Canyon Mine area are provided in Chapter 6.

512.200 Plans and Engineering Designs

All plans and engineering designs presented in this M&RP were prepared by or under the direction of and certified by a qualified registered professional engineer.

Excess Spoil. No excess spoil will be generated from the permit area.

Durable Rock Fills. No durable rock fills will exist in the permit area.

Coal Mine Waste. The designs of the waste-rock facilities at the **Dugout**, SUFCo and Skyline Mines were certified by a qualified registered professional engineer. Information regarding these disposal facilities can be found in their respective M&RPs.

Impoundments. The only impoundment to be constructed for the mining and reclamation operation will consist of the sedimentation pond (see Plate 7-5). This impoundment has been designed under the direction of a professional engineer using current, prudent, engineering practices. These designs were certified by a qualified registered professional engineer.

Primary Roads. The design and construction of the primary road associated with the mine has been certified by a professional engineer as meeting the requirements of R645-301-534.200 and R645-301-742.420. This certification is presented in Figure 5-1.

Variance From Approximate Original Contour. No variance from the approximate original contour requirements of the regulations is being requested in this M&RP.

513 Compliance with MSHA Regulations and MSHA Approvals

513.100 Coal Processing Waste Dams and Embankments

No coal processing waste dams or embankments will exist within the permit area.

513.200 Impoundments and Sedimentation Ponds

No impoundments or sedimentation ponds in the permit area will meet the size criteria of 30 CFR 77.216(a).

513.300 Underground Development Waste, Coal Processing Waste, and Excess Spoil

No coal processing waste or excess spoil will be generated within the permit area. Disposal of underground development waste in underground mine workings is described in Section 536.500 of this M&RP.

513.400 Refuse Piles

Waste rock generated from the Dugout Canyon Mine may be temporarily stored on the surface of the mine site at the location shown on Plate 5-2. This storage will be for a short period of time prior to disposal ~~either underground or in the waste-rock disposal areas associated with the SUFCo and/or Skyline Mines.~~ Refer to the "Refuse Pile Amendment, February 2003 for information pertaining to the Dugout Mine refuse pile. High-ash coal product may also be produced during mine construction and development. This material may also be transferred to Sunnyside Cogeneration Associates (ACT/007/035) or a similar permitted facility. ~~Waste rock stored temporarily on the surface will be disposed of after 1,500 cubic yards of material accumulates or every 4 months, whichever is shorter.~~ Runoff from the surface-stored materials will drain to the site sedimentation pond or other appropriate sediment-control structures.

waste fires. An ongoing educational program will emphasize the need for attention to fire prevention. Prevention will be further enhanced by the short-term nature of the surface storage of both coal and waste rock at the Dugout Canyon Mine. Suppression will occur by separating smoldering material and compacting the adjacent material (to minimize oxygen content in the adjacent material). The burning material will then be extinguished using appropriate methods (see Section 528.300 of this M&RP). No burning mine waste will be removed from the temporary storage area without a removal plan approved by the Division.

514 Inspections

514.100 Excess Spoil

Excess spoil will not be generated at the Dugout Canyon Mine.

514.200 Refuse Piles

The frequency and methods of inspections of the waste-rock areas at the SUFCo and Skyline Mines is discussed in their respective M&RPs. **Refer to the "Refuse Pile Amendment, February 2003 for inspection information pertaining to the Dugout Mine refuse pile.** ~~The Dugout Canyon Mine does not currently have a permanent waste rock disposal site. Therefore, since this regulation applies to permanent waste rock disposal sites, no inspections are planned for the temporary sites.~~

All activities performed at this area will be in accordance with the applicable MSHA permit.

514.300 Impoundments

Regular inspections will be made during construction of the sedimentation pond as well as upon completion of construction. These inspections will be made by or under the direction of a registered professional engineer experienced in the construction of similar earth and water

Two "existing structures" are present within the permit area which were presumably "used in connection with or to facilitate coal mining and reclamation operations for which construction began prior to January 21, 1981" (see R645-100-200). These are an existing county road and a UP&L power distribution line. The existing county road enters the permit area in NE¼, SE¼ Sec. 22, T. 13 S., R. 12 E., extending within that section for approximately 500 feet within the permit area. The road then exits the permit area for approximately 1300 feet of road length, then reenters the permit area in the SW¼ NW¼ Sec. 23, where it ends approximately 300 feet northeast of the southwest edge of the proposed disturbed area boundary (i.e., at the BLM/State property boundary, near the upstream edge of the sedimentation pond). The county road lies on land owned by the entities shown on Plate 1-3. The date of its initial construction is unknown, but is presumed to have been prior to 1981. Other existing roads within the disturbed area and permit area are privately owned and maintained roads. The general locations of roads within and adjacent to the permit area are shown on Plate 5-7.

Plates 4-1 and 5-2 depict the location of an existing UP&L distribution line that will be improved and activated to provide electrical service to the mine. This distribution line, which is not classified as a major electric transmission line, will be owned and upgraded by UP&L. The date of its initial construction is unknown, but is presumed to have been prior to 1981.

Some debris remains within the disturbed area from previous mining operations. That which cannot be salvaged will be disposed of during the construction of the mining facilities. The final disposal location will be determined by the nature of the debris. Durable, rock-type debris may be incorporated into the construction fill if it does not compromise the integrity of the fill. Other debris will be salvaged or disposed of at a permitted off-site facility. All debris will be handled in accordance with applicable Federal, State, and local regulations.

As noted previously, waste rock which is generated at the Dugout Canyon Mine will be disposed of underground or in the approved waste-rock disposal areas at the **Dugout Canyon**, SUFCo and/or Skyline Mines. The location of the sedimentation pond within the permit area is shown on Plate 5-2. There will be no permanent water impoundments within the permit area.

Storage Areas - gravel, asphalt, or soil pads
Crusher - metal structure on concrete pad/footings
Coal Sampler - Metal structure on skids, on concrete pad
Storage Building - Metal structure on concrete pad
Stoker Coal Storage Bin - concrete container

- The area of disturbance at the mine mouth,
- Coal storage and loading facilities, and
- The explosive storage and handling facility, which includes two metal magazines.

Once the office/bath house/warehouse/shop building ~~is~~ **was** completed in late fall of 2002, the temporary facilities ~~were~~ **will be** either removed or relocated. Plate 5-2 (~~revised 10/04/02~~) reflects where ~~five (5)~~ of the containers ~~currently being~~ used for the temporary warehouse, storage and foreman facilities ~~will be~~ **were** moved following the completion of the new building. These containers ~~will be~~ **were** placed on either soil or a gravel pad.

Drainage facilities are shown on Plate 7-5, including the site sedimentation pond, culverts, and ditches.

Cross sections of the proposed surface facilities are provided on Plate 5-3 and Figure 7-9-2 (Appendix 7-9). The disturbed area shown on Plate 5-2 is the same as the land area for which a performance bond or other guarantee has been posted.

Under the currently approved construction plan, several areas within the existing disturbed area boundary will not be significantly disturbed during site construction. The first such area consists of 0.08 acres located on the hillside west of the portal pad, north of the substation access road, and east of the storage area adjacent to that road. The second such area consists of 0.13 acres located on the hillside above the mine haulage/manway portal. Each of the above areas is located on a hillside above the area of actual disturbance.

Transportation Facilities. Roads that will be constructed, used, or maintained by SCM in the

seam thickness, etc.) is provided in Chapter 6. In particular, Plate 6-1 provides a surficial geologic map of the permit and adjacent areas, Plate 6-2 shows the locations of the coal-seam outcrops in the vicinity of the proposed surface facilities, and **Figure 6-1, Plate 6-3, 6-3A and 6-3B** provide geologic cross sections based on data collected from drill holes in the area. Furthermore, information related to the physical conditions which may affect mining is presented in Sections 622 (a discussion of the cross sections), 624.100 (a discussion of stratigraphic and structural conditions), and 624.300 (a discussion of rock clay content), as well as Appendix 6-1 (drill-hole logs).

Subsidence Control Measures. Most of the land within the permit area will eventually be affected by subsidence. Anticipated areas of subsidence are shown on Plate 5-7. This subsidence boundary was projected to the surface based on an angle of draw of 30 degrees as measured from the vertical as required in R645-301-525.542. It is presumed that the actual angle of draw will be less, ~~approximately 22.5 degrees,~~ based upon results of mining and subsidence in the general area. ~~However, since no subsidence has occurred in the Dugout Canon Mine Permit area and no studies have been performed specific to this permit area, the 30 degree angle of draw required by the State has been used to determine the subsidence boundary.~~ Plate 5-7 illustrates the projected extent of subsidence based on a 30 degree angle of draw ~~and 22.5 angle of draw.~~ The primary areas where future subsidence is not anticipated are the areas overlying the previous workings shown on Plate 5-1 (since these areas will not be re-mined). Plate 5-7 also illustrates a subsidence buffer zone that extends beyond the limits of Federal Lease U7064-027821 **and State Lease ML-48435**. This buffer zone does not suggest that CFC will mine outside of the lease boundaries, however, it does indicate the limit of projected subsidence.

Subsidence Monitoring. Numerous control points have been established within the permit and nearby areas to assist in subsidence surveys (see Plate 5-7). Coordinates and elevations of these control points (as established in January 1984) are provided in Table 5-2. The control points consist of traverse monuments, benchmark monuments, and survey stations (as indicated on Plate 5-7) which have been constructed generally as follows:

TABLE 5-2
SUBSIDENCE CONTROL POINT SURVEY DATA*

STATION NAME	NORTHING	EASTING	PIN ELEVATION
Sage	498254.15	2257232.34	8467.62
Sage, Az.	497324.93	2256623.81	8422.66
Francis	496611.07	2264094.03	8544.89
Skaggs	505868.76	2269371.61	8837.05
McFarlen	489283.24	2272314.34	8317.79
Soldier	498530.39	2281585.15	9053.75
Sublett	487882.23	2256822.75	6757.00
Mosca	494899.03	2258577.93	7303.60
Oslund	492074.41	2259135.38	7767.77
Durrett	490307.50	2262347.14	7474.79
Semborski	489694.42	2268293.47	7818.22
Streeter	493114.47	2264816.93	8239.50
Doney	494159.83	2267719.90	8096.61
Ogden	496576.39	2270095.01	7811.33
Presset	493596.17	2269951.00	7544.26
Chi	492119.67	2268718.50	7142.70
Reynoso	492837.37	2268611.30	7185.10
Palmer	488120.29	2266987.04	7712.80
3045	499635.34	2254210.70	8170.10
3048	500395.85	2264658.31	8419.59
3049	499585.59	2267096.57	8418.76
3052	491499.67	2276901.14	8455.63
3061	504632.44	2271891.63	8856.88

* Additional survey points are reported each year in the Annual Reports.

monitoring will be the renewable resources, including perennial streams and springs. The methods to be used for monitoring will be ground surveys of monuments and visual surveys of areas surrounding monitored seeps, springs, and streams during water monitoring or any other surface activities. In addition, roads used to access hydrologic monitoring stations will be visually evaluated during monitoring activities. Following an initial survey prior to the beginning of mining operations, future surveys will concentrate on areas which have been mined in the past or are anticipated to be mined within the upcoming year. Hence, the area of detailed survey may be expanded each progressive year.

Annual resurveys of the mine permit area will produce vertical control at the same sites as the previous year. Information on each site will be produced annually while the area underlying the site is being actively mined or is still potentially subsiding. The subsiding areas which show no change for two consecutive years will be considered stable and will be omitted from further annual surveys. If additional mining is anticipated within the stable areas, these areas will again be added to the annual surveys.

In addition to the ground surveys, aerial photogrammetric methods will be included in the surveys when the areas become too large to feasibly handle with ground surveys. This method may be added to enhance the ground surveys and to cover larger areas as the mine expands. Visual checks for subsidence will be made during all surface activities, especially during water monitoring activities. These visual surveys will be used to detect surface irregularities and surface cracks.

~~Each year, a subsidence monitoring report will be sent to the Division. This report will include dates of surveys, a description of the methodology used, and results obtained. This report will also include changes in the monitoring plan that may be made due to economic conditions or technical advancement in subsidence monitoring.~~

Anticipated Effects of Subsidence. Based on experience in the region and the results of investigations performed by Dunrud (1976), future subsidence in the permit area is anticipated

technologically and economically feasible by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses which it was capable of supporting before the subsidence. In addition, SCM will notify the Division of any slide, rock fall, or other disturbance known to be caused by subsidence that will have an adverse effect on the environment.

Protection of Significant Surface Resources. None of the following exist within the area of potential subsidence associated with the Dugout Canyon Mine:

- Public buildings or facilities,
- Churches, schools, and hospitals,
- Impoundments with a storage capacity of 20 acre-feet or more or bodies of water with a volume of 20 acre-feet or more,
- Aquifers or bodies of water that serve as a significant water source for any public water supply system, or
- Urbanized areas, cities, towns, or communities.

Hence, no special control measures are required to preclude subsidence impacts to these resources.

Raptor nests and other wildlife resources which may be influenced by subsidence are presented on Plate 3-2. ~~Since selected information on this plate is not available for public release, Plate 3-2 is provided in the confidential file of this M&RP. Transferring this information to Plate 5-7 would also require that Plate 5-7 be placed in the confidential file, which placement was not otherwise considered necessary. Hence, the reader is referred to Plate 3-2 in the confidential file to note the wildlife resources which may be influenced by subsidence.~~ A discussion of protective measures associated with wildlife resources in the permit area is presented in Section 333.300 of this M&RP.

525.300 Public Notice of Proposed Mining

Each owner of property or resident within the area above an underground mining block and adjacent area that may be affected by subsidence will be notified by mail at least 6 months prior to mining or within that period if approved by the Division. The notification will contain:

- Identification of specific areas in which mining will take place;
- **Approximate** dates the specific areas will be undermined; and
- The location or locations where the SCM subsidence control plan may be examined.

526 Mine Facilities

526.100 Mine Structures and Facilities

As stated in Section 521.100 of this M&RP, no buildings existed at the mine surface at the time construction was begun on the Dugout Canyon Mine. Nonetheless, Section 521.100 of this M&RP indicates that two "existing structures" are present within the permit area which were presumably "used in connection with or to facilitate coal mining and reclamation operations for which construction began prior to January 21, 1981" (see R645-100-200). These are the existing county road and a UP&L power distribution line.

A description of the location of the existing county road within the permit area is provided in Section 521.100 of this M&RP. It is unknown when this road was initially constructed. This road is currently a gravel road which will be modified by the County (see Section 527.200). As indicated in Section 521.100 of this M&RP, it is anticipated that the county road will not be relocated within the permit area.

Building construction will generally involve grading and preparation of foundation areas, excavation and installation of foundations, building erection, interior and exterior finish work, and connection of utilities. Storage areas will generally be open graded, providing outside storage for large supplies. Both building sites and storage areas will be graded to ensure effective drainage to disturbed-area ditches and culverts as noted on Plate 7-5. Operation and maintenance of support structures and facilities at the Dugout Canyon Mine will involve regular grading of facility areas, together with inspection, cleaning, and repairs as required.

No coal processing waste banks, dams, or embankments will exist in the permit area. ~~Similarly, no spoil or coal preparation waste sites will exist in the permit area.~~ Sediment that is periodically removed from the sedimentation pond will be ~~stored at the Canyon Fuel Company, LLC Banning Loadout facility,~~ disposed of with underground development waste generated from the mine or pumped back into the sealed, abandoned "Gilson West-Old Workings"

General refuse that is generated on site will be stored in a dumpster to be situated at a convenient location within the disturbed area. This waste will consist predominantly of old brattice cloth, ventilation tubing, broken timbers, wire, broken machinery parts, paper, cardboard, and miscellaneous garbage. This non-hazardous, non-toxic, non-coal, non-waste rock refuse will be disposed of periodically through Carbon County at a state-approved landfill. The agreement with Carbon County for disposal of this refuse is provided in Appendix 5-3.

During site construction, operation, and reclamation activities, any spilled petroleum products such as grease, hydraulic fluid, fuel, oil, joint coating, or other pollutants will be removed immediately with the associated contaminated soil and disposed of at a state-approved facility that is permitted to receive such waste. Adequate spill collection materials (including absorbents to stop or contain contaminants that may enter a stream) will be readily available at the site during these activities to contain any such spills.

a reclaim tunnel to the crusher and then via the loadout conveyor to the truck loadout bin. From the bin, the coal will be loaded onto trucks and transported from the site.

528.200 Overburden

No overburden will be removed, handled, stored, or transported within the permit area.

528.300 Spoil, Coal Processing Waste, Non-Coal Waste, and Mine Development Waste

Excess Spoil. No spoil will be generated at the Dugout Canyon Mine. Sediment removed from the sedimentation pond will be handled in accordance with Section 732.200 of this M&RP.

Coal Processing Waste. SCM will not process their coal at the Dugout Canyon Mine beyond crushing. Thus, no coal processing waste will be generated in the permit area.

Burning and Burned Waste Utilization. As noted below and in Section 536 of this M&RP, waste rock generated from the Dugout Canyon Mine will be permanently disposed of either underground or at permitted facilities located at the **Dugout**, SUFCo or Skyline. If coal mine waste fires occur at the permitted disposal/storage facilities, they will be controlled in the manner outlined in their respective permits.

Waste rock will only be temporarily stored at the surface of the Dugout Canyon Mine prior to ultimate disposal. If spontaneous combustion of this material does occur, the burning section will be removed from the remainder of the pile using a backhoe or other appropriate means. The affected waste rock will then be spread so that the material can cool and mixed with soil to extinguish the fire. The extinguished material will then be returned to the waste pile.

Non-Coal Mine Waste. Non-coal (non-waste rock) waste generated in the permit area will be temporarily stored in a dumpster to be situated at a convenient location within the disturbed area.

~~This dumpster will be located adjacent to the office/bath house shown on Plate 5-2. This waste will be disposed of periodically through Carbon County at a permitted landfill.~~

Liquid wastes such as oil and solvents will be contained and disposed of or recycled, in accordance with applicable State and Federal regulations, at facilities which are permitted to accept such wastes. Small quantities of such wastes (e.g., resulting from cleanup of small spills, etc.) may be contained onto absorbent pads prior to disposal. In all cases, disposal and/or recycling will be only at sites which are permitted by appropriate regulatory authorities to accept such waste.

No non-coal (non-waste rock) waste will be permanently disposed of within the permit area other than, potentially, some durable rock-type construction materials such as cinder block, which may be disposed of underground. Non-coal (non-waste rock) waste will be temporarily stored at the site prior to permanent off-site disposal either in a dumpster or in the temporary waste-rock storage area. Off-site disposal will be only at sites which are permitted by appropriate regulatory authorities to accept such waste.

It is currently anticipated that no non-coal waste that is defined as hazardous under 40 CFR 261 will be generated at the mine. If such waste is generated in the future, it will be handled in accordance with the requirements of Subtitle C of the Resource Conservation and Recovery Act and any implementing regulations.

Underground Development Waste. Underground development waste which is generated at the Dugout Canyon Mine will be disposed of either:

- Underground within the Dugout Canyon Mine (without bringing this waste to the surface);
- At the approved temporary waste-rock storage site at the Banning Loadout;
- At the approved waste-rock disposal facility at the **Dugout Canyon Mine**, SUFCo Mine and Skyline Mine. ; or
- ~~At the approved waste-rock disposal facility at the Skyline Mine.~~

Descriptions of the waste-rock disposal facilities at the **Dugout Canyon Mine (Refuse Pile Amendment, February 2003)**, SUFCo Mine and the Skyline Mines are provided in their respective M&RPs. A discussion of the disposal of underground development waste in the underground workings of the Dugout Canyon Mine is provided in Section 536.500 of this M&RP.

Minimization of Acid, Toxic, and Fire Hazards. Data presented in Chapter 6 indicate that neither acid- nor toxic-forming materials are present in the overburden, underburden, or coal. These conclusions are supported by the data contained in Appendix 5-7, which provides the results of analyses of waste-rock materials. Should an acid- or toxic-forming problem with the waste rock be identified during future sample collection, those materials so identified will be buried within 30 days after the material is exposed at the mine site.

As noted previously in this section, temporary storage of debris generated at the mine will be in a dumpster. As a result, this debris will be protected from the wind and other elements. Because debris that is generated at the mine site will be only temporarily stored at the mine prior to off-site disposal, there is no significant potential for this debris to spontaneously combust. Fire extinguishers will be kept on mobile equipment in the mine yard to extinguish any fires should combustion of the waste materials occur. No waste materials that constitute a fire hazard will be accumulated in the permit area. No hazardous materials, as defined in 40 CFR, will be disposed of underground. These materials will be disposed of in accordance with all applicable state and federal regulations.

Road Surfacing. The county road which accesses the mine site will be surfaced with a non-rutting asphalt concrete. This surface will be designed to account for the anticipated volume of traffic as well as the weight and speed of vehicles using the road.

Road Maintenance. The county road will be maintained by Carbon County.

Road Culverts. All culverts along the county road will be designed, installed, and maintained by Carbon County. Culverts to be installed within the surface facilities have been designed in accordance with the hydrologic criteria discussed in Section 742.300. These culverts will be installed in accordance with manufacturer's recommendations to sustain the vertical soil pressure, the passive resistance of the foundation, and the weight of vehicles using the road.

535 Spoil

No spoil will be generated in the permit area. No valley fills or head-of-hollow fills will be created for the disposal of spoil material. Furthermore, no excess spoil will be disposed of in pre-existing benches.

536 Coal Mine Waste

Coal mine waste resulting from mining activities at the Dugout Canyon Mine will be disposed of either in the underground workings within the permit area or at the approved waste-rock disposal facilities operated at the **Dugout Canyon Mine**, SUFCo Mine or at the Skyline Mine waste-rock storage facilities. ~~These are sister operations of SCM.~~ Descriptions of the aforementioned facilities are presented in the respective M&RPs.

The coal mine waste generated from the Dugout Canyon Mine may be temporarily stored on the surface of the Dugout Canyon Mine facilities at the location shown on Plate 5-2 prior to ultimate disposal. Coal mine waste which is temporarily stored on the surface at the mine site will be

removed from the temporary waste-rock storage area and placed in its final disposal area at the frequency noted in Section 513.400 of this M&RP. Runoff from the temporary waste-rock storage area will report to the mine-site sedimentation pond and be treated accordingly. ~~During the period of temporary storage, berms will be installed around the temporary storage area to contain and direct runoff to a nearby ditch (see Plate 7-5). The berms around the temporary waste-rock storage area are not noted on Plate 7-5 or elsewhere since these will be located as necessary, depending upon the extent of the waste-rock storage.~~

536.100 Design

The waste-rock disposal facilities ~~at the SUFCo Mine and Skyline Mine~~ were designed to achieve minimum long-term static safety factors of at least 1.5. These designs and the associated evaluations were based on the results of detailed foundation and laboratory analyses of soils at the sites of the disposal facilities.

Due to the temporary nature of the waste-rock storage area shown on Plate 5-2, the long-term static safety factor of this material has not been evaluated. Foundation conditions beneath the pad on which the waste rock will be temporarily stored are discussed in Chapter 2 and Appendix 5-4 of this M&RP.

536.200 Waste Emplacement

Waste rock from the Dugout Canyon Mine that is to be hauled to the **Dugout**, SUFCo or Skyline Mines disposal sites will be emplaced in accordance with the respective M&RPs. This waste will be placed in a controlled manner to ensure the mass stability of the waste piles and prevent mass movement during and after construction. The waste rock will be covered periodically to minimize public hazards and the potential for spontaneous combustion. Waste rock that is disposed of in underground workings will be emplaced in accordance with Section 536.500 of this M&RP.

Waste rock will be emplaced in the temporary storage areas at the Dugout Canyon Mine using front-end loaders and other appropriate earth-moving equipment. Due to the temporary nature of this storage, mass movement, public hazards, and spontaneous combustion of the material will not occur prior to its ultimate disposal.

536.300 Excess Spoil Fills

No excess spoil fills will exist in the permit area.

536.400 Impounding Structures Constructed of Coal Mine Waste

No impounding structures will be constructed of coal mine waste in the permit area.

536.500 Disposal of Coal Mine Waste in Special Areas

Coal mine waste generated at the Dugout Canyon Mine will be disposed of at either the approved ~~SUFCo facility~~, the approved Skyline facility, or in underground workings within the permit area. The source of this material will be primarily waste rock resulting from partings and splits in the coal seam. As indicated in Chapter 6, neither acid- nor toxic-forming materials are present in the overburden, underburden, or coal (i.e., the material that will comprise the waste rock that will be generated from the Dugout Canyon Mine). Prior to the disposal of underground development waste within the permit-area mine workings, approval for such disposal will be obtained from MSHA.

The waste rock which will be stowed underground will be backfilled into dead-end panels primarily near the outer extent of the area to be mined. Backfilling will occur prior to second mining to ensure that adequate roof support exists in the area. No influence on the active mining operation is anticipated from the backfilling process.

536.600 Underground Development Waste

A detailed description of the geotechnical investigations, design, construction, operation, maintenance, and reclamation of the waste-rock disposal sites at the SUFCo and Skyline Mines is provided in their respective M&RPs. These M&RPs also contain:

- Descriptions of pre-disturbance soil resources at the waste-rock disposal sites;
- Descriptions of plans for stockpiling topsoil at the waste-rock disposal sites; and
- Discussions of the suitability of the material for reclamation.

536.700 Coal Processing Waste

No coal processing waste will be generated within the permit area.

536.800 Coal Processing Waste Banks, Dams, and Embankments

No coal processing waste banks, dams, or embankments will exist within the permit area.

536.900 Refuse Piles

A detailed description of the waste-rock disposal/storage sites at the **Dugout Canyon Mine (Refuse Pile Amendment, February 2003)**, SUFCo and Skyline Mines is provided in their respective M&RPs. These M&RPs provide:

- A description of pre-disturbance soils at the sites;
- Certification of the design and plans;
- Compliance with applicable MSHA regulations;
- A description of proposed inspection activities;
- A description of the design, stability, operation, and reclamation of the waste-rock

environmental protection performance standards of the State Program.

542 Narratives, Maps, and Plans

542.100 Reclamation Timetable

A timetable for the completion of each major step in the reclamation plan is presented in Figure 5-3.

542.200 Plan for Backfilling, Soil Stabilization, Compacting, and Grading

The regrading plans for the waste rock disposal facilities at the **Dugout Canyon Mine (Refuse Pile Amendment, February 2003)**, SUFCo and Skyline Mines are presented in their respective M&RPs. The Dugout Canyon regrading plan was designed to meet the objectives of balancing cut and fill quantities, maintaining a geotechnically stable base. The primary features of this plan are:

- Removal of the pad upon which surface activities will be constructed at the mine, thereby creating a slope which will adequately drain while minimizing long-term erosion concerns;
- Backfilling to remove highwalls within the objectives noted above (cut and fill balance, site stability, and erosion control),
- Construction of stable channels across regraded areas;
- Placement of topsoil;
- Revegetation and mulching of the topsoiled site; and
- Removal of the sedimentation pond (together with accompanying regrading, topsoiling, revegetation, and mulching of the sedimentation pond area) and implementation of interim sediment-control measures.

The estimated cut quantity for the Dugout Canyon facility is approximately 97,575 cubic yards with an estimated fill of 99,630 cubic yards (see Appendix 5-5). The difference between these two quantities is anticipated to be balanced by compaction and the import of topsoil from the

Disposal of Coal Mine Waste. All coal mine waste generated at the Dugout Canyon Mine will be disposed of either underground or at the waste-rock disposal sites associated with the **Dugout Canyon Mine (Refuse Pile Amendment, February 2003)**, SUFCo and/or Skyline Mines. Coal mine waste that is temporarily stored on the surface at the Dugout Canyon Mine prior to off-site disposal will be removed from the Dugout Canyon Mine prior to reclamation. Information regarding disposal practices and reclamation plans for these off-site disposal facilities is provided in their respective M&RPs.

Disposal of Non-Coal Mine Wastes. All non-coal (non-waste rock) waste generated from mining and reclamation operations will be disposed of as outlined in Sections 526.100 and 528.300. Following cessation of mining activities, non-coal mine waste that is still temporarily stored at the site will be removed and disposed of as outlined in Section 528.300. Non-coal waste that is generated during the course of reclamation that cannot be salvaged will be disposed of at an off-site permitted facility.

542.800 Estimated Cost of Reclamation

The existing bond, together with the estimated cost to reclaim the Dugout Canyon Mine surface facilities as modified by this submittal, is provided in Appendix 5-6.

550 RECLAMATION DESIGN CRITERIA AND PLANS

551 Casing and Sealing of Underground Openings

Each underground opening to the mine will be sealed and backfilled when no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects. Permanent closure measures will be as described in Section 542.700. This closure method has been

In an effort to eliminate pre-existing highwalls at the site following reclamation, soil may be replaced during reclamation at slopes of up to 1.5H:1V. The steepness of these slopes will be reduced at their base, providing a concave slope. As noted above, these slopes will be geotechnically stable. Dozers will be used during placement of the topsoil or substitute topsoil on these steep slopes, taking care to achieve a reasonably uniform thickness of the final soil cover. Following placement and prior to seeding, all areas with a slope steepness of 3H:1V or steeper will be deep gouged using a trackhoe. The final surface will consist of mounds and depressions capable of holding runoff and difficult to walk on. Refer to Sections 355 and 341 regarding erosion-control matting and revegetation.

Although the gouging will extend below the depth of the final topsoil layer, information presented in Section 222.400 of this M&RP indicates that the subsoils will be of acceptable chemical and physical quality, with the possible exception of the percentage of rock fragments. Hence, the surface will still be capable of sustaining an adequate vegetative cover, further minimizing long-term erosion of the slopes.

Post-Mining Land Use. The disturbed area will be backfilled and regraded in a manner that supports the approved post-mining land use.

553.200 Spoil and Waste

Spoil. No spoil will be generated within the permit area.

Refuse Piles. Details regarding the design, operation, final surface configuration, and final grading of the waste-rock disposal sites at the **Dugout Canyon Mine**, SUFCo and Skyline Mines are provided in their respective M&RPs. Refuse generated from the Dugout Canyon Mine will be disposed of only at sites that have been approved to accept material from the mine.

Coal Processing Waste. No coal processing waste will be generated within the permit area.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
510 INTRODUCTION	5-1
511 General Requirements	5-1
512 Certification	5-1
512.100 Cross Sections and Maps	5-2
Previously Mined Areas	5-2
Surface Facilities	5-2
Surface Configurations	5-3
Hydrology	5-3
Geology	5-4
512.200 Plans and Engineering Designs	5-4
Excess Spoil	5-4
Durable Rock Fills	5-4
Coal Mine Waste	5-4
Impoundments	5-4
Primary Roads	5-4
Variance from Approximate Original Contour	5-4
513 Compliance with MSHA Regulations and MSHA Approvals	5-5
513.100 Coal Processing Waste Dams and Embankments	5-5
513.200 Impoundments and Sedimentation Ponds	5-5
513.300 Underground Development Waste, Coal Processing Waste, and Excess Spoil	5-5
513.400 Refuse Piles	5-5
513.500 Underground Openings to the Surface	5-6
513.600 Discharge to Underground Mines	5-6
513.700 Surface Coal Mining and Reclamation Activities	5-6
513.800 Coal Mine Waste Fires	5-6
514 Inspections	5-7
514.100 Excess Spoil	5-7
514.200 Refuse Piles	5-7

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
514.300 Impoundments	5-7
515 Reporting and Emergency Procedures	5-9
515.100 Slides	5-9
515.200 Impoundment Hazards	5-9
515.300 Temporary Cessation of Operations	5-9
520 OPERATION PLAN	5-10
521 General	5-10
521.100 Cross Sections and Maps	5-10
Previously Mined Areas	5-10
Existing Surface and Subsurface Facilities and Features	5-12
Landowner, Right of Entry, and Public Interest	5-14
Mining Sequence and Planned Subsidence	5-14
Land Surface Configuration	5-15
Surface Facilities	5-15
Transportation Facilities	5-17
Other Relevant Information	5-17
521.200 Signs and Markers	5-17
Mine and Permit Identification Signs	5-17
Perimeter Markers	5-21
Buffer Zone Markers	5-21
Topsoil Markers	5-21
522 Coal Recovery	5-22
523 Mining Methods	5-23
Continuous Miner Operations	5-23
Longwall Mining	5-24
Anticipated Production	5-24
Major Equipment	5-25
524 Blasting and Explosives	5-25
525 Subsidence	5-27

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
525.100 Subsidence Control Plan	5-27
Structures and Renewable Resource Lands	5-27
Mining Methods	5-27
Physical Conditions Affecting Subsidence	5-27
Subsidence Control Measures	5-28
Subsidence Monitoring	5-28
Anticipated Effects of Subsidence	5-31
525.200 Subsidence Control	5-32
Adopted Control Measures	5-32
Compliance With Control Plan	5-32
Correction of Material Damage	5-32
Protection of Significant Surface Resources	5-33
525.300 Public Notice of Proposed Mining	5-33
526 Mine Facilities	5-34
526.100 Mine Structures and Facilities	5-34
526.200 Utility Installation and Support Facilities	5-37
Utility Installations	5-37
Support Facilities	5-37
Water Pollution Control Facilities	5-38
527 Transportation Facilities	5-38
527.100 Road Classification	5-38
527.200 Description of Transportation Facilities	5-39
Road Specifications	5-39
Drainageway Alterations	5-41
Road Maintenance	5-45
528 Handling and Disposal of Coal, Excess Spoil, and Coal Mine Waste	5-45

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
528.100 Coal Handling and Transportation	5-45
528.200 Overburden	5-47
528.300 Spoil, Coal Processing Waste, Non-Coal Waste, and Mine Development Waste	5-47
Excess Spoil	5-47
Coal Processing Waste	5-47
Burning and Burned Waste Utilization	5-47
Non-coal Mine Waste	5-47
Underground Development Waste	5-48
Minimization of Acid, Toxic and Fire Hazards	5-49
528.400 Dams, Embankments, and Impoundments	5-50
529 Management of Mine Openings	5-50
530 OPERATIONAL DESIGN CRITERIA AND PLANS	5-51
531 General	5-51
532 Sediment Control	5-51
533 Impoundments	5-52
533.100 Slope Stability	5-52
533.200 Foundation Considerations	5-52
533.300 Slope Protection	5-53
533.400 Embankment Faces	5-53
533.500 Highwalls	5-53
533.600 MSHA Criteria	5-54
533.700 Pond Operation and Maintenance Plans	5-54
534 Roads	5-54
534.100 Location, Design, Construction, Reconstruction, Use, Maintenance, and Reclamation	5-54
Control of Damage to Public or Private Property	5-54
Road Surfacing	5-54

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
Slope Stability	5-54
534.200 Environmental Protection and Safety	5-55
534.300 Primary Roads	5-56
General	5-56
Road Alignment	5-56
Road Surfacing	5-57
Road Maintenance	5-57
Road Culverts	5-57
535 Spoil	5-57
536 Coal Mine Waste	5-57
536.100 Design	5-58
536.200 Waste Emplacement	5-58
536.300 Excess Spoil Fills	5-59
536.400 Impounding Structures Constructed of Coal Mine Waste	5-59
536.500 Disposal of Coal Mine Waste in Special Areas	5-59
536.600 Underground Development Waste	5-60
536.700 Coal Processing Waste	5-61
536.800 Coal Processing Waste Banks, Dams, and Embankments	5-61
536.900 Refuse Piles	5-61
537 Regraded Slopes	5-62
537.100 Division Approval	5-62
537.200 Regrading of Settled and Revegetated Fills	5-63
540 RECLAMATION PLAN	5-63
541 General	5-63
541.100 Commitment	5-63
541.200 Surface Coal Mining and Reclamation Activities	5-64
541.300 Underground Coal Mining and Reclamation Activities	5-64
541.400 Environmental Protection Performance Standards	5-64

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
542 Narratives, Maps, and Plans	5-64
542.100 Reclamation Timetable	5-64
542.200 Plan for Backfilling, Soil Stabilization, Compacting, and Grading	5-64
Building Demolition	5-66
Backfilling and Compaction	5-67
Construction of Reclamation Channels	5-67
Sedimentation Pond Removal and Interim Sediment Control	5-68
542.300 Final Surface Configuration Maps and Cross Sections	5-70
542.400 Removal of Temporary Structures	5-70
542.500 Removal of Sedimentation Pond	5-71
542.600 Roads	5-71
542.700 Final Abandonment of Mine Openings and Disposal Areas	5-72
Abandonment of Openings	5-72
Disposal of Excess Spoil	5-72
Disposal of Coal Mine Waste	5-73
Disposal of Non-Coal Mine Wastes	5-73
542.800 Estimated Cost of Reclamation	5-73
550 RECLAMATION DESIGN CRITERIA AND PLANS	5-73
551 Casing and Sealing of Underground Openings	5-73
552 Permanent Features	5-74
552.100 Small Depressions	5-74
552.200 Permanent Impoundments	5-74
553 Backfilling and Grading	5-74
553.100 Disturbed Area Backfilling and Grading	5-75

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
Approximate Original Contour	5-75
Elimination of Highwalls, Spoil Piles and Depressions	5-75
Slope Stability	5-75
Erosion and Water Pollution	5-75
Post-Mining Land Use	5-76
553.200 Spoil and Waste	5-76
Spoil	5-76
Refuse Piles	5-76
Coal Processing Waste	5-76
553.300 Exposed Coal Seams, Acid- and Toxic-Forming Materials, and Combustible Materials	5-77
Exposed Coal Seams	5-77
Acid-and Toxic-Forming Materials	5-77
Combustible Materials	5-77
553.400 Cut-and-Fill Terraces	5-77
553.500 Highwalls From Previously Mined Areas	5-77
553.600 Previously Mined Areas	5-77
553.700 Backfilling and Grading - Thin Overburden	5-78
553.800 Backfilling and Grading - Thick Overburden	5-78
553.900 Regrading of Settled and Revegetated Fills	5-78
560 PERFORMANCE STANDARDS	5-79
REFERENCES	5-80

LIST OF TABLES

Table

5-1	List of Major Equipment	5-25
5-2	Subsidence Control Point Survey Data	5-29
5-3	Mine Road Specifications	5-40

LIST OF FIGURES

Figure

5-1	Typical Road Cross Sections	5-18
5-2	Material Flow Diagram	5-46
5-3	Reclamation Timetable	5-65
5-4	Silt Fence and Straw-Bale Dike Schematics	5-69

LIST OF PLATES

Plate

- 5-1 Previously Mined Areas
- 5-2 Surface Facilities
- 5-3 Surface Facilities Cross Sections
- 5-4 Existing Surface Topography
- 5-5 Reclamation Surface Topography
- 5-6 Reclamation Cross Sections
- 5-7 Proposed Mine Sequence and Planned Subsidence Boundary

LIST OF APPENDICES

Appendix

- 5-1 **DELETED IN MAY 1999 REVISION**
- 5-2 Approvals for Waste-Rock Disposal
- 5-3 Carbon County Waste Disposal Agreement
- 5-3A Dugout Canyon Mine Wastewater Disposal Approval
- 5-4 Slope Stability Analyses
- 5-5 Cut and Fill Calculations
- 5-6 Reclamation Bond Estimate
- 5-7 Waste-Rock Analyses
- 5-8 Dugout Canyon Mine Blasting Plan

CHAPTER 5 ENGINEERING

510 INTRODUCTION

This chapter provides a discussion of general engineering aspects, an operation plan, a reclamation plan, design criteria, and performance standards related to the Dugout Canyon Mine. The proposed coal mining and reclamation activities associated with the mine have been or will be designed, located, constructed, maintained, and reclaimed in accordance with the operation and reclamation plans.

Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

511 General Requirements

This permit application includes descriptions of the proposed coal mining and reclamation operations together with the appropriate maps, plans, and cross sections. Potential environmental impacts as well as methods and calculations utilized to achieve compliance with the design criteria are also presented.

512 Certification

Where required by the regulations, cross sections and maps in this permit application have been prepared by or under the direction of, and certified by, qualified registered professional engineers or land surveyors. As appropriate, these persons were assisted by experts in the fields of hydrology, geology, biology, etc.

512.100 Cross Sections and Maps

Previously Mined Areas. A certified map showing the location of previously mined areas within the permit and adjacent areas is provided as Plate 5-1.

Surface Facilities. Underground development waste which is generated at the Dugout Canyon Mine will be disposed of either:

- Underground within the Dugout Canyon Mine (without bringing this waste to the surface), at the approved waste-rock disposal facility at the Dugout Canyon Mine;
- At the approved waste-rock disposal facility at the SUFCo Mine (a sister operation of SCM); or
- At the approved waste-rock disposal facility at the Skyline Mine (also a sister operation of SCM).

Copies of the Division correspondence approving the SUFCo and Skyline waste-rock disposal facilities for receipt of Dugout Canyon waste rock are provided in Appendix 5-2.

Certified maps and cross sections concerning the disposal of underground development waste at the SUFCo and Skyline Mines are provided in the respective Mining and Reclamation Plans (M&RPs) for those mines. A certified map showing the proposed location of coal storage and loading areas, and explosive storage and handling facilities, is provided as Plate 5-2. Cross sections of the proposed facilities area are provided on Plate 5-3.

A map of the existing topography prior to disturbance by SCM is provided as Plate 5-4. Also noted on Plate 5-4 is the area of disturbance which was mapped to exist at the site in 1980. Since mining ceased at the site in 1964 (as noted in section 521.100 of this M&RP), this boundary represents the area of pre-SMCRA disturbance. Plate 5-4 also shows areas of non-mining disturbance which

occurred after 1980 but prior to 1996. These disturbances were created by logging activities in the area and are not subject to the requirements of R645-301 through R645-302. No areas shown on Plate 5-4 are subject to the requirements of R645-200 through R645-203.

A certified map showing the location of the topsoil stockpile is provided as Plate 2-3.

The proposed location of the sedimentation pond is noted on Plate 5-2. No water treatment facilities will exist at the site other than the sedimentation pond.

The following facilities or activities will not exist or occur within the permit area:

- Coal preparation plant,
- Coal cleaning,
- Coal processing waste banks, dams, or embankments,
- Disposal of non-coal (non-waste rock) waste other than durable rock-type construction materials such as cinder block, and
- Air pollution control facilities.

Hence, certified maps or cross sections of these facilities are not provided in this plan. The durable rock-type construction materials will be disposed of in locations designated to receive underground development waste.

Surface Configurations. Certified maps and cross sections showing the proposed final (post-reclamation) surface configuration of the Dugout Canyon disturbed area are provided on Plates 5-5 and 5-6, respectively.

Hydrology. Certified maps and cross sections associated with the hydrology of the Dugout Canyon Mine area are provided in Chapter 7.

Geology. Certified maps and cross sections associated with the geology of the Dugout Canyon Mine area are provided in Chapter 6.

512.200 Plans and Engineering Designs

All plans and engineering designs presented in this M&RP were prepared by or under the direction of and certified by a qualified registered professional engineer.

Excess Spoil. No excess spoil will be generated from the permit area.

Durable Rock Fills. No durable rock fills will exist in the permit area.

Coal Mine Waste. The designs of the waste-rock facilities at the Dugout, SUFCo and Skyline Mines were certified by a qualified registered professional engineer. Information regarding these disposal facilities can be found in their respective M&RPs.

Impoundments. The only impoundment to be constructed for the mining and reclamation operation will consist of the sedimentation pond (see Plate 7-5). This impoundment has been designed under the direction of a professional engineer using current, prudent, engineering practices. These designs were certified by a qualified registered professional engineer.

Primary Roads. The design and construction of the primary road associated with the mine has been certified by a professional engineer as meeting the requirements of R645-301-534.200 and R645-301-742.420. This certification is presented in Figure 5-1.

Variance From Approximate Original Contour. No variance from the approximate original contour requirements of the regulations is being requested in this M&RP.

513 Compliance with MSHA Regulations and MSHA Approvals

513.100 Coal Processing Waste Dams and Embankments

No coal processing waste dams or embankments will exist within the permit area.

513.200 Impoundments and Sedimentation Ponds

No impoundments or sedimentation ponds in the permit area will meet the size criteria of 30 CFR 77.216(a).

513.300 Underground Development Waste, Coal Processing Waste, and Excess Spoil

No coal processing waste or excess spoil will be generated within the permit area. Disposal of underground development waste in underground mine workings is described in Section 536.500 of this M&RP.

513.400 Refuse Piles

Waste rock generated from the Dugout Canyon Mine may be temporarily stored on the surface of the mine site at the location shown on Plate 5-2. This storage will be for a short period of time prior to disposal. Refer to the "Refuse Pile Amendment, February 2003 for information pertaining to the Dugout Mine refuse pile. High-ash coal product may also be produced during mine construction and development. This material may also be transferred to Sunnyside Cogeneration Associates (ACT/007/035) or a similar permitted facility. Runoff from the surface-stored materials will drain to the site sedimentation pond or other appropriate sediment-control structures.

A representative sample will be collected of the waste rock removed from the mine at a rate of one sample per 2,000 cubic yards of waste-rock material. These samples will be analyzed in accordance

with Table 6 of the Division's topsoil and overburden guidelines (Leatherwood and Duce, 1988). Waste rock with acid- and toxic-forming characteristics will be handled in accordance with the permits associated with the disposal locations.

513.500 Underground Openings to the Surface

Upon abandonment, each opening to the surface from the underground will be capped, sealed, backfilled, or otherwise properly managed in accordance with 30 CFR 75.1771. Details regarding final abandonment of mine openings are provided in Section 542.700.

513.600 Discharges to Underground Mines

Water not meeting UPDES standards during sediment pond cleaning will be pumped into the sealed, abandoned "Gilson West - Old Workings".

513.700 Surface Coal Mining and Reclamation Activities

No surface coal mining and reclamation activities will occur in the permit area.

513.800 Coal Mine Waste Fires

If any coal mine waste fires occur within the permit area, these will be reported immediately to MSHA and the Division. Immediate remedial action will be taken as deemed necessary by SCM to protect public health and safety as well as the environment. Following initial remedial efforts, a long-term plan will be formulated in discussion with MSHA and the Division to extinguish any existing fires and prevent future fires.

SCM will utilize a program of prevention and suppression to minimize the potential for coal mine waste fires. An ongoing educational program will emphasize the need for attention to fire prevention. Prevention will be further enhanced by the short-term nature of the surface storage of both coal and

waste rock at the Dugout Canyon Mine. Suppression will occur by separating smoldering material and compacting the adjacent material (to minimize oxygen content in the adjacent material). The burning material will then be extinguished using appropriate methods (see Section 528.300 of this M&RP). No burning mine waste will be removed from the temporary storage area without a removal plan approved by the Division.

514 Inspections

514.100 Excess Spoil

Excess spoil will not be generated at the Dugout Canyon Mine.

514.200 Refuse Piles

The frequency and methods of inspections of the waste-rock areas at the SUFCo and Skyline Mines is discussed in their respective M&RPs. Refer to the "Refuse Pile Amendment, February 2003 for inspection information pertaining to the Dugout Mine refuse pile.

All activities performed at this area will be in accordance with the applicable MSHA permit.

514.300 Impoundments

Regular inspections will be made during construction of the sedimentation pond as well as upon completion of construction. These inspections will be made by or under the direction of a registered professional engineer experienced in the construction of similar earth and water structures.

Annual inspections of the sedimentation pond will continue until removal of the structure or release of the performance bond. A certified report of inspection will be prepared by a qualified registered professional engineer and submitted to the Division in the annual report. The report will discuss any appearances of instability, structural weakness or other hazardous conditions, depth and elevation

of any impounded waters, existing storage capacity, and existing or required monitoring procedures and instrumentation, and any other aspects of the structure affecting stability. A copy of this report will also be maintained at the mine site.

No impoundments are anticipated within the permit area that are subject to 30 CFR 77.216.

county road and a UP&L power distribution line. The existing county road enters the permit area in NE $\frac{1}{4}$, SE $\frac{1}{4}$ Sec. 22, T. 13 S., R. 12 E., extending within that section for approximately 500 feet within the permit area. The road then exits the permit area for approximately 1300 feet of road length, then reenters the permit area in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 23, where it ends approximately 300 feet northeast of the southwest edge of the proposed disturbed area boundary (i.e., at the BLM/State property boundary, near the upstream edge of the sedimentation pond). The county road lies on land owned by the entities shown on Plate 1-3. The date of its initial construction is unknown, but is presumed to have been prior to 1981. Other existing roads within the disturbed area and permit area are privately owned and maintained roads. The general locations of roads within and adjacent to the permit area are shown on Plate 5-7.

Plates 4-1 and 5-2 depict the location of an existing UP&L distribution line that will be improved and activated to provide electrical service to the mine. This distribution line, which is not classified as a major electric transmission line, will be owned and upgraded by UP&L. The date of its initial construction is unknown, but is presumed to have been prior to 1981.

Some debris remains within the disturbed area from previous mining operations. That which cannot be salvaged will be disposed of during the construction of the mining facilities. The final disposal location will be determined by the nature of the debris. Durable, rock-type debris may be incorporated into the construction fill if it does not compromise the integrity of the fill. Other debris will be salvaged or disposed of at a permitted off-site facility. All debris will be handled in accordance with applicable Federal, State, and local regulations.

As noted previously, waste rock which is generated at the Dugout Canyon Mine will be disposed of underground or in the approved waste-rock disposal areas at the Dugout Canyon, SUFCo and/or Skyline Mines. The location of the sedimentation pond within the permit area is shown on Plate 5-2. There will be no permanent water impoundments within the permit area.

Plans for mining in areas (leased or unleased) outside of the permit area are dependant upon economic feasibility and obtaining corresponding permits. New areas will be reviewed on a case by case basis.

Land Surface Configuration. Surface contours of undisturbed areas adjacent to proposed disturbed areas associated with the mine are shown on Plate 5-2. As stated in Section 521.100 of this M&RP, surface facilities have been in existence in the Dugout Canyon area since the mid-1920s. As a result, pre-mining topographic maps do not exist. However, the surface contours in undisturbed areas shown on Plate 5-2 are considered generally indicative of original land slopes in the vicinity of the mine.

A map showing topographic conditions prior to disturbance by SCM is provided as Plate 5-4. This map also shows the area of pre-SMCRA disturbance, as mapped in 1980, together with non-mining areas of disturbance which occurred after 1980 but prior to 1996. Plate 5-4 also shows topographic conditions in undisturbed areas extending at least 100 feet from the disturbed area.

Surface Facilities. Plate 5-2 shows the locations of the following surface facilities:

- Buildings, utility corridors, and facilities to be used, including:
 - Water Tanks - two metal tanks on concrete pads,
 - Water Well Pump House - metal building on concrete pad (Appendix 7-9),
 - Fueling Station - metal structure and fueling equipment on concrete pad,
 - Portals - see Section 529
 - Transfer Building - see subsequent portions of this Section,
 - Conveyor - see subsequent portions of this Section,
 - Truck Loading Bin - metal structure on concrete pad (see Section 528),
 - Fan - metal structure containing a fan,
 - Substation - metal structure sitting on gravel and concrete pad,
 - Small Substation - metal structure sitting on gravel and concrete pad,
 - Temporary Waste Rock Storage Area - see Sections 514.200, and 536,
 - Roads - see Sections 527.100 and 527.200,

Sedimentation Pond - see Chapter 7 and Appendix 7-8,
Office/Bath House/Shop - block and metal building on concrete pad
Parking Areas - gravel or asphalt pads
Storage Areas - gravel, asphalt, or soil pads
Crusher - metal structure on concrete pad/footings
Coal Sampler - Metal structure on skids, on concrete pad
Storage Building - Metal structure on concrete pad
Stoker Coal Storage Bin - concrete container

- The area of disturbance at the mine mouth,
- Coal storage and loading facilities, and
- The explosive storage and handling facility, which includes two metal magazines.

Once the office/bath house/warehouse/shop building was completed in late fall of 2002, the temporary facilities were either removed or relocated. Plate 5-2 reflects where the containers used for the temporary warehouse, storage and foreman facilities were moved following the completion of the new building. These containers were placed on either soil or a gravel pad.

Drainage facilities are shown on Plate 7-5, including the site sedimentation pond, culverts, and ditches.

Cross sections of the proposed surface facilities are provided on Plate 5-3 and Figure 7-9-2 (Appendix 7-9). The disturbed area shown on Plate 5-2 is the same as the land area for which a performance bond or other guarantee has been posted.

Under the currently approved construction plan, several areas within the existing disturbed area boundary will not be significantly disturbed during site construction. The first such area consists of 0.08 acres located on the hillside west of the portal pad, north of the substation access road, and east of the storage area adjacent to that road. The second such area consists of 0.13 acres located on the hillside above the mine haulage/manway portal. Each of the above areas is located on a hillside above the area of actual disturbance.

seam thickness, etc.) is provided in Chapter 6. In particular, Plate 6-1 provides a surficial geologic map of the permit and adjacent areas, Plate 6-2 shows the locations of the coal-seam outcrops in the vicinity of the proposed surface facilities, and Figure 6-1, Plate 6-3, 6-3A and 6-3B provide geologic cross sections based on data collected from drill holes in the area. Furthermore, information related to the physical conditions which may affect mining is presented in Sections 622 (a discussion of the cross sections), 624.100 (a discussion of stratigraphic and structural conditions), and 624.300 (a discussion of rock clay content), as well as Appendix 6-1 (drill-hole logs).

Subsidence Control Measures. Most of the land within the permit area will eventually be affected by subsidence. Anticipated areas of subsidence are shown on Plate 5-7. This subsidence boundary was projected to the surface based on an angle of draw of 30 degrees as measured from the vertical as required in R645-301-525.542. It is presumed that the actual angle of draw will be less, based upon results of mining and subsidence in the general area. Plate 5-7 illustrates the projected extent of subsidence based on a 30 degree angle of draw. The primary areas where future subsidence is not anticipated are the areas overlying the previous workings shown on Plate 5-1 (since these areas will not be re-mined). Plate 5-7 also illustrates a subsidence buffer zone that extends beyond the limits of Federal Lease U7064-027821 and State Lease ML-48435. This buffer zone does not suggest that CFC will mine outside of the lease boundaries, however, it does indicate the limit of projected subsidence.

Subsidence Monitoring. Numerous control points have been established within the permit and nearby areas to assist in subsidence surveys (see Plate 5-7). Coordinates and elevations of these control points (as established in January 1984) are provided in Table 5-2. The control points consist of traverse monuments, benchmark monuments, and survey stations (as indicated on Plate 5-7) which have been constructed generally as follows:

- Traverse and Benchmark Monuments - These monuments are constructed with a 3¼-inch diameter tap-on convex cap with a center punch mark and a 5-

TABLE 5-2

SUBSIDENCE CONTROL POINT SURVEY DATA*

STATION NAME	NORTHING	EASTING	PIN ELEVATION
Sage	498254.15	2257232.34	8467.62
Sage, Az.	497324.93	2256623.81	8422.66
Francis	496611.07	2264094.03	8544.89
Skaggs	505868.76	2269371.61	8837.05
McFarlen	489283.24	2272314.34	8317.79
Soldier	498530.39	2281585.15	9053.75
Sublett	487882.23	2256822.75	6757.00
Mosca	494899.03	2258577.93	7303.60
Oslund	492074.41	2259135.38	7767.77
Durrett	490307.50	2262347.14	7474.79
Semborski	489694.42	2268293.47	7818.22
Streeter	493114.47	2264816.93	8239.50
Doney	494159.83	2267719.90	8096.61
Ogden	496576.39	2270095.01	7811.33
Presset	493596.17	2269951.00	7544.26
Chi	492119.67	2268718.50	7142.70
Reynoso	492837.37	2268611.30	7185.10
Palmer	488120.29	2266987.04	7712.80
3045	499635.34	2254210.70	8170.10
3048	500395.85	2264658.31	8419.59
3049	499585.59	2267096.57	8418.76
3052	491499.67	2276901.14	8455.63
3061	504632.44	2271891.63	8856.88

* Additional survey points are reported each year in the Annual Reports.

be visually evaluated during monitoring activities. Following an initial survey prior to the beginning of mining operations, future surveys will concentrate on areas which have been mined in the past or are anticipated to be mined within the upcoming year. Hence, the area of detailed survey may be expanded each progressive year.

Annual resurveys of the mine permit area will produce vertical control at the same sites as the previous year. Information on each site will be produced annually while the area underlying the site is being actively mined or is still potentially subsiding. The subsiding areas which show no change for two consecutive years will be considered stable and will be omitted from further annual surveys. If additional mining is anticipated within the stable areas, these areas will again be added to the annual surveys.

In addition to the ground surveys, aerial photogrammetric methods will be included in the surveys when the areas become too large to feasibly handle with ground surveys. This method may be added to enhance the ground surveys and to cover larger areas as the mine expands. Visual checks for subsidence will be made during all surface activities, especially during water monitoring activities. These visual surveys will be used to detect surface irregularities and surface cracks.

Anticipated Effects of Subsidence. Based on experience in the region and the results of investigations performed by Dunrud (1976), future subsidence in the permit area is anticipated to result in the formation of tension cracks, with these cracks healing to some degree following formation. It is further anticipated that no substantial damage will occur to

technologically and economically feasible by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses which it was capable of supporting before the subsidence. In addition, SCM will notify the Division of any slide, rock fall, or other disturbance known to be caused by subsidence that will have an adverse effect on the environment.

Protection of Significant Surface Resources. None of the following exist within the area of potential subsidence associated with the Dugout Canyon Mine:

- Public buildings or facilities,
- Churches, schools, and hospitals,
- Impoundments with a storage capacity of 20 acre-feet or more or bodies of water with a volume of 20 acre-feet or more,
- Aquifers or bodies of water that serve as a significant water source for any public water supply system, or
- Urbanized areas, cities, towns, or communities.

Hence, no special control measures are required to preclude subsidence impacts to these resources.

Raptor nests and other wildlife resources which may be influenced by subsidence are presented on Plate 3-2. A discussion of protective measures associated with wildlife resources in the permit area is presented in Section 333.300 of this M&RP.

525.300 Public Notice of Proposed Mining

Each owner of property or resident within the area above an underground mining block and adjacent area that may be affected by subsidence will be notified by mail at least 6 months prior to mining or within that period if approved by the Division. The notification will contain:

- Identification of specific areas in which mining will take place;
- Approximate dates the specific areas will be undermined; and
- The location or locations where the SCM subsidence control plan may be examined.

526 Mine Facilities

526.100 Mine Structures and Facilities

As stated in Section 521.100 of this M&RP, no buildings existed at the mine surface at the time construction was begun on the Dugout Canyon Mine. Nonetheless, Section 521.100 of this M&RP indicates that two "existing structures" are present within the permit area which were presumably "used in connection with or to facilitate coal mining and reclamation operations for which construction began prior to January 21, 1981" (see R645-100-200). These are the existing county road and a UP&L power distribution line.

A description of the location of the existing county road within the permit area is provided in Section 521.100 of this M&RP. It is unknown when this road was initially constructed. This road is currently a gravel road which will be modified by the County (see Section 527.200). As indicated in Section 521.100 of this M&RP, it is anticipated that the county road will not be relocated within the permit area.

Building construction will generally involve grading and preparation of foundation areas, excavation and installation of foundations, building erection, interior and exterior finish work, and connection of utilities. Storage areas will generally be open graded, providing outside storage for large supplies. Both building sites and storage areas will be graded to ensure effective drainage to disturbed-area ditches and culverts as noted on Plate 7-5. Operation and maintenance of support structures and facilities at the Dugout Canyon Mine will involve regular grading of facility areas, together with inspection, cleaning, and repairs as required.

No coal processing waste banks, dams, or embankments will exist in the permit area. Sediment that is periodically removed from the sedimentation pond will be disposed of with underground development waste generated from the mine or pumped back into the sealed, abandoned "Gilson West-Old Workings"

General refuse that is generated on site will be stored in a dumpster to be situated at a convenient location within the disturbed area. This waste will consist predominantly of old brattice cloth, ventilation tubing, broken timbers, wire, broken machinery parts, paper, cardboard, and miscellaneous garbage. This non-hazardous, non-toxic, non-coal, non-waste rock refuse will be disposed of periodically through Carbon County at a state-approved landfill. The agreement with Carbon County for disposal of this refuse is provided in Appendix 5-3.

During site construction, operation, and reclamation activities, any spilled petroleum products such as grease, hydraulic fluid, fuel, oil, joint coating, or other pollutants will be removed immediately with the associated contaminated soil and disposed of at a state-approved facility that is permitted to receive such waste. Adequate spill collection materials (including absorbents to stop or contain contaminants that may enter a stream) will be readily available at the site during these activities to contain any such spills.

a reclaim tunnel to the crusher and then via the loadout conveyor to the truck loadout bin. From the bin, the coal will be loaded onto trucks and transported from the site.

528.200 Overburden

No overburden will be removed, handled, stored, or transported within the permit area.

528.300 Spoil, Coal Processing Waste, Non-Coal Waste, and Mine Development Waste

Excess Spoil. No spoil will be generated at the Dugout Canyon Mine. Sediment removed from the sedimentation pond will be handled in accordance with Section 732.200 of this M&RP.

Coal Processing Waste. SCM will not process their coal at the Dugout Canyon Mine beyond crushing. Thus, no coal processing waste will be generated in the permit area.

Burning and Burned Waste Utilization. As noted below and in Section 536 of this M&RP, waste rock generated from the Dugout Canyon Mine will be permanently disposed of either underground or at permitted facilities located at the Dugout, SUFCo or Skyline. If coal mine waste fires occur at the permitted disposal/storage facilities, they will be controlled in the manner outlined in their respective permits.

Waste rock will only be temporarily stored at the surface of the Dugout Canyon Mine prior to ultimate disposal. If spontaneous combustion of this material does occur, the burning section will be removed from the remainder of the pile using a backhoe or other appropriate means. The affected waste rock will then be spread so that the material can cool and mixed with soil to extinguish the fire. The extinguished material will then be returned to the waste pile.

Non-Coal Mine Waste. Non-coal (non-waste rock) waste generated in the permit area will be temporarily stored in a dumpster to be situated at a convenient location within the disturbed area.

This waste will be disposed of periodically at a permitted landfill.

Liquid wastes such as oil and solvents will be contained and disposed of or recycled, in accordance with applicable State and Federal regulations, at facilities which are permitted to accept such wastes. Small quantities of such wastes (e.g., resulting from cleanup of small spills, etc.) may be contained onto absorbent pads prior to disposal. In all cases, disposal and/ or recycling will be only at sites which are permitted by appropriate regulatory authorities to accept such waste.

No non-coal (non-waste rock) waste will be permanently disposed of within the permit area other than, potentially, some durable rock-type construction materials such as cinder block, which may be disposed of underground. Non-coal (non-waste rock) waste will be temporarily stored at the site prior to permanent off-site disposal either in a dumpster or in the temporary waste-rock storage area. Off-site disposal will be only at sites which are permitted by appropriate regulatory authorities to accept such waste.

It is currently anticipated that no non-coal waste that is defined as hazardous under 40 CFR 261 will be generated at the mine. If such waste is generated in the future, it will be handled in accordance with the requirements of Subtitle C of the Resource Conservation and Recovery Act and any implementing regulations.

Underground Development Waste. Underground development waste which is generated at the Dugout Canyon Mine will be disposed of either:

- Underground within the Dugout Canyon Mine (without bringing this waste to the surface);
- At the approved temporary waste-rock storage site at the Banning Loadout;
- At the approved waste-rock disposal facility at the Dugout Canyon Mine, SUFCo Mine and Skyline Mine.

Descriptions of the waste-rock disposal facilities at the Dugout Canyon Mine (Refuse Pile Amendment, February 2003), SUFCo Mine and the Skyline Mines are provided in their respective M&RPs. A

discussion of the disposal of underground development waste in the underground workings of the Dugout Canyon Mine is provided in Section 536.500 of this M&RP.

Minimization of Acid, Toxic, and Fire Hazards. Data presented in Chapter 6 indicate that neither acid- nor toxic-forming materials are present in the overburden, underburden, or coal. These conclusions are supported by the data contained in Appendix 5-7, which provides the results of analyses of waste-rock materials. Should an acid- or toxic-forming problem with the waste rock be identified during future sample collection, those materials so identified will be buried within 30 days after the material is exposed at the mine site.

As noted previously in this section, temporary storage of debris generated at the mine will be in a dumpster. As a result, this debris will be protected from the wind and other elements. Because debris that is generated at the mine site will be only temporarily stored at the mine prior to off-site disposal, there is no significant potential for this debris to spontaneously combust. Fire extinguishers will be kept on mobile equipment in the mine yard to extinguish any fires should combustion of the waste materials occur. No waste materials that constitute a fire hazard will be accumulated in the permit area. No hazardous materials, as defined in 40 CFR, will be disposed of underground. These materials will be disposed of in accordance with all applicable state and federal regulations.

Road Surfacing. The county road which accesses the mine site will be surfaced with a non-rutting asphalt concrete. This surface will be designed to account for the anticipated volume of traffic as well as the weight and speed of vehicles using the road.

Road Maintenance. The county road will be maintained by Carbon County.

Road Culverts. All culverts along the county road will be designed, installed, and maintained by Carbon County. Culverts to be installed within the surface facilities have been designed in accordance with the hydrologic criteria discussed in Section 742.300. These culverts will be installed in accordance with manufacturer's recommendations to sustain the vertical soil pressure, the passive resistance of the foundation, and the weight of vehicles using the road.

535 Spoil

No spoil will be generated in the permit area. No valley fills or head-of-hollow fills will be created for the disposal of spoil material. Furthermore, no excess spoil will be disposed of in pre-existing benches.

536 Coal Mine Waste

Coal mine waste resulting from mining activities at the Dugout Canyon Mine will be disposed of either in the underground workings within the permit area or at the approved waste-rock disposal facilities operated at the Dugout Canyon Mine, SUFCo Mine or at the Skyline Mine waste-rock storage facilities.

Descriptions of the aforementioned facilities are presented in the respective M&RPs.

The coal mine waste generated from the Dugout Canyon Mine may be temporarily stored on the surface of the Dugout Canyon Mine facilities at the location shown on Plate 5-2 prior to ultimate disposal. Coal mine waste which is temporarily stored on the surface at the mine site will be removed from the temporary waste-rock storage area and placed in its final disposal area at the frequency noted in Section 513.400 of this M&RP. Runoff from the temporary waste-rock storage area will report

to the mine-site sedimentation pond and be treated accordingly.

536.100 Design

The waste-rock disposal facilities were designed to achieve minimum long-term static safety factors of at least 1.5. These designs and the associated evaluations were based on the results of detailed foundation and laboratory analyses of soils at the sites of the disposal facilities.

Due to the temporary nature of the waste-rock storage area shown on Plate 5-2, the long-term static safety factor of this material has not been evaluated. Foundation conditions beneath the pad on which the waste rock will be temporarily stored are discussed in Chapter 2 and Appendix 5-4 of this M&RP.

536.200 Waste Emplacement

Waste rock from the Dugout Canyon Mine that is to be hauled to the Dugout, SUFCo or Skyline Mines disposal sites will be emplaced in accordance with the respective M&RPs. This waste will be placed in a controlled manner to ensure the mass stability of the waste piles and prevent mass movement during and after construction. The waste rock will be covered periodically to minimize public hazards and the potential for spontaneous combustion. Waste rock that is disposed of in underground workings will be emplaced in accordance with Section 536.500 of this M&RP.

Waste rock will be emplaced in the temporary storage areas at the Dugout Canyon Mine using front-end loaders and other appropriate earth-moving equipment. Due to the temporary nature of this storage, mass movement, public hazards, and spontaneous combustion of the material will not occur prior to its ultimate disposal.

536.300 Excess Spoil Fills

No excess spoil fills will exist in the permit area.

536.400 Impounding Structures Constructed of Coal Mine Waste

No impounding structures will be constructed of coal mine waste in the permit area.

536.500 Disposal of Coal Mine Waste in Special Areas

Coal mine waste generated at the Dugout Canyon Mine will be disposed of at either the approved facility, or in underground workings within the permit area. The source of this material will be primarily waste rock resulting from partings and splits in the coal seam. As indicated in Chapter 6, neither acid- nor toxic-forming materials are present in the overburden, underburden, or coal (i.e., the material that will comprise the waste rock that will be generated from the Dugout Canyon Mine). Prior to the disposal of underground development waste within the permit-area mine workings, approval for such disposal will be obtained from MSHA.

- Descriptions of plans for stockpiling topsoil at the waste-rock disposal sites; and
- Discussions of the suitability of the material for reclamation.

536.700 Coal Processing Waste

No coal processing waste will be generated within the permit area.

536.800 Coal Processing Waste Banks, Dams, and Embankments

No coal processing waste banks, dams, or embankments will exist within the permit area.

536.900 Refuse Piles

A detailed description of the waste-rock disposal/storage sites at the Dugout Canyon Mine (Refuse Pile Amendment, February 2003), SUFCo and Skyline Mines is provided in their respective M&RPs. These M&RPs provide:

- A description of pre-disturbance soils at the sites;
- Certification of the design and plans;
- Compliance with applicable MSHA regulations;
- A description of proposed inspection activities;
- A description of the design, stability, operation, and reclamation of the waste-rock sites; and
- A discussion of runoff- and sediment-control plans associated with the sites.

The suitability of the waste rock to be generated from the Dugout Canyon Mine for reclamation is discussed in Chapters 2 and 6 of this M&RP.

541.200 Surface Coal Mining and Reclamation Activities

No surface coal mining and reclamation activities will be conducted in the permit area.

541.300 Underground Coal Mining and Reclamation Activities

All surface equipment, structures, or other facilities not required for continued underground mining activities and monitoring, unless approved by the Division as suitable for the post-mining land use or environmental monitoring, will be removed and the affected lands reclaimed following permanent cessation of mining operations.

541.400 Environmental Protection Performance Standards

The plan presented herein is designed to meet the requirements of R645-301 and the environmental protection performance standards of the State Program.

542 Narratives, Maps, and Plans

542.100 Reclamation Timetable

A timetable for the completion of each major step in the reclamation plan is presented in Figure 5-3.

542.200 Plan for Backfilling, Soil Stabilization, Compacting, and Grading

The regrading plans for the waste rock disposal facilities at the Dugout Canyon Mine (Refuse Pile Amendment, February 2003), SUFCo and Skyline Mines are presented in their respective M&RPs. The Dugout Canyon regrading plan was designed to meet the objectives of balancing cut and fill quantities, maintaining a geotechnically stable base. The primary features of this plan are:

Disposal of Coal Mine Waste. All coal mine waste generated at the Dugout Canyon Mine will be disposed of either underground or at the waste-rock disposal sites associated with the Dugout Canyon Mine (Refuse Pile Amendment, February 2003), SUFCo and/or Skyline Mines. Coal mine waste that is temporarily stored on the surface at the Dugout Canyon Mine prior to off-site disposal will be removed from the Dugout Canyon Mine prior to reclamation. Information regarding disposal practices and reclamation plans for these off-site disposal facilities is provided in their respective M&RPs.

Disposal of Non-Coal Mine Wastes. All non-coal (non-waste rock) waste generated from mining and reclamation operations will be disposed of as outlined in Sections 526.100 and 528.300. Following cessation of mining activities, non-coal mine waste that is still temporarily stored at the site will be removed and disposed of as outlined in Section 528.300. Non-coal waste that is generated during the course of reclamation that cannot be salvaged will be disposed of at an off-site permitted facility.

542.800 Estimated Cost of Reclamation

The existing bond, together with the estimated cost to reclaim the Dugout Canyon Mine surface facilities as modified by this submittal, is provided in Appendix 5-6.

550 RECLAMATION DESIGN CRITERIA AND PLANS

551 Casing and Sealing of Underground Openings

Each underground opening to the mine will be sealed and backfilled when no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects. Permanent closure measures will be as described in Section 542.700. This closure method has been designed to prevent access to the mine workings by people, livestock, fish and wildlife, and machinery. The closures have also been

In an effort to eliminate pre-existing highwalls at the site following reclamation, soil may be replaced during reclamation at slopes of up to 1.5H:1V. The steepness of these slopes will be reduced at their base, providing a concave slope. As noted above, these slopes will be geotechnically stable. Dozers will be used during placement of the topsoil or substitute topsoil on these steep slopes, taking care to achieve a reasonably uniform thickness of the final soil cover. Following placement and prior to seeding, all areas with a slope steepness of 3H:1V or steeper will be deep gouged using a trackhoe. The final surface will consist of mounds and depressions capable of holding runoff and difficult to walk on. Refer to Sections 355 and 341 regarding erosion-control matting and revegetation.

Although the gouging will extend below the depth of the final topsoil layer, information presented in Section 222.400 of this M&RP indicates that the subsoils will be of acceptable chemical and physical quality, with the possible exception of the percentage of rock fragments. Hence, the surface will still be capable of sustaining an adequate vegetative cover, further minimizing long-term erosion of the slopes.

Post-Mining Land Use. The disturbed area will be backfilled and regraded in a manner that supports the approved post-mining land use.

553.200 Spoil and Waste

Spoil. No spoil will be generated within the permit area.

Refuse Piles. Details regarding the design, operation, final surface configuration, and final grading of the waste-rock disposal sites at the Dugout Canyon Mine, SUFCo and Skyline Mines are provided in their respective M&RPs. Refuse generated from the Dugout Canyon Mine will be disposed of only at sites that have been approved to accept material from the mine.

Coal Processing Waste. No coal processing waste will be generated within the permit area.

CHAPTER 7
HYDROLOGY

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
725 Baseline Cumulative Impact Area Information	7-39
726 Modeling	7-40
727 Alternative Water Source Information	7-40
728 Probable Hydrologic Consequences	7-40
728.100 Potential Impacts to Surface and Groundwater	7-40
728.200 Baseline Hydrologic and Geologic Information	7-41
728.300 PHC Determination	7-41
Potential Impacts to the Hydrologic Balance	7-41
Acid- or Toxic-Forming Materials	7-41
Sediment Yield	7-41
Acidity, Total Suspended Solids, and Total Dissolved Solids	7-42
Flooding or Streamflow Alteration	7-43
Groundwater and Surface Water Availability	7-45
Potential Hydrocarbon Contamination	7-50
Road Salting	7-50
Coal Haulage	7-50
Water Replacement	7-51
729 Cumulative Hydrologic Impact Assessment (CHIA)	7-51
730 OPERATION PLAN	7-52
731 General Requirements	7-52
731.100 Hydrologic-Balance Protection	7-52
Groundwater Protection	7-52
Surface Water Protection	7-52
731.200 Water Monitoring	7-53
Groundwater Monitoring	7-53
Surface Water Monitoring	7-58
731.300 Acid- and Toxic-Forming Materials	7-62
731.400 Transfer of Wells	7-62
731.500 Discharges	7-62

CHAPTER 7 HYDROLOGY

710 INTRODUCTION

711 General Requirements

This chapter presents a description of:

- Existing hydrologic resources within the permit and adjacent areas;
- Proposed operations and the potential impacts to the hydrologic balance;
- Methods of compliance with design criteria and the calculations utilized to show compliance;
- Applicable hydrologic performance standards; and
- Hydrologic reclamation plans for the Dugout Canyon Mine.

Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

712 Certification

All maps, plans, and cross sections presented in this chapter have been certified by a qualified, registered professional engineer.

713 Inspection

Impoundments associated with the mining and reclamation operations will be inspected as described in Section 514.300 of this M&RP.

M&RP. All groundwater use (seeps and springs) within the permit and adjacent areas is confined to wildlife and stock watering.

Table 7-2 provides a summary of the period of record and selected additional information regarding groundwater sources that have been monitored within the permit area and the nearby vicinity. These sources include wells, springs, and mine-water inflows from the Soldier Canyon Mine. The geologic source for the springs presented in Table 7-2 was determined by comparing Plates 6-1 and 7-1. These data have been collected from over 100 locations within the permit and adjacent areas beginning as early as 1976 and extending through the present, as indicated in the data base contained in Appendix 7-2.

The data provided in Appendix 7-2 were obtained from multiple sources, including (but not limited to) the Soldier Creek Coal Company M&RP and annual reports, U.S. Geological Survey publications, the Sage Point-Dugout Canyon permit application filed by Eureka Energy Company in 1980, Appendix 7-3 of this M&RP, and various consultant reports. Since not all monitoring parties were responsible to adhere to UDOGM or SMCRA rules, the laboratory parameters varied between reports. However, the data are still considered valid and appropriate for determining baseline conditions within the permit and adjacent areas. It should be noted that much of the manganese data presented in Appendix 7-3 represent total (as opposed to dissolved) concentrations. **Additional baseline and operational data for sampling sites within the SITLA tract addition to the Dugout Mine permit is also available on the Division's Electron Water Monitoring Database.**

A hydrologic evaluation of the area was ~~recently~~ published by Mayo and Associates (1996). This evaluation, which is presented in Appendix 7-3 of this M&RP was used together with published reports of the area and the extensive data base contained in Appendix 7-2, to prepare this description of baseline hydrologic conditions within the permit and adjacent areas. **While the Mayo report does not specifically include the SITLA tract area, the geologic and hydrogeologic conditions within the tract are similar enough to the area studied by Mayo to assume the conclusions reached by Mayor would apply to the SITLA tract.**

Groundwater Systems

Geologic conditions in the permit and adjacent areas are described in detail in Chapter 6 of this M&RP. Formal aquifer names have not been applied to any groundwater system in the permit and

Waddell et al. (1986) performed seepage studies in Pine Canyon (located immediately north of the permit area) and found that significant increases in the flow of Pine Canyon occur near the contact of the North Horn Formation and the overlying Flagstaff Formation. They concluded that downward percolation from the Flagstaff Formation is impeded by the claystones and mudstones of the North Horn Formation, forcing the water to move laterally and emerge along the outcrop in the canyon bottom.

724.200 Surface Water Information

Water Quantity

The permit area exists within portions of the Dugout Creek, Soldier Creek, and Pace Creek, and Rock Creek watersheds. Major tributaries of Soldier Creek whose watersheds extend into the permit area include Fish Creek and Pine Canyon. Based on observations and flow data obtained during the collection of water-quality samples within the permit and adjacent areas, portions of Dugout, Fish Creek, and Pace Creek are considered perennial within the permit area. Pine Canyon appears to be perennial in its upper reaches near the northern border of the permit area. Rock Creek appears to be perennial in its upper reaches above the Castlegate Sandstone and only intermittent below the formation. Several smaller tributaries of these streams within the permit and adjacent areas, are ephemeral.

Waddell et al. (1981) estimated that the average flow of Dugout Creek is approximately 7 cubic feet per second (5,100 acre-feet per year) and that up to 70 percent of the streamflow occurs during the period of May through July each year. The seasonal record of a stream gaging station which was installed on Dugout Creek during the period of October 1, 1979 through October 2, 1981 suggest that this estimate of the seasonal variation is correct (see Appendix 7-5). The location of this stream gaging station (DC-1) is noted on Plate 7-1.

During the 1980 water year, Waddell et al. (1986) estimated that the total flow of Dugout Creek at station DC-1 (referred by them as station S60) was 1,900 acre-feet. They further estimated that 53 percent of this flow (1,000 acre-feet) was contributed by springs issuing from the Flagstaff Formation, 10 percent (200 acre-feet) was contributed by springs issuing from the Blackhawk and other formations, and 37 percent (700 acre-feet) was contributed as surface runoff.

Figure 7-10 presents semilog plots of streamflow in Soldier Creek (station G-5) and Dugout Creek (station DC-1) for the latter portion of 1980, as reported by Waddell et al. (1986). Included in this figure are plots of discharge rates for springs issuing from the Flagstaff Formation and from the underlying Blackhawk Formation, Castlegate Sandstone, and Price River and North Horn Formations (Waddell et al., 1986). At Soldier Creek, the curves are approximately parallel for streamflow and the composite flows issuing from the Flagstaff Formation through August. Thereafter, the recession curve for the streamflow flattens, while that for the Flagstaff Formation continues to decrease. Based on this condition, Waddell et al. (1986) concluded that the discharge of Soldier Creek is controlled predominantly by seepage from the Flagstaff Formation during the spring and early summer and by seepage from the underlying formations (Blackhawk, Castlegate, Price River, and North Horn) during the late summer and fall.

The data presented in Figure 7-10 indicate that discharge from the Flagstaff Formation dominates the flow of Dugout Creek throughout the year. Seepage from the underlying formations may slightly influence the flow of Dugout Creek during the autumn months, but this influence appears to be minimal. The lack of seepage from the Blackhawk and immediately-overlying formations to Dugout Creek supports the conclusion presented in Section 724.100 that the flow of groundwater within the permit and adjacent areas is to the north-northwest (i.e., away from Dugout Canyon).

Limited flow data is available from monitoring points within Pace Canyon and Rock Canyon Creeks. However, the data included in Appendix 7-7 suggests that flow within Pace Canyon Creek varies seasonally. **Data collected at points PC-1A and PC-2 since June 1999, which are included in the Division's water database and in the updated spreadsheets found in Appendix 7-7, supports this determination. Flows in spring/early summer are typically several times greater than in late summer/fall. Also, it is interesting to note that in 2002 and 2003 there have been periods when there is no flow at station PC-2 and flows measured in late summer/fall at PC-1A have been significantly less than in previous years. The drop in flow is undoubtedly related to the prolonged drought the area has been suffering through since 1999.** Base flow within this drainage appears to originate from springs discharging from the Castlegate Sandstone, Price River, Flagstaff/North Horn, and Colton Formations. The majority of the flow appears to originate from springs within the North Horn and Flagstaff Formations. **Rock Canyon Creek base flow in its upper reaches appears to originate from springs discharging from the Northhorn Formation. Flow data from monitoring site RC-1 indicates the lower sections of Rock Creek generally flow in response to spring runoff and after summer precipitation events.**

Surface flows measured at monitoring point RC-1 near the mouth of Rock Canyon indicate that the stream is intermittent and also fluctuates in flow volume seasonally. In 2002 and 2003, flow was measured at RC-1 only flowed after a significant precipitation event. Again, the lack of flow in this creek is most likely related to the drought conditions that appear to have begun in the area in 1999.

No streamflow data are available for ephemeral drainages in the permit and adjacent areas. When it does occur, ephemeral runoff in the area is expected to occur predominantly in the months of April and May in response to snowmelt runoff and in the months of August and September as a result of thunderstorm activity. Snowmelt may result in flow durations of a few weeks, while thunderstorms are expected to result in runoff with a short duration and high intensity.

Several small impoundments have been constructed in the permit and adjacent areas to capture water for stock watering. Those impoundments where water rights applications have been filed are located as shown on Plate 7-2. The impoundments capture water either from an adjacent spring or from snowmelt.

A UPDES permit application has been issued by the Utah Division of Water Quality as indicated in Appendix 7-6. This application applies to discharge from the ~~proposed~~ sedimentation pond. Discharge from this point ~~will~~ occurs only infrequently as a result of pond dewatering **or after significant precipitation events**. The application also applies to discharges from the underground mine workings.

Surface-water quality samples have been periodically collected in the permit and adjacent areas from stations located on Soldier Creek, Dugout Creek, Pine Canyon, Pace Creek, and Rock Canyon Creek (Plate 7-1). Analytical data from these sources are summarized in Appendix 7-7. These data were obtained from multiple sources, including (but not limited to) the Soldier Creek Coal Company M&RP and annual reports, U.S. Geological Survey publications, the Sage Point-Dugout Canyon permit application filed by Eureka Energy Company in 1980, Appendix 7-3 of this M&RP, and various consultant reports. Since not all monitoring parties were responsible to adhere to UDOGM or SMCRA rules, the laboratory parameters varied between reports. However, the data are still considered valid and appropriate for determining baseline conditions within the permit and adjacent areas. It should be noted that most of the manganese data presented in Appendix 7-3 represent total (as opposed to dissolved) concentrations.

In general, TDS concentrations of surface waters in the permit and adjacent areas vary inversely with the discharge rate. These concentrations also tend to increase in the downstream direction (Waddell et al., 1986). Total suspended solids concentrations in the local surface waters tend to vary directly with the flow rate (Waddell et al., 1986).

The data presented in Appendix 7-7 indicate that the dominant ions in surface water during high-flow periods are calcium and bicarbonate, whereas the dominant ions in the low-flow periods are sodium, magnesium, sulfate, and bicarbonate. During high-flow periods, runoff is rapid and most surface waters only interact chemically with the uppermost regions of the soil zone. Thus, they are dominated by calcium and bicarbonate ions. Furthermore, groundwater contributions from the Flagstaff Formation (where calcium and bicarbonate are the primary ions) dominate the chemical quality of surface water during high-flow periods (see Figure 7-10).

quickly fill, recreating pre-subsidence stream channel conditions. Thus, the potential impact to sediment yield from subsidence in the permit area would be minor and of short duration.

Various sediment-control measures will be implemented during reclamation as the vegetation becomes established. As discussed in Section 542.200 of this M&RP, these measures will include installation of silt fences and straw-bale dikes in appropriate locations to minimize potential contributions of sediment to Dugout Creek. These measures will reduce the amount of erosion from the reclaimed areas, thereby precluding adverse impacts to the environment.

Acidity, Total Suspended Solids, and Total Dissolved Solids. Probable impacts of mining and reclamation operations on the acidity and total suspended solids concentrations of surface and groundwater in the permit and adjacent areas were addressed previously in this section.

Data presented in Appendix 7-2 and summarized in Section 724.100 of this M&RP indicate that the average TDS concentration of water in the Blackhawk Formation (as measured in inflow to the nearby Soldier Canyon Mine) is approximately 750 mg/l and is of the sodium-bicarbonate type. As noted in Section 724.200, the TDS concentration of water in Dugout Creek ranges from 350 to 500 mg/l. The dominant ions in this water are calcium and bicarbonate during high-flow periods, whereas the dominant ions during low-flow periods are sodium, magnesium, sulfate, and bicarbonate.

These data suggest that the TDS concentration of water in Dugout Creek can be expected to increase by a factor of approximately 2 if water is discharged from the mine to the Creek. During periods of low streamflow, the dominant ions in the Blackhawk Formation water and Dugout Creek should be similar. However, during periods of high streamflow, the dominant cation will be sodium in the Blackhawk water and calcium in Dugout Creek. It should be noted that it is anticipated that the Dugout Canyon Mine will use powdered limestone or dolomite (i.e., calcium-magnesium-carbonate) for rock dust. It is not anticipated that gypsum rock dust (calcium-sulfate) will be used in the mine. Hence, dissolution of rock dust by water in the mine should not influence the chemical type of water in Dugout Creek if mine water is discharged to the creek.

Typical iron and manganese concentrations in the Blackhawk Formation and Dugout Creek (as summarized in previous sections) are:

	<u>Blackhawk Formation</u>	<u>Dugout Creek</u>
Dissolved iron	<0.1 mg/l	<0.01 mg/l
Total iron	<0.5 mg/l	<1.0 mg/l

Dissolved manganese	--	<0.01 mg/l
Total manganese	<0.1 mg/l	<0.1 mg/l

These data indicate that the concentration of iron and manganese in Dugout Creek should not be significantly affected by discharges from the mine.

Dugout Creek, as part of the lower Price River basin, is classified according to Section R317-2-13 of the Utah Administrative Code (Standards of Quality for Waters of the State) as a class 2B (secondary contact recreation use), 3C (nongame fish and other aquatic life use), and 4 (agricultural use) water. No TDS standards exist for class 2B and 3C water. The TDS standard for class 4 water is 1,200 mg/l. Hence, if discharges occur from the Dugout Canyon Mine to Dugout Creek, the data indicate that the TDS concentration of these discharges will not exceed the applicable water quality standard.

It should also be noted that the dissolved iron standard for class 3C water is 1.0 mg/l. No dissolved iron standard exists for class 2B or 4 waters. The data presented above indicate that potential discharge water from the mine will not exceed the dissolved iron standard of Dugout Creek. No standards exist in the R317 regulations for total iron, dissolved manganese, or total manganese. However, the data presented above indicate that potential discharges from the mine to Dugout Creek will meet the effluent limitations of 40 CFR 434.

Mining in the Gilson seam on the east side of the Right Fork of Dugout Creek resulted in the operator draining the flooded old Knight Ideal Mine working in August 2002 and again in May 2003 to prevent catastrophic flooding of the current Dugout Canyon Mine operations. The old workings contained water with total iron in excess of 1 mg/l and this water was discharged to Dugout Creek at a rate that at times reached 1117 gpm. As a result of draining the old workings, the water discharged to Dugout Creek did have a total iron concentration in excess of the UPDES permit limit of 1 mg/l for a short period of time. It appears that water will be continuously drained from the Knight Ideal Mine for the foreseeable future to maintain safe underground working conditions but at a discharge rate expected to be much less than 100 gpm.

No hydrologic impacts have been noted at the adjacent Soldier Canyon Mine nor at the Dugout Canyon Mine due to subsidence. Although tension cracks may locally divert water into deeper formations, resulting in increased leaching of the formation and increased TDS concentrations, the potential of this occurring is considered minimal. This conclusion is based on experience at the Soldier Canyon Mine and on the fact that the shale content of the North Horn Formation, the

Price River Formation, and the Blackhawk Formation should cause these subsidence cracks to heal quickly where they are saturated by groundwater flow. Thus, potential impacts on TDS concentrations would be minor and not of significant concern. **To date (January 2004), mining and subsidence within the Dugout permit area has not resulted in the loss of surface flows in the Dugout Creek drainage or impacts to ground water discharge rates at the monitored seeps and springs.**

Flooding or Streamflow Alteration. Runoff from all disturbed areas will flow through a sedimentation pond or other sediment-control device prior to discharge to Dugout Creek. Three factors indicate that these sediment-control devices will minimize or preclude flooding impacts to downstream areas as a result of mining operations:

1. The sedimentation pond has been designed and will be constructed to be geotechnically stable. Thus, the potential is minimized for breaches of the sedimentation pond to occur that could cause downstream flooding.
2. The flow routing that occurs through the sedimentation pond and other sediment-control devices reduces peak flows from the disturbed areas. This precludes flooding impacts to downstream areas.
3. By retaining sediment on site in the sediment-control devices, the bottom elevations of Dugout Creek downstream from the disturbed area will not be artificially raised. Thus, the hydraulic capacity of the stream channel will not be altered.

The volume of streamflow will increase in Dugout Creek if water is discharged from the mine to the creek. Potential impacts to the creek channel could include the displacement of fines on the channel bottom, and minor widening of the channel. However, the degree of widening will likely be minimized by the increased vigor and quantity of vegetation which will be sustained along the stream channel by the increased availability of water. In particular, it is anticipated that the deciduous streambank vegetative community (see Section 321.100) will increase in density and vigor as a result of mine-water discharges. This effect will occur for the distance downstream that surface flows can be sustained above channel transmission losses. Care will be taken during discharge of this water to avoid flooding of downstream areas. Once mining ceases, the mine will be sealed and no discharges will occur. The streamflow in Dugout Creek will then return to pre-mining discharge levels.

Following reclamation, stream channels which have been altered by mining operations will be returned to a stable state (see Section 762.100). The reclamation channels have been designed to safely pass the peak flow resulting from the 10-year, 6-hour or the 100-year, 6-hour precipitation event as appropriate for the channel and in accordance with the R645 regulations (Appendix 7-

11). Thus, flooding in the reclaimed areas will be minimized. Interim sediment-control measures and maintenance of the reclaimed areas during the post-mining period will preclude deposition of significant amounts of sediment in downstream channels following reclamation, thus maintaining the hydraulic capacity of the channels and precluding adverse, off-site flooding impacts.

Subsidence tension cracks that appear on the surface will increase the secondary porosity of the formations overlying the Dugout Canyon Mine. During the period prior to healing of these cracks, this increased percolation will decrease runoff during the high-flow season (when the water would have rapidly entered the stream channel rather than flowing into the groundwater system). During low-flow periods, the result of this increased percolation will be an increase in the base flow of the stream. Hence, the net result will be a decrease in the flooding potential of the affected stream.

Subsidence under the main fork of Dugout Creek will occur in areas where overburden ranges from 600 to 1200 feet thick. The area of the least amount of overburden, approximately 600 feet, occurs in the southern half of Section 14, Township 13 South Range 12 East. Additionally, subsidence on the right hand fork of Dugout Creek will occur where overburden ranges from 500 feet to 2000 feet. The least amount of overburden on this fork of the creek occurs in the northeast quarter of Section 23, Township 13 South, Range 12 East. In both areas where the least amount of overburden occurs, the stream channels are lined with several feet of soils and fine grained sediments. Also, the upper Blackhawk Formation, which consists of interbedded shale, mudstone, siltstone, and sandstone, is exposed at the surface in a portion of these low overburden areas. The Castlegate Sandstone is present in the two low overburden areas but is rarely exposed in the channel floors.

The current mine plans include mining gate roads and entries under several sections of Pace Creek. However only limited subsidence will occur under Pace Creek in a portion of the southwest 1/4 of in portions of Section 20, Township 13 South, Range 13 East where a longwall panel is projected to be mined (Plate 5-7). The stream channel in this area is lined with several feet of soils and fine grained sediments. Additionally, if surface cracks do occur in the sediments due to subsidence, it is likely any cracks will quickly fill with fine grained material and restrict the water from entering the fractures. Also, The upper Blackhawk upper units of the Price River Formation which consists of sandstone, and the lower units of the North Horn Formation which consist of interbedded sandstone and mudstone, underlie the stream in this area. is exposed at the surface in this area. The overburden above the Gilson seam where subsidence will occur under Pace Creek will be at least 1000 feet thick or more. As mining progresses to the east, the overburden

becomes thicker due to changes in topographic elevation and the dip of the coal beds. Current mine plans do not include subsidizing any perennial portion of Rock Canyon Creek.

A subsidence study performed at Burnout Canyon, a perennial stream drainage subsided by long wall mining at the Canyon Fuel Company, LLC Skyline Mines, suggests that thick fine grained soil mantles overlying bedrock appear to prevent noticeable stream flow losses to the bedrock (Rocky Mountain Research Station, 1998). Though the climatic regime and regional stratigraphy are not identical to the Burnout Canyon area, enough similarities exist to suggest that the bedrock, soils, and channel floors should react to subsidence in a similar fashion. As discussed in preceding sections, fractures related to subsidence within the fine grained sediments of the upper Blackhawk Formation in the Soldier Canyon Mine area tend to heal relatively rapidly. Also, fractures within the channel floor would be expected to fill quickly with fine grained sediments and become relatively impermeable. Therefore, the loss of stream flow to the mine is highly unlikely and losses to bedrock beneath the channel, or in the limited areas where bedrock is exposed in the channel floor, would be short lived.

Groundwater and Surface Water Availability. Potential impacts to the availability of surface and groundwater from the Dugout Canyon Mine operations include both decreased and increased stream flows and spring discharges caused by mine-related subsidence, bedrock fracturing, and aquifer dewatering. These potential impacts are discussed below.

Potential for Decreased Spring and Stream Flows

To date, limited surface subsidence has been identified as a result of coal mining in the nearby Soldier Canyon Mine. However, bedrock fracturing routinely occurs in the rock units overlying the mined coal seams. Given the limited number of springs and limited groundwater resources of the Blackhawk, Castlegate, and Price River Formations in the permit and adjacent areas, subsidence or fracturing would affect the hydrologic balance in the area only if zones of increased vertical hydraulic conductivity were created which extended through the Price River Formation into the North Horn and Flagstaff Formations.

Several lines of evidence suggest that mining-related subsidence and bedrock fracturing have not resulted in decreased stream flows or groundwater discharge in the vicinity of the nearby Soldier Canyon Mine. For instance, although spring SP-10 is likely the result of the upwelling of deep groundwater, it is significant to note that the spring discharge rate has not been affected by mining operations, even though mining has cut through the fracture zone at depths. Furthermore,

although considerable seasonal and climatic variability are noted in the hydrographs of springs in the permit and adjacent areas, data for both Soldier Creek and springs which overlie the Soldier Canyon Mine workings do not show discharge declines which may be attributed to either subsidence or bedrock fracturing (see Appendix 7-3).

As of December 2003, none of the spring monitoring sites had been undermined and subsided at Dugout Canyon Mine. Therefore, impacts to springs due to subsidence at this mine cannot be fully studied at this time but should have similar effects to ground water as mining at the Soldier Canyon Mine. Ephemeral portions of Fish Creek and Dugout Creek drainages have been subsided and no significant adverse effects to those drainages have been noted to Dugout Creek.

Active groundwater systems in the Flagstaff and North Horn Formations are separated from the Blackhawk groundwater system by the Price River Formation. As discussed in Section 724.100, this formation contains very few springs and is not considered to be a major groundwater resource. Past mining in the Soldier Canyon Mine has not increased the rate of spring discharge from the Price River Formation, indicating that groundwater is not being diverted into this formation. The absence of increased saturation in the Price River Formation due to coal mining indicates that vertical zones of artificially-increased hydraulic conductivity do not extend into the Price River Formation and from thence into the active groundwater systems of the North Horn and Flagstaff Formations.

Data presented in Appendix 7-3 and summarized in Section 724.100 indicate that the Blackhawk groundwater system, in the vicinity of mined coal seams, contains ancient groundwater which is compartmentalized both vertically and horizontally. Coal mining locally dewateres overlying rock layers in the Blackhawk Formation but does not appear to draw additional recharge from overlying or underlying groundwater systems (see Appendix 7-3).

The strong vertical gradients in Blackhawk Formation rock layers underlying actively mined coal seams in the Soldier Canyon Mine and the absence of significant discharge into the mine from these layers indicates that mining does not draw groundwater from the underlying Mancos Shale. Additionally, the distinctive solute composition of Mancos Shale groundwater has not been observed inside the Soldier Canyon Mine (see Appendix 7-3).

From the above discussion, it appears that the Soldier Canyon Mine has not decreased groundwater discharge in overlying or underlying groundwater systems. Hence, it is unlikely that coal mining will effect the discharges of any spring as a result of mining in the Dugout Canyon permit and adjacent areas.

However, a copy will be maintained at the mine site as required by the Utah Division of Water Quality.

Road Salting. No salting of roads will occur within the permit area. Hence, this impact is not a significant concern.

Coal Haulage. Coal will be hauled over the county road from the mine portal area to the Soldier Creek Road and thence to its ultimate destination. In the event of an accident which causes coal to spill from the trucks, residual coal following cleanup of the spill may wash into local streams during a runoff event. Possible impacts to the surface water are increased total suspended solids concentrations and turbidity from the fine coal particulates. The probability of a spill occurring in an area sufficiently close to a stream channel to introduce coal to the stream bed is considered small.

In addition to spills, wind may carry coal dust or small pieces of coal from the open top of the coal trucks into creeks near the roads. The impact from fugitive coal dust is considered to be insignificant due to the small amounts lost during haulage in the permit and adjacent areas.

Water Replacement

The water consumed in operating underground equipment, dust suppression, and evaporation is obtained from ground water sources. These underground water sources are not connected to the surface waters in the area. Research has been performed by the mine to verify that water currently entering the mine is not coming from the surface or depleting surface waters. Continued monitoring by the mine of the surface waters and seeps and springs flows in the permit and adjacent areas have shown no discernable impacts due to mining activities. It is the operator's position that the water consumed in operating Dugout Canyon Mine is not depleting surface water sources. In fact, there is an overall net gain to local river systems discharging to the Colorado River as a result of the mine's discharge.

The Permittee will replace the water supply of any land owner if such a water supply proves to be contaminated, diminished or interrupted as a result of the mining operations. First, a determination will be made by the Division in accordance with R645 - 301- 731.800 as to whether or not material damage has occurred. Then, in accordance with Regulation R645-301-525.510, Dugout Canyon Mine will correct any material damage resulting from subsidence caused to surface lands (which includes water rights), to the extent technologically and economically feasible, by restoring the land to a condition capable of maintaining the value and reasonably

foreseeable uses that it was capable of supporting before subsidence damage. Negotiations will be held with the water right holders to determine the best plan of action and implementation of water replacement.

729 Cumulative Hydrologic Impact Assessment (CHIA)

A Cumulative Hydrologic Impact Assessment to include the permit and adjacent areas is to be prepared by the Division.

730 OPERATION PLAN

731 General Requirements

This permit application includes an operation plan which addresses the following:

- Groundwater and Surface Water Protection and Monitoring Plan;
- Design Criteria and Plans;
- Performance Standards; and
- Reclamation Plan.

731.100 Hydrologic-Balance Protection

Groundwater Protection. To protect the hydrologic balance, coal mining and reclamation operations will be conducted to handle earth materials and runoff in a manner that minimizes acidic, toxic, or other harmful infiltration to the groundwater system. Additionally, ~~SCM~~the permittee will manage excavations and disturbances to prevent or control discharges of pollutants to the groundwater.

As indicated in Section 728.300, it is anticipated that an average of approximately 190 gallons per minute of groundwater encountered in the mine will eventually be discharged to Dugout Creek. This water will be discharged in a controlled manner, in accordance with an approved UPDES permit, via a pipeline from the mine to the creek. The discharge point is anticipated to be located at the upstream inlet to the Dugout Canyon culvert, UC-5. If the discharge occurs to a point outside of the culvert, riprap will be placed at the outlet of the pipe to prevent erosion. Any erosion that occurs at the point of discharge will be repaired as soon as practical.

Surface Water Protection. To protect the hydrologic balance, coal mining and reclamation operations will be conducted to handle earth materials and runoff in a manner that minimizes

Data will be collected under the groundwater monitoring program every year following the completion of surface reclamation activities. During the post-mining period, water levels will be collected from the monitoring wells and data/samples will be collected from the identified springs once each year during September or October (i.e., the low-flow season while the sites are still accessible). Groundwater monitoring during the post-mining period will continue until bond release.

All groundwater monitoring data will be submitted to the Division by the end of the quarter following sampling. If analyses of any groundwater sample indicates noncompliance with the permit conditions, ~~SCM~~ **the permittee** will promptly notify the Division and take immediate appropriate actions. UPDES reporting requirements will be met for the mine-water discharge point. The Snotel data used to determine "wet" or "dry" years, as described previously in this section, will be submitted with the first quarter water monitoring data beginning in the year 2001.

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of groundwater in the permit and adjacent areas have been or will be installed, maintained, and operated in accordance with accepted procedures. Where feasible, this equipment will be removed or properly abandoned by ~~SCM~~ **the permittee** when no longer needed.

Surface Water Monitoring. Surface water monitoring to be conducted in the permit and adjacent areas will consist of data collection from streams and sedimentation pond discharges. Locations of streams to be monitored are noted on Plate 7-1. The surface water monitoring plans presented herein were developed based on information presented in the PHC determination, the baseline hydrologic data, and the geologic data presented in Chapter 6 of this M&RP.

Station DC-1 will be monitored to evaluate surface-water conditions downstream from the proposed surface facilities. Stations DC-2 and DC-3 will provide data concerning background surface-water conditions immediately upstream from the proposed surface facilities. Stations DC-4 and DC-5 will be located at the Castlegate Sandstone-Blackhawk Formation contact and will provide data that will be used to determine the relationship between the Blackhawk Formation and the base flow of Dugout Creek.

PC-1a and PC-2 are located on Pace Creek and will be monitored to evaluate surface-water conditions up gradient and down gradient, respectively, of the permit area. RC-1 has also been established as monitoring point to obtain baseline data for future mine expansion. Baseline data will be obtained from the aforementioned three sites for three years prior to initiating operational sampling.

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of surface water in the permit and adjacent areas have been or will be installed, maintained, and operated in accordance with accepted procedures. Where feasible, this equipment will be removed or properly abandoned by SCM when no longer needed.

731.300 Acid- and Toxic-Forming Materials

Analyses presented in Chapter 6 of this M&RP indicate that acid- and toxic-forming materials are not present within the permit area. Parameters defining acid- and toxic-forming materials will periodically be monitored as described in Chapter 6 of this M&RP. In the event that acid- or toxic-forming materials are identified, they will be disposed of in appropriate waste-rock disposal facilities as described in Chapter 5 of this M&RP.

731.400 Transfer of Wells

Before final release of bond, exploration or monitoring wells will be sealed in a safe and environmentally sound manner in accordance with R645-301-631, R645-301-738, and R645-301-765. Ownership of wells will be transferred only with prior approval of the Division. The conditions of such a transfer will comply with State and local laws. ~~SCM~~The permittee will remain responsible for the management of the wells until bond release in accordance with R645-301-529, R645-301-551, R645-301-631, R645-301-738, and R645-301-765.

731.500 Discharges

Discharges into an Underground Mine. No discharges of surface water will be made to an underground mine in the permit and adjacent areas.

Gravity Discharges from an Underground Mine. No gravity discharges will be made from an underground mine in the permit and adjacent areas.

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
725 Baseline Cumulative Impact Area Information	7-39
726 Modeling	7-40
727 Alternative Water Source Information	7-40
728 Probable Hydrologic Consequences	7-40
728.100 Potential Impacts to Surface and Groundwater	7-40
728.200 Baseline Hydrologic and Geologic Information	7-41
728.300 PHC Determination	7-41
Potential Impacts to the Hydrologic Balance	7-41
Acid- or Toxic-Forming Materials	7-41
Sediment Yield	7-41
Acidity, Total Suspended Solids, and Total Dissolved Solids	7-42
Flooding or Streamflow Alteration	7-43
Groundwater and Surface Water Availability	7-45
Potential Hydrocarbon Contamination	7-50
Road Salting	7-50
Coal Haulage	7-50
Water Replacement	7-51
729 Cumulative Hydrologic Impact Assessment (CHIA)	7-51
730 OPERATION PLAN	7-52
731 General Requirements	7-52
731.100 Hydrologic-Balance Protection	7-52
Groundwater Protection	7-52
Surface Water Protection	7-52
731.200 Water Monitoring	7-53
Groundwater Monitoring	7-53
Surface Water Monitoring	7-58
731.300 Acid- and Toxic-Forming Materials	7-62
731.400 Transfer of Wells	7-62
731.500 Discharges	7-62

CHAPTER 7 HYDROLOGY

710 INTRODUCTION

711 General Requirements

This chapter presents a description of:

- Existing hydrologic resources within the permit and adjacent areas;
- Proposed operations and the potential impacts to the hydrologic balance;
- Methods of compliance with design criteria and the calculations utilized to show compliance;
- Applicable hydrologic performance standards; and
- Hydrologic reclamation plans for the Dugout Canyon Mine.

Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

712 Certification

All maps, plans, and cross sections presented in this chapter have been certified by a qualified, registered professional engineer.

713 Inspection

Impoundments associated with the mining and reclamation operations will be inspected as described in Section 514.300 of this M&RP.

M&RP. All groundwater use (seeps and springs) within the permit and adjacent areas is confined to wildlife and stock watering.

Table 7-2 provides a summary of the period of record and selected additional information regarding groundwater sources that have been monitored within the permit area and the nearby vicinity. These sources include wells, springs, and mine-water inflows from the Soldier Canyon Mine. The geologic source for the springs presented in Table 7-2 was determined by comparing Plates 6-1 and 7-1. These data have been collected from over 100 locations within the permit and adjacent areas beginning as early as 1976 and extending through the present, as indicated in the data base contained in Appendix 7-2.

The data provided in Appendix 7-2 were obtained from multiple sources, including (but not limited to) the Soldier Creek Coal Company M&RP and annual reports, U.S. Geological Survey publications, the Sage Point-Dugout Canyon permit application filed by Eureka Energy Company in 1980, Appendix 7-3 of this M&RP, and various consultant reports. Since not all monitoring parties were responsible to adhere to UDOGM or SMCRA rules, the laboratory parameters varied between reports. However, the data are still considered valid and appropriate for determining baseline conditions within the permit and adjacent areas. It should be noted that much of the manganese data presented in Appendix 7-3 represent total (as opposed to dissolved) concentrations. Additional baseline and operational data for sampling sites within the SITLA tract addition to the Dugout Mine permit is also available on the Division's Electron Water Monitoring Database.

A hydrologic evaluation of the area was published by Mayo and Associates (1996). This evaluation, which is presented in Appendix 7-3 of this M&RP was used together with published reports of the area and the extensive data base contained in Appendix 7-2, to prepare this description of baseline hydrologic conditions within the permit and adjacent areas. While the Mayo report does not specifically include the SITLA tract area, the geologic and hydrogeologic conditions within the tract are similar enough to the area studied by Mayo to assume the conclusions reached by Mayo would apply to the SITLA tract.

Groundwater Systems

Geologic conditions in the permit and adjacent areas are described in detail in Chapter 6 of this M&RP. Formal aquifer names have not been applied to any groundwater system in the permit and adjacent areas because the geometry, continuity, boundary conditions, and flow paths of the groundwater systems in the area are not fully understood. However, the data do suggest

Waddell et al. (1986) performed seepage studies in Pine Canyon (located immediately north of the permit area) and found that significant increases in the flow of Pine Canyon occur near the contact of the North Horn Formation and the overlying Flagstaff Formation. They concluded that downward percolation from the Flagstaff Formation is impeded by the claystones and mudstones of the North Horn Formation, forcing the water to move laterally and emerge along the outcrop in the canyon bottom.

724.200 Surface Water Information

Water Quantity

The permit area exists within portions of the Dugout Creek, Soldier Creek, Pace Creek, and Rock Creek watersheds. Major tributaries of Soldier Creek whose watersheds extend into the permit area include Fish Creek and Pine Canyon. Based on observations and flow data obtained during the collection of water-quality samples within the permit and adjacent areas, portions of Dugout, Fish Creek, and Pace Creek are considered perennial within the permit area. Pine Canyon appears to be perennial in its upper reaches near the northern border of the permit area. Rock Creek appears to be perennial in its upper reaches above the Castlegate Sandstone and only intermittent below the formation. Several smaller tributaries of these streams within the permit and adjacent areas, are ephemeral.

Waddell et al. (1981) estimated that the average flow of Dugout Creek is approximately 7 cubic feet per second (5,100 acre-feet per year) and that up to 70 percent of the streamflow occurs during the period of May through July each year. The seasonal record of a stream gaging station which was installed on Dugout Creek during the period of October 1, 1979 through October 2, 1981 suggest that this estimate of the seasonal variation is correct (see Appendix 7-5). The location of this stream gaging station (DC-1) is noted on Plate 7-1.

During the 1980 water year, Waddell et al. (1986) estimated that the total flow of Dugout Creek at station DC-1 (referred by them as station S60) was 1,900 acre-feet. They further estimated that 53 percent of this flow (1,000 acre-feet) was contributed by springs issuing from the Flagstaff Formation, 10 percent (200 acre-feet) was contributed by springs issuing from the Blackhawk and other formations, and 37 percent (700 acre-feet) was contributed as surface runoff.

Figure 7-10 presents semilog plots of streamflow in Soldier Creek (station G-5) and Dugout Creek (station DC-1) for the latter portion of 1980, as reported by Waddell et al. (1986). Included in this figure are plots of discharge rates for springs issuing from the Flagstaff Formation and from the underlying Blackhawk Formation, Castlegate Sandstone, and Price River and North Horn Formations (Waddell et al., 1986). At Soldier Creek, the curves are approximately parallel for streamflow and the composite flows issuing from the Flagstaff Formation through August. Thereafter, the recession curve for the streamflow flattens, while that for the Flagstaff Formation continues to decrease. Based on this condition, Waddell et al. (1986) concluded that the discharge of Soldier Creek is controlled predominantly by seepage from the Flagstaff Formation during the spring and early summer and by seepage from the underlying formations (Blackhawk, Castlegate, Price River, and North Horn) during the late summer and fall.

The data presented in Figure 7-10 indicate that discharge from the Flagstaff Formation dominates the flow of Dugout Creek throughout the year. Seepage from the underlying formations may slightly influence the flow of Dugout Creek during the autumn months, but this influence appears to be minimal. The lack of seepage from the Blackhawk and immediately-overlying formations to Dugout Creek supports the conclusion presented in Section 724.100 that the flow of groundwater within the permit and adjacent areas is to the north-northwest (i.e., away from Dugout Canyon).

Limited flow data is available from monitoring points within Pace Canyon and Rock Canyon Creeks. However, the data included in Appendix 7-7 suggests that flow within Pace Canyon Creek varies seasonally. Data collected at points PC-1A and PC-2 since June 1999, which are included in the Division's water database and in the updated spreadsheets found in Appendix 7-7, supports this determination. Flows in spring/early summer are typically several times greater than in late summer/fall. Also, it is interesting to note that in 2002 and 2003 there have been periods when there is no flow at station PC-2 and flows measured in late summer/fall at PC-1A have been significantly less than in previous years. The drop in flow is undoubtedly related to the prolonged drought the area has been suffering through since 1999. Base flow within this drainage appears to originate from springs discharging from the Castlegate Sandstone, Price River, Flagstaff/North Horn, and Colton Formations. The majority of the flow appears to originate from springs within the North Horn and Flagstaff Formations. Rock Canyon Creek base flow in its upper reaches appears to originate from springs discharging from the Northhorn Formation. Flow data from monitoring site RC-1 indicates the lower sections of Rock Creek generally flow in response to spring runoff and after summer precipitation events.

Surface flows measured at monitoring point RC-1 near the mouth of Rock Canyon indicate that the stream is intermittent and also fluctuates in flow volume seasonally. In 2002 and 2003, flow was

measured at RC-1 only flowed after a significant precipitation event. Again, the lack of flow in this creek is most likely related to the drought conditions that appear to have begun in the area in 1999.

No streamflow data are available for ephemeral drainages in the permit and adjacent areas. When it does occur, ephemeral runoff in the area is expected to occur predominantly in the months of April and May in response to snowmelt runoff and in the months of August and September as a result of thunderstorm activity. Snowmelt may result in flow durations of a few weeks, while thunderstorms are expected to result in runoff with a short duration and high intensity.

Several small impoundments have been constructed in the permit and adjacent areas to capture water for stock watering. Those impoundments where water rights applications have been filed are located as shown on Plate 7-2. The impoundments capture water either from an adjacent spring or from snowmelt.

A UPDES permit application has been issued by the Utah Division of Water Quality as indicated in Appendix 7-6. This application applies to discharge from the sedimentation pond. Discharge from this point occurs only infrequently as a result of pond dewatering or after significant precipitation events. The application also applies to discharges from the underground mine workings.

Surface-water quality samples have been periodically collected in the permit and adjacent areas from stations located on Soldier Creek, Dugout Creek, Pine Canyon, Pace Creek, and Rock Canyon Creek (Plate 7-1). Analytical data from these sources are summarized in Appendix 7-7. These data were obtained from multiple sources, including (but not limited to) the Soldier Creek Coal Company M&RP and annual reports, U.S. Geological Survey publications, the Sage Point-Dugout Canyon permit application filed by Eureka Energy Company in 1980, Appendix 7-3 of this M&RP, and various consultant reports. Since not all monitoring parties were responsible to adhere to UDOGM or SMCRA rules, the laboratory parameters varied between reports. However, the data are still considered valid and appropriate for determining baseline conditions within the permit and adjacent areas. It should be noted that most of the manganese data presented in Appendix 7-3 represent total (as opposed to dissolved) concentrations.

In general, TDS concentrations of surface waters in the permit and adjacent areas vary inversely with the discharge rate. These concentrations also tend to increase in the downstream direction (Waddell et al., 1986). Total suspended solids concentrations in the local surface waters tend to vary directly with the flow rate (Waddell et al., 1986).

The data presented in Appendix 7-7 indicate that the dominant ions in surface water during high-flow periods are calcium and bicarbonate, whereas the dominant ions in the low-flow periods are sodium, magnesium, sulfate, and bicarbonate. During high-flow periods, runoff is rapid and most surface waters only interact chemically with the uppermost regions of the soil zone. Thus, they are dominated by calcium and bicarbonate ions. Furthermore, groundwater contributions from the Flagstaff Formation (where calcium and bicarbonate are the primary ions) dominate the chemical quality of surface water during high-flow periods (see Figure 7-10).

quickly fill, recreating pre-subsidence stream channel conditions. Thus, the potential impact to sediment yield from subsidence in the permit area would be minor and of short duration.

Various sediment-control measures will be implemented during reclamation as the vegetation becomes established. As discussed in Section 542.200 of this M&RP, these measures will include installation of silt fences and straw-bale dikes in appropriate locations to minimize potential contributions of sediment to Dugout Creek. These measures will reduce the amount of erosion from the reclaimed areas, thereby precluding adverse impacts to the environment.

Acidity, Total Suspended Solids, and Total Dissolved Solids. Probable impacts of mining and reclamation operations on the acidity and total suspended solids concentrations of surface and groundwater in the permit and adjacent areas were addressed previously in this section.

Data presented in Appendix 7-2 and summarized in Section 724.100 of this M&RP indicate that the average TDS concentration of water in the Blackhawk Formation (as measured in inflow to the nearby Soldier Canyon Mine) is approximately 750 mg/l and is of the sodium-bicarbonate type. As noted in Section 724.200, the TDS concentration of water in Dugout Creek ranges from 350 to 500 mg/l. The dominant ions in this water are calcium and bicarbonate during high-flow periods, whereas the dominant ions during low-flow periods are sodium, magnesium, sulfate, and bicarbonate.

These data suggest that the TDS concentration of water in Dugout Creek can be expected to increase if water is discharged from the mine to the Creek. During periods of low streamflow, the dominant ions in the Blackhawk Formation water and Dugout Creek should be similar. However, during periods of high streamflow, the dominant cation will be sodium in the Blackhawk water and calcium in Dugout Creek. It should be noted that it is anticipated that the Dugout Canyon Mine will use powdered limestone or dolomite (i.e., calcium-magnesium-carbonate) for rock dust. It is not anticipated that gypsum rock dust (calcium-sulfate) will be used in the mine. Hence, dissolution of rock dust by water in the mine should not influence the chemical type of water in Dugout Creek if mine water is discharged to the creek.

Typical iron and manganese concentrations in the Blackhawk Formation and Dugout Creek (as summarized in previous sections) are:

	<u>Blackhawk Formation</u>	<u>Dugout Creek</u>
Dissolved iron	<0.1 mg/l	<0.01 mg/l
Total iron	<0.5 mg/l	<1.0 mg/l

Dissolved manganese	--	<0.01 mg/l
Total manganese	<0.1 mg/l	<0.1 mg/l

These data indicate that the concentration of iron and manganese in Dugout Creek should not be significantly affected by discharges from the mine.

Dugout Creek, as part of the lower Price River basin, is classified according to Section R317-2-13 of the Utah Administrative Code (Standards of Quality for Waters of the State) as a class 2B (secondary contact recreation use), 3C (nongame fish and other aquatic life use), and 4 (agricultural use) water. No TDS standards exist for class 2B and 3C water. The TDS standard for class 4 water is 1,200 mg/l.

It should also be noted that the dissolved iron standard for class 3C water is 1.0 mg/l. No dissolved iron standard exists for class 2B or 4 waters. The data presented above indicate that potential discharge water from the mine will not exceed the dissolved iron standard of Dugout Creek. No standards exist in the R317 regulations for total iron, dissolved manganese, or total manganese. However, the data presented above indicate that potential discharges from the mine to Dugout Creek will meet the effluent limitations of 40 CFR 434.

Mining in the Gilson seam on the east side of the Right Fork of Dugout Creek resulted in the operator draining the flooded old Knight Ideal Mine working in August 2002 and again in May 2003 to prevent catastrophic flooding of the current Dugout Canyon Mine operations. The old workings contained water with total iron in excess of 1 mg/l and this water was discharged to Dugout Creek at a rate that at times reached 1117 gpm. As a result of draining the old workings, the water discharged to Dugout Creek did have a total iron concentration in excess of the UPDES permit limit of 1 mg/l for a short period of time. It appears that water will be continuously drained from the Knight Ideal Mine for the foreseeable future to maintain safe underground working conditions but at a discharge rate expected to be much less than 100 gpm.

No hydrologic impacts have been noted at the adjacent Soldier Canyon Mine nor at the Dugout Canyon Mine due to subsidence. Although tension cracks may locally divert water into deeper formations, resulting in increased leaching of the formation and increased TDS concentrations, the potential of this occurring is considered minimal. This conclusion is based on experience at the Soldier Canyon Mine and on the fact that the shale content of the North Horn Formation, the Price River Formation, and the Blackhawk Formation should cause these subsidence cracks to heal quickly where they are saturated by groundwater flow. Thus, potential impacts on TDS concentrations would be minor and not of significant concern. To date (January 2004), mining and subsidence within the Dugout permit area has not resulted in the loss of surface flows in the Dugout Creek drainage or impacts to ground water discharge rates at the monitored seeps and springs.

Flooding or Streamflow Alteration. Runoff from all disturbed areas will flow through a sedimentation pond or other sediment-control device prior to discharge to Dugout Creek. Three factors indicate that these sediment-control devices will minimize or preclude flooding impacts to downstream areas as a result of mining operations:

1. The sedimentation pond has been designed and will be constructed to be geotechnically stable. Thus, the potential is minimized for breaches of the sedimentation pond to occur that could cause downstream flooding.
2. The flow routing that occurs through the sedimentation pond and other sediment-control devices reduces peak flows from the disturbed areas. This precludes flooding impacts to downstream areas.
3. By retaining sediment on site in the sediment-control devices, the bottom elevations of Dugout Creek downstream from the disturbed area will not be artificially raised. Thus, the hydraulic capacity of the stream channel will not be altered.

The volume of streamflow will increase in Dugout Creek if water is discharged from the mine to the creek. Potential impacts to the creek channel could include the displacement of fines on the channel bottom, and minor widening of the channel. However, the degree of widening will likely be minimized by the increased vigor and quantity of vegetation which will be sustained along the stream channel by the increased availability of water. In particular, it is anticipated that the deciduous streambank vegetative community (see Section 321.100) will increase in density and vigor as a result of mine-water discharges. This effect will occur for the distance downstream that surface flows can be sustained above channel transmission losses. Care will be taken during discharge of this water to avoid flooding of downstream areas. Once mining ceases, the mine will be sealed and no discharges will occur. The streamflow in Dugout Creek will then return to pre-mining discharge levels.

Following reclamation, stream channels which have been altered by mining operations will be returned to a stable state (see Section 762.100). The reclamation channels have been designed to safely pass the peak flow resulting from the 10-year, 6-hour or the 100-year, 6-hour precipitation event as appropriate for the channel and in accordance with the R645 regulations (Appendix 7-11). Thus, flooding in the reclaimed areas will be minimized. Interim sediment-control measures and maintenance of the reclaimed areas during the post-mining period will preclude deposition of significant amounts of sediment in downstream channels following reclamation, thus maintaining the hydraulic capacity of the channels and precluding adverse, off-site flooding impacts.

Subsidence tension cracks that appear on the surface will increase the secondary porosity of the formations overlying the Dugout Canyon Mine. During the period prior to healing of these cracks, this increased percolation will decrease runoff during the high-flow season (when the water would have rapidly entered the stream channel rather than flowing into the groundwater system). During

low-flow periods, the result of this increased percolation will be an increase in the base flow of the stream. Hence, the net result will be a decrease in the flooding potential of the affected stream.

Subsidence under the main fork of Dugout Creek will occur in areas where overburden ranges from 600 to 1200 feet thick. The area of the least amount of overburden, approximately 600 feet, occurs in the southern half of Section 14, Township 13 South Range 12 East. Additionally, subsidence on the right hand fork of Dugout Creek will occur where overburden ranges from 500 feet to 2000 feet. The least amount of overburden on this fork of the creek occurs in the northeast quarter of Section 23, Township 13 South, Range 12 East. In both areas where the least amount of overburden occurs, the stream channels are lined with several feet of soils and fine grained sediments. Also, the upper Blackhawk Formation, which consists of interbedded shale, mudstone, siltstone, and sandstone, is exposed at the surface in a portion of these low overburden areas. The Castlegate Sandstone is present in the two low overburden areas but is rarely exposed in the channel floors.

The current mine plans include mining gate roads and entries under several sections of Pace Creek. However only limited subsidence will occur under Pace Creek in portions of Section 20, Township 13 South, Range 13 East where a longwall panel is projected to be mined (Plate 5-7). The stream channel in this area is lined with several feet of soils and fine grained sediments. Additionally, if surface cracks do occur in the sediments due to subsidence, it is likely any cracks will quickly fill with fine grained material and restrict the water from entering the fractures. The upper units of the Price River Formation which consists of sandstone, and the lower units of the North Horn Formation which consist of interbedded sandstone and mudstone, underlie the stream in this area. The overburden above the Gilson seam where subsidence will occur under Pace Creek will be at least 1000 feet thick or more. As mining progresses to the east, the overburden becomes thicker due to changes in topographic elevation and the dip of the coal beds. Current mine plans do not include subsiding any perennial portion of Rock Canyon Creek.

A subsidence study performed at Burnout Canyon, a perennial stream drainage subsided by long wall mining at the Canyon Fuel Company, LLC Skyline Mines, suggests that thick fine grained soil mantles overlying bedrock appear to prevent noticeable stream flow losses to the bedrock (Rocky Mountain Research Station, 1998). Though the climatic regime and regional stratigraphy are not identical to the Burnout Canyon area, enough similarities exists to suggest that the bedrock, soils, and channel floors should react to subsidence in a similar fashion. As discussed in preceding sections, fractures related to subsidence within the fine grained sediments of the upper Blackhawk Formation in the Soldier Canyon Mine area tend to heal relatively rapidly. Also, fractures within the channel floor would be expected to fill quickly with fine grained sediments and become relatively impermeable. Therefore, the loss of stream flow to the mine is highly unlikely and losses to bedrock beneath the channel, or in the limited areas where bedrock is exposed in the channel floor, would be short lived.

Groundwater and Surface Water Availability. Potential impacts to the availability of surface and groundwater from the Dugout Canyon Mine operations include both decreased and increased stream flows and spring discharges caused by mine-related subsidence, bedrock fracturing, and aquifer dewatering. These potential impacts are discussed below.

Potential for Decreased Spring and Stream Flows

To date, limited surface subsidence has been identified as a result of coal mining in the nearby Soldier Canyon Mine. However, bedrock fracturing routinely occurs in the rock units overlying the mined coal seams. Given the limited number of springs and limited groundwater resources of the Blackhawk, Castlegate, and Price River Formations in the permit and adjacent areas, subsidence or fracturing would affect the hydrologic balance in the area only if zones of increased vertical hydraulic conductivity were created which extended through the Price River Formation into the North Horn and Flagstaff Formations.

Several lines of evidence suggest that mining-related subsidence and bedrock fracturing have not resulted in decreased stream flows or groundwater discharge in the vicinity of the nearby Soldier Canyon Mine. For instance, although spring SP-10 is likely the result of the upwelling of deep groundwater, it is significant to note that the spring discharge rate has not been affected by mining operations, even though mining has cut through the fracture zone at depths. Furthermore, although considerable seasonal and climatic variability are noted in the hydrographs of springs in the permit and adjacent areas, data for both Soldier Creek and springs which overlie the Soldier Canyon Mine workings do not show discharge declines which may be attributed to either subsidence or bedrock fracturing (see Appendix 7-3).

As of December 2003, none of the spring monitoring sites had been undermined and subsided at Dugout Canyon Mine. Therefore, impacts to springs due to subsidence at this mine cannot be fully studied at this time but should have similar effects to ground water as mining at the Soldier Canyon Mine. Ephemeral portions of Fish Creek and Dugout Creek drainages have been subsided and no significant adverse effects to those drainages have been noted to Dugout Creek.

Active groundwater systems in the Flagstaff and North Horn Formations are separated from the Blackhawk groundwater system by the Price River Formation. As discussed in Section 724.100, this formation contains very few springs and is not considered to be a major groundwater resource. Past mining in the Soldier Canyon Mine has not increased the rate of spring discharge from the Price River Formation, indicating that groundwater is not being diverted into this formation. The absence of increased saturation in the Price River Formation due to coal mining indicates that vertical zones of artificially-increased hydraulic conductivity do not extend into the Price River Formation and from thence into the active groundwater systems of the North Horn and Flagstaff Formations.

Data presented in Appendix 7-3 and summarized in Section 724.100 indicate that the Blackhawk groundwater system, in the vicinity of mined coal seams, contains ancient groundwater which is compartmentalized both vertically and horizontally. Coal mining locally dewateres overlying rock layers in the Blackhawk Formation but does not appear to draw additional recharge from overlying or underlying groundwater systems (see Appendix 7-3).

The strong vertical gradients in Blackhawk Formation rock layers underlying actively mined coal seams in the Soldier Canyon Mine and the absence of significant discharge into the mine from these layers indicates that mining does not draw groundwater from the underlying Mancos Shale. Additionally, the distinctive solute composition of Mancos Shale groundwater has not been observed inside the Soldier Canyon Mine (see Appendix 7-3).

From the above discussion, it appears that the Soldier Canyon Mine has not decreased groundwater discharge in overlying or underlying groundwater systems. Hence, it is unlikely that coal mining will effect the discharges of any spring as a result of mining in the Dugout Canyon permit and adjacent areas.

Potential for Increased Stream Flows

If sufficient water is encountered in the Dugout Canyon Mine workings to require discharge of that water to the surface, the flow of Dugout Creek will be increased. To estimate the potential quantity of inflow to the Dugout Canyon Mine, the investigation of Lines (1985) was reviewed. In this investigation, Lines (1985) evaluated groundwater conditions in the Trail Mountain Area, located in the hydrogeologically-similar Wasatch Plateau approximately 23 miles southwest of the proposed Dugout Canyon Mine permit area. Using a finite-difference model, Lines (1985) evaluated potential inflows into a hypothetical coal mine in the Blackhawk Formation assuming hydraulic conductivities of 0.01 ft/day for the Blackhawk Formation and 0.02 ft/day for the Star Point Sandstone. He further assumed hydraulic gradients which varied from 0.041 ft/ft to 0.098 ft/ft. Results of these evaluations are presented in Figure 7-11.

As noted in Section 724.100, the median hydraulic conductivity of the Blackhawk Formation in the vicinity of the permit area is 5.1×10^{-4} ft/day, a factor of 20 lower than the values assumed by Lines (1985). As also noted in Section 724.100, the average hydraulic gradient of the Blackhawk Formation is 0.008 ft/ft, a factor of 5 lower than the lowest values assumed by Lines (1985). Since an increase in the hydraulic conductivity and the hydraulic gradient would tend to increase the inflow to the mine, using the evaluation of Lines (1985) should result in an overestimate of potential inflows to the Dugout Canyon Mine.

According to Plate 5-7 of this M&RP, the planned area of mining west of the proposed North Mains within the Rock Canyon seam will have a length of approximately 10,000 feet and an average width of about 3,000 feet. The planned area of mining within the Gilson seam west of the North Mains will have an average length of 6,000 feet and an average width of 3,000 feet. Similarly, the mine area within the Gilson seam in the vicinity of the Southeast Mains can be divided into two sections; one section having an approximate length of 10,000 feet and an approximate width of 4,000 feet and the other having an average length of 8,500 feet and an average width of 2,000 feet.

Using the above data and Figure 7-11, these mine "segments" can be expected to have steady-state inflows as follows:

- Rock Canyon seam 10,000-foot long and 3,000-foot wide mine segment can have a steady-state inflow of approximately 0.13 cfs (58 gpm),
- Gilson seam (west) 6,000-foot long and 3,000-foot wide mine segment can have a steady-state inflow of approximately 0.09 cfs (40 gpm),
- Gilson seam (east) 10,000-foot long and 4,000-foot wide mine segment can have a steady-state inflow of approximately 0.15 cfs (67 gpm), and
- Gilson seam (east) 8,500-foot long and 2,000-foot wide mine segment can have a steady-state inflow of approximately 0.11 cfs (49 gpm).

Totaling the one mine segment within the Rock Canyon seam and the three segments within the Gilson seam, the mine could be expected to produce approximately 214 gpm.

It should be re-emphasized that this estimate is considered to be conservatively high. Not only do site conditions indicate lower hydraulic conductivities and lower hydraulic gradients, but each section of the mine is being treated in the above analysis as though it was hydraulically isolated. Since there would be significant overlap between the cones of depression created by each section, the inflow to the mine would be further reduced below that estimated above.

The amount of water which will be discharged from the mine will equal the inflow minus that which is consumed in the mining operation (dust suppression and evaporation). Based on experience at the Soldier Canyon Mine, the rate of water to be consumed in the Dugout Canyon Mine is estimated to be 15,000,000 gallons per year (approximately 30 gpm). The remaining 190 gpm (306 acre-feet per year) is the maximum estimated discharge to Dugout Creek. This represents an increase of 6 percent in the estimated average annual flow of Dugout Creek of 5,100 acre-feet (see Section 724.200).

Section 3.1.2.1 of Appendix 7-3 estimates that the maximum discharge from both the Dugout Canyon Mine and a potential mine in the Alkali Creek tract located west of the Soldier Canyon Mine will be 800 gpm. This estimate is based on the assumption that "groundwater discharge rates into mined areas are approximately proportional to mining rates." No specific data are presented in Appendix 7-3 in support of this assumption.

Appendix 7-3 predicts that approximately 400 gpm of the 800 gpm estimated maximum discharge can be attributed to the Alkali Creek tract, leaving an estimated maximum discharge from the Dugout Canyon Mine of 400 gpm. If this maximum rate of 400 gpm could be sustained for a period of one year, this would represent an increase of 13 percent in the estimated average annual flow of Dugout Creek of 5,100 acre-feet (see Section 724.200). Hence, discharges from the Dugout Canyon Mine may result in increases in the flow of Dugout Creek of 6 percent (under steady-state conditions) to 13 percent (under maximum transient conditions).

Potential Hydrocarbon Contamination. Diesel fuel, oils, greases, and other hydrocarbon products will be stored and used at the site for a variety of purposes. Diesel and oil stored in above-ground tanks at the mine surface facilities may spill onto the ground during filling of the storage tank, leakage of the storage tank, or filling of vehicle tanks. Similarly, greases and other oils may be spilled during use in surface and underground operations.

The probable future extent of the contamination caused by diesel and oil spillage is expected to be small for three reasons. First, because the tanks will be located above ground, leakage from the tanks will be readily detected and repaired. Second, spillage during filling of the storage or vehicle tanks will be minimized to avoid loss of an economically valuable product.

Finally, the Spill Prevention Control and Countermeasure Plan which will be developed for the site will provide inspection, training, and operation measures to minimize the extent of contamination resulting from the use of hydrocarbons at the site. This plan is not required to be submitted. However, a copy will be maintained at the mine site as required by the Utah Division of Water Quality.

Road Salting. No salting of roads will occur within the permit area. Hence, this impact is not a significant concern.

Coal Haulage. Coal will be hauled over the county road from the mine portal area to the Soldier Creek Road and thence to its ultimate destination. In the event of an accident which causes coal to spill from the trucks, residual coal following cleanup of the spill may wash into local streams

during a runoff event. Possible impacts to the surface water are increased total suspended solids concentrations and turbidity from the fine coal particulates. The probability of a spill occurring in an area sufficiently close to a stream channel to introduce coal to the stream bed is considered small.

In addition to spills, wind may carry coal dust or small pieces of coal from the open top of the coal trucks into creeks near the roads. The impact from fugitive coal dust is considered to be insignificant due to the small amounts lost during haulage in the permit and adjacent areas.

Water Replacement

The water consumed in operating underground equipment, dust suppression, and evaporation is obtained from ground water sources. These underground water sources are not connected to the surface waters in the area. Research has been performed by the mine to verify that water currently entering the mine is not coming from the surface or depleting surface waters. Continued monitoring by the mine of the surface waters and seeps and springs flows in the permit and adjacent areas have shown no discernable impacts due to mining activities. It is the operator's position that the water consumed in operating Dugout Canyon Mine is not depleting surface water sources. In fact, there is an overall net gain to local river systems discharging to the Colorado River as a result of the mine's discharge.

The Permittee will replace the water supply of any land owner if such a water supply proves to be contaminated, diminished or interrupted as a result of the mining operations. First, a determination will be made by the Division in accordance with R645 - 301- 731.800 as to whether or not material damage has occurred. Then, in accordance with Regulation R645-301-525.510, Dugout Canyon Mine will correct any material damage resulting from subsidence caused to surface lands (which includes water rights), to the extent technologically and economically feasible, by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses that it was capable of supporting before subsidence damage. Negotiations will be held with the water right holders to determine the best plan of action and implementation of water replacement.

729 Cumulative Hydrologic Impact Assessment (CHIA)

A Cumulative Hydrologic Impact Assessment to include the permit and adjacent areas is to be prepared by the Division.

730 OPERATION PLAN

731 General Requirements

This permit application includes an operation plan which addresses the following:

- Groundwater and Surface Water Protection and Monitoring Plan;
- Design Criteria and Plans;
- Performance Standards; and
- Reclamation Plan.

731.100 Hydrologic-Balance Protection

Groundwater Protection. To protect the hydrologic balance, coal mining and reclamation operations will be conducted to handle earth materials and runoff in a manner that minimizes acidic, toxic, or other harmful infiltration to the groundwater system. Additionally, the permittee will manage excavations and disturbances to prevent or control discharges of pollutants to the groundwater.

As indicated in Section 728.300, it is anticipated that an average of approximately 190 gallons per minute of groundwater encountered in the mine will eventually be discharged to Dugout Creek. This water will be discharged in a controlled manner, in accordance with an approved UPDES permit, via a pipeline from the mine to the creek. The discharge point is anticipated to be located at the upstream inlet to the Dugout Canyon culvert, UC-5. If the discharge occurs to a point outside of the culvert, riprap will be placed at the outlet of the pipe to prevent erosion. Any erosion that occurs at the point of discharge will be repaired as soon as practical.

Surface Water Protection. To protect the hydrologic balance, coal mining and reclamation operations will be conducted to handle earth materials and runoff in a manner that minimizes acidic or toxic drainage, prevents, to the extent possible, additional contributions of suspended solids to streamflow outside the permit area, and otherwise prevents water pollution. Additionally, SCM will maintain adequate runoff- and sediment-control facilities to protect local surface waters.

During initial construction to develop the surface facilities, and prior to installation of all runoff- and sediment-control facilities as outlined in Section 732 of this M&RP, silt fences will be installed along the top bank of Dugout Creek and its eastern tributary in areas prior to disturbance. These silt fences will be installed in accordance with Figure 5-4. If required for control of local erosion, straw-bale dikes may also be installed at the site during initial construction. These dikes will also be

installed in accordance with Figure 5-4. The silt fences and straw-bale dikes will be periodically inspected, and accumulated sediment will be removed as needed to maintain functionality. Once the sedimentation pond, ditches, and culverts are installed, the silt fences and straw-bale dikes may be removed.

Once the runoff- and sediment-control facilities outlined in Section 732 have been installed, these structures will prevent additional contributions of suspended solids to streamflow outside the permit area. A description of sediment control following reclamation is presented in Sections 540 and 760 of this M&RP.

731.200 Water Monitoring

Groundwater Monitoring. Groundwater monitoring to be conducted in the permit and adjacent areas will consist of data collection from monitoring wells, springs, and mine-water discharges. Locations of wells and springs to be monitored are noted on Plate 7-1. The groundwater monitoring plans presented herein were developed based on information presented in the PHC determination, the baseline hydrologic data, and the geologic data presented in Chapter 6 of this M&RP.

Monitoring wells included in the groundwater monitoring program are GW-10-2, GW-11-2, and GW-24-1. The remaining monitoring wells in the general vicinity are either too remote from the permit area to be indicative of impacts occurring from the Dugout Canyon operations (i.e., GW-5-1, GW-6-1, GW-32-1, and G-58.5) or are completed across multiple aquifers (i.e., GW-19-1), making data interpretation difficult.

The monitoring wells are all completed in the Price River Formation or the underlying Castlegate Sandstone. Because the Castlegate Sandstone immediately overlies the Blackhawk Formation, data collected from these wells allow hydrologic impacts of mining to be evaluated in groundwater systems which overlie the mine workings but underlie the Flagstaff and North Horn groundwater systems.

Water-level measurements will be collected on a quarterly basis when the wells are accessible. Given the ages of the wells and the probable deterioration of the casing materials, no attempts will be made to collect water-quality data from the monitoring wells.

The springs to be included in the operational and post-mining groundwater monitoring program are:

All groundwater monitoring data will be submitted to the Division by the end of the quarter following sampling. If analyses of any groundwater sample indicates noncompliance with the permit conditions, the permittee will promptly notify the Division and take immediate appropriate actions. UPDES reporting requirements will be met for the mine-water discharge point. The Snotel data used to determine "wet" or "dry" years, as described previously in this section, will be submitted with the first quarter water monitoring data beginning in the year 2001.

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of groundwater in the permit and adjacent areas have been or will be installed, maintained, and operated in accordance with accepted procedures. Where feasible, this equipment will be removed or properly abandoned by the permittee when no longer needed.

Surface Water Monitoring. Surface water monitoring to be conducted in the permit and adjacent areas will consist of data collection from streams and sedimentation pond discharges. Locations of streams to be monitored are noted on Plate 7-1. The surface water monitoring plans presented herein were developed based on information presented in the PHC determination, the baseline hydrologic data, and the geologic data presented in Chapter 6 of this M&RP.

Station DC-1 will be monitored to evaluate surface-water conditions downstream from the proposed surface facilities. Stations DC-2 and DC-3 will provide data concerning background surface-water conditions immediately upstream from the proposed surface facilities. Stations DC-4 and DC-5 will be located at the Castlegate Sandstone-Blackhawk Formation contact and will provide data that will be used to determine the relationship between the Blackhawk Formation and the base flow of Dugout Creek.

PC-1a and PC-2 are located on Pace Creek and will be monitored to evaluate surface-water conditions up gradient and down gradient, respectively, of the permit area. RC-1 has also been established as monitoring point to obtain baseline data for future mine expansion. Baseline data will be obtained from the aforementioned three sites for three years prior to initiating operational sampling.

Protocols for surface-water monitoring within the permit and adjacent areas are:

- DC-1 - Quarterly data collection in accordance with Table 7-5 (operational parameters). This table is the same as that presented in Coal Regulatory Program Directive Tech-004, with the exception that total hardness and total alkalinity are not

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of surface water in the permit and adjacent areas have been or will be installed, maintained, and operated in accordance with accepted procedures. Where feasible, this equipment will be removed or properly abandoned by SCM when no longer needed.

731.300 Acid- and Toxic-Forming Materials

Analyses presented in Chapter 6 of this M&RP indicate that acid- and toxic-forming materials are not present within the permit area. Parameters defining acid- and toxic-forming materials will periodically be monitored as described in Chapter 6 of this M&RP. In the event that acid- or toxic-forming materials are identified, they will be disposed of in appropriate waste-rock disposal facilities as described in Chapter 5 of this M&RP.

731.400 Transfer of Wells

Before final release of bond, exploration or monitoring wells will be sealed in a safe and environmentally sound manner in accordance with R645-301-631, R645-301-738, and R645-301-765. Ownership of wells will be transferred only with prior approval of the Division. The conditions of such a transfer will comply with State and local laws. The permittee will remain responsible for the management of the wells until bond release in accordance with R645-301-529, R645-301-551, R645-301-631, R645-301-738, and R645-301-765.

731.500 Discharges

Discharges into an Underground Mine. No discharges of surface water will be made to an underground mine in the permit and adjacent areas.

Gravity Discharges from an Underground Mine. No gravity discharges will be made from an underground mine in the permit and adjacent areas.




UTAH DIVISION OF WATER RIGHTS

WRPLAT Program Output Listing

Version: 2003.10.25.00 Rundate: 10/30/2003 06:53 AM

Search of Township 13S, Range 12E, SL b&m Criteria:wrtypes=W,C,E podtypes=all
status=U,A,P usetypes=all

31	32	33	34	31-500	36	31
22425 6	23594 91-543	91-526	23594 91-515	2	1	
91-2573	91-535	91-743	23594 91-547	91-4806	91-514	
22354 91-203		23594 91-528	23594 91-509	91-511	91-1746	23594
91-532	91-533			23594 23420		
91-36 19	20	91-4677	91-4679	23594	91-1742	
91-725						
91-518 91-550	91-549	28	91-3732	26	91-4676	
91-516	32	33	22301	35	36	
6	5	4	91-466	2	1	

0 0.4 0.8 1.2 1.6 mi

Water Rights

<u>WR</u> <u>Number</u>	<u>Diversion Type/Location</u>	<u>Well</u> <u>Log</u>	<u>Status</u>	<u>Priority</u>	<u>Uses</u>	<u>CFS</u>	<u>ACFT</u>	<u>Own</u>
<u>91-203</u>	Underground S780 E900 N4 18 13S 12E SL		P	19540506	O	0.250	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-36</u>	Surface N1040 E730 W4 19 13S 12E SL		P	19170926	DI	0.000	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-427</u>	Surface N50 E1030 SW 34 13S 12E SL		P	19020000	S	0.000	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-466</u>	Surface N50 E860 SW 34 13S 12E SL		P	19010000		0.000	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-496</u>	Surface N700 E530 W4 30 13S 12E SL		P	18900000	I	4.000	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-497</u>	Surface N1040 E740 SW 19 13S 12E SL		P	18900000	IS	4.000	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-510</u>	Surface N900 E200 S4 11 13S 12E SL		P	19020000	S	0.022	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-518</u>	Surface N700 E530 W4 30 13S 12E SL		P	18900000	I	4.000	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-519</u>	Surface N1040 E740 SW 19 13S 12E SL		P	18900000	IS	4.000	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-529</u>	Surface S850 W1380 NE 16 13S 12E SL		P	19020000		0.022	0.000	Canyon Fuel Com CityPlace One Sui
<u>91-725</u>	Surface N1040 E730 SW 19 13S 12E SL		P	19170926	DI	0.000	0.000	Canyon Fuel Com CityPlace One Sui
<u>a23420</u>	Underground S125 E2307 NW 23 13S 12E SL	<u>well</u> <u>info</u>	A	19990615	OX	0.000	245.000	Canyon Fuel Com City Place One Su
<u>t21359</u>	Surface S1250 E400 NW 05 13S 12E SL		A	19970725	O	0.000	1.000	Canyon Fuel Com 6955 Union Park
<u>t22301</u>	Surface S2500 E1230 NW 23 13S 12E SL		A	19980612	O	0.000	19.000	Nielson Construct P.O. Box 620
<u>t22301</u>	Surface		A	19980612	O	0.000	19.000	Nielson Construct

S2300 E2010 NW 34 13S 12E SL				P.O. Box 620
<u>t22354</u>	Surface N30 W1140 SE 07 13S 12E SL	A	19980630 OX 0.250 84.000	Canyon Fuels Cor 6955 Union Park
<u>t22425</u>	Surface N2190 W650 SE 04 13S 12E SL	A	19980803 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t22425</u>	Surface N1680 E460 SW 06 13S 12E SL	A	19980803 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t22425</u>	Surface N310 W860 SE 09 13S 12E SL	A	19980803 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t22425</u>	Surface S1100 E1400 NW 15 13S 12E SL	A	19980803 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t22425</u>	Surface S150 E710 W4 23 13S 12E SL	A	19980803 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t23594</u>	Surface N2190 W650 SE 04 13S 12E SL	A	19990726 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t23594</u>	Surface N1680 E460 SW 05 13S 12E SL	A	19990726 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t23594</u>	Surface N2000 W50 SE 09 13S 12E SL	A	19990726 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t23594</u>	Surface N700 W2400 SE 14 13S 12E SL	A	19990726 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t23594</u>	Surface S1100 E1400 NW 15 13S 12E SL	A	19990726 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t23594</u>	Surface S750 W1400 NE 16 13S 12E SL	A	19990726 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t23594</u>	Surface S150 E710 W4 23 13S 12E SL	A	19990726 O 0.000 2.000	Canyon Fuel Com 6955 Union Park
<u>t28162</u>	Surface N1600 W1325 SE 13 13S 12E SL	A	20030807 O 0.000 2.500	Canyon Fuel Com 6955 Union Park
<u>t28162</u>	Surface N1850 W1120 SE 13 13S 12R ST.	A	20030807 O 0.000 2.500	Canyon Fuel Com 6955 Union Park

STATE OF UTAH, DIVISION OF WATER RIGHTS

Page 4 of 6

<u>91-1738</u>	Point to Point 0 0 24 13S 12E SL	P	18690000	0.000 0.000	Thayn, George M
<u>91-1741</u>	Point to Point 0 0 24 13S 12E SL	P	19020000	0.011 0.000	Thayn, George M
<u>91-1742</u>	Point to Point 0 0 24 13S 12E SL	P	18690000	0.000 0.000	Thayn, George M
<u>91-1743</u>	Point to Point 0 0 13 13S 12E SL	P	18690000	0.011 0.000	Thayn, George M
<u>91-1744</u>	Point to Point 0 0 13 13S 12E SL	P	18690000	0.011 0.000	Thayn, George M
<u>91-1745</u>	Point to Point 0 0 13 13S 12E SL	P	18690000 S	0.000 0.000	Thayn, George M
<u>91-1746</u>	Point to Point 0 0 13 13S 12E SL	P	18690000	0.011 0.000	Thayn, George
<u>91-2573</u>	Point to Point 0 0 07 13S 12E SL	P	18690000 S	0.000 0.000	USA Bureau of L: (Price Field Office 125 South 600 W.
<u>91-2574</u>	Point to Point 0 0 18 13S 12E SL	P	18690000 S	0.000 0.000	USA Bureau of L: (Price Field Office 125 South 600 W.
<u>91-3752</u>	Point to Point 0 0 27 13S 12E SL	P	18690000 S	0.000 0.000	USA Bureau of L: (Price Field Office 125 South 600 W.
<u>91-4544</u>	Point to Point 0 0 21 13S 12E SL	P	18690000 OS	0.015 0.000	USA Bureau of L: (Price Field Office 125 South 600 W.
<u>91-4676</u>	Point to Point 0 0 25 13S 12E SL	P	18690000 OS	0.000 0.000	USA Bureau of L: (Price Field Office 125 South 600 W.
<u>91-4677</u>	Point to Point 0 0 21 13S 12E SL	P	18690000 OS	0.000 0.000	USA Bureau of L: (Price Field Office 125 South 600 W.
<u>91-4678</u>	Point to Point 0 0 31 13S 12E SL	P	18690000 OS	0.000 0.000	USA Bureau of L: (Price Field Office 125 South 600 W.
<u>91-4679</u>	Point to Point 0 0 22 13S 12E SL	P	18690000 OS	0.000 0.000	USA Bureau of L: (Price Field Office 125 South 600 W.
<u>91-4806</u>	Point to Point 0 0 11 13S 12E SL	P	18690000 S	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-499</u>	Point to Point S400 W900 E4 10 13S 12E SL	P	19020000	0.000 0.000	Canyon Fuel Com CityPlace One Sui

<u>91-501</u>	Point to Point 0 0 10 13S 12E SL	P	18690000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-502</u>	Point to Point 0 0 10 13S 12E SL	P	18690000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-503</u>	Point to Point 0 0 10 13S 12E SL	P	18690000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-504</u>	Point to Point S250 E300 W4 10 13S 12E SL	P	19020000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-505</u>	Point to Point N630 E110 W4 10 13S 12E SL	P	19020000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-506</u>	Point to Point S900 W100 N4 15 13S 12E SL	P	19020000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-507</u>	Point to Point 0 0 15 13S 12E SL	P	19020000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-508</u>	Point to Point 0 0 15 13S 12E SL	P	18690000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-509</u>	Point to Point N200 E200 SW 15 13S 12E SL	P	19020000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-511</u>	Point to Point 0 0 14 13S 12E SL	P	18690000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-512</u>	Point to Point 0 0 12 13S 12E SL	P	18690000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-513</u>	Point to Point 0 0 12 13S 12E SL	P	18690000	0.022 0.000	Canyon Fuel Com CityPlace Once S
<u>91-514</u>	Point to Point 0 0 12 13S 12E SL	P	18690000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-515</u>	Point to Point 0 0 03 13S 12E SL	P	19020000 S	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-516</u>	Point to Point 0 0 31 13S 12E SL	P	18730000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-524</u>	Point to Point 0 0 04 13S 12E SL	P	18690000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-525</u>	Point to Point 0 0 04 13S 12E SL	P	18690000 S	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-526</u>	Point to Point N2150 W910 S4 04 13S 12E SL	P	18690000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-527</u>	Point to Point N290 W530 E4 16 13S 12E SL	P	19020000	0.022 0.000	Canyon Fuel Com CityPlace One Sui

<u>91-528</u>	Point to Point N660 W2580 E4 16 13S 12E SL	P	19020000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-530</u>	Point to Point N500 W860 E4 09 13S 12E SL	P	19020000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-531</u>	Point to Point S1000 E1250 NW 09 13S 12E SL	P	19020000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-532</u>	Point to Point S1600 E2320 NW 09 13S 12E SL	P	19020000	0.011 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-533</u>	Point to Point S650 W750 NE 17 13S 12E SL	P	19020000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-534</u>	Point to Point S210 W1500 E4 08 13S 12E SL	P	19020000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-535</u>	Point to Point N1800 W540 S4 08 13S 12E SL	P	18690000	0.022 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-536</u>	Point to Point 0 0 30 13S 12E SL	P	18730000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-543</u>	Point to Point 0 0 05 13S 12E SL	P	18690000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-547</u>	Point to Point N780 W440 E4 10 13S 12E SL	P	19020000	0.000 0.000	Canyon Fuel Com CityPlace One Sui
<u>91-549</u>	Point to Point S850 E470 W4 29 13S 12E SL	P	19020000 S	0.000 0.000	Olsen, Hattie 305 South Carbor
<u>91-550</u>	Point to Point 0 0 30 13S 12E SL	P	18730000 S	0.000 0.000	Olsen, Hattie 305 South Carbor
<u>91-552</u>	Point to Point 0 0 18 13S 12E SL	P	18690000	0.000 0.000	Sampinos, Sam 228 North Carbor
<u>91-743</u>	Point to Point S100 W300 E4 09 13S 12E SL	P	19020000	0.000 0.000	Canyon Fuel Com CityPlace One Sui





UTAH DIVISION OF WATER RIGHTS

WRPLAT Program Output Listing

Version: 2003.10.25.00 Rundate: 10/30/2003 06:55 AM

Search of Township 13S, Range 13E, SL b&m Criteria:wrtypes=W,C,E podtypes=all
status=U,A,P usetypes=all

31	32	33	34	90-1732	36	31
90-927	90-832	90-743	90-753	2	1	
90-353	90-854	90-871	90-584	90-805	12	
18 T28160	91-1736	90-619	90-572	90-617	91-4758	
91-1740 T28160 T28160	91-1735	91-3033 91-4970	91-3498	91-331	91-2024	
T28914 91-4680	91-1728	91-1729	91-1731	26	25	
91-4783	32	91-4796	91-4797	91-300	36	
6	5	4	3	2	1	

0 0.4 0.8 1.2 1.6 mi

Water Rights

<u>WR Number</u>	<u>Diversion Type/Location</u>	<u>Well Log</u>	<u>Status</u>	<u>Priority</u>	<u>Uses</u>	<u>CFS</u>	<u>ACFT</u>	<u>Owner</u>
<u>91-495</u>	Surface S1000 W200 N4 06 13S 13E SL		P	18800000	IS	2.500	0.000	Canyon Fuel Comq CityPlace One Suit
<u>91-4970</u>	Surface N950 E1050 SW 21 13S 13E SL		P	18690000	S	0.009	0.000	Thayn, George M. Sunnyside Star Ro
<u>91-607</u>	Surface S1000 W200 N4 06 13S 13E SL		P	18800000	IS	2.500	0.000	Canyon Fuel Comq CityPlace One Suit
<u>t25914</u>	Surface N1150 W950 SE 19 13S 13E SL		A	20010820	O	0.000	2.500	Canyon Fuel Comq P.O. Box 1029
<u>t25914</u>	Surface N1150 E1200 SW 20 13S 13E SL		A	20010820	O	0.000	2.500	Canyon Fuel Comq P.O. Box 1029
<u>t25914</u>	Surface S150 E1850 NW 30 13S 13E SL		A	20010820	O	0.000	2.500	Canyon Fuel Comq P.O. Box 1029
<u>t27967</u>	Surface N1090 W950 SE 19 13S 13E SL		A	20030612	O	0.000	0.100	Canyon Fuel Comq HC 35 Box 380
<u>t28160</u>	Surface N1090 W950 SE 19 13S 13E SL		A	20030806	O	0.000	2.500	Canyon Fuel Comq HC 35 Box 380
<u>t28160</u>	Surface N1735 W850 NE 19 13S 13E SL		A	20030806	O	0.000	2.500	Canyon Fuel Comq HC 35 Box 380
<u>t28160</u>	Surface N1160 E1140 SW 20 13S 13E SL		A	20030806	O	0.000	2.500	Canyon Fuel Comq HC 35 Box 380
<u>90-1011</u>	Point to Point 0 0 07 13S 13E SL		P	18850000	S	0.000	0.000	Thayn, George Mil
<u>90-1012</u>	Point to Point 0 0 17 13S 13E SL		P	18850000	S	0.000	0.000	Thayn, George Mil
<u>90-1013</u>	Point to Point 0 0 21 13S 13E SL		P	18850000	S	0.000	0.000	Thayn, George Mil
<u>90-1068</u>	Point to Point 0 0 04 13S 13E SL		P	18850000		0.011	0.000	USA Bureau of La (Price Field Office), 125 South 600 We
<u>90-1240</u>	Point to Point 0 0 14 13S 13E SL		P	18850000	S	0.011	0.000	USA Bureau of La (Price Field Office), 125 South 600 We
<u>90-1241</u>	Point to Point		P	18850000	S	0.000	0.000	USA Bureau of La ~

	0 0 11 13S 13E SL				125 South 600 We
<u>90-1247</u>	Point to Point	P	18850000	0.000 0.000	USA Bureau of La (Price Field Office)
	0 0 09 13S 13E SL				125 South 600 We
<u>90-1248</u>	Point to Point	P	18850000	0.011 0.000	USA Bureau of La (Price Field Office)
	0 0 09 13S 13E SL				125 South 600 We
<u>90-348</u>	Point to Point	P	18850000 S	0.000 0.000	Thayn, Albert Route #1
	0 0 05 13S 13E SL				
<u>90-350</u>	Point to Point	P	18850000	0.000 0.000	Thayn, Albert Route #1
	0 0 07 13S 13E SL				
<u>90-351</u>	Point to Point	P	18850000	0.000 0.000	Thayn, Albert Route #1
	0 0 07 13S 13E SL				
<u>90-352</u>	Point to Point	P	18850000	0.011 0.000	Thayn, Albert Route No 1
	0 0 07 13S 13E SL				
<u>90-353</u>	Point to Point	P	18850000	0.011 0.000	Thayn, Albert Route #1
	0 0 07 13S 13E SL				
<u>90-469</u>	Point to Point	P	18850000 S	0.150 0.000	Pagano, Jay
	0 0 11 13S 13E SL				
<u>90-470</u>	Point to Point	P	18850000 S	0.000 0.000	Pagano, Jay
	0 0 11 13S 13E SL				
<u>90-493</u>	Point to Point	P	18850000 S	0.022 0.000	Conover, J. M.
	0 0 04 13S 13E SL				
<u>90-494</u>	Point to Point	P	18850000	0.022 0.000	Conover, Ione S.
	0 0 04 13S 13E SL				
<u>90-495</u>	Point to Point	P	18850000	0.022 0.000	Conover, Clyde
	0 0 04 13S 13E SL				
<u>90-496</u>	Point to Point	P	18850000	0.022 0.000	Conover, Harry
	0 0 04 13S 13E SL				
<u>90-497</u>	Point to Point	P	18850000	0.022 0.000	Conover, Elden
	0 0 04 13S 13E SL				
<u>90-498</u>	Point to Point	P	18850000	0.022 0.000	Conover, Elaine
	0 0 04 13S 13E SL				
<u>90-499</u>	Point to Point	P	18850000	0.022 0.000	Snow, Emily Cono
	0 0 04 13S 13E SL				
<u>90-500</u>	Point to Point	P	18850000	0.022 0.000	Conover, Reed
	0 0 04 13S 13E SL				
<u>90-501</u>	Point to Point	P	18850000	0.022 0.000	Conover, Wallace
	0 0 04 13S 13E SL				

<u>90-502</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, J. George
<u>90-517</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, J. M.
<u>90-518</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, Ione S.
<u>90-519</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, Clyde
<u>90-520</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, Harry
<u>90-521</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, Elden
<u>90-522</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, Elaine C.
<u>90-523</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Snow, Emily C.
<u>90-524</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, Reed
<u>90-525</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, Wallace
<u>90-526</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.033 0.000	Conover, J. George
<u>90-528</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, J. M.
<u>90-529</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Ione S.
<u>90-530</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Clyde
<u>90-531</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Harry
<u>90-532</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Elden
<u>90-533</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Elaine C.
<u>90-534</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.022 0.000	Snow, Emily C.
<u>90-535</u>	0 0 10 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Reed

<u>90-536</u>	Point to Point 0 0 10 13S 13E SL	P	18850000	0.022 0.000	Conover, Wallace
<u>90-537</u>	Point to Point 0 0 10 13S 13E SL	P	18850000	0.022 0.000	Conover, J. Georg
<u>90-538</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, J. M.
<u>90-539</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, Ione S.
<u>90-540</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, Clyde
<u>90-541</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, Harry
<u>90-542</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, Elden
<u>90-543</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, Elaine
<u>90-544</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Snow, Emily C.
<u>90-545</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, Reed
<u>90-546</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, Wallace
<u>90-547</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.022 0.000	Conover, J. Georg
<u>90-548</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.250 0.000	Conover, J. M. and
<u>90-549</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.250 0.000	Conover, J. Georg
<u>90-550</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.250 0.000	Conover, Wallace
<u>90-551</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.250 0.000	Conover, Elaine C.
<u>90-552</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.250 0.000	Conover, Harry
<u>90-553</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.250 0.000	Conover, Clyde
<u>90-554</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.250 0.000	Snow, Emily Cono
<u>90-555</u>	Point to Point	P	18850000	0.044 0.000	Conover, J. M. and

<u>90-555</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.044 0.000	Conover, J. M. and
<u>90-556</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.044 0.000	Conover, J. George
<u>90-557</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.044 0.000	Conover, Wallace
<u>90-558</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.044 0.000	Conover, Elaine
<u>90-559</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.044 0.000	Conover, Harry
<u>90-560</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.044 0.000	Conover, Clyde
<u>90-561</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.044 0.000	Snow, Emily Cono
<u>90-562</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.044 0.000	Conover, Reed
<u>90-563</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, J. M.
<u>90-564</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, Ione
<u>90-565</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, Clyde
<u>90-566</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, Harry
<u>90-567</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, Elden
<u>90-568</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, Elaine
<u>90-569</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Snow, Emily C.
<u>90-570</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, Reed
<u>90-571</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, Wallace
<u>90-572</u>	Point to Point 0 0 15 13S 13E SL	P	18850000	0.066 0.000	Conover, George J
<u>90-573</u>	Point to Point 0 0 22 13S 13E SL	P	18850000	0.250 0.000	Conover, Reed
<u>90-574</u>	Point to Point	P	18850000	0.000 0.000	Conover, J. M.

	0 0 08 13S 13E SL				
<u>90-575</u>	Point to Point	P	18850000	0.022 0.000	Conover, J. M.
	0 0 10 13S 13E SL				
<u>90-576</u>	Point to Point	P	18850000	0.022 0.000	Conover, Ione S.
	0 0 10 13S 13E SL				
<u>90-577</u>	Point to Point	P	18850000	0.022 0.000	Conover, Clyde
	0 0 10 13S 13E SL				
<u>90-578</u>	Point to Point	P	18850000	0.022 0.000	Conover, Harry
	0 0 10 13S 13E SL				
<u>90-579</u>	Point to Point	P	18850000	0.022 0.000	Conover, Elden
	0 0 10 13S 13E SL				
<u>90-580</u>	Point to Point	P	18850000	0.022 0.000	Conover, Elaine
	0 0 10 13S 13E SL				
<u>90-581</u>	Point to Point	P	18850000	0.022 0.000	Snow, Emily C.
	0 0 10 13S 13E SL				
<u>90-582</u>	Point to Point	P	18850000	0.022 0.000	Conover, Reed
	0 0 10 13S 13E SL				
<u>90-583</u>	Point to Point	P	18850000	0.022 0.000	Conover, Wallace
	0 0 10 13S 13E SL				
<u>90-584</u>	Point to Point	P	18850000	0.022 0.000	Conover, J. George
	0 0 10 13S 13E SL				
<u>90-586</u>	Point to Point	P	18850000	0.000 0.000	Conover, J. M. and
	0 0 08 13S 13E SL				
<u>90-587</u>	Point to Point	P	18850000	0.000 0.000	Conover, J. George
	0 0 08 13S 13E SL				
<u>90-588</u>	Point to Point	P	18850000	0.000 0.000	Conover, Wallace
	0 0 08 13S 13E SL				
<u>90-589</u>	Point to Point	P	18850000	0.000 0.000	Conover, Harry L.
	0 0 08 13S 13E SL				
<u>90-590</u>	Point to Point	P	18850000	0.000 0.000	Conover, Clyde
	0 0 08 13S 13E SL				
<u>90-591</u>	Point to Point	P	18850000	0.000 0.000	Conover, Reed
	0 0 08 13S 13E SL				
<u>90-592</u>	Point to Point	P	18850000	0.000 0.000	Conover, Elaine
	0 0 08 13S 13E SL				
<u>90-593</u>	Point to Point	P	18850000	0.000 0.000	Snow, Emily Cono
	0 0 08 13S 13E SL				
<u>90-594</u>	Point to Point	P	18850000	0.022 0.000	Conover, J. M.
	0 0 04 13S 13E SL				

<u>90-595</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Ione
<u>90-596</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Clyde
<u>90-597</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Harry
<u>90-598</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Elden
<u>90-599</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Reed
<u>90-615</u>	0 0 06 13S 13E SL Point to Point	P	18850000	0.011 0.000	Thayn, Albert Route 1
<u>90-616</u>	0 0 06 13S 13E SL Point to Point	P	18850000	0.011 0.000	Thayn, Albert Route #1
<u>90-617</u>	0 0 14 13S 13E SL Point to Point	P	18850000 S	0.011 0.000	USA Bureau of La (Price Field Office) 125 South 600 We
<u>90-618</u>	0 0 16 13S 13E SL Point to Point	P	18850000 S	0.000 0.000	Utah School and Ir Lands Admin. 675 East 500 Sout
<u>90-619</u>	0 0 16 13S 13E SL Point to Point	P	18850000 S	0.000 0.000	Utah School and Ir Lands Admin. 675 East 500 Sout
<u>90-712</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Wallace
<u>90-713</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, J. Georg
<u>90-714</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Conover, Elaine
<u>90-715</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.022 0.000	Snow, Emily Cono
<u>90-716</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, J. M.
<u>90-717</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Ione
<u>90-718</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Clyde
<u>90-719</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Harry L.
<u>90-720</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Elden
<u>90-721</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Reed
<u>90-722</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Wallace

<u>90-723</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, J. George
<u>90-724</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Elaine
<u>90-725</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Snow, Emily Cono
<u>90-726</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, J. M.
<u>90-728</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Clyde
<u>90-729</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Harry
<u>90-730</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Elden
<u>90-731</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Reed
<u>90-732</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Wallace
<u>90-733</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, J. George
<u>90-734</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Elaine
<u>90-735</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Snow, Emily Cono
<u>90-736</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, J. George
<u>90-737</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, J. M.
<u>90-738</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Clyde
<u>90-739</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Harry
<u>90-740</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Reed
<u>90-741</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Wallace
<u>90-742</u>	0 0 04 13S 13E SL Point to Point	P	18850000	0.000 0.000	Conover, Elaine

<u>90-743</u>	Point to Point 0 0 04 13S 13E SL	P	18850000	0.000 0.000	Snow, Emily
<u>90-744</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, J. M.
<u>90-745</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, Ione S.
<u>90-746</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, Clyde
<u>90-747</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, Harry L.
<u>90-748</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, Elden
<u>90-749</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, Elaine
<u>90-750</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Snow, Emily C.
<u>90-751</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, Reed
<u>90-752</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, Wallace
<u>90-753</u>	Point to Point 0 0 03 13S 13E SL	P	18850000	0.000 0.000	Conover, J. George
<u>90-754</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, J. M. and
<u>90-755</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, J. George
<u>90-756</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Wallace
<u>90-757</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Harry
<u>90-758</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Snow, Emily C.
<u>90-759</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Clyde
<u>90-760</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Reed
<u>90-761</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Elaine

<u>90-762</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, J. M. and
<u>90-763</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, J. George
<u>90-764</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Wallace
<u>90-765</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Harry
<u>90-766</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Snow, Emily C.
<u>90-767</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Clyde
<u>90-768</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Reed
<u>90-769</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.044 0.000	Conover, Elaine
<u>90-790</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.250 0.000	Conover, J. M. and
<u>90-791</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.250 0.000	Conover, J. George
<u>90-792</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.250 0.000	Conover, Wallace
<u>90-793</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.250 0.000	Conover, Harry
<u>90-794</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.250 0.000	Snow, Emily C.
<u>90-795</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.250 0.000	Conover, Reed
<u>90-796</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.250 0.000	Conover, Elaine
<u>90-797</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.250 0.000	Conover, Clyde
<u>90-798</u>	Point to Point 0 0 11 13S 13E SL	P	18850000	0.088 0.000	Martinez, Paul B. 205 300 North
<u>90-799</u>	Point to Point 0 0 11 13S 13E SL	P	18850000	0.088 0.000	Martinez, Paul B. 205 300 North
<u>90-800</u>	Point to Point 0 0 11 13S 13E SL	P	18850000	0.088 0.000	Martinez, Paul B. 205 300 North
<u>90-801</u>	Point to Point	P	18850000	0.088 0.000	Martinez, Paul B.

STATE OF UTAH, DIVISION OF WATER RIGHTS

Page 12 of 20

<u>70-801</u>	Point to Point 0 0 11 13S 13E SL	P	18850000	0.088 0.000	Martinez, Marc A. 162 W. Geneva Dr
<u>90-802</u>	Point to Point 0 0 11 13S 13E SL	P	18850000	0.088 0.000	Martinez, Marc A. 162 West Geneva J
<u>90-803</u>	Point to Point 0 0 11 13S 13E SL	P	18850000	0.088 0.000	Martinez, Marc Ar 162 W. Geneva Dr
<u>90-804</u>	Point to Point 0 0 11 13S 13E SL	P	18850000	0.088 0.000	Martinez, Marc A. 162 W. Geneva Dr
<u>90-805</u>	Point to Point 0 0 11 13S 13E SL	P	18850000	0.088 0.000	Martinez, Joe D. P. O. Box 103
<u>90-806</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.000 0.000	Conover, J. M. and
<u>90-807</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.000 0.000	Conover, J. George
<u>90-808</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.000 0.000	Conover, Wallace
<u>90-809</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.000 0.000	Conover, Harry
<u>90-810</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.000 0.000	Snow, Emily C.
<u>90-811</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.000 0.000	Conover, Clyde
<u>90-812</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.000 0.000	Conover, Reed
<u>90-813</u>	Point to Point 0 0 17 13S 13E SL	P	18850000	0.000 0.000	Conover, Elaine
<u>90-814</u>	Point to Point 0 0 05 13S 13E SL	P	18850000	0.000 0.000	Conover, J. George
<u>90-815</u>	Point to Point 0 0 05 13S 13E SL	P	18850000	0.000 0.000	Conover, J. M.
<u>90-816</u>	Point to Point 0 0 05 13S 13E SL	P	18850000	0.000 0.000	Conover, Harry
<u>90-817</u>	Point to Point 0 0 05 13S 13E SL	P	18850000	0.000 0.000	Conover, Reed
<u>90-818</u>	Point to Point 0 0 05 13S 13E SL	P	18850000	0.000 0.000	Conover, Elaine
<u>90-819</u>	Point to Point 0 0 05 13S 13E SL	P	18850000	0.000 0.000	Conover, Wallace
<u>90-821</u>	Point to Point	P	18850000	0.000 0.000	Snow, Emily Cono

	0 0 05 13S 13E SL				
<u>90-822</u>	Point to Point	P	18850000	0.000 0.000	Conover, Clyde
	0 0 05 13S 13E SL				
<u>90-823</u>	Point to Point	P	18850000	0.000 0.000	Conover, J. M.
	0 0 05 13S 13E SL				
<u>90-824</u>	Point to Point	P	18850000	0.000 0.000	Conover, Ione
	0 0 05 13S 13E SL				
<u>90-825</u>	Point to Point	P	18850000	0.000 0.000	Conover, Clyde
	0 0 05 13S 13E SL				
<u>90-826</u>	Point to Point	P	18850000	0.000 0.000	Conover, Harry
	0 0 05 13S 13E SL				
<u>90-827</u>	Point to Point	P	18850000	0.000 0.000	Conover, Elden
	0 0 05 13S 13E SL				
<u>90-828</u>	Point to Point	P	18850000	0.000 0.000	Conover, Elaine
	0 0 05 13S 13E SL				
<u>90-829</u>	Point to Point	P	18850000	0.000 0.000	Conover, Reed
	0 0 05 13S 13E SL				
<u>90-830</u>	Point to Point	P	18850000	0.000 0.000	Snow, Emily C.
	0 0 05 13S 13E SL				
<u>90-831</u>	Point to Point	P	18850000	0.000 0.000	Conover, Wallace
	0 0 05 13S 13E SL				
<u>90-832</u>	Point to Point	P	18850000	0.000 0.000	Conover, J. George
	0 0 05 13S 13E SL				
<u>90-840</u>	Point to Point	P	18850000	0.000 0.000	Conover, J. George
	0 0 08 13S 13E SL				
<u>90-841</u>	Point to Point	P	18850000	0.000 0.000	Conover, Wallace
	0 0 08 13S 13E SL				
<u>90-842</u>	Point to Point	P	18850000	0.000 0.000	Conover, Harry
	0 0 08 13S 13E SL				
<u>90-843</u>	Point to Point	P	18850000	0.000 0.000	Conover, Clyde
	0 0 08 13S 13E SL				
<u>90-844</u>	Point to Point	P	18850000	0.000 0.000	Conover, Reed
	0 0 08 13S 13E SL				
<u>90-845</u>	Point to Point	P	18850000	0.000 0.000	Conover, Elaine
	0 0 08 13S 13E SL				
<u>90-846</u>	Point to Point	P	18850000	0.000 0.000	Snow, Emily Cono
	0 0 08 13S 13E SL				
<u>90-847</u>	Point to Point	P	18850000	0.000 0.000	Conover, J. M. and
	0 0 08 13S 13E SL				

<u>90-848</u>	Point to Point 0 0 08 13S 13E SL	P	18850000	0.000 0.000	Conover, J. George
<u>90-849</u>	Point to Point 0 0 08 13S 13E SL	P	18850000	0.000 0.000	Conover, Wallace
<u>90-850</u>	Point to Point 0 0 08 13S 13E SL	P	18850000	0.000 0.000	Snow, Emily C.
<u>90-851</u>	Point to Point 0 0 08 13S 13E SL	P	18850000	0.000 0.000	Conover, Harry
<u>90-852</u>	Point to Point 0 0 08 13S 13E SL	P	18850000	0.000 0.000	Conover, Clyde
<u>90-853</u>	Point to Point 0 0 08 13S 13E SL	P	18850000	0.000 0.000	Conover, Elaine
<u>90-854</u>	Point to Point 0 0 08 13S 13E SL	P	18850000	0.000 0.000	Conover, Reed
<u>90-856</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, J. M.
<u>90-857</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, J. George
<u>90-858</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Elaine
<u>90-859</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Clyde
<u>90-860</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Harry
<u>90-861</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Reed
<u>90-862</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Snow, Emily C.
<u>90-863</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Wallace
<u>90-864</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Snow, Emily C.
<u>90-865</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Wallace
<u>90-866</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Reed
<u>90-867</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Harry

<u>90-868</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Clyde
<u>90-869</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, Elaine
<u>90-870</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, J. M.
<u>90-871</u>	Point to Point 0 0 09 13S 13E SL	P	18850000	0.022 0.000	Conover, J. Georg
<u>90-927</u>	Point to Point 0 0 06 13S 13E SL	P	18850000	0.022 0.000	Iriart, Bernard 403 East 1st North
<u>91-1661</u>	Point to Point 0 0 23 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1662</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1664</u>	Point to Point 0 0 27 13S 13E SL	P	18700000 S	0.011 0.000	Day, W. Lavon & .
<u>91-1665</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1666</u>	Point to Point 0 0 22 13S 13E SL	P	18690000 S	0.000 0.000	Day, W. Lavon & .
<u>91-1667</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1668</u>	Point to Point 0 0 23 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1669</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1671</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1672</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1673</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1674</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-168</u>	Point to Point 0 0 22 13S 13E SL	P	19480907	0.001 0.000	Thayn, George M.
<u>91-1682</u>	Point to Point 0 0 23 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1692</u>	Point to Point	P	18690000	0.011 0.000	Day, W. Lavon & .

<u>91-1002</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1685</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1686</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1687</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1688</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1689</u>	Point to Point 0 0 23 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1690</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1692</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1693</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1694</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1695</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1703</u>	Point to Point 0 0 23 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1704</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1706</u>	Point to Point 0 0 27 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1707</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1708</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.000 0.000	Day, W. Lavon & .
<u>91-1709</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-1717</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.000 0.000	Wells, Glen P. O. Box 52
<u>91-1719</u>	Point to Point 0 0 33 13S 13E SL	P	18690000	0.011 0.000	Wells, Glen P. O. Box 52
<u>91-1720</u>	Point to Point	P	18690000 S	0.000 0.000	Wells, Glen

	0 0 33 13S 13E SL				P. O. Box 52
<u>91-1721</u>	Point to Point	P	18690000	0.000 0.000	Wells, Glen
	0 0 33 13S 13E SL				P. O. Box 52
<u>91-1722</u>	Point to Point	P	18690000	0.000 0.000	Stevenson, Ralph
	0 0 34 13S 13E SL				P. O. Box 52
<u>91-1724</u>	Point to Point	P	18690000	0.011 0.000	Stevenson, Ralph
	0 0 33 13S 13E SL				P. O. Box 52
<u>91-1725</u>	Point to Point	P	18690000	0.000 0.000	Wells, Glen
	0 0 33 13S 13E SL				P. O. Box 52
<u>91-1726</u>	Point to Point	P	18690000	0.000 0.000	Stevenson, Ralph
	0 0 33 13S 13E SL				P. O. Box 52
<u>91-1728</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George M.
	0 0 29 13S 13E SL				
<u>91-1729</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George M.
	0 0 28 13S 13E SL				
<u>91-1730</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George M.
	0 0 27 13S 13E SL				
<u>91-1731</u>	Point to Point	P	18690000	0.000 0.000	Thayn, George M.
	0 0 27 13S 13E SL				
<u>91-1732</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George
	0 0 21 13S 13E SL				
<u>91-1733</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George M.
	0 0 20 13S 13E SL				
<u>91-1734</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George M.
	0 0 20 13S 13E SL				
<u>91-1735</u>	Point to Point	P	18690000	0.000 0.000	Thayn, George
	0 0 20 13S 13E SL				
<u>91-1736</u>	Point to Point	P	18690000	0.000 0.000	Thayn, George M.
	0 0 17 13S 13E SL				
<u>91-1737</u>	Point to Point	P	18690000	0.000 0.000	Thayn, George M.
	0 0 30 13S 13E SL				
<u>91-1739</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George M.
	0 0 19 13S 13E SL				
<u>91-1740</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George M.
	0 0 19 13S 13E SL				
<u>91-1747</u>	Point to Point	P	18690000	0.011 0.000	Thayn, George M.
	0 0 22 13S 13E SL				
<u>91-1993</u>	Point to Point	P	18690000	0.011 0.000	Liddell, Frank
	0 0 24 13S 13E SL				Post Office Box 1C
<u>91-2012</u>	Point to Point	P	18690000 S	0.000 0.000	Liddell, Frank
	0 0 23 13S 13E SL				Post Office Box 1C
<u>91-2013</u>	Point to Point	P	18690000	0.000 0.000	Liddell, Frank
	N2120 W340 S4 23 13S 13E SL				Post Office Box 1C

<u>91-2023</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.000 0.000	Pagano, Jay
<u>91-2024</u>	Point to Point 0 0 24 13S 13E SL	P	18690000 S	0.000 0.000	Pagano, Jay
<u>91-2033</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.000 0.000	Pagano, Jay
<u>91-2034</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.011 0.000	Pagano, Jay
<u>91-2035</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.011 0.000	Pagano, Jay
<u>91-2036</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.011 0.000	Pagano, Jay
<u>91-2037</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.000 0.000	Pagano, Jay
<u>91-2175</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.000 0.000	Thayn, George M.
<u>91-300</u>	Point to Point 0 0 35 13S 13E SL	P	18690000	0.000 0.000	Pagano, Jay
<u>91-3033</u>	Point to Point 0 0 21 13S 13E SL	P	18690000	0.011 0.000	Thayn, George M.
<u>91-331</u>	Point to Point 0 0 23 13S 13E SL	P	19060000 DX	0.033 1.820	Utah Oil & Wax C PO Box 13
<u>91-3474</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & J
<u>91-3475</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & J
<u>91-3476</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & J
<u>91-3477</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & J
<u>91-3478</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & J
<u>91-3479</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & J
<u>91-3480</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & J
<u>91-3481</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & J
<u>91-3482</u>	Point to Point	P	18690000	0.011 0.000	Day, W. Lavon & J

STATE OF UTAH, DIVISION OF WATER RIGHTS

Page 19 of 20

<u>91-3482</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3483</u>	Point to Point 0 0 34 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3484</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3485</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3486</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3487</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3488</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3489</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3490</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3491</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3492</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3493</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3494</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3495</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3496</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3497</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-3498</u>	Point to Point 0 0 22 13S 13E SL	P	18690000	0.011 0.000	Day, W. Lavon & .
<u>91-4680</u>	Point to Point 0 0 30 13S 13E SL	P	18690000 OS	0.000 0.000	USA Bureau of La (Price Field Office) 125 South 600 We
<u>91-4758</u>	Point to Point 0 0 13 13S 13E SL	P	18690000 OS	0.000 0.000	USA Bureau of La (Price Field Office) 125 South 600 We
<u>91-4775</u>	Point to Point 0 0 33 13S 13E SL	P	18690000 OS	0.000 0.000	USA Bureau of La (Price Field Office) 125 South 600 We
<u>91-4783</u>	Point to Point	P	18690000 OS	0.000 0.000	USA Bureau of La (Price Field Office)

<u>91-4795</u>	0 0 31 13S 13E SL Point to Point	P	18690000 S	0.000 0.000	125 South 600 We Stevenson, Ralph
	0 0 33 13S 13E SL				P.O. Box 52
<u>91-4796</u>	Point to Point	P	18690000 S	0.000 0.000	Stevenson, Ralph
	0 0 33 13S 13E SL				P.O. Box 52
<u>91-4797</u>	Point to Point	P	18690000 S	0.000 0.000	Stevenson, Ralph
	0 0 34 13S 13E SL				P.O. Box 52

