CHAPTER I

R614-301-100 GENERAL CONTENTS

UNITED STATES FUEL COMPANY
Hiawatha, Utah

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R614-301-112 IDENTIFICATION OF INTERESTS

112.100 **A STATEMENT AS TO WHETHER THE APPLICANT IS A CORPORATION, PARTNERSHIP, SINGLE PROPRIETORSHIP, ASSOCIATION, OR OTHER BUSINESS ENTITY:**

United States Fuel Company is a corporation and is incorporated in the state of Nevada.

112.200 **NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF THE APPLICANT, THE OPERATOR (IF DIFFERENT FROM THE APPLICANT) AND THE APPLICANT'S RESIDENT AGENT WHO WILL ACCEPT SERVICE OF PROCESS:**

Applicant: United States Fuel Company
P.O. Box A, Hiawatha, Utah 84527
(801)-637-2252

Resident Agent: Michael W. Baum, President/Director
P.O. Box A, Hiawatha, Utah 84527
(801)-637-2252

112.300 **FOR APPLICANTS OTHER THAN SINGLE PROPRIETORSHIPS:**

112.310 **NAME AND ADDRESS OF EACH OFFICER, PARTNER, PRINCIPAL, PRINCIPAL SHAREHOLDER, AND DIRECTOR OR OTHER PERSON PERFORMING A FUNCTION SIMILAR TO A DIRECTOR:**

United States Fuel Company is a wholly owned subsidiary of Arava Natural Resources Company Inc. Arava Natural Resources is a wholly owned subsidiary of Muller Industries Inc.

Officers authorized to act on behalf of United States Fuel Company are:

Michael W. Baum, President/Director
James Wilson, Vice President Director
Michael p. Watson, Secretary/Director
Kelly Hanrahan, Assistant Secretary

Corporate Office Address: United States Fuel Company
1 Main St., P.O. Box A
Hiawatha, Utah 84527

Officers authorized to act on behalf of Arava Natural Resources Company:

Harvey L. Karp, Chairman
Gary L. Barker, President/Director
Martin Tos, Treasurer
James Wilson, Secretary/Director
Kelly Hanrahan, Assistant Secretary

Corporate Office Address: Arava Natural Resources Co.
555 North Woodlawn
Wichita, Kansas 67208

Officers authorized to act on behalf of Muller Industries Incorporated:

Raymond H. Wechsler, C.E.O. and Chairman of Board
Gary Gladstein, Board Member
Gerard Manolovici, Board Member
James O'Mara, Board Member
J. Allen Mactier, Board Member
Peter Schwab, Board Member

Corporate Office Address: Muller Industries Incorporated
555 North Woodlawn
Wichita, Kansas 67208

112.320 **ALL NAMES UNDER WHICH THE APPLICANT, PARTNER, OR PRINCIPAL SHAREHOLDER OPERATES OR PREVIOUSLY OPERATED A COAL MINE AND RECLAMATION OPERATION IN THE UNITED STATES WITHIN THE 5 YEARS PRECEDING THE DATE OF APPLICATION:**

United States Fuel Company and Carpentertown Coal and Coke Company.

112.400 **PENDING, CURRENT AND PREVIOUS COAL MINING AND RECLAMATION OPERATION PERMIT APPLICATIONS:**

U.S. Fuel Company and Carpentertown Coal and Coke both held coal mining permits subsequent to 1970. Listed on Table I-1 are permits presently or previously held by Carpentertown Coal and Coke. U.S. Fuel Company's mining permits have been listed in Table I-2.

112.500 Surface and subsurface ownership can be referenced on Exhibits IV-1 and IV-2. Appendix I-1 lists the ownership of both surface and coal rights in the permit area. The area is broken into five categories based on its ownership and lease status. Refer to the legend and summary on page 10.

112.600 Refer to Exhibits IV-1 and IV-2 for names and addresses of the owners of record.

Table I-1

Carpentertown Coal And Coke Coal Mining Permits

Active Underground Permits*

Permit Number	Type of Permit	Issuing Agency
Federal Identification Number 36-04595	Deep Mine	Mine Safety and Health Administration
0383304	Mining Activity Permit	Pennsylvania Dept. of Environmental Resources

*Underground mining discontinued. Mine in process of reclamation.

Active Surface Permits

Permit Number	Type of Permit	Issuing Agency
03813702	Refuse Disposal Permit (A)	Pennsylvania D.E.R.
03820702	Refuse Disposal Permit (Little Germany)	Pennsylvania D.E.R.
36-04025	Prep. Plant & Surface Mine I.D. Number	Mine Safety and Health Administration
03840201	Coal Refuse Reprocessing Permit	Pennsylvania D.E.R.
03850109	Surface Mining Permit	Pennsylvania D.E.R.
03823082	Surface Mining Permit	Pennsylvania D.E.R.

Table I-1 (Continued)

Carpentertown Coal And Coke Coal Mining Permits

Deactivated Surface Permits*

Permit Number	Type of Permit	Issuing Agency
3576BSM20	Mine Drainage	Pennsylvania D.E.R.
3570BSM26	Mine Drainage	Pennsylvania D.E.R.
3572BSM16	Mine Drainage	Pennsylvania D.E.R.
18410	Surface Mining	Pennsylvania D.E.R.
18411	Surface Mining	Pennsylvania D.E.R.
18412	Surface Mining	Pennsylvania D.E.R.
18413	Surface Mining	Pennsylvania D.E.R.
18414	Surface Mining	Pennsylvania D.E.R.
18415	Surface Mining	Pennsylvania D.E.R.

*Permits have been deactivated and bonds released by the Pennsylvania D.E.R.

Table I-2

United States Fuel Company Licenses and Permits

Permit	Permitting Agency	Status
1. NPDES Permit No. UT-0023094	U.S. Environmental Protection Agency Region VIII 1860 Lincoln Street Denver Colorado 80295	Permit Renewed April 1, 1990
2. Water Supply Facilities I.D. No's 04005 & 04045	Utah Division of Environmental Health 150 West North Temple Salt Lake City, Utah 84111	Facilities Approved March 17, 1980
3. Sedimentation Ponds I.D. No's D003 D004 D005 D006 D007 D008 D009 D011	Utah Division of Water Rights 1636 West North Temple Salt Lake City, Utah 84116	Ponds Approved Oct. 21, 1991
4. Refuse Piles and Slurry Impoundments Blanket Coverage	U.S. Army Corps of Engineers 125 South State Salt Lake City, Utah 84111	Permit Granted Under Section 404 WPCA, 1972
5. Refuse Piles and Slurry Impoundments I.D. No's: 1211-UT-09-00098-01 1211-UT-09-00098-02 1211-UT-09-00098-03 1211-UT-09-00098-04 1211-UT-09-00098-05	Coal Mine Safety and Health Box 25367 Denver, Colorado 80225	 Approved 1979 " " " Approved 1987
6. USGS & BLM Resource Recovery and Protection Plan No ID Number	U.S. Geological Survey 8426 Federal Building 125 South State Salt Lake City, Utah 84111	Approved Nov. 22, 1978
7. King IV Roof Control Plan ID No. 42-00098	Coal Mine Safety and Health Box 25367 Denver, Colorado 80225	Approved Feb. 17, 1989

Table I-2 (Continued)

United States Fuel Company Licenses and Permits

Permit	Permitting Agency	Status
8. King IV Ventilation Plan ID No. 42-00098	Coal Mine Safety And Health Box 25367 Denver, Colorado 80225	Approved Mar. 8, 1989
9. King V Roof Control Plan ID No. 42-01389	Coal Mine Safety And Health Box 25367 Denver, Colorado 80225	Approved Mar. 24, 1983
10. King V Ventilation Plan ID No. 42-01389	Coal Mine Safety and Health Box 25367 Denver, Colorado 80225	Approved Jan. 31, 1983
11. King VI Roof Control Plan ID No. 42-01599	Coal Mine Safety and Health Box 25367 Denver, Colorado 80225	Approved Oct. 17, 1985
12. King VI Ventilation Plan ID No. 42-01599	Coal Mine Safety and Health Box 25367 Denver, Colorado 80225	Approved Jan. 23, 1989
13. Air Quality Approval Orders No Numbers Assigned	Utah Bureau of Air Quality 288 North 1460 West Salt Lake City , Ut 84116	Approvals May 20, 1981 Oct. 23, 1986 July 25, 1989

112.700 **THE MSHA NUMBERS FOR ALL MINE-ASSOCIATED STRUCTURES THAT REQUIRE MSHA APPROVAL:**

STRUCTURE	MSHA ID No.
King 4 Mine	42-00098
King 5 Mine	42-01389
King 6 Mine	42-01599
Slurry Pond No. 1	1211-UT-09-00098-01
Slurry Pond No. 4	1211-UT-09-00098-02
Slurry Pond No. 5	1211-UT-09-00098-03
Refuse Pile No. 1	1211-UT-09-00098-05
Refuse Pile No. 2	1211-UT-09-00098-07

112.800 **A STATEMENT OF ALL LANDS, INTEREST IN LANDS, OPTIONS, OR PENDING BIDS ON INTERESTS HELD OR MADE BY THE APPLICANT FOR LANDS CONTIGUOUS TO THE AREA DESCRIBED IN THE PERMIT APPLICATION:**

The applicant has no current interests, options or pending bids for lands contiguous to the permit area.

R614-301-113 VIOLATION INFORMATION. AN APPLICATION WILL CONTAIN THE FOLLOWING:

113.100 **A STATEMENT OF WHETHER THE APPLICANT OR ANY SUBSIDIARY, AFFILIATE, OR PERSONS CONTROLLED BY OR UNDER COMMON CONTROL WITH THE APPLICANT HAS:**

113.110 **HAD A FEDERAL OR STATE PERMIT TO CONDUCT COAL MINING AND RECLAMATION OPERATIONS SUSPENDED OR REVOKED IN THE FIVE YEARS PRECEDING THE DATE OF SUBMISSION OF THE APPLICATION; OR:**

No

113.120 **FORFEFITED A PERFORMANCE BOND OR SIMILAR SECURITY DEPOSITED IN LIEU OF BOND;**

No

113.200 Not Applicable

113.300 **A LIST OF ALL VIOLATION NOTICES RECEIVED BY THE APPLICANT OR ANY SUBSIDIARY, AFFILIATE, OR PERSONS CONTROLLED BY OR UNDER COMMON CONTROL WITH THE APPLICANT IN CONNECTION WITH ANY COAL MINING AND RECLAMATION OPERATION DURING THE THREE YEAR PERIOD PRECEDING THE APPLICATION DATE, FOR VIOLATIONS OF ANY PROVISION OF THE FEDERAL ACT, THE ACT; OR ANY LAW, RULE, OR REGULATION PERTAINING TO AIR OR WATER ENVIRONMENTAL PROTECTION. THE APPLICATION WILL ALSO CONTAIN THE FOLLOWING INFORMATION ABOUT EACH VIOLATION NOTICE:**

113.310 **THE DATE OF ISSUANCE AND IDENTITY OF THE ISSUING REGULATORY AUTHORITY, DEPARTMENT OR AGENCY;**

113.320 **A BRIEF DESCRIPTION OF THE VIOLATION ALLEGED IN THE NOTICE;**

113.330 **THE DATE, LOCATION, AND TYPE OF ANY ADMINISTRATIVE OR JUDICIAL PROCEEDINGS INITIATED CONCERNING THE VIOLATION, INCLUDING, BUT NOT LIMITED TO, PROCEEDINGS, INITIATED BY ANY PERSON IDENTIFIED IN R614-301-113.300 TO OBTAIN ADMINISTRATIVE OR JUDICIAL REVIEW OF THE VIOLATION;**

113.340 **THE CURRENT STATUS OF THE PROCEEDINGS AND OF THE VIOLATION NOTICE; AND**

113.350 **THE ACTIONS, IF ANY, TAKEN BY ANY PERSON IDENTIFIED IN R614-301-113.300 TO ABATE THE VIOLATION.**

Violation information for United States Fuel Company and Carpentertown Coal and Coke Company required under R614-301-300 through R614-301-113.350 are given in Appendix I-2.

R614-301-114 RIGHT-OF-ENTRY INFORMATION

114.100 **AN APPLICATION WILL CONTAIN A DESCRIPTION OF THE DOCUMENTS UPON WHICH THE APPLICANT BASES THEIR LEGAL RIGHT TO ENTER AND BEGIN COAL MINING AND RECLAMATION OPERATIONS IN THE PERMIT AREA AND WILL STATE WHETHER THAT RIGHT IS THE SUBJECT OF PENDING LITIGATION. THE DESCRIPTION WILL IDENTIFY THE DOCUMENTS BY TYPE AND DATE OF EXECUTION, IDENTIFY THE SPECIFIC LANDS TO WHICH THE DOCUMENT PERTAINS, AND EXPLAIN THE LEGAL RIGHTS CLAIMED BY THE APPLICANT.**

Land, coal and minerals in the permit area are owned by U.S. Fuel Company or leased from the U.S. Government. Appendix I-1 shows land ownership and identifies the legal rights claimed.

114.200 **WHERE THE PRIVATE MINERAL ESTATE TO BE MINED HAS BEEN SEVERED FROM THE PRIVATE SURFACE ESTATE, AN APPLICANT WILL ALSO SUBMIT:**

Not applicable.

R614-301-115 STATUS OF UNSUITABILITY CLAIMS

115.100 **AN APPLICATION WILL CONTAIN AVAILABLE INFORMATION AS TO WHETHER THE PROPOSED PERMIT AREA IS WITHIN AN AREA DESIGNATED AS UNSUITABLE FOR COAL MINING AND RECLAMATION OPERATIONS OR IS WITHIN AN AREA UNDER STUDY FOR DESIGNATION IN AN ADMINISTRATIVE PROCEEDING UNDER R614-103-300, R614-103-400, OR 30 CFR PART 769.**

During the permit application process Mr. D. Wayne Hedberg of DOGM (personal communication, 13 October 1983) was contacted regarding this matter. According to him, there were no administrative proceedings occurring at that time to designate as unsuitable for mining any property within the proposed permit area. See Appendix I-3 for additional information.

115.200 **AN APPLICATION IN WHICH THE APPLICANT CLAIMS THE EXEMPTION DESCRIBED IN R614-301-333 WILL CONTAIN INFORMATION SUPPORTING THE ASSERTION THAT THE APPLICANT MADE SUBSTANTIAL LEGAL AND FINANCIAL COMMITMENTS BEFORE JANUARY 4, 1977, CONCERNING THE PROPOSED COAL MINING AND RECLAMATION OPERATIONS.**

No exemption claimed.

115.300 **AN APPLICATION IN WHICH THE APPLICANT PROPOSES TO CONDUCT COAL MINING AND RECLAMATION OPERATIONS WITHIN 300 FEET OF AN OCCUPIED DWELLING OR WITHIN 100 FEET OF A PUBLIC ROAD WILL CONTAIN THE NECESSARY INFORMATION AND MEET THE REQUIREMENTS OF R614-103-230 THROUGH R614-103-238.**

All occupied dwellings within 300 feet of any proposed mining operations are owned by U.S. Fuel Company, therefore, no waiver is required. All land in the permit area on which surface operations are located are owned by U.S. Fuel. Surface operations have existed within 100 feet of a public road for at least fifty years prior to this application. The interests of the public and the landowner should not be adversely affected.

R614-301-116 PERMIT TERM

116.100 **EACH PERMIT APPLICATION WILL STATE THE ANTICIPATED OR ACTUAL STARTING AND TERMINATION DATE OF EACH PHASE OF THE COAL MINING AND RECLAMATION OPERATION AND THE ANTICIPATED NUMBER OF ACRES OF LAND TO BE AFFECTED DURING EACH PHASE OF MINING OVER THE LIFE OF THE MINE.**

See Table I-3.

116.200 **IF THE APPLICANT REQUIRES AN INITIAL PERMIT TERM IN EXCESS OF FIVE YEARS IN ORDER TO OBTAIN NECESSARY FINANCING FOR EQUIPMENT AND THE OPENING OF THE OPERATION, THE APPLICATION WILL:**

A permit term in excess of five years is not requested.

Table I-3

MINING METHODS AND ESTIMATED PRODUCTIVITY

Mine	Seam	Mining Method	Production Date	Termination Date	Estimated Productivity Tons/Year	Acres Affected
King 4	A	Continuous Miner Room and Pillar	1993	1998	200,000	476
King 4	B	Continuous Miner Room and Pillar	Operating	1995	200,000	122
King 5	B	Continuous Miner Room and Pillar	Inactive	Unknown	200,000	878
King 6	Hiawatha	Continuous Miner Room and Pillar	Inactive	Unknown	350 000	608

R614-301-117 INSURANCE, PROOF OF PUBLICATION AND FACILITIES OR STRUCTURES USED IN COMMON.

117.100 **A PERMIT APPLICATION WILL CONTAIN EITHER A CERTIFICATE OF LIABILITY INSURANCE OR EVIDENCE OF SELF-INSURANCE IN COMPLIANCE WITH R614-301-800.**

The company's current Certificate of Liability Insurance is filed with Utah DOGM. A copy is included in Appendix VIII-3 of Chapter VIII (Bonding and Insurance).

117.200 **A COPY OF THE NEWSPAPER ADVERTISEMENTS OF THE APPLICATION FOR A PERMIT, SIGNIFICANT REVISION OF A PERMIT, OR RENEWAL OF A PERMIT, OR PROOF OF PUBLICATION OF THE ADVERTISEMENTS WHICH IS ACCEPTABLE TO THE DIVISION WILL BE FILED WITH THE DIVISION AND WILL BE MADE A PART OF THE APPLICATION NOT LATER THAN 4 WEEKS AFTER THE LAST DATE OF PUBLICATION AS REQUIRED BY R614-300-121.100.**

The newspaper advertisement and proof of publication are included in Appendix I-4.

117.300 **THE PLANS OF A FACILITY OR STRUCTURE THAT IS TO BE SHARED BY TWO OR MORE SEPARATELY PERMITTED COAL MINING AND RECLAMATION OPERATIONS.**

No facilities or structures are planned to be permanently shared with another permitted operation.

R614-301-118 FILING FEE. EACH PERMIT APPLICATION TO CONDUCT COAL MINING AND RECLAMATION OPERATIONS PURSUANT TO THE STATEPROGRAM WILL BE ACCOMPANIED BY A FEE OF $5.00.

A permit renewal application fee in the amount of $5.00 was paid to the Division on Sept. 8, 1991. See Appendix I-5.

R614-301-120 PERMIT APPLICATION FORMAT AND CONTENTS

121.000 No response necessary.

121.100 No response necessary.

121.200 No response necessary.

121.300 No response necessary.

122.000 No response necessary.

123.000 **APPLICATIONS FOR PERMITS; PERMIT CHANGES; PERMIT RENEWALS; OR TRANSFERS, SALES OR ASSIGNMENTS OF PERMIT RIGHTS WILL CONTAIN THE NOTARIZED SIGNATURE OF A RESPONSIBLE OFFICIAL OF THE APPLICANT, THAT THE INFORMATION CONTAINED IN THE APPLICATION IS TRUE AND CORRECT TO THE BEST OF THE OFFICIAL'S INFORMATION AND BELIEF.**

Refer to Attachment 1. on following page.

R614-301-130 REPORTING OF TECHNICAL DATA

131.000 No response necessary.

132.000 No response necessary.

R614-301-140 MAPS AND PLANS

141.000 No response necessary.

142.000 No response necessary.

142.100 No response necessary.

142.200 No response necessary.

142.210 No response necessary.

142.220 No response necessary.

142.300 No response necessary.

142.400 No response necessary.

R614-301-150 COMPLETENESS

No response necessary.

ATTACHMENT 1

VERIFICATION OF APPLICATION

United States Fuel Company
Permit No. ACT/007/011

Michael W. Baum being first duly sworn, upon oath deposes and says that he is the President and General Manager of United States Fuel Company and that he has reviewed and knows the contents of U.S. Fuel Company's Mining and Reclamation Plan submitted to the utah Division of Oil, Gas and Mining.

I verify that the above mentioned plan is true and correct to the best of my information and belief.

Michael W. Baum
President and General Manager

Suscribed and sworn to before me this 23rd day of January, 1992.

Noraty Public

APPENDIX I-1

UNITED STATES FUEL COMPANY

PROPERTY OWNERSHIP

11/27/89

TABLE I-1

UNITED STATES FUEL COMPANY
PROPERTY OWNERSHIP

Land Subdivision	Area (Acres) 1	2	3	4	5	Legal Document	Date of Document	Recorded Book Page	Remarks
								Carbon County	
T.15S., R.7E., SLBM									
Section 13: S1/2					320	Lease U-058261	2/1/61	B.L.M.	All U.S.A.
Section 24: N1/2, SW1/4					480	Lease U-058261	2/1/61	B.L.M.	
N1/2 SE1/4, SW1/4 SE1/4					120	Lease U-058261	2/1/61	B.L.M.	
SE1/4 SE1/4		40				Conveyance	1/3/16	3D-257	Surface-U.S.A.
Section 25: E1/2 E1/2		160				Conveyance	1/3/16	3D-257	Surface-U.S.A.
W1/2 E1/2					160	Lease SL-069985	11/1/69	B.L.M.	All U.S.A.
E1/2 NW1/4					80	Lease U-026583	2/1/61	B.L.M.	All U.S.A.
Section 36: N1/2 NE1/4, W1/2 SE1/4					160	Lease SL-069985	11/1/69	B.L.M.	All U.S.A.
S1/2 NE1/4, E1/2 SE1/4					160	Lease SL-025431	2/8/63	B.L.M.	All U.S.A

TABLE I-1

UNITED STATES FUEL COMPANY
PROPERTY OWNERSHIP

Land Subdivision	Area (Acres) 1	2	3	4	5	Legal Document	Date of Document	Recorded Book Page	Remarks
T.15S., R.8E., SLBM								Carbon County	
Section 17: S1/2 NE1/4, SE1/4			240			Patent 1013339	3/8/28	6A-125	Subsurface-U.S.A.
E1/2 SW1/4			80			Patent 1013339	3/8/28	6A-125	Subsurface-U.S.A.
S1/2 NW1/4, NW1/4 SW1/4	10		110			*Conveyance	1/3/16	3D-257	Coal-Plateau
SW1/4 SW1/4	40					Conveyance	1/3/16	3D-257	Mining
N1/2 NW1/4 (part)			7.5			Conveyance	1/3/16	3D-257	
Section 18: SE1/4 SE1/4	40					Conveyance	1/3/16	3D-257	
SW1/4 SE1/4	40					"	"	"	
NE1/4 SE1/4 (part)	1.51					"	"	"	
NW1/4 SE1/4 (part)	1.51					"	"	"	
SE1/4 SW1/4	40					"	"	"	
NE1/4 SW1/4 (part)	3.49					"	"	"	
SW1/4 SW1/4	37.78					"	"	"	
NW1/4 SW1/4 (part)	9.10					"	"	"	
NW1/4			155.56			"	"	"	Coal Leased to
NE1/4			160			"	"	"	Plateau
N1/2 SE1/4			76.97			"	"	"	Mining
N1/2 SW1/4			65.19			"	"	"	"

*This 120 acres was acquired by U.S. Fuel in 1916. The coal rights were subsequently sold to Plateau Mining in 1944, other than that portion of the NW1/4 of the SW1/4 lying south of Miller Creek (approximately 10 acres).

TABLE I-1

UNITED STATES FUEL COMPANY
PROPERTY OWNERSHIP

Land Subdivision	Area (Acres) 1	2	3	4	5	Legal Document	Date of Document	Recorded Book Page	Remarks
								Carbon County	
T.15S., R.8E., SLBM									
Section 19: All	631					Conveyance	1/3/16	3D-257	
Section 20: E1/2			320			Patent 1013339	3/8/28	6A-125	Subsurface-U.S.A.
N1/2 SW1/4			80			Patent 1013339	3/8/28	6A-125	Subsurface-U.S.A.
S1/2 SW1/4	80					Conveyance	1/3/16	3D-257	
NW1/4				160		Lease U-51923	10/1/85		Subsurface-U.S.A.
Section 21: All			640			Patent 1013339	3/8/28	6A-125	Subsurface-U.S.A.
Section 26: W1/2 SW1/4	80					Warranty Deed	6/21/76	161-112	
Section 27: N1/2 SE1/4, N1/2 SW1/4	160					Conveyance	1/3/16	3D-257	
SW1/4 NW1/4, SW1/4 SW1/4	80					Conveyance	1/3/16	3D-257	
S1/2 SE1/4, SE1/4 SW1/4	120					Conveyance	1/3/16	3D-260	
Section 28: All			640			Patent 1013339	3/8/28	6A-125	Subsurface-U.S.A.

TABLE I-1

UNITED STATES FUEL COMPANY
PROPERTY OWNERSHIP

Land Subdivision	Area (Acres) 1	2	3	4	5	Legal Document	Date of Document	Recorded Book Page	Remarks
								Carbon County	
T.15S., R.8E., SLBM									
Section 29: NE1/4 NE1/4			40			Patent 1013339	3/8/28	6A-125	Subsurface-U.S.A.
S1/2 NE1/4									
NW1/4 NE1/4	120					Conveyance	1/3/16	3D-257	
NW1/4, S1/2	480					Conveyance	1/3/16	3D-257	
Section 30: All	631					Conveyance	1/3/16	3D-257	
Section 31: N1/2				316		Conveyance	1/3/16	3D-257	Coal-U.S.A.
S1/2				316		Patent 1013339	3/8/28	6A-125	Subsurface-U.S.A.
Section 32: SE1/4 NE1/4	40					Patent 12257	4/22/20	2A-251	
N1/2 NE1/4,									
SW1/4 NE1/4	120					Quit Claim Deed	5/6/23	3H-427	
NW1/4, S1/2	480					Quit Claim Deed	5/6/23	3H-427	
Section 33: N1/2			320			Patent 1013339	3/8/28	6A-125	
S1/2	320					Conveyance	1/3/16	3D-260	

TABLE I-1

UNITED STATES FUEL COMPANY
PROPERTY OWNERSHIP

Land Subdivision	Area (Acres) 1	2	3	4	5	Legal Document	Date of Document	Recorded Book Page	Remarks
								Carbon County	
T.15S., R.8E., SLBM									
Section 34: N1/2 NE1/4, N1/2 NW1/4	160					Conveyance	1/3/16	3D-260	
NE1/4 SW1/4, SW1/4 NW1/4	80					Warranty Deed	12/1/17	5F-309	
SW1/4 NE1/4, NW1/4 SE1/4	80					Patent 12499	10/14/20	2A-252	
SE1/4 NW1/4	40					Patent 12499	10/14/20	2A-252	
SE1/4 NE1/4	40					Patent 11722	10/20/19	2A-226	
S1/2 SW1/4			80			Patent 10835	7/17/18	2A-226	Coal-U.S.A.
NE1/4 SE1/4	40					Warranty Deed	6/21/76	161-112	
NW1/4 SW1/4			40			Patent 1114115	6/4/42	6A-267	Subsurface-U.S.A.
Section 35: E1/2 NW1/4, NW1/4 SW1/4	120					Warranty Deed	6/21/76	161-112	
NW1/4 NW1/4	40					Patent 11723	10/20/19	2A-226	
SW1/4 NW1/4	40					Conveyance	1/3/16	3D-260	

TABLE I-1

UNITED STATES FUEL COMPANY
PROPERTY OWNERSHIP

Land Subdivision	Area (Acres) 1	2	3	4	5	Legal Document	Date of Document	Recorded Book Page	Remarks
								Emery County	
T.16S., R.8E., SLBM									
Section 3: W1/2	361					Conveyance	1/3/16	A5-318	
Section 4: Lots 1,2,3, 4,5,6,7	202					Conveyance	1/3/16	A5-318	
Lots 8,9, 10,11,12	200					Conveyance	1/3/16	A5-318	
SW1/4	160					Conveyance	1/3/16	A5-315	
SE1/4	160					Warranty Deed	5/31/19	B9-205 Emery County	
Section 5: Lots 1,5,8,12				140		Patent 11804	11/26/19	A2-50	Coal-U.S.A.
Lots 2,3,4,6, 7,9,10,11			261			Patent 11804	11/26/19	A2-50	Coal-U.S.A.
S1/2			320			Patent 11803	11/26/19	A2-51	Coal-U.S.A.
Section 6: Lots 1,2,3,4, 5,6,7,8,9				291		Patent 11804	11/26/19	A2-50	Coal-U.S.A.
NE1/4 SE1/4			40			Patent 11803	11/26/19	A2-50	Coal-U.S.A.
Lot 10				40		Patent 11804	11/26/19	A2-50	Coal-U.S.A.

TABLE I-1

UNITED STATES FUEL COMPANY
PROPERTY OWNERSHIP

Land Subdivision	Area (Acres) 1	2	3	4	5	Legal Document	Date of Document	Recorded Book Page	Remarks
								Emery County	
T.16S., R.8E., SLBM									
Section 8: E1/2, E1/2	160					Conveyance	1/3/16	A5-315	
Section 9: W1/2, W1/2 NE1/4	400					Conveyance	1/3/16	A5-315	
W1/2 SE1/4, SE1/4 SE1/4	120					Conveyance	1/3/16	A5-315	
E1/2 NE1/4, NE1/4 SE1/4			120			Patent 1013339	3/8/28	A2-317	

TABLE I-1

UNITED STATES FUEL COMPANY
PROPERTY OWNERSHIP

Land Subdivision	Area (Acres) 1	2	3	4	5	Legal Document	Date of Document	Recorded Book Page	Remarks

DESIGNATION OF TITLE — ACREAGE

1). Surface-Fee Title, Coal Rights-Fee Title.....5,968
2). Surface Rights-None, Coal Rights-Fee Title.....200
3). Surface Rights-Fee Title, Coal Rights-None.....3,796
4). Surface-Fee Title, Coal Rights-Leased.....1,263
5). Surface Rights-None, Coal Rights-Leased.....1,480

Total.....12,707

Revised 5/13/88

APPENDIX I-2

VIOLATION INFORMATION
FOR
UNITED STATES FUEL COMPANY
AND
CARPENTERTOWN COAL AND COKE COMPANY

UNITED STATES FUEL COMPANY NOTICES OF VIOLATION

December 1988 Through December 1991

Violation Number	Discussion
N89-28-2-1	Issued by DOGM on 2-22-89 for failure to minimize suspended solid contributions to stream flow. No proceedings were initiated. The violation was terminated when the pipeline was repaired.
N89-28-3-1	Issued by DOGM on 2-23-89 for failure to obtain a permit to operate coal processing equipment. No proceedings were initiated. Violation was terminated when permit was obtained.
N89-28-7-1	Issued by DOGM on 8-9-89 for failure to place underground development waste in a controlled manner. No proceedings were initiated. Violation was terminated when waste was removed.
N89-28-8-1	Issued by DOGM on 9-1-89 for failure to maintain diversion ditches and failure to maintain a support facility. No proceedings were initiated. Violation was terminated when the ditches were maintained and the pipeline was repaired.
N90-28-2-1	Issued by DOGM on 3-23-90 for failure to obtain approval for the construction of a truck runaway road. No proceedings were initiated. Violation was terminated when plans were submitted and approved.
N90-28-8-1	Issued by DOGM on 11-20-90 for failure to conduct coal mining and reclamation operations as described in the approved application. No proceedings were initiated. The violation was terminated when a road which had been utilized to access a sediment pond was included in the disturbed area to be reclaimed.
N90-28-8-2	Issued by DOGM on 11-20-90 for failure to maintain a support facility and prevent additional contributions of suspended solids to streamflow outside the permit area. No proceedings were initiated. The violation was terminated when the pipeline and related erosion was repaired.
N90-28-9-1	Issued by DOGM on 11-27-90 for failure to comply with terms and conditions of the permit. Specifically, Condition #4 relating to inspection of seals in Hiawatha No. 2 Mine. No proceedings were initiated. The violation was terminated when inspections resumed.

UNITED STATES FUEL COMPANY NOTICES OF VIOLATION (Continued)

December 1988 Through December 1991

Violation Number	Discussion
N91-39-1-4	Issued by DOGM on 2-19-91 for (1) failure to have a combination of principle and emergency spillways on two sediment ponds, (2) Failure to maintain diversion ditches, (3) failure to maintain a nonclogging dewatering device on a sediment pond and (4) failure to have a siltation structure for containment of drainage near the south west corner of Slurry Pond No. 5. No proceedings were initiated. Violations were terminated when additional spillways were installed on two sediment ponds, diversion ditches were maintained, the nonclogging dewatering device was exposed and repaired and plans were submitted and approved for a catch basin near the south west corner of Slurry Pond No. 5.
N91-39-3-1	Issued by DOGM on 3-25-91 for failure to properly dispose of noncoal waste. No proceedings were initiated. Violation was terminated when noncoal waste was cleaned up and a copy of U.S. Fuel's policy for disposal of noncoal waste was provided to DOGM.
N91-39-7-2	Issued by DOGM on 8-23-91 for (1) failure to have a siltation structure for containment of surface drainage at Savage Truck Shop and (2) erosion of inlets to sediment ponds D011, D003, D004 and D008. No proceedings were initiated. Violation was terminated when plans were submitted designating the Savage Truck Shop area as an alternate sediment control site and erosion of the sediment pond inlets was repaired.

CARPENTERTOWN COAL AND COKE COMPANY NOTICES OF VIOLATION

December 1988 Through December 1991

Violation Number	Discussion
89G206	Issued 5-6-89 by the Pennsylvania Department of Environmental Resources for exceeding effluent limitations at a discharge treatment pond. No proceedings were initiated. Abatement was achieved by modifying treatment parameters.
89G240	Issued 6-24-89 by Pennsylvania DER for exceeding effluent limitations at a discharge treatment pond. No proceedings were initiated. Abatement was achieved by modifying treatment parameters.
89G267	Issued 7-17-89 by Pennsylvania DER for exceeding effluent limitations from a filtering lagoon. No proceedings were initiated. Violation was terminated when treatment parameters were modified.
89G287	Issued 8-28-89 by Pennsylvania DER for exceeding effluent limitations from a filtering lagoon. No proceedings were initiated. Violation was terminated when treatment parameters were modified.

Facilities associated with the above violations have since been deactivated and bonds released by the Pennsylvania Department of Environmental Resources.

APPENDIX I-3

STATUS OF UNSUITABILITY CLAIMS

ATTACHMENT 1

11/27/89

SCOTT M. MATHESON
Governor

GORDON E. HARMSTON
Executive Director
NATURAL RESOURCES

CLEON B. FEIGHT
Director

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING
1588 West North Temple
Salt Lake City, Utah 84116
(801) 533-5771

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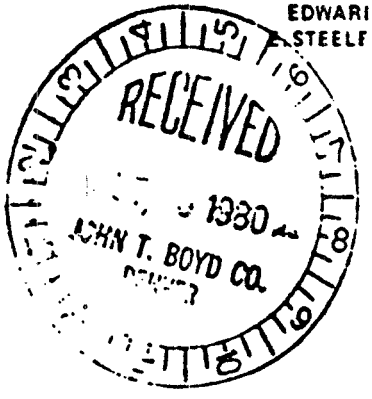


October 2, 1980

Mr. Michael Meenan
Environmental Engineer
John T. Boyd Company
1860 Lincoln Street
Suite 1028
Denver, Colorado 80295

RE: U. S. Fuel Company
Hiawatha Complex
ACT/007/011
Carbon County, Utah

Dear Mr. Meenan:

In response to your letter dated September 23, 1980, regarding areas designated unsuitable for mining; to date, this office has received no determination, application or petition of unsuitability for mining at or near U. S. Fuel Company's Hiawatha Complex in Carbon County, Utah.

Should such a condition arise in the future, U. S. Fuel Company shall promptly be notified.

Sincerely,

JAMES W. SMITH, JR.
COORDINATOR OF MINED
LAND DEVELOPMENT

cc: Bob Eccli, U. S. Fuel Company

JWS/btm

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Manti-LaSal National Forest - Price Ranger District
10 North Carbon Avenue #2
Price, Utah 84501

John T. Boyd Company
1860 Lincoln Street
Suite 1028
Denver, Colorado 80295
ATTENTION: Michael K. Meenan

Dear Mr. Meenan:

We are in receipt of your letter of 8/27/80 requesting information on U.S. Fuel Company's property in Carbon and Emery Counties, Utah. As we understand it, your request entails any available information regarding unsuitability criteria or "restrictions" that might apply to the subject property as indicated by your accompanying map.

After researching available data at our disposal, the only unsuitability criterion that might apply would be #17 covering municipal watersheds. The leased land (lease nos. SL 069985, SL 025431 and U 026583) under Forest Service jurisdiction falls into the Price River and Huntington Canyon drainages. Both drainages serve municipal water supplies. Since these watersheds cover such a large area of coal bearing lands owned by Federal, State and private interests, a determination has yet to be made relative to the applicability of criterion #17.

Regarding further "restrictions" not covered under the unsuitability criteria these would be handled on a more specific basis through the environmental assessment process.

One additional item that we might mention is the fact that the U.S. Fuel property boundary, as shown on your map, includes unleased Federal coal lands under Forest Service administration. Specifically, these lands include Section 19, $N\frac{1}{2}N\frac{1}{2}$, Section 20; $N\frac{1}{2}N\frac{1}{2}$, $S\frac{1}{2}NE\frac{1}{4}$, $NE\frac{1}{4}SE\frac{1}{4}$; Section 21, $W\frac{1}{2}NW\frac{1}{4}$, $N\frac{1}{2}SW\frac{1}{4}$, T. 16 S., R. 8 E., SLM.

We hope that the above adequately complies with your request. If you have any further questions, please don't hesitate to contact us.

Ira W. Hatch

IRA W. HATCH
District Ranger

6200-11 (1/89)

APPENDIX I-4

NEWSPAPER ADVERTISEMENTS

NOTICE OF REQUEST FOR PERMIT RENEWAL

United States Fuel Company, whose business address is 1 Main Street, Hiawatha, Utah 84527, is applying for a Mining and Reclamation Permit renewal with the Utah Department of Natural Resources, Division of Oil Gas and Mining according to regulation R614-300-121 of U.C.A. Title 40.

The permit location and boundaries is defined by the following land subdivisions:

T.15 S., R.7 E., SLM, Utah, Sec. 13, S½ ; Sec. 24, All; Sec. 25, E½ , E½ NW¼ ; Sec. 36, E½ .

T.15 S., R.8 E., SLM, Utah, Sec. 17, S½ , S½ N½ ; Sec. 18, S½ S½ , NE¼ SW¼ (Part); NW¼ SW¼ (Part); Sec. 19, All; Sec. 20, All; Sec. 21, All; Sec. 26, W½ SW¼ ; Sec. 27, S½ , SW¼ NW¼ ; Sec. 28, All, Sec. 29, All, Sec. 30, All, Sec. 31, All, Sec. 32, All, Sec. 33, All, Sec. 34, N½ , SW¼ , N½ SE¼ ; Sec. 35, NW¼ , NW¼ SW¼ .

T.16 S., R.8 E., SLM, Utah, Sec. 3, W½ ; Sec. 4, All; Sec. 5, All; Sec. 6, NE¼ SE¼ , Lots 1 through 10, Sec. 8, E½ E½ ; Sec. 9, All.

A full Copy of the permit application may be reviewed at the Recorders office at the Carbon County Courthouse in Price, Utah and at the office of the Utah Division of Oil, Gas and Mining at 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah.

Written comments, objections, or requests for informal conferences may be submitted to the Utah Department of Natural Resources, Division of Oil, Gas and Mining, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180.

Published in the Sun Advocate January 21, 28, February 4 and 11, 1992.

ATTACHMENT 3

11/27/89

AFFIDAVIT OF PUBLICATION

STATE OF UTAH }
County of Carbon, } ss.

I, Robert L. Finney, on oath, say that I am the Publisher of The Sun-Advocate, a weekly newspaper of general circulation, published at Price, State and County aforesaid, and that a certain notice, a true copy of which is hereto attached, was published in the full issue of such newspaper for Four (4) consecutive issues, and that the first publication was on the 25th day of March, 19 81 and that the last publication of such notice was in the issue of such newspaper dated the 15th day of April, 19 81

Robert L. Finney

Subscribed and sworn to before me this 15th day of April, 19 81

Notary Public.

My Commission expires My Commission Expires October 26, 1983

Publication fee, $ 122.40

PUBLIC NOTICE

United States Fuel Company, Hiawatha, Utah 84527, pursuant to Utah Mining Code promulgated under UCA 40-10-1 et. seq., is submitting the King Mines Mining and Reclamation Plan.

The project area is located on the U.S. Geological Survey Hiawatha 7.5 - minute quadrangle. The map below shows the general location and property boundries. A detailed description of the fee and lease properties is included in the permit application.

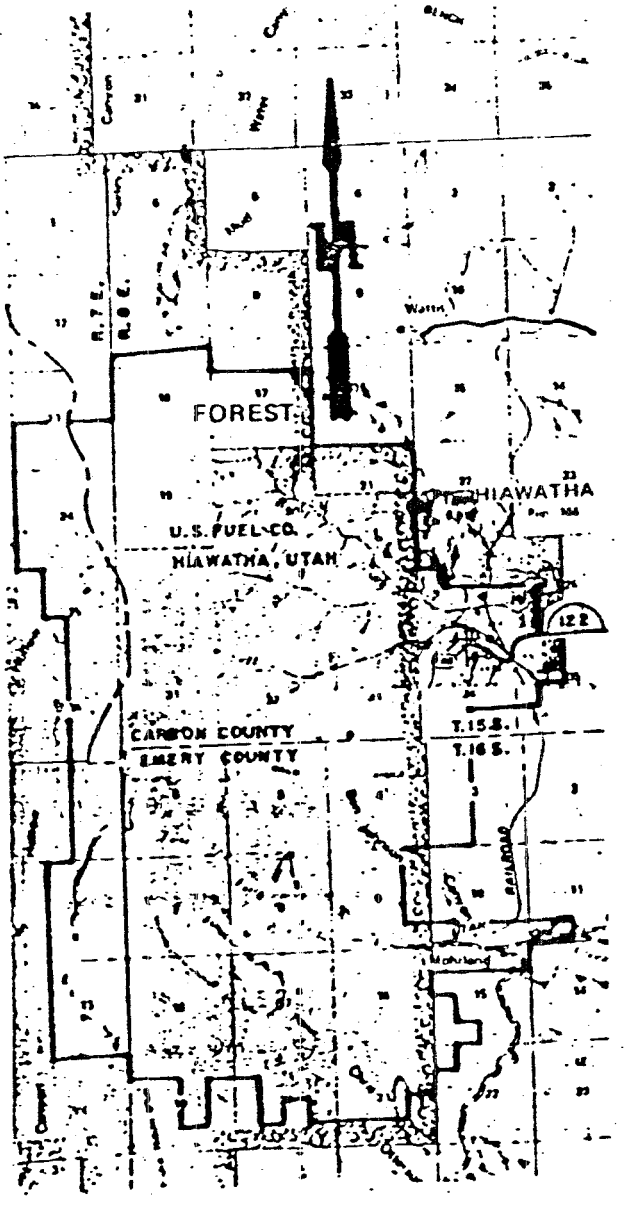
A copy of the application is available for public inspection at the following address:

Recorder's Office
Carbon County Courthouse
Price, Utah 84501
Recorder's Office
Emery County Courthouse
Castle Dale, Utah 84513

Written comments, objections or requests for informal conference should be sent to the following addresses:

Division of Oil, Gas and Mining
1588 West North Temple
Salt Lake City, Utah 84116
Office of Surface Mining
Brooks Towers, Suite 1020
15th Street
Denver, Colorado 80202

Published in the Sun Advocate March 25 and April 1, 8 and 15, 1981.



w/c. P.C.N-1404SV
c: P.O.R.C.
Bob Eccli

AFFIDAVIT OF PUBLICATION

STATE OF UTAH }
County of Carbon, } ss.

I, Dan Stockburger, on oath, say that I am the General Manager of The Sun-Advocate, a weekly newspaper of general circulation, published at Price, State and County aforesaid, and that a certain notice, a true copy of which is hereto attached, was published in the full issue of such newspaper for Four (4) consecutive issues, and that the first publication was on the 22nd day of February, 19 84, and that the last publication of such notice was in the issue of such newspaper dated the 14th day of March, 19 84

Subscribed and sworn to before me this

14th day of March, 19 84

Notary Public.

My Commission expires My Commission Expires October 22, 1986, 19

Publication fee, $ 156.00

LEGAL NOTICE

United States Fuel Company, P.O. Box A, Hiawatha, Utah 84527, pursuant to Utah Mining Code 786, promulgated under UCA 40-10-1, has submitted an "apparently complete" Mining and Reclamation Plan for the King Mines. United States Fuel Company's permit application number is ACT 007/011.

The King Mines permit area is located approximately 25 miles south-west of Price, Utah via U.S. Hwy. 10 and State Hwy. 122.

The following described lands are contained on the U.S. Geological Survey 7.5 minute Hiawatha quadrangle map.

TOWNSHIP 15 S., RANGE 7 E.
Sec. 13 S½
Sec. 24 all
Sec. 25 E½, E½NW¼
Sec. 36 E½

TOWNSHIP 15 S., RANGE 8 E.
Sec. 17 SW¼, S½NE¼, SE¼, S½NW¼, N½NW¼ portion
All of sections: 18, 19, 20 & 21
Sec. 26 W½SW¼
Sec. 27 SE¼, SW¼, SW¼NW¼
All of sections: 28, 29, 30, 31, 32 & 33
Sec. 34 NE¼, NW¼, SW¼, N½SE¼
Sec. 35 NW¼, NW¼SW¼

TOWNSHIP 16 S., RANGE 7 E.
Sec. 1 E½
Sec. 12 NE¼, SE¼, E½W½
Sec. 13 E½, E½W½

TOWNSHIP 16 S., RANGE 8 E.
Sec. 3 W½
All of sections: 4, 5, 6, 7, 8 & 9
Sec. 10 S½S½
Sec. 11 S½SW¼
Sec. 15 W½SW¼, SE¼SW¼, NW¼, N½NE¼, SW¼NE¼
All of sections: 16, 17 & 18
Sec. 19 N½N½, SW¼NE¼, NW¼SE¼
Sec. 20 NE¼, NE¼SE¼, N½NW¼, SE¼NW¼, NE¼SW¼
Sec. 21 NE¼, N½SE¼, NW¼, N½SW¼
Sec. 22 NW¼NW¼

A copy of the application is available for inspection at the following locations:
Carbon County Courthouse, Price, Utah 84501
Emery County Courthouse, Castle Dale, Utah 84513

Written comments, objections or requests for informal conferences may be submitted under Sec. UMC 786.12-786.14 to:
Utah Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, Utah 84114

Office of Surface Mining
Reclamation and Enforcement
Brooks Towers
1020 15th Street
Denver, Colorado 80202

Published in the Sun Advocate February 22, 29, March 7 and 14, 1984.

APPENDIX I-5

PERMIT RENEWAL REQUEST AND APPLICATION FEE

UNITED STATES FUEL COMPANY

P.O. Box A
Hiawatha, Utah 84527

(801) 637-2252
TELEX: 453-123

November 8, 1991

Division of Oil, Gas and Mining
Department of Natural Resources
State of Utah
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, UT 84180-1203
Attn: Daron R. Haddock, Permit Supervisor

Re: Permit No. ACT/007/001, United States Fuel Company, Hiawatha Complex, Carbon County, Utah

In accordance with Utah Division of Oil, Gas & Mining ("DOGM") Coal Mining Rule R614-303-230, United States Fuel Company ("U.S. Fuel") hereby applies for renewal of Permit ACT/007/001. Money Order for the filing fee in the amount of $5.00 is enclosed.

Copy of current Liability Insurance Policy Certificate, the original of which was previously filed with DOGM by letter of October 4, 1991, is enclosed. Bonds currently posted to secure the performance of reclamation within the permit area continue in full force and effect. The bonds are not subject to release until reclamation is completed as outlined in the Mining and Reclamation Plan.

Attached is a copy of U. S. Fuel's proposed newpaper notice to be published in accordance with R614-121.100. Please advise.

Michael W. Baum
President & General Manager

WWB/009/05kc

CUSTOMER'S RECEIPT

DO NOT SEND THIS RECEIPT FOR PAYMENT
KEEP IT FOR YOUR RECORDS

43875468663 911104 849010 **5*00

SERIAL NUMBER	YEAR MONTH DAY	POST OFFICE	U.S. DOLLARS AND CENTS

PAY TO: DIVISION OF OIL, GAS & MINING
STREET: 355 WEST NO. TEMPLE 3 TRIAD CENTER
CITY: SALT LAKE CITY STATE: UT ZIP: 84180

PURCHASER: UNITED STATES FUEL CO.
STREET: 1 MAIN STREET
CITY: HIAWATHA STATE: UT ZIP: 84527

CUSTOMER RECEIPT

COD NO. OR USED FOR

This receipt is your guarantee of 100% refund if your money order is lost or stolen, provided you fill in the *Pay To* and *Purchaser* information on the money order in the space provided. No claim for improper payment permitted 2 years after payment.

If your money order is lost or stolen, present this receipt and file a claim for a refund at your Post Office.

STATE OF UTAH)
:SS.
COUNTY OF CARBON)

I, Michael W. Baum, President of United States Fuel Company do hereby certify that the information contained in the above application is true and correct to the best of my knowledge and belief.

Michael W. Baum

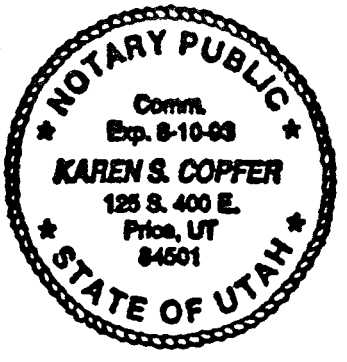
Michael W. Baum

Subscribed and sworn before me this 8th day of November, 1991.

Karen S. Copfer

NOTARY PUBLIC

My Commission Expires: 8/10/93 Residing in: Price, Utah



NOTICE OF REQUEST FOR PERMIT RENEWAL

United States Fuel Company, whose business address is 1 Main Street, Hiawatha, Utah 84527, is applying for a Mining and Reclamation Permit renewal with the Utah Department of Natural Resources, Division of Oil Gas and Mining according to regulation R614-300-121 of U.C.A. Title 40.

The permit location and boundaries is defined by the following land subdivisions:

T.15 S., R.7 E., SLM, Utah
Sec. 13, S½;
Sec. 24, All;
Sec. 25, E½, E½NW¼;
Sec. 6, E½.
T.15 S., R.8 E., SLM, Utah
Sec. 17, S½, S½N½;
Sec. 18, S½S½, NE¼SW¼ (Part);
NW¼SW¼ (Part);
Sec. 19, All;
Sec. 20, All;
Sec. 21, All;
Sec. 26, W½SW¼;
Sec. 27, S½, SW¼Nw¼;
Sec. 28, All
Sec. 29, All
Sec. 30, All
Sec. 31, All
Sec. 32, All
Sec. 33, All
Sec. 34, N½, SW¼, N½SE¼;
Sec. 35, NW¼, NW¼SW¼.
T.16 S., R.8 E., SLM, Utah
Sec. 3, W½;
Sec. 4, All;
Sec. 5, All;
Sec. 6, NE¼SE¼, Lots 1 through 10
Sec. 8, E½E½;
Sec. 9, All.

A full Copy of the permit application may be reviewed at the Recorders office at the Carbon County Courthouse in Price, Utah and at the office of the Utah Division of Oil, Gas and Mining at 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah.

Written comments, objections, or requests for informal conferences may be submitted to the Utah Department of Natural Resources, Division of Oil Gas and Mining, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180.

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CHAPTER II PERMIT APPLICATION REQUIREMENTS: SOILS

APPENDIX

R614-301-220 ENVIRONMENTAL DESCRIPTION

R614-301-221 PRIME FARMLAND INVESTIGATION

An investigation of the areas proposed to be affected by surface operations or facilities was conducted by the U.S.D.A. Soil Conservation Service in January 1983. They have determined that there are no prime farmland soils in the area. Refer to Attachment II-1 for documentation of this subject.

R614-301-222 SOIL SURVEY

During 1980 the Soil Conservation Service conducted a study of the soils found in the mine permit area and compiled it into a report entitled, "Soil Survey and Interpretations for U.S. Fuel Company Mine Area" dated February 1981. This report is included in the mine permit application as Appendix II-1. Also in conjunction with the soil survey, a vegetation survey was done. It is included within the same appendix and follows the soil survey report. Appendix II-1 contains information on soil identification, soil descriptions and productivity.

In June, 1988 the Soil Conservation Service issued a publication intitled "Soil Survey of Carbon Area, Utah". This publication describes soils in U.S. Fuel's permit area east of the national forest boundary. In May, 1990 George S. Cook, Range Conservationist with the Soil Conservation Service provided information for extending portions of this survey beyond the Forest Service boundary and recommended that we also use soil information compiled by the Forest Service since they had done surveys within their boundaries. Exhibits in this chapter, therefore, show soil types identified by both the Soil Conservation Service and the Forest Service. These Soils are distinguished by separate map symbols. Soils identified by the Forest Service are defined in Appendix II-2. They were provided by Dan Larsen, Soil Scientist, With the Price Ranger District, Manti-LaSal National Forest. Soils identified by the Soil Conservation Service are described in Appendixes II-1 and in the Carbon Area Soil Survey publication noted above.

222.100 Soil Maps

Maps delineating different soil types are labeled Exhibits II-1, II-2 and II-3.

222.200 Soil Identification

Soil identification can be found in Appendixes II-1, II-2 and the publication Soil Survey of Carbon Area, Utah.

222.300 Soil Description

A description of the soils shown on Exhibits II-1,II-2 and II-3

ATTACHMENT II-1

United States Department of Agriculture
Soil Conservation Service
P. O. Box 11350
Salt Lake City, UT 84147

REGULATIONS:
UMC-783.27
OSM.

January 17, 1983

Charles J. Jahne
Sharon Steel - Mining Division
19th Floor, University Club Building
136 East South Temple
Salt Lake City, UT 84111

Dear Mr. Jahne:

Mr. Keith Beardall, District Conservationist, Price, Utah has made a field review of the areas for which you requested information concerning prime farmland.

The absence of irrigation eliminates these soils from the prime farmland category. Because of the arid climatic conditions, irrigation would be essential.

We have retained the maps which you furnished with your letter for any future reference.

According to his observations and data available in soil survey reports, there are no prime farmland soils in the area in question.

If we can be of further assistance, please call us.

Sincerely,

Ferris Allgood

FERRIS P. ALLGOOD
State Soil Scientist

can be found in Appendixes II-1, II-2, and the publication Soil Survey of Carbon Area, Utah.

222.400 Soil Productivity

The present and potential productivity of existing soils can be found in Appendixes II-1, II-2 and the publication Soil Survey of Carbon Area, Utah.

R614-301-223 SOIL CHARACTERIZATION

Soil characterization is provided in Appendixes II-1, II-2 and the publication Soil Survey of Carbon Area, Utah.

R614-301-224 SUBSTITUTE TOPSOIL

The U.S. Fuel coal processing plant and loadout facility have been in operation since 1939. Mining operations and the town of Hiawatha have been in existence since the early 1900's. Prior to the Surface Mining Control and Reclamation Act, no topsoil had been removed prior to surface disturbance. Because of the extent of disturbance it will be necessary to utilize substitute topsoil to comply with reclamation requirements. Substitute topsoil borrow sites have been established near the Hiawatha area and at the South Fork and Middle Fork mine sites. See Exhibits II-1, II-2 and II-3 for deleneation of these sites. This material will be excavated and used at the time of final reclamation. Substitute topsoil for use in reclamation is discussed under each specific site from which it will be removed.

R614-301-230 OPERATION PLAN

R614-301-231 GENERAL REQUIREMENTS

231.100 Soil Removing and Storing

Topsoil Removal

Topsoil will be removed from areas of surface operations or major structures after vegetative cover that would interfere with the removal of topsoil has been cleared away. Topsoil will be removed before any drilling, blasting, mining or other surface disturbance is undertaken. Vegetation will be removed by scraping the surface with a blade or bucket of a dozer or patrol.

Topsoil will be removed in a separate layer unless substitute or supplemental materials are approved. If supplemental material is approved, all materials to be redistributed will be removed. Subsoil horizons or other underlying layers will be removed and segregated if necessary or desireable to ensure soil

productivity. Soil will be sampled according to DOGM'S guidelines or recommendations. In some cases, such as very rocky or limited access areas, or where meager or poor quality soil makes removal unfeasible, substitute materials will be used upon approval. If the topsoil is less than six inches thick, a six inch layer that includes the topsoil and unconsolidated material immediately below the topsoil will be removed and later redistributed as the surface soil layer. In situations such as road cuts on steep slopes, it would be very difficult to remove topsoil in advance of road development due to inaccessibility. In such cases, especially if soils are thin, it may be more feasible to provide substitute materials upon final reclamation.

Depth of topsoil removal will be judged by eye on small areas. At the borrow sites the lifts will be staked or soil pillars will be left to accurately judge the depth of removal.

If removal of vegetation or topsoil results in erosion that causes air or water pollution, the size of the area from which topsoil is removed at any one time will be limited and the soil will be redistributed at a time when physical and chemical properties can be protected and erosion minimized.

Topsoil Storage

Topsoil and other materials will be stockpiled only when it is impractical to promptly redistribute such materials on regraded areas. Existing and proposed topsoil storage sites are shown on Exhibits II-1, 2 and 3.

Stockpiled materials will be selectively placed on a stable surface area, not disturbed and protected from wind and water erosion, unnecessary compaction and contaminants that would interfere with revegetation. Protection will be accomplished by loosely piling soil materials then constructing a temporary berm or diversion around the pile to prevent soil loss and planting an effective cover of non-noxious, quick growing plants during the first normal planting period for favorable planting conditions after removal. The seed mix to be used on the stockpiled topsoil will be determined based on its location. However, it will be one of the four seed mixes designated for final reclamation. No fertilizer has been necessary to establish vegetative cover on the topsoil piles and will not be applied in the future unless deemed necessary. Side slopes of storage piles will be kept to a minimum. Stockpiles will be marked with identification signs to help prevent unnecessary disturbance. Stockpiled topsoil will not be moved until required for redistribution unless approved.

231.200 Suitability of Topsoil Substitutes or Supplements

Soils and refuse of the mine permit area, presently disturbed, stockpiled or designated to be used as substitute material have been sampled and their chemical and physical properties discussed

in the text and presented in table form. Selected overburden materials have been chosen for use as substitute topsoil materials during final reclamation. Most of the sites in the permit area were originally disturbed in the early 1900's and no topsoil was removed and stockpiled. Where no suitable substitute topsoil materials exist on site substitute materials will be imported from the borrow areas. Some disturbed areas have substitute materials stockpiled in the form of mine pads, berms, embankments or uncontaminated areas. These materials have beentested and appear to be suitable for use as substitute topsoil material based on total depth, texture, percent coarse fragments, pH, areal extent and physical and chemical tests. On site field trials support the conclusion that these soils can successfully be utilized for final reclamation.

Physical and chemical results for each substitute soil site are presented and discussed next.

Hiawatha Area

U.S. Fuel Company proposes to utilize topsoil and substitute topsoil materials from borrow areas A, B, C and D (Exhibit II-1) to reclaim disturbed areas associated with the Hiawatha Preparation Plant, slurry ponds and coal refuse embankments as well as the North Fork Vent Portal site. Analyses of the substitute soil areas indicate they are suitable for revegetation and their use will cause the least amount of disturbance to achieve compliance with regulatory requirements.

Physi... C and D

Labor... chemical characteristics of re... from test pits in Borrow Areas ...oil constituents in each pedon ...1).

In B... ...e is consistently a loam for ... ...e varies from 38 to 44 perce... 45 percent, and the clay perce... verage percent sand, silt and ... ...t soil of the C_2 horizon which ... is as follows:

Here are the analyses for the borrow area soils. Nutrients are low, but they're not bad otherwise. FYI - Soil for the refuse test plots was the topsoil (1ft) from the mural area test plots. Too good?

		Silt	Clay
Area A refuse		42.2%	16.5%
Area A C_2 Horizon	38.0%	45.0%	17.0%

in the text and presented in table form. Selected overburden materials have been chosen for use as substitute topsoil materials during final reclamation. Most of the sites in the permit area were originally disturbed in the early 1900's and no topsoil was removed and stockpiled. Where no suitable substitute topsoil materials exist on site substitute materials will be imported from the borrow areas. Some disturbed areas have substitute materials stockpiled in the form of mine pads, berms, embankments or uncontaminated areas. These materials have beentested and appear to be suitable for use as substitute topsoil material based on total depth, texture, percent coarse fragments, pH, areal extent and physical and chemical tests. On site field trials support the conclusion that these soils can successfully be utilized for final reclamation.

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Physical Properties of Borrow Areas A. B. C and D

Laboratory analyses of the physical and chemical characteristics of representative soil samples obtained from test pits in Borrow Areas A and D indicate that the major soil constituents in each pedon are nearly identical (see Table II-1).

In Borrow Area A, the USDA soil testure is consistently a loam for all horizons. The sand percentage varies from 38 to 44 percent, the silt percentage from 40 to 45 percent, and the clay percentage from 13 to 20 percent. The average percent sand, silt and clay for the pedon, compared to that soil of the C_2 horizon which will be left to aid in reclamation, is as follows:

	Sand	Silt	Clay
Area A Pedon	41.2%	42.2%	16.5%
Area A C_2 Horizon	38.0%	45.0%	17.0%

TABLE II-1
SOILS LABORATORY ANALYSES

Area	(g) Ident	%OM	(b) SP	pH	(b) ECe	(c) CEC	SAR	(d) NA	(d) CA	(d) Mg	(d) HCO_3	NO_3-N	%N	(e) P	(e) K	%>2M	(f) Sand	(f) Silt	(f) Clay	Texture
A	0-3	3.62	34	8.0	.4	8.7	.3	.5	3.9	.8	3.1	.3	.11	6.2	180	0	44	43	13	Loam
	3-11	2.14	39	8.0	.3	8.9	.4	.5	3.0	.7	3.5	< .1	.04	.7	134	0	43	41	16	Loam
	11-37	1.22	35	8.1	.2	9.9	.5	.6	2.4	.6	1.9	.1	.05	1.5	41	0	40	40	20	Loam
	37-78	1.05	36	8.4	.3	8.0	.8	.9	1.5	.9	2.1	< .1	.04	3.1	38	0	38	45	17	Loam
D	0-6	2.02	36	8.0	.4	8.2	.3	.5	3.8	.6	2.9	< .1	.11	9.0	184	0	47	36	17	Loam
	6-14	1.53	37	8.2	.2	7.7	.3	.4	2.4	.5	2.1	< .1	.08	1.1	125	0	51	34	15	Loam
	14-20	1.43	35	8.3	.2	7.1	.4	.5	2.1	.6	2.1	< .1	.10	< .5	112	0	53	32	15	Sandy-Loam
	20-34	1.21	36	8.3	.3	6.4	.5	.6	2.1	1.0	2.1	.3	.02	< .5	48	0	48	37	15	Loam

(a) SP = % Water at Saturation
(b) ECe = Electrical Conductivity of Saturation Extract in mmhos/cm
(c) CEC = Cation Exchange Capacity in Meq/100 g
(d) Soluble in Saturation Extract in Meq/L
(e) In Parts Per Million
(f) Percent
(g) Depth in Inches

The electrical conductivity (ECe) of the Area A soil is very consistent throughout the pedon. The average ECe of the Area A pedon is 0.3 mmhos/cm and the ECe of the C_2 horizon is 0.3 mmhos/cm.

The pH ranges from 8.0 to 8.4 with the average for the Area A pedon of 8.1. This compares to a pH of 8.4 for the C_2 horizon. The available water holding capacity for both the Area A pedon and the C_2 horizon is 0.16 to 0.17 inches per inch.

In Borrow Area B the soil texture varies from a loam to a clay loam and a silty clay loam. The sand percentage varies from 12 to 43 percent, the silt content from 42 to 59 percent and the clay from 15 to 32 percent. The average percent sand, silt and clay for the pedon, compared to that of the C_4 horizon which will be left to aid in reclamation, is as follows:

	Sand	Silt	Clay
Area B Pedon	26.4%	48.6%	25.0%
Area B C_4 Horizon	26.0%	44.0%	30.0%

The electrical conductivity (ECe) of the Area B soil ranges from 3 mmhos/cm to 3.9 mmhos/cm with an average ECe of 1.68 mmhos/cm. The C_4 horizon has an ECe of 2.6 mmhos/cm. All of the ECe values are rated as good for reclamation suitability.

The pH ranges from 8.0 to 8.2 with an average pH for the pedon of 8.1, compared with the pH of the C_4 horizon of 8.2. The pH values have good suitability for reclamation and enhancement of the vegetative regrowth.

The available water holding capacity (AWC) varies from 16.6 to 18.3 percent. The pedon has an average AWC of 17.62 percent compared to the 18.3 percent of the C_4 horizon. The high AWC values provide good suitability for reclamation purposes. The Sodium Adsorption Ratio (SAR) ranges from 0.3 to 1.6, with the average for the pedon of 0.76 compared to 1.0 for the C_4 horizon. Again the low SAR values have good suitability for reclamation and will not restrict new plant growth.

In Borrow Area C the USDA soil texture is consistently a loam which has good reclamation suitability. The sand content varies from 27 to 43 percent, the silt from 36 to 46 percent, and the clay from 21 to 27 percent. The average percent sand, silt and clay for the pedon, compared to that of the C_4 horizon, which will be left for reclamation purposes, is as follows:

	Sand	Silt	Clay
Area C Pedon	35.0%	42.2%	22.6%
Area C C_4 Horizon	43.0%	36.0%	21.0%

The ECe of the Area C soil varies from 0.4 to 6.1 mmhos/cm with an average for the pedon of 2.6 mmhos/cm compared to 6.1 mmhos/cm for the C_4 horizon. The average ECe for the pedon has good overall reclamation suitability, while the 5.5 mmhos/cm for the C_3 horizon and 6.1 mmhos/cm for the C_4 horizon have fair suitability.

The pH values range from 8.1 to 8.4, with an average value for the pedon of 8.2 and the value for the C_4 horizon of 8.1. The pH values have good reclamation suitability.

The AWC values are all 16.3 percent and have good reclamation suitability. The SAR values range from 0.3 to 2.6, with an average SAR for the profile of 1.1, and a 2.6 value for the C_4 horizon. The range of SAR values all fall within the good suitability criteria and will not be restrictive to vegetative regrowth.

C1 - 11 to 37 inches; pale brown (10YR 6/3) loam, dark brown (10 YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and plastic; few very fine and fine roots; common fine and few medium pores; moderately calcareous; moderately alkaline (pH 8.1) abrupt wavy boundary.

C2 -37 to 78 inches; pale brown (10 YR 6/3) loam, brown (10 YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine and fine roots; common fine and few medium pores; moderately calcareous, moderately alkaline (pH 8.4).

Borrow Areas B and C Pedon Description

The soil materials in borrow areas B and C are classified as the Haverdad soil, ASSCS correlated series and phase, and the detailed pedon descriptions are as follows:

Haverdad Loam, Moist, 1 to 5 Percent Slopes

This very deep, well drained soil is on alluvial fans and valley floors. It is located in the area of Clarks Valley, Gordon Creek, Coal Creek and near Wattis. It formed in alluvium derived predominantly from sandstone and shale. Slopes are 300 to 400 feet in length and single. The present vegetation is mainly big sagebrush, greasewood, blue grama, Indian ricegrass and needle and thread grass. Elevation is 6,300 to 6,850 feet. The average annual precipitation is about 12 to 14 inches, the mean annual air temperature is 45 to 47 F, and the average freeze-free period is 100 to 120 days.

Typically, the surface layer is brown loam about six inches thick. The underlying layer is pale brown loam about 30 inches thick. The next layer to a depth of 60 inches or more is pale brown fine sandy loam.

Included in this unit are 5 percent of Glenberg family, 3 to 6 percent slopes and 5 percent of a soil similar to Haverdad loam but having an air temperature between 42 and 45 F.

Permeability of this Haverdad soil is moderate. Available water capacity is about 8 to 10 inches. Water supplying capacity is 6.5 to 8 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 moderate. Runoff, originating from adjacent areas, is concentrated in the gullies. Gullies are "U" shaped, 5 to 10 feet deep, and 300 to 500 feet apart. The hazard of soil blowing is moderate.

This unit is used mainly for rangeland and wildlife habitat. A few areas are used for irrigated crops.

The potential plant community on the Haverdad soil is about 60 percent grasses, 10 percent forbs, and 30 percent shrubs. Important plants are western wheatgrass, big sagebrush, needle and thread, Indian ricegrass, Nevada bluegrass, mutton grass, and bluebunch wheatgrass. Dense stands of big sagebrush may develop with continuous overgrazing.

Practices needed to maintain or improve the vegetation include a planned grazing system, proper grazing use, and proper locations of water developments. Brush management by prescribed burning, chemical spraying or mechanical treatment can be used to improve deteriorated rangeland areas.

Seeding may be advisable if the plant community is in poor condition. Plants suitable for seeding include Russian wildrye, intermediate wheatgrass, Tegmar wheatgrass, pubescent wheatgrass, alfalfa, small burnet, prostrate kochia and potential native plants for which plant materials are available.

Under irrigation the management practices used to maintain or improve the area include conservation cropping systems with rotations of alfalfa hay, small grain and corn. Crop residues should be incorporated in the soil and fertilizer applied to maintain production.

Irrigation water can be applied by sprinkler or flood methods. Fields can be leveled without damage to the soil.

This unit is in capability subclass IIe-2, irrigated, and capability subclass VIe, nonirrigated. This Haverdad soil is in the Upland Loam (Basin Big Sagebrush) range site.

Haverdad Series

The Haverdad series consists of very deep, well drained, moderately permeable soils on sloping alluvial fans, fan terraces, and valley floors. These soils formed in stratified alluvium derived dominately from sandstone and shale. Slopes are 1 to 8 percent. Elevation is 5,500 to 6,850 feet. The average annual precipitation ranges from 8 to 14 inches, and the mean annual air temperature ranges from 45 to 49 F.

These soils are fine-loamy, mixed (calcareous), mesic Ustic Torrifluvents.

A typical pedon of Haverdad loam, 1 to 8 percent slopes about six miles northeast of Wellington, about 2,900 feet west and 2,300 feet south of the northeast corner of section 18, T. 14 S., R. 12 E.

A1- 0 to 3 inches; light brownish gray (10 YR 6/2) loam, dark grayish brown (10 YR 4/2) moist; weak thin platy structure parting to weak fine granular; slightly hard, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; many very fine and few fine vesicular pores and coarse roots; calcareous, carbonates are disseminated; moderately alkaline (pH 8.4); clear wavy boundary.

C1- 3 to 10 inches; pale brown (10 YR 6/3) loam, brown (10 YR 4/3) moist; weak medium subangular blocky structure; hard, firable, slightly sticky and plastic; few fine, medium and coarse roots; common very fine and fine pores; moderately calcareous, carbonates are disseminated; moderately alkaline (pH 8.4); clear wavy boundary.

C2- 10 to 17 inches; light yellowish brown (10 YR 6/4) loam, yellowish brown (10 YR 5/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and plastic; few fine roots; common very fine and fine pores; moderately calcareous, carbonates are disseminated; moderately alkaline (pH 8.2); clear wavy boundary.

C3- 17 to 46 inches; pale brown (10 YR 6/3) clay loam, yellowish brown (10 YR 5/4) moist; massive; very hard, firm, sticky and plastic; few fine roots; common very fine pores; moderately calcareous, carbonates are disseminated; moderately alkaline (pH 8.2); clear wavy boundary.

C4- 46 to 60 inches; pale brown (10 YR 6/3) loam, yellowish brown (10 YR 5/4) moist; massive; very hard, friable, slightly sticky and plastic; few very fine roots; common very fine pores; moderately calcareous, carbonates are disseminated; moderately alkaline (pH 8.2).

A horizon: Value is 5 or 6 dry, and chroma is 2 or 3.

TABLE II-5

SUBSTITUTE TOPSOIL BORROW AREA B AND C

Area	Depth Inches	Sp[a]	pH	ECe[b] mmhos/cm	SAR[c]	Na[d]	Ca[d]	Mg[d]	OM[e]	NO_3-N[d]	AWC[f]	P[d]	K[d]	Texture[g]	CEC[h]	>2MM
B	0-6	65	8.0	1.2	.3	0.6	7.5	2.1	40.9	34.0	16.6	27.0	400	L	17.4	0
B	6-18	32	8.2	.4	.4	0.6	3.6	0.9	1.26	0.6	16.6	0.8	221	L	7.1	0
B	18-38	53	8.1	.3	.5	0.7	3.4	1.0	3.95	0.6	17.5	3.1	167	SiCL	20.3	0
B	38-48	64	8.0	3.9	1.6	8.0	30.6	19.3	3.74	0.6	17.5	1.7	252	SiCL	20.3	0
B	48-84	71	8.2	2.6	1.0	4.0	12.4	18.8	2.95	2.4	18.3	0.5	122	CL	16.1	0
C	0-5	39	8.1	.4	.3	0.5	3.5	0.7	2.95	0.4	16.6	3.5	225	L	12.3	0
C	5-12	44	8.1	1.1	.6	1.2	6.2	3.0	2.02	0.4	16.6	<.5	343	L	11.2	0
C	12-18	40	8.4	.6	.4	0.7	3.0	2.3	1.38	<.1	16.6	<.5	255	L	8.6	0
C	18-28	45	8.3	2.0	.8	2.3	7.4	8.1	1.12	<.1	16.6	1.1	133	L	11.3	0
C	28-48	44	8.2	5.5	1.8	11.1	20.6	51.8	0.86	<.1	16.6	0.8	103	L	8.5	0
C	48-80	39	8.1	6.1	2.6	15.7	18.8	54.2	1.00	<.1	16.6	<.5	121	L	8.8	0

[a] Sp - Percentage of Water at Saturation

[b] ECe - Electrical Conductivity of Saturation Extract in mmhos/cm

[c] SAR - Sodium Adsorption Ratio

[d] - Soluble in Saturation Extract in Parts Per Million

[e] OM - Organic Matter

[f] AWC - Available Water Capacity in Percent

[g] Texture - L = Loam SiCL = Silty Clay Loam CL = Clay Loam

[h] CEC - Cation Exchange Capacity

C horizon: Value is 4 or 5 moist, and chroma is 3 or 4. Texture is fine sandy loam, loam, clay loam and sandy clay loam. Clay content is 14 to 30 percent. Reaction is moderately alkaline or strongly alkaline.

Borrow Area D Pedon Description

This soil is a loamy, messic Ustic Torrifluvent. This deep, well drained soil is formed on alluvial terraces. It is formed in alluvium derived principally from sandstone and shale. Slopes are 300 to 400 feet in length and single. Elevation is from 6,300 to 7,000 feet and range from 1 to 5 percent. The average annual precipitation is 14 inches. The mean annual air temperature is 44 to 46 F, and the average freeze-free period is 100 to 120 days.

In a typical profile, the surface layer is a dark grayish brown loam about six inches thick. The underlying layer is dark grayish brown loam about eight inches thick. The next layer is a brown sandy loam about six inches thick. The next layer is a grayish brown loam 14 inches thick. Extending from 34 inches to a depth of more than 60 inches is a light yellowish brown, extremely cobbly, gravelly sand.

Permeability is moderate (0.6 to 2.0 inches per hour). Available water capacity is 6 to 9 inches. Water supplying capacity is 5 to 8 inches. The organic matter content of the surface layer is 2 percent. Runoff is slow and the hazard of water erosion is moderate.

A typical pedon of the loam soil in Borrow Area D is:

C1- 0 to 6 inches; light brownish gray (10 YR 6/2) loam, dark grayish brown (10 YR 4/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine, common fine, medium and coarse roots; common very fine and fine pores; moderately calcareous, carbonates are desseminated; moderately alkaline (pH 8.2); clear wavy boundary.

C2- 14 to 20 inches; light yellowish brown (10 YR 6/4) sandy loam, brown (10 YR 5/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine and common fine roots; common very fine and fine pores; moderately calcareous, carbonates are disseminated; moderately alkaline (pH 8.3); clear wavy boundary.

C3- 20 to 34 inches; pale brown (10 YR 6/3) loam, brown (10 YR 5/3) moist; massive; very hard, firm, slightly sticky and slightly plastic; few very fine and fine roots; common very fine pores; moderately calcareous, carbonates are dissemianted; moderately alkaline (pH 8.3); clear wavy boundary.

C4- 34 to 60 inches; light yellowish brown (10 YR 6/4) extremely cobbly loamy sand, yellowish brown (10 YR 5/4) moist; single grain loose very friable; nonsticky and nonplastic; few fine roots; moderately calcareous; moderately alkaline; 15 percent gravel, 50 percent cobbles, 10 percent boulders.

Descriptions of the physical characteristics of other soils in the permit area can be found in Appendix II-1 "Soil Survey and Interpretations For U.S. Fuel Company Mine Area".

The results of detailed pedon descriptions as contained in the previous discussion and laboratory tests (Table II-1 and II-4) confirm that six feet (194,084 cubic yards) of suitable topsoil or substitute topsoil materials are available from Area A; that 4.5 feet (89,661 cubic yards) are available from Borrow Area B; that 4.5 feet (64,251 cubic yards) are available from Area C; and 1.83 feet (30,114 cubic yards) from Area D. The minimum amount of topsoil or substitute topsoil material available for reclamation is, therefore, 378,069 cubic yards. The results of analyses for the major and minor constituents used to determine the suitability of substitute topsoil for reclamation, and the volumes available from each horizon, are given in Table II-5. These data support the proposed reclamation plan which calls for removal of the upper horizons in Area A to a depth of 72 inches and leaving 6 inches (the 72 to 78 inch layer and underlying layers) of the C_2 horizon for subsequent reclamation of the borrow area. In Area D, the upper horizons will be removed to a depth of 22 inches, leaving 12 inches (from the 22 to 34 inch depths) of the C_3 horizon in place for subsequent reclamation of the borrow area.

The results of laboratory tests indicate that, while the substitute topsoil material has the desired characteristics for a plant growth medium, some nutrients and soil amendments are necessary to enhance the revegetation effort (see Tables II-6 and II-7). Soil tests will be conducted immediately prior to seeding the redistributed topsoil to ensure that fertilizer mixes and application rates are based on the soil conditions at the time of reclamation.

TABLE II-3

BORROW AREA TEST PIT ANALYSES

Area	USDA Texture	Percent			mmhos /cm ECe	in./in. AWC	pH
		Sand	Silt	Clay			
Area A Pedon	Loam	41.2	42.2	16.5	.3	.16-.17	8.1
Area A C_2	Loam	38.0	45.0	17.0	.3	.16-.17	8.4
Area B Pedon	Silt Loam	49.8	34.8	15.5	.28	.15	8.2
Area B C_4	Clay Loam	48.0	37.0	15.0	.3	.16-.17	8.3
Area C Pedon	Loam	35.0	42.4	22.6	2.6	16.3	8.2
Area C_4	Loam	43.0	36.0	21.0	6.1	16.3	8.1
Area D Pedon	Loam	49.8	34.8	15.5	.28	15.0	8.2
Area D C_3	Loam	48.0	37.0	15.0	.30	16.0	8.3

TABLE II-4

SUBSTITUTE TOPSOIL VOLUMES
AREAS A,B,C,D

AREA	HORIZON	ACREAGE	DEPTH (Inches)	VOLUME (Cu.Yd.)	REMARKS
A	A_1	20.05	0-3	8,086.8	Topsoil
	B_1	20.05	3-11	22,643.1	Topsoil with amendments
	C_1	20.05	11-37	69,546.8	Topsoil with amendments
	C_2	20.05	37-78	93,807.3	Subsoil-topsoil with amendments
B	A_1	12.35	0-6	9,962.3	Topsoil
	B_1	12.35	6-18	19,924.7	Topsoil
	C_1	12.35	18-38	32,875.7	Topsoil with amendments
	C_2	12.35	38-48	16,936	Topsoil with amendments
	C_3	12.35	48-68	32,875.7	Topsoil with amendments
	C_4	12.35	68-84	26,898.3	Topsoil with amendments
C	A_1	8.85	0-5	7,139	Topsoil
	B_1	8.85	5-12	8,566.8	Topsoil
	B_2	8.85	12-18	7,139	Topsoil
	C_1	8.85	18-28	12,136.3	Subsoil-topsoil with amendments
	C_2	8.85	28-48	23,558.7	Subsoil-topsoil with amendments
	AB_1	8.85	48-80	37,836.7	Topsoil
D	B_1	10.2	0-6	8,228	Topsoil
	B_2	10.2	6-14	11,519	Topsoil
	C_1	10.2	14-20	10,367	Subsoil-topsoil with amendments
	C_2	10.2	20-34	30,114	Subsoil-topsoil with amendments

TABLE II-5

SOIL MATERIAL SUITABILITY FOR SUBSTITUTE TOPSOIL

Area	Ident	OM	S	SP	S	pH	S	Texture	S	ECe	S	AWC	S	SAR	S	Stones	S	$CaCo_3$	S	Str.	S	K	S	MC	S	RF	S	Volume (yd^3)
A	0-3	3.62	G	34	G	8.0	F	L	G	.4		.16-.17	G	.3	G	0	G	M	F	g	G	.6-2.0	G	fr	G	<5	G	8,086.8
	3-11	2.14	G	39	G	8.0	F	L	G	.3	G	.16-.17	G	.4	G	0	G	M	F	b	F	.6-2.0	G	fr	G	<5	G	22,643.1
	11-37	1.22	F	35	G	8.1	F	L	G	.2	G	.16-.17	G	.5	G	0	G	M	F	b	F	.6-2.0	G	fi	F	<5	G	69,546.8
	37-78	1.05	F	36	G	8.4	F	L	G	.3	G	.16-.17	G	.8	G	0	G	M	F	M	P	.6-2.0	G	fi	F	<5	G	93,807.3(1)
D	0-6	2.02	G	36	G	8.0	F	L	G	.4	G	.16-.17	G	.3	G	0	G	M	F	g	G	.6-2.0	G	fr	G	<5	G	8228
	6-14	1.53	G	37	G	8.2	F	L	G	.2	G	.16-.17	G	.3	G	0	G	M	F	b	F	.6-2.0	G	fr	G	<5	G	11,519
	14-20	1.43	F	35	G	8.3	F	SL	G	.2	G	.10-.11	F	.4	G	0	G	M	F	b	F	2.0-6.0	G	fr	G	<5	G	10,367(2)
	20-34	1.21	F	36	G	8.3	F	L	G	.3	G	.16-.17	G	.5	G	0	G	M	F	M	P	.6-2.0	G	fi	F	<5	G	

OM = % Organic Matter
SP = Saturation Percentage
Texture = USDA Soil Texture (v = Very; f = Fine; SL= Sandy Loam; L= Loam; si = Silt; c = Clay)
ECe = Electrical Conductivity of Saturation Extract
AWC = Available Water Capacity, inch/inch
SAR = Sodium Adsorption Ratio, meq/liter

(1) Volume Based on 37" to 72" Excavation;

(2) Volume Based on Excavation from 14" to 22"

$CaCo_3$ = Calcium Carbonate (S = Slight, 0-14%; Moderate 15-29% High 30%)
Stone = Stoneness Class
Str = Soil Structure (g = Granular; b = Blocky; M = Massive)
K = Permeability in Inches Per Hour
MC = Moist Consistency (vfr = Very Friable; fr = Friable; L = Loose; fi= Firm vfi = very firm; efi = ex. firm
RF = Rock fragments
S = Suitability Rating (G = good; F = Fair; D = Poor; U = Unsuitable)
Ident = Depth in Inches

TABLE II-6
FERTILITY STATUS OF SUBSTITUTE TOPSOIL

Area	Ident	OM	N	P	K	NO_3-N	pH
A	0-3	3.62 G	.11	6.2 L	180 G	.3 L	8.0 F
	3-11	2.14 G	.04	.7 L	134 G	< .1 L	8.0 F
	11-37	1.22 F	.05	1.5 L	41 L	.1 L	8.1 F
	37-78	1.05 F	.04	3.1 L	38 L	< .1 L	8.4 F
D	0-6	2.02 G	.11	9.0 F	184 G	< .1 L	8.0 F
	6-14	1.53 G	.08	1.1 L	125 G	< .1 L	8.2 F
	14-20	1.43 F	.10	< .5 L	112 F	< .1 L	8.3 F
	20-34	1.21 F	.02	< .5 L	48 L	.3 L	8.3 F

Fertility Status:

G = Good, no amendments or nutrients necessary

F = Fair, sufficient to support vegetation at moderate levels

L = Low, amendments or nutrients necessary to support vegetation

Ident = Depth in inches

TABLE II-7

SUBSTITUTE TOPSOIL

NUTRIENT AND SOIL AMENDMENT REQUIREMENTS

Area	Ident[a]	OM[b]	NO_3-N[c]	P[d]	K[e]
A	0-3	2000	40	30	0
	3-11	2000	40	30	0
	11-37	2000	40	30	30
	37-78	2000	40	30	30
D	0-6	2000	40	15	0
	6-14	2000	40	30	0
	14-20	2000	40	30	0
	20-34	2000	40	30	30

[a] = Depth in inches

[b] = Native haygrass, straw, etc. in pounds per acre

[c] = Sulfur-coated urea, 45-0-0 in pounds per acre

[d] = Treble superphosphate 0-46-0 in pounds per acre

[e] = Potassium chloride 0-0-60 or potassium nitrate 13-0-44 in pounds per acre

Unit Train Loadout Underpass Soil Investigation

Construction of an underpass will permanently disturb .73 acres. Evaluation of the soil resources in this area indicate that only the upper 12 inches is suitable for reclamation. Therefore, only this material will be salvaged and protected for use in final reclamation. The 1,177 cubic yards of materials salvaged will be moved to the topsoil stockpile which is immediately east of Slurry Pond #5. The side slopes will slope gradually at an angle of 3:1 to where it intersects the runoff diversion circumscribed around the pile. The area will be seeded with mix no. 1, which will be broadcast at the prescribed rate.

The stockpiled topsoil, salvaged before the construction of the underpass, will be used in the final reclamation of the refuse piles because the underpass will be a permanent structure as a part of the state highway and will not be reclaimed.

The results of the field investigation and subsequent laboratory analyses of the extremely cobbley (35 to 45 percent cobbles) nature of the subsoil indicate that only the upper 12 inches is suitable for use in reclamation.

The soil at the underpass, a gravelly sandy loam, has a fair available water holding capacity at 7.5 percent. The percentage of rock fragments varies from 9.7 to 33.0 percent averaging 16.4 percent which has a fair suitability for reclamation. Additionally a 40 percent saturation percentage has good suitability. Therefore the overall physical characteristics of this soil will not be a significant limiting factor for use in reclamation.

The chemical characteristics also indicate that use of this soil for reclamation will be beneficial to post mining reclamation. The pH of 8.3, a 0.3 ECe, and a 0.6 SAR support this conclusion. It will be necessary to add some soil nutrients and amendments to enhance vegetative regrowth. The 1.8 average percentage of organic matter coupled with the 2.9 percent average nitrate nitrogen content indicate than forty pounds per acre of nitrogen are needed to enhance vegetative regrowth. To achieve the desired application rate, approximately one hundred pounds per acre of sulfur coated urea (45-0-0) would need to be added. The average phosphorus level, 2.1 ppm, is low and requires the addition of 30 pounds per acre of P_2O_5. This can be added in the form of a treble super phosphate.

Coal Refuse Materials

Four representative samples of the coal refuse materials were collected from test pits (Exhibit II-1) excavated in the embankments of Slurry Ponds 1, 3, 4 and 5 during October 1983, and two additional samples from Slurry Pond #1 were collected on March 4, 1984. The test pits were excavated by hand to a depth of 18 inches. As the hole progressed in depth representative samples were collected thereby producing a composite sample of the refuse material. Approximately 15 pounds of samples were collected from each hole. The composite sample was well mixed and then split into two samples one of which was submitted to an EPA certified laboratory for analysis of trace metals to determine the level of concentration, if any, of acid or toxic forming materials present in the refuse material. The results of these tests are presented in Table II-8 sampled as above. The results of these analyses confirm that there are not sufficient concentrations present to affect revegetation or plant growth adversely. The pH levels which ranged from 6.8 to 7.8 are considered to be very good. At these levels both the cations and anions are relatively inactive. At these pH's, even higher concentrations of biologically active trace metals would be inactive. However, irrespective of the pH, the trace metal concentrations are considered to be low. Almost all of the concentrations of the biologically active trace metals are considered low, having no toxicity to plants or animals. The selenium concentrations do approach the moderate levels, however, these levels are considered to be suitable for plant root growth and no significant dilatory effects are expected (Donahue, 1977). In Slurry Pond #4, the iron concentration at 15.8 ppm is considered on the high side of optimum, however, with a corresponding pH of 6.8 the iron is considered to be inert. Additionally the carbonate value for Slurry Pond #4, calcium 21.1 meq/l, magnesium 43.0 meq/l and bicarbonate 3.2 meq/liter, are sufficiently high to possess a buffering capacity to prevent acid formation (White, 1982).

The effects of the dark colored coal refuse and the respective higher temperatures which does affect plant growth will be eliminated by covering the coal refuse with the six inch layer of light colored substitute topsoil.

The other representative samples of the slurry ponds were submitted to an approved agricultural laboratory for analyses of physical and chemical characteristics (Table II-9). The major characteristics which affect suitability for plant root growth are shown in Table II-10. The salt concentrations determined by ECe, SAR, sodium, calcium and magnesium are all within the acceptable plant tolerance ranges (Donahue and others, 1977). The ECe values ranged from 1.7 to 4.3 mmhos/cm. Values of 0 to 4.0 mmhos/cm are considered non-saline and

TABLE II-8

SLURRY PONDS AND EMBANKMENTS
CONCENTRATIONS OF BIOLOGICALLY ACTIVE TRACE METALS

Area	Al (ppm)	B (ppm)	Cd (ppm)	Cr (ppm)	Cu (ppm)	Fe (ppm)	Pb (ppm)	Mn (ppm)	Hg (ppb)	Se (ppm)	Zn (ppm)	pH
Slurry Pond 5	2.78 L	1.08 L	0.03 L	0.05 L	0.20 L	0.63 L	0.94 L	2.06 L	<1.0 L	1.30 M	<0.01 L	7.86 G
Slurry Pond 3	2.26 L	4.70 L	0.04 L	0.06 L	0.22 L	0.31 L	1.07 L	0.65 L	2.0 L	1.50 M	<0.01 L	7.85 G
Slurry Pond 1	1.60 L	3.40 L	0.02 L	0.03 L	0.18 L	1.10 L	0.73 L	0.29 L	<1.0 L	0.91 M	<0.01 L	8.52 F
Slurry Pond 4	2.92 L	0.20 L	0.05 L	0.08 L	0.28 L	15.80 H	1.44 L	5.50 L	20.0 L	1.93 M	<0.01 L	7.35 G
Slurry Pond 4 (1980 Sample)			.001 L	.010 L			.002 L		1.5 L	.003 L		7.5 G

Concentrations of trace metals:

L = Low concentrations, no toxicity to plants or animals
M = Moderate toxicity, very slight toxicity to plants, moderate to animals
H = High concentration, potentially toxic to plants and animals or acid-forming material treatment needed

pH: G = Good pH , no treatment required
F = Fair pH, limited treatment required

Table II-9 Coal Refuse

Soils Laboratory Analyses

Area	OM	SP[a]	pH	ECe[b]	CEC[c]	SAR	Na[d]	Ca[d]	Mg[d]	HCO_3[d]	NO_3-N[e]	N	P[e]	K[e]	>2mm	Sand[f]	Silt[f]	Clay[f]	Texture
Slurry Pond 1	85.8	43	7.8	1.7	2.2	.2	.6	14.6	7.8	.9	<.1	.95	<.5	34	0	90	6	4	sand
Slurry Pond 3	80.6	69	7.8	3.4	6.6	.1	.7	22.5	24.2	1.6	3.8	1.10	<.5	41	0	65	29	6	sandy loam
Slurry Pond 4	25.8	33	6.8	4.3	6.8	.1	.7	21.1	43.0	3.2	<.1	.24	3.6	75	0	75	15	10	sandy loam
Slurry Pond 5	37.1	34	7.3	3.1	10.2	.2	.9	23.8	17.8	1.8	1.1	.43	4.6	64	0	68	18	14	sandy loam

a = SP = Percent water at saturation

b = Ece = Electrical conductivity of saturation extract in mmhos/cm

c = CEC = Cation exchange capacity in meq/liter

d = H_2O = Solution in saturation extract meq/liter

e = In parts per million

f = In percent

Table II-10 Coal Refuse

Characteristic's Which Affect Suitability for Plant Root Growth

Area	OM %	S	SP %	S	pH	S	Texture	S	ECe	S	CEC	S	SAR	S	AWC in/ft	S	HCO_3 meq/l	S	NO_3-N ppm	S^a	N %	S^a	P ppm	S^a	K ppm	S^a
Slurry Pond 1	85.8	G	43	F	7.8	G	S	P	1.7	G	2.2	G	.2	G	0.7	P	.9	G	<.1	L	.95	L	.5	L	34	L
Slurry Pond 3	80.6	G	69	F	7.8	G	SL	G	3.4	G	6.6	G	.1	G	1.3	F	1.6	G	3.8	L	1.10	L	.5	L	41	L
Slurry Pond 4	25.8	G	33	F	6.8	G	SL	G	4.3	F	6.8	G	.1	G	1.2	F	3.2	G	<.1	L	.24	L	3.6	L	75	G
Slurry Pond 5	37.1	G	34	F	7.3	G	SL	G	3.1	G	10.2	G	.2	G	1.3	F	1.8	G	1.1	L	.43	L	4.6	L	64	G

OM = Organic matter percent

S = Suitability rating (good, fair, poor, unsuitable)

SP = Saturation percentage

Texture = USDA soil texture (S = sand, SL = sandy loam)

ECe = Electrical conductivity of saturation extract

CEC = Cation exchange capacity meq/liter

SAR = Sodium adsorption ratio meq/liter

AWC = Available water capacity inches/feet

S^a = Suitability of available nutrients (G = Good, no amendments needed L = Low, amendments needed)

from 4.0 to 8.0 mmhos/cm as slightly to moderately saline. The 4.3 meq/liter value is considered to be slightly saline and is not expected to affect plant root growth.

The sodium adsorption ratio (SAR) is an indicator of plant tolerance for sodium. Soils are generally considered non-sodic if SAR values are below 10 (Richards, 1954). The values range from .1 to .2 and are well within plant tolerance ranges.

Values for calcium range from 14.5 to 23.8 meq/liter and are well within the general ranges found in topsoil.

Magnesium values range from 7.8 to 43.0 milli-equivalents per liter and are sufficient in quantities for plant growth (Empleton, 1966).

The macronutrient levels for nitrogen are considered low with values of less than .1 to 3.8 ppm and require the addition of 40 pounds per acre of sulfur coated urea (Saltanpour, 1975). Phosphorus levels are also considered low with values ranging from less than .5 to 4.6 ppm. Thirty pounds per acre of treble superphosphate will be added as a supplement. Potassium levels range from 34 to 75 ppm. The two potassium levels of 34 and 44 ppm in Slurry Ponds 1 and 3 respectively will need a supplement of 30 pounds per acre of potassium nitrate or potassium chloride. The other two levels 75 and 64 ppm of potassium for Slurry Ponds 4 and 5 respectively are adequate for plant growth. In all cases the fertilizers will be added to the redistributed substitute topsoil and not the refuse since leaching will carry the nutrients to the subsurface. The rates of application of nutrients in this section corresponds with those in Table II-7.

The available water holding capacity values range from 0.7 to 1.3 inches per foot (Erickson, 1973). The value of .7 inches per foot for Slurry Pond #1 is considered low, marginally suitable for plant root growth.

"Soil" texture is an important parameter to plant growth, however the main concern with the texture of a material is its water holding capacity which was previously described.

Two refuse samples were collected from Slurry Pond #1. The representative sample, collected from each test pit is a composite for the interval between the surface and a 2.5 foot depth level. The samples were submitted to Utah State University's Soil Laboratory (an approved agricultural laboratory) and Western Analytical Laboratory (an approved EPA certified laboratory) for analysis of the physical and chemical characteristics, (Table II-18) and biologically active trace metals, respectively (Table II-11).

TABLE II-11

SLURRY POND 1

BIOLOGICALLY ACTIVE TRACE METALS CONCENTRATIONS AND SUITABILITY

Area	ppm A 1	S	ppm B	S	ppm Cd	S	ppm Cu	S	ppm Fe	S	ppm Hg	S	ppm Mn	S	ppm Pb	S	ppm Se	S	ppm Zn	S	ppm pH	S
Sample A	.39	L	.40	L	<.01	L	2.0	L	70	L	<.002	L	1.2	L	<.01	L	<.01	L	2.4	L	6.0	G
Sample B	.46	L	.38	L	>.01	L	2.0	L	37	L	<.002	L	1.3	L	<.01	L	<.01	L	4.2	L	7.4	G

Concentrations of trace metals:

L = Low concentrations no toxicity to plants or animals
pH = G = Good pH no treatment required

TABLE II-12

SLURRY POND 1

SUITABILITY OF REFUSE FOR RECLAMATION

Area	pH	S[h]	mmhos/cm EC[a]	S	SAR[b]	S	% Sp[c]	S	% AWC[d]	S	Texture[e]	S	% CF[f]	S	MC[g]	S	OM	S
Slurry Pond 1 Sample A	6.0	G	2.5	G	.2	G	40	G	7.8	F	SL	G	54.1	P	Lo	F	44.2	G
Slurry Pond 1 Sample B	7.4	G	3.5	G	.3	G	37	G	6.4	F	SL	G	27.5	F	Lo	F	37.7	G

a = EC = Electrical conductivity in mmhos/cm
b = SAR = Sodium adsorption ratio
c = SP = Percent water at saturation
d = AWC = Available water capacity in percent
e = Texture = SL = Sandy loam
f = CF = Percent coarse fragments greater than 2mm
g = MC = Moist consistency Lo = loose
H = S = Suitability (g = good, f = fair, p = poor)

An assessment of the laboratory test data shows that the pH is considered to have good reclamation suitability. The key biologically active trace metals, which have been shown to be potentially toxic to plants and/or animals, have sufficiently low concentrations to be classified as non-toxic and non-acid producing.

The coal refuse material has good reclamation suitability for the following parameters (Table II-12): pH, electrical conductivity, SAR, saturation percentage, texture and the percent organic matter.

The available water holding capacity with values of 6.4 and 7.8 is rated as fair. The surface of the six inches of redistributed topsoil will be covered by one ton per acre of mulch. The mulch will increase infiltration and reduce evaporation and soil temperature through shading. The percentage of coarse fragments ranges from 27.5 to 54.2 and is rated as fair to poor respectively. The vegetative test plot for the refuse material will be located in the area of Sample A to show that the coal refuse material will support acceptable standards of vegetation.

The loose moist consistency is rated as fair. No mitigation will be made for the loose, moist consistency.

Data from previous laboratory analyses and those presented in Table II-9 and II-10 substantiate that the refuse materials can be used as a plant root growth medium.

When discussing coal refuse it is important to remember that coal refuse is derived from the overburden and underburden immediately contiguous to the coal and from partings within the coal itself. As such, coal refuse is site specific to a particular coal field or area. The lithostratigraphic characteristics of the coal refuse at Hiawatha are primarily carbonaceous shales and siltstones, bone coal (impure silty/shaly coal) and, to a much lesser extent, sandstone (less than one percent of the total amount of refuse). Even though in areas much of the coal refuse appears to be of a coarse nature, and based on size gradation alone might be classified as a gravelly material, it would be erroneous to assume that it would behave as a gravelly textured subsoil. Many factors account for the gravelly appearance of the refuse material which is visible on the surface of the refuse piles at Hiawatha, and the corresponding laboratory data which would characterize the materials as having the physical properties of a fine grained soil. They are: 1) the rate at which the continuous miner is advancing and cutting the face materials; 2) the depositional and stratigraphic characteristics of the lithologic unit; 3) the cleaning and segregating process in the preparation plant; 4) the method of hauling and placement of the coal refuse on the disposal pile; 5) the degree to which the coal refuse is disturbed by machinery after being emplaced on the disposal pile;

6) if exposed on the surface, the amount of fines which have been transported by wind and water erosion leaving the coarse material in place; and 7) the length of time the coal refuse has weathered, and whether it has been buried or left exposed on the surface.

The overall physical characteristics of the coal refuse at Hiawatha are; carbonaceous, laminated to thin bedded series of siltstones, claystones and shales. The material slakes readily and after a one to three year period it weathers significantly, to the point of being very friable with little inherent strength remaining. After a three to seven year period the boundary of the particle is still visible, however it is no longer indurated and the particle can't be segregated intact from the other refuse material. Materials which have been emplaced for thirty years or more have started forming a soil structure.

Inspections conducted in test pits excavated in two year old refuse materials revealed a significant amount of root hairs firmly attached to the surface of the coarse particles and entwined within the numerous fractures which develop in these shaley materials and coal. Numerous species of plants grow on the refuse piles and slurry ponds. The roots of these plants were traced to over two feet in depth. The abundance and vitality of the roots and root hairs appeared to be consistent; being very abundant and very healthy. Additionally a test pit was excavated in the area on the north-east sideslope of Slurry Pond #1 (the sideslopes of Slurry Pond #1 are approximately one and a half horizontal to one vertical). The area was covered with six inches of soil material ranging from a sandy loam to a gravelly sandy loam some four years previously and was subsequently seeded with crested wheatgrass. The plant roots examined in the test pit did not show any variance in overall appearance or abundance between the soil material and the underlying coal refuse and there was no observable matting of the roots or root hairs at the soil-coal refuse interface. With the exception of the close grazing of the plants by wildlife, the plants were healthy and provided good surface coverage.

Vegetation is currently growing on the refuse piles. The following species were observed growing on the refuse: rabbitbrush, sagebrush, Indian ricegrass, Russian thistle, yucca and beeplant. When digging the test pits to obtain representative samples of the refuse, roots and roothairs were numerous. In many areas over 50 percent coverage by vegetation growth was observed and documented. It is emphasized that refuse piles have not been seeded. These plants are strictly voluntary and have been observed on all areas of the refuse piles except where continued disturbance prohibits their growth.

When the coal refuse was sampled, roots classified as common to many, very fine to fine, root hairs and roots were present (in Slurry Ponds 4 and 5) from the surface to approximately three feet in depth. (Root hairs were also present in the two representative samples obtained from Slurry Pond #1 on March 8,

1984). It is impractical to segregate the coal fines from the other organic matter. Irrespective of the percentage of organic matter or the suitability rating for the level of organic matter present, one ton per acre of mulch will be added to the reclaimed surface of the areas in question. Mulch added to the surface will increase infiltration, reduce erosion, lower the soil temperature through shading, reduce evaporation and add nutrients to the soil as they are released during decomposition of the mulch. The recommended rate of application of the mulch is sufficient in quantity and quality to sustain plant growth and enhance the probability of vegetative success by the parameters previously mentioned.

Laboratory test results conducted to determine the physical and chemical characteristics of the coal refuse support the field observations. The saturation percentage for all of the samples was rated as having good suitability for reclamation. The available water capacity, which is the percent of water held at one-third atmosphere, minus the amount of water held at fifteen atmospheres, was rated as having a fair reclamation suitability. These same coal refuse samples were texturally classified as a loam to a gravelly-sandy loam.

Additionally all of the other parameters concerning reclamation suitability were rated as either good or fair. Thus based on field observations and laboratory tests the coal refuse materials do have a sufficient water holding capacity to support acceptable stands of vegetation. U.S. Fuel will document, through the use of test plot studies, that the available water capacity of the refuse is more than adequate to support vegetation.

* The test plot will be located as designated on Exhibit II-1. It will be placed on a minimum of two feet of new refuse which has been emplaced and compacted by a minimum of three passes of a large track mounted tractor. After it is compacted and the proposed grade and slope are met, then the upper twelve inches will be ripped to promote root penetration, increase water infiltration and to provide a good bond with the overlying topsoil. The three trial thicknesses of topsoil; 6, 12 and 16 inches, will then be distributed. The topsoil will be disced along contour, then the seed and fertilizer will be applied plus the required amount of mulch. Refer to Appendix III-5 for a discussion of the field test plot study.

Preparation Plant Insitu Soils

The preparation plant area has approximately 91.14 acres associated with it. Of this amount 37.69 acres are covered with coal refuse, so the reclamation will be identical to that of the other coal refuse and slurry pond areas. A 53.4 acre area at the preparation plant is relatively free of coal refuse and can be

reclaimed by utilizing the in-situ soils. In order to evaluate the reclamation suitability of these soils, a total of eight representative soil samples were collected from the disturbed areas associated with the preparation plant and the upper storage yard. The laboratory test results (Table II-13) indicate that the soils have a good overall reclamation suitability and will support acceptable stands of vegetative growth.

Sample 1 (Exhibit II-1) was taken from a hand dug test pit which was excavated some 2.5 feet in depth. Only the upper 8 inches showed signs of previous disturbance. Beginning at the surface, as the test pit was advanced, a representative sample of the material was collected and placed in the sample bag until a composite sample for the total excavated depth was obtained.

Sample 2 was taken from a hand dug test pit which was excavated 3.0 feet in depth. Only the upper 4 to 6 inches showed signs of previous disturbance. A composite sample for the total excavation depth was collected.

Sample 3 was collected from an undisturbed, in-situ soil profile on the upper side of a shallow road bank. The exposed face of the soil was removed and a channel sample of the upper three feet was collected and composited.

Sample 4 was collected from a hand dug test pit which was excavated 2.0 feet in depth. The upper 6 to 8 inches of the soil profile was previously disturbed. A composite sample was collected as the test pit was excavated.

Sample 5 and 6 were collected from the upper storage yard and represent the disturbed soils in the Upper Coal Storage Yard. Both test pits were excavated to a depth of 1.5 feet and composite samples from each pit were collected as the hole was advanced.

Sample 7 was collected from a bucket auger hole excavated in an undisturbed soil profile. The pit was excavated to a depth of 3.5 feet and a composite sample was collected.

Sample 8 was collected from a hand dug test pit excavated in a moderately disturbed soil profile. The pit was excavated to a depth of 2.5 feet and a composite sample collected as the test pit was advanced.

TABLE II-13

SOIL LABORATORY ANALYSES

DISTURBED SOILS AT PREPARATION PLANT

Sample	Area	pH	ECe[a]	SAR[b]	OM[c]	NO_3-N[d]	P[e]	K[e]	NA[e]	CA[e]	Mg[e]	Sp[f]	Texture[g]	AWC %	>2MM
1	PP	8.4	0.3	0.4	1.9	3.9	1.3	20	0.6	3.1	0.5	34	SL	7.5	24.0
2	PP	8.1	0.4	0.6	4.1	2.8	4.9	110	0.8	3.0	0.7	36	SL	10.4	3.2
3	PP	8.0	1.1	0.5	2.7	7.0	6.0	129	1.2	7.4	2.3	39	SL	7.4	31.4
4	PP	8.1	1.0	1.4	4.4	4.3	11.0	126	2.8	5.9	1.6	33	SL	8.7	18.5
5	USY	8.0	0.6	0.8	0.9	1.5	1.3	45	1.2	4.1	0.8	27	SL	5.8	47.2
6	USY	8.0	0.6	0.4	0.6	0.5	11.0	112	0.6	4.3	1.1	26	SL	10.8	<.1
7	USY	8.1	0.4	0.5	2.9	3.1	1.5	79	0.7	3.6	0.8	42	L	13.3	18.0
8	USY	8.0	0.6	0.9	1.2	4.3	6.5	>400	1.6	5.5	1.5	31	SL	7.6	29.1
9	UP	8.1	0.2	0.4	1.4	2.2	1.4	65	0.5	2.2	0.3	40	L	10.0	9.7
10	UP	8.3	0.3	0.6	2.0	7.0	2.8	58	0.5	1.1	0.5	40	SL	7.3	33.0

[a] ECe - Electrical Conductivity of Saturation Extraction in mmhos/cm

[b] SAR - Sodium Adsorption Ratio

[c] OM - Organic Matter in Percent

[d] NO_3-N - Nitrate Nitrogen

e - Soluble in Saturation Extract in ppM

[f] Sp - Saturation Percentage

[g] Texture - L = Loam SL = Sandy Loam

[h] AWC - Available Water Capacity in Percent

Middle Fork Area

Middle Fork Substitute Topsoil Sites

Six samples of soils in the Middle Fork Area (three from the upper pad and three from the lower pad Exhibit II-3) were collected in December 1983 and analyzed for physical and chemical characteristics (Table II-14) to determine their suitability for use during reclamation. Each sampling location was chosen based on the criteria that: the area was representative (visual observation) for both soils and aspect, the area could be protected if chosen for a test plot site, and the area had not been contaminated with toxic materials(oil, hydraulic fluid or other solid or fluid which is toxic to vegetation). The accumulated depth of snow from the seasonal snowfall was removed from the sampling site. A spud bar, shovel and hand auger were then used to collect samples from an 8 inch diameter hole excavated to 18 inches in depth. As the hole was advanced from the surface to 18 inches, representative portions of the excavated soils were collected as a composite sample and saved for laboratory analyses. Approximately 9 pounds of soil was collected from each of the 12 holes (3 holes located on each mine pad) and submitted to Western Analytical Laboratory and GARCO Testing Laboratory for analyses of physical and chemical properties. Additionally, the samples were analyzed for the presence of acid forming and toxic materials. Information contained in the discussion on the samples indicates that the soils will be suitable for substitute topsoil materials. As a result, since there was no topsoil removed and stored for general reclamation of the Middle Fork Area during initial contruction, the best available material currently on the site (as determined visually by a high percentage of fines, high organic matter content, and low coarse fraction) will be separated during the regrading operations and placed as a final layer during the reclamation process. On steep slope areas (those greater or equal to 2:1), the regraded surface will be roughened (by hand or using equipment depending on accessibility) to facilitate bonding of the substitute and stockpiled topsoil to the fill materials.

After the sampling program was carried out on the mine pad soils, analyses were performed to determine if the pad fill itself might be suitable as substitute material for reclamation. The chemical analyses are presented in tables accompanying the text for each location. The soil samples were also tested for concentrations of biologically active trace metals, metals which in large enough concentration could be detrimental to revegetation. The results are presented in Table II-15.

The soils which comprise the King IV and V upper and lower pads are suitable for use in reclamation of that area. This conclusion is based on six soil samples collected from the mine pad areas (see Exhibit II-3) and analyzed in December 1983 (see Tables II-14 and II-15). Considering the major parameters (texture, sodium adsorption ratio, electrical conductivity, and pH) and minor parameters (moist consistency, available water

capacity, permeability and organic matter) for soil material suitability, the soils average fair for use in reclamation. The pH ranges from 7.3 to 8.0 with an average pH of 7.6. These pH values are considered good for reclamation.

Of the six soil samples collected, four are classified as sandy loams and two as loamy sands. The average texture, a sandy loam, has very good suitability for reclamation and will not require any amendments. However, because of the presence of 15 to 20 percent gravel and cobbles in some locations of the mine pads, it might be necessary to separate the coarse materials by using a mechanical rock picker after the mine pad is regraded and the salvaged pad soil redistributed.

The sodium adsorption ratio (SAR) and the electrical conductivity (ECe) are both used as indicators of potential salinity problems. At the King IV and V mine pads, both SAR and ECe values indicate that salinity is not a problem. The SAR values range from 0.06 to 3.04, with the average value of 1.11. The ECe values range from 0.22 to 1.00 mmhos/cm with the average value of 0.49 mmhos/cm.

The moist consistency ranges from firm to friable with the average consistency being friable. Friable soils have good susceptibility to reclamation use and revegetation. Their permeability rates are good and average over 0.6 inches per hour. The available water capacity (AWC) of these soils range from 0.09 to 0.14 inches per inch with the average AWC of 11 inches per inch. AWC values between 0.08 and 0.16 have fair suitability ratings for reclamation.

Organic matter varies form 1.18 to 9.94 percent withan average value of 3.9. Soils with values over 1.5 percent organic matter are considered good for reclamation.

Analyses for trace metals, which are biologically active, also indicate the mine pad soils, at the King VI mine, do not contain any concentrations of any trace elements which might prove harmful or toxic to revegetation.

Based on the results of analyses of the soil samples collected in the Middle Fork area, soils in the area are low in organic matter, nitrogen, phosphorus, and potassium (see Table II-14). Soil amendments required to make the pad soils suitable for revegetation are provided in Table II-16.

TABLE II-14
SOIL LABORATORY ANALYSES
KING IV, V, AND VI

Area	Sample	SP[a]	pH	ECe[b]	SAR	NA[c]	Ca[c]	Mg[c]	HCO_3[c]	OM	N	P[c]	K[c]	Texture[c]	MC[c]	AWC[a]
King IV & V Upper	1	27	7.5	.31	.06	176	46.2	15.6	.02	4.32	.08	1.84	10	SL	fr	.09-.10
King IV & V Upper	2	19	8.0	.43	.08	170	30.0	32.9	.01	8.49	.07	.43	20	L	fi	.09-.10
King IV & V Upper	3	22	7.3	.39	.08	180	13.6	4.3	.02	2.37	.02	.84	5	SL	fi	.13-.14
King IV & V Lower	4	29	7.6	1.00	2.27	725	70.8	17.5	.01	1.98	.04	.80	38	SL	fr	.13-.14
King IV & V Lower	5	25	7.6	.49	1.13	325	87.1	24.7	.01	1.76	.02	.19	18	SL	fi	.13-.14
King III & V Lower	6	22	7.4	.22	3.04	26	75.6	17.9	.01	8.24	.01	.38	16	LS	fr	.09-.10
King VI Upper	7	26	7.2	.16	.06	8	75.9	20.8	.02	9.94	.01	.22	10	SL	fr	.13-.14
King VI Upper	8	21	6.9	.47	.05	18	127.0	16.7	.02	1.53	.05	1.06	20	SL	fr	.13-.14
King VI Upper	9	20	8.0	.34	.06	219	18.5	4.9	.03	1.18	.02	.79	10	SCL	fr	.12-.13
King VI Lower	10	25	7.5	.49	.05	28	47.5	42.6	.01	2.28	.02	.10	14	SL	fr	.09-.10
King IV Lower	11	25	7.7	.32	.03	23	61.2	30.0	.01	2.12	.02	.05	13	SCL	fi	.13-.14
King VI Lower	12	25	7.0	.61	.06	128	75.1	16.8	.01	6.49	.02	.73	14	SL	fr	.13-.14

[a]SP = Percentage of Water at Saturation

[b]ECE = Electrical Conductivity of Saturation Extract in mmhos/cm

[c]Soluble in Saturation Extract in Parts Per Million

[d]Percent

[e]Texture: S = Sand, C = Clay, L = Loam

[f]Moist Consistency: fr = Friable, fi = Firm

[g]AWC = Available Water Capacity Inches/Inch

TABLE II-15
KING IV, V AND VI
CONCENTRATIONS OF BIOLOGICALLY ACTIVE TRACE METALS

Pad	No.	Al (ppm)		B (ppm)		Cd (ppm)		Cu (ppm)		Fe (ppm)		Pb (ppm)		Mn (ppm)		Hg (ppb)		Se (ppm)		Zn (ppm)		pH	
King IV & V	1	14.0	M	.05	L	.002	L	.077	L	25.8	M	<.01	L	.105	L	<1	L	.26	M	.394	L	8.1	F
(Upper)	2	6.10	L	.37	L	<.001	L	.099	L	1.69	L	<.01	L	.026	L	<1	L	<.02	L	.296	L	8.8	P
	3	6.30	L	.04	L	<.001	L	.083	L	2.62	L	<.01	L	.012	L	<1	L	<.02	L	.379	L	8.7	P
King IV & V	1	29.90	M	<.02	L	.003	L	.104	L	11.4	M	<.01	L	.344	L	<1	L	.32	M	.271	L	7.9	F
(Lower)	2	1.75	L	.04	L	.001	L	.064	L	2.69	L	<.01	L	.443	L	<1	L	<.02	L	.180	L	7.7	G
	3	8.80	L	.15	L	.001	L	.087	L	4.61	L	<.01	L	.024	L	<1	L	<.02	L	.159	L	7.8	G
King VI	1	1.92	L	.21	L	.001	L	.075	L	6.24	L	<.01	L	.021	L	<1	L	<.02	L	.031	L	7.6	G
(Upper)	2	31.7	M	.11	L	.001	L	.062	L	16.4	M	<.01	L	.080	L	<1	L	.29	M	.421	L	8.3	F
	3	17.8	M	.24	L	.001	L	.068	L	5.14	L	<.01	L	.033	L	1	L	.13	M	.333	L	8.8	P
King VI	1	.53	L	.50	L	.004	L	.036	L	.249	L	<.01	L	.006	L	<1	L	<.01	L	.002	L	8.1	G
(Lower)	2	2.42	L	.32	L	.002	L	.059	L	3.43	L	<.01	L	.027	L	<1	L	<.02	L	.016	L	8.3	F
	3	5.28	L	.03	L	.001	L	.074	L	6.97	L	<.01	L	.042	L	<1	L	<.02	L	.036	L	8.0	F

Concentrations of trace metals:

L = Low concentrations, no toxicity to plants or animals

M = Moderate toxicity, very slight toxicity to plants, moderate to animals

H = High concentration, potential toxicity to plants and animals or acid-forming treatment needed

pH: G = Good pH range, no treatment required

F = Fair pH, limited treatment necessary

P = Poor pH, moderate treatment required with $CaSO_4$

TABLE II-16 – KING IV, V AND VI
RECOMMENDED NUTRIENT AND SOIL AMENDMENTS

AREA	SAMPLE	OM[a]	N[b]	P[c]	K[d]
KING IV and V (upper)	1	2000	40	30	30
KING IV and V (upper)	2	2000	40	30	30
KING IV and V (upper)	3	2000	40	30	30
KING IV and V (lower)	4	2000	40	30	30
KING IV and V (lower)	5	2000	40	30	30
KING IV and V (lower)	6	2000	40	30	30
KING VI (upper)	7	2000	40	30	30
KING VI (upper)	8	2000	40	30	30
KING VI (upper)	9	2000	40	30	30
KING VI (lower)	10	2000	40	30	30
KING VI (lower)	11	2000	40	30	30
KING VI (lower)	12	2000	40	30	30

[a] OM = Native Grass Hay, Straw, or Other Organic Amendments Pounds Per Acre

[b] N = Sulphur Coated Urea 45-0-0 Pounds Per Acre

[c] P = Treble Super Phosphate 0-46-0 Pounds Per Acre

[d] K = Potassium Chloride 0-0-60 or Potassium Nitrate 13-0-44 Pounds Per Acre

Middle Fork Area: Upper and Lower Pads

The areas delineated on Exhibit II-3 depict the areal extent of the proposed substitute topsoil. The minimum volumes available for the Middle Fork area are shown in Table II-17. It is important to restate that these volumes indicate only the materials that have been identified as suitable on the surface, and that additional suitable materials are expected to be found during regrading and reclamation of the pad areas. These will be temporarily stockpiled during regrading operations to be redistributed to achieve a six inch cover layer after the final grade has been emplaced.

TABLE II-17
Soil Volumes Available From
The Middle Fork Pad

Area	Acres	Depth (ft)	Volume (yd)
A	2.55	1.5	6,169
B	0.66	1.5	1,596
C	1.18	1.5	2,855

A total of 10,620 cubic yards is available to cover the 10 acre disturbed area at Middle Fork. The volume would allow a minimum cover of 6 inches over the regraded mine pad area. The small storage yards and the haul road will be reclaimed using on site materials. Refer to the Middle Fork Haul Road reclamation plan.

Middle Fork Topsoil Storage

The Middle Fork Topsoil stockpile is located at the junction of the Middle Fork and North Fork roads. This stockpile measures 50 feet in diameter and averages four feet high. The minimum slope is 0, it is flat on top. The maximum slope of the pile is 30 degrees. Approximately 354 cubic yards of material are stored in the stockpile. One soil sample, a composite of the surface to 4.0 foot depth, was collected from the existing topsoil storage pile and submitted to Utah State University for analyses. The results of these analyses are given in Table II-18.

The topsoil materials stockpiled in the Middle Fork Canyon have an overall good suitability rating for reclamation. Refer to Table II-19. Those parameters which have good suitability ratings are: organic matter, saturation percentage, electrical conductivity, SAR, texture and moist consistency.

The available water capacity value of 5.5 percent has fair reclamation suitability. Mulch, which will be added to all reclaimed surfaces, will increase the infiltration rate and decrease temperature and evaporation through soil shading.

The pH of 8.0 has fair reclamation suitability. The addition of sulfur coated urea and potassium nitrate will lower the pH into a more neutral position which would then receive a good suitability rating.

The 22 percent coarse fraction is noted as fair for reclamation suitability. No mitigation will be done for the coarse fraction.

The topsoil will require soil nutrients and amendments to enhance the establishment of vegetation.

The nitrate nitrogen level of 2.5 ppm will be increased by the addition of 40 pounds per acre of sulfur coated urea.

The 4.9 ppm level pf phosphorus will be increased by the application of 30 pounds per acre of treble super phosphate.

Potassium at 55 ppm is considered good, one ton per acre of mulch will be applied to the reclaimed surfaces. The mulch will either be straw, native grass hay or hydromulch.

Refer to Exhibit II-1 for the location of this soil stockpile.

TABLE II-18

LABORATORY ANALYSES RESULTS

OF

MIDDLEFORK TOPSOIL STOCKPILE AND SLURRY POND 1 EMBANKMENT

Area	pH	% OM[a]	SP[b]	EC[c]	SAR[d]	CA[e]	NA[e]	MG[e]	HCO_3[e]	NO_3-N[f]	N	P[f]	K[f]	AWC[g]	Sand	Silt	Clay	Texture	% > 2mm
Topsoil Stockpile	8.0	1.53	32	.5	.7	3.5	1.0	1.0	1.6	1.5	.09	4.9	137	6.5	58	24	18	SL	22.0
Slurry Pond 1 Sample A	6.0	44.2	40	2.5	.2	24.2	.8	6.9	.9	2.6	.39	4.4	55	7.8	65	18	17	SL	54.1
Slurry Pond 1 Sample B	7.4	37.7	37	3.5	.3	22.1	1.4	22.6	1.1	1.7	.38	8.1	53	6.4	66	20	14	SL	27.5

a = OM = Percent organic matter
b = SP = Percent water at saturation
c = EC = Electrical conductivity in mmhos/cm
d = SAR = Sodium adsorption ratio
e = H_2O solution in meq/liter
f = Concentrations in parts per million
g = AWC = Available water capacity in percent
h = Texture = SL = Sandy loam

TABLE II-19

MIDDLEFORK TOPSOIL STOCKPILE

SUITABILITY OF TOPSOIL FOR RECLAMATION

Area	pH	S	[a] mmhos/cm EC	S	[b] SAR	S	[c] % SP	S	[d] % AWC	S	[e] Texture	S	[f] % CF	S	[g] MC	S	[h] OM	S
Topsoil Stockpile	8.0	F	.5	G	.7	G	32	G	6.5	F	SL	G	22.0	F	FR	G	1.53	G

a = EC = Electrical conductivity in mmhos/cm
b = SAR = Sodium adsorption ratio
c = SP = Percent water at saturation
d = AWC = Available water capacity in percent
e = Texture = SL = Sandy loam
f = CF = Percent coarse fragments greater than 2mm
g = MC = Moist consistency (fr = friable)
h = OM = Percent organic matter
i = s = Suitability (g = good f = fair)

South Fork Area

South Fork Substitute Topsoil Sites

Six soil samples were collected from the South Fork Area (Exhibit II-2) in December 1983 (three from the upper pad and three from the lower pad, areas A and B respectively). These samples were analyzed for physical and chemical characteristics (Table II-14) to determine their suitability for use during reclamation.

The soil materials which comprise the upper and lower pads at the King VI mine are suitable for use in reclaiming that area. This conclusion is based on six soil samples collected from the mine pad area (see Exhibit II-2) and analyzed (see Tables II-14 and II-15).Considering both the major parameters: (texture, sodium adsorption ratio, electrical conductivity and pH) and minor parameters (moist consistency, available water capacity, permeability and organic matter), the soils at the King VI pads have a fair suitability for reclamation use.

The pH ranges from 7.6 to 8.8 and averages 8.2. These pH values are considered fair for reclamation.

Of the six soil samples collected, four are classified as sandy loams and two as sandy clay loams. The average texture, a sandy loam, has very good suitability for reclamation and will not require any textural amendments. However, because of the presence of 15 to 20 percent gravels and cobbles, in some locations of the mine pads, it may be necessary to separate the coarse materials. After the mine pad is regraded and soil redistributed, the coarse material will be removed by a mechanical rock picker.

The sodium adsorption ratio (SAR) values range from 0.034 to 0.063 with the average SAR of 0.062. The electrical conductivity values (ECe) range from 0.16 to 0.61 mmhos/cm with the average value of 0.4 mmhos/cm. These values for both the SAR and ECe indicate that salinity is not a potential problem.

The moist consistency of the soils ranged from firm to friable. Five of the soils were classified as friable and one as firm. A friable soil has a good suitability rating for reclamation.

The permeability rates are good and average over 0.6 inches per hour. The available water capacity (AWC) of these soils range from 0.09 to 0.14 inches per inch with the average AWC of 11 inches per inch. AWC values between 0.08 to 0.16 have fair suitability ratings for reclamation.

Organic matter varies from 1.18 to 9.94 percent with an average value of 3.90. Soils with values over 1.5 percent organic matter are considereed good for reclamation.

Organic matter varies from 1.18 to 9.94 percent with an average value of 3.90. Soils with values over 1.5 percent organic matter are considereed good for reclamation.

Analyses for trace metals, which are biologically active, also indicate the mine pad soils, at the King VI mine, do not contain any concentrations of any trace elements which might prove harmful or toxic to revegetation.

Based on the depth of the soil samples and the test results, a total of 6,337 cubic yards of substitute topsoil material is available for reclamation of the South Fork mine yard and bathhouse area from areas A and B on Exhibit II-2. This volume will allow for a minimum of six inches of substitute material to be distributed over the 9.3 acre mine yard area. Refer to Table II-20 for the breakdown according to area.

TABLE II-20

Soil Volumes Available From The South Fork Pad

Area	Acres	Depth (ft)	Volume (yd)
A	1.49	1.5	3,605
B	1.13	1.5	2,734

It is important to note that these volumes indicate the materials that are available on the surface and that the best available material from regrading and reclamation activities of the entire pad area will be temporarily stockpiled until the regrading and reclamation activities are complete. The salvaged materials will then be distributed to achieve a six inch cover according to the reclamation plans for South Fork. Once reclamation starts it will be a continuous operation and will be completed during one growing season. Because the substitute topsoil stockpile will be added to on a continuous basis during regrading and reclamation it is impractical to try to vegetate the topsoil stockpile. The stockpiles will be protected from erosion by diverting channel flows away from the stockpile.

Based on the results of analyses of the soil samples collected in the South Fork area, soils in the area are low in organic matter, nitrogen, phosphorus and potassium (see Table II-14). Soil amendments required to make the pad soils more suitable for revegetation are provided in Table II-16.

The South Fork conveyorline, coal pile and truck loadout will be reclaimed with topsoil salvaged during construction. The salvaged topsoil has been stockpiled and protected. It is

located in the area designated on Exhibit II-2 as the Lamb's Trailer Soil Stockpile Area. The total volume available from these piles is 1,206 cubic yards.

North Fork Area

North Fork Substitute Topsoil

An intake ventilation portal for the King IV mine was constructed in the North Fork area in 1979-80. The disturbed area comprises 1.1 acre. Topsoil was salvaged during construction and redistributed on the regraded slopes near the portal. Additional topsoil is available for this site from borrow area D near Hiawatha. Suitability of this soil for use in Reclamation was previously discussed under Borrow Area D Pedon Description.

231.300 Testing Plan

Testing to evaluate the results of topsoil handling will be done during final reclamation to eliminate the potential for excessive compaction and to assess the nutrient level of the soil. A visual examination will be done after the area is scarified and prior to seeding to ensure that seed depth and moisture absorption will not be hindered. A grab composite sample of the top six inches will be taken to evaluate fertilizer requirements.

231.400 Construction, Modification and Maintenance

The construction, modification, use and maintenance of topsoil stockpile areas is addressed under R614-301-231.100.

R614-301-232 TOPSOIL AND SUBSOIL REMOVAL

232.100 Topsoil will be removed prior to disturbance, where possible, and stored for reclamation purposes.

232.200 Materials to be utilized for final reclamation have all proven to be of a quality suitable for reclamation purposes. Refer to the five year test plot study that is located in Appendix III-5.

232.300 More than six inches of topsoil exists at all sites where substitute topsoil will be removed.

232.400 Topsoil may not be removed in the case of small structures such as power poles, signs or fence lines, or where the disturbance will destroy the existing vegetation or cause erosion.

232.500 Subsoil segregation is not required.

232.600 Soil material will be removed after the vegetative cover is cleared away and prior to other surface disturbance.

R614-301-233 TOPSOIL SUBSTITUTES AND SUPPLEMENTS

U.S. Fuel has conducted field test plot studies to demonstrate that various proposed soil mediums are suitable for sustaining vegetation and are the best available in the area to support revegetation. The results of the field trials are presented in Appendix III-5. The results of physical and chemical analyses of the substitute topsoil material are listed in table form under R614-301-231.200 in this chapter.

R614-301-234 TOPSOIL STORAGE

234.100 Topsoil will be stockpiled when impractical to redistribute promptly on regraded areas.

234.200 The material will be placed on a stable site within the permit area, be protected from contaminants and unnecessary compaction, be protected from wind and water erosion (if the pile will exist for a prolonged period of time) and not be moved until required for redistribution, unless approved by the Division.

R614-301-240 RECLAMATION PLAN

R614-301-241 GENERAL REQUIREMENTS

A general plan for the redistribution of soils is discussed under R614-301-242. The use of soil amendments and nutrients is discussed in R614-301-243. A plan for soil stabilization is presented in R614-301-244.

Each significant location of reclamation has addressed the above mentioned points in the discussion specifically for that site. Soil redistribution, soil stabilization and soil nutrients and amendments are covered in a plan designed for that site and its particular needs. Presented below is a brief scope of the revegetation work to be done and the reclamation plans for the most significant sites. Reclamation of any areas not discussed in the following plans will be conducted according to the general reclamation plan outlined in R614-301-240.

Revegetation

Four seed mixtures intended for revegetation of specific reclamation situations are provided in Chapter III, (Tables III-4, III-5, III-6, III-7). These are for reclamation of (1) the areas affected by coal refuse and other coal materials, (2) the alluvial fan sites, (3) the mine pads and approaches in South, Middle and North Fork, (4) riparian areas. Mixture No. 3 also includes nursery grown stock for trees. Mixture No. 4 includes nursery grown stock for both trees and shrubs.

Two basic methods used for seed planting are drilling and broadcasting. Hydroseeding is another method sometimes used. Drilling distributes and covers the seed in one operation and consequently gives the best results where topographic conditions allow. The drilling rate is to be one-half the broadcast rate shown in Tables III-4 through III-7.

Planting techniques will utilize drilling of seed where slopes are level enough and areas to be reclaimed are large enough. Otherwise, broadcasting by hand, using portable spreaders, or hydroseeding will be utilized. Nursery stock will be planted in clumped arrangements in areas that are to receive trees or shrubs (portions of the mine pads and riparian areas). The intended plant densities and seeding rates are provided in the seed mix tables (Tables III-4 to III-7).

Any roads that will be reclaimed will be ripped, surface materials removed and planting done according to the procedures described with seed mixture no. 3. Revegetation will achieve the necessary standards provided by the appropriate reference areas

except that forage values will be enhanced at the expense of undesireable shrub density as explained in the rationale accompanying the discussion of field trial test plot studies.

Hiawatha Area Reclamation

The Hiawatha coal processing plant and refuse disposal facilities have been in operation since 1939. They comprise 91.14 acres associated with the Preparation Plant and 111.5 acres associated with the slurry ponds and coal refuse embankments, for a total disturbed area of 202.64 acres. U.S. Fuel Company intends to dismantle and remove all coal processing, loadout and support facilities. Office buildings will be turned over to the town of Hiawatha. There has been no topsoil or fill material salvaged and stockpiled for reclamation as operations preceded the Surface Mining Control and Reclamation Act. The majority of disturbed area in Hiawatha is slurry ponds, refuse piles (from the preparation plant) and sedimentation ponds.

Preparation Plant Area

When all mining operations have ceased and the facilities in the preparation plant are no longer required, then the facilities will be dismantled. After the facilities are dismantled, all foreign debris and materials will be removed and disposed of, as previously described, in preparation for final reclamation. Only selected portions of the preparation plant and upper storage yard areas will need to be backfilled as a part of the reclamation activity. Therefore, prior to any post-mining reclamation activity which would significantly harm or destroy the topsoil resources in these areas, a minimum of the upper 1.5 feet of topsoil and appropriate subsoil materials will be removed and temporarily stockpiled and protected. The soil to be temporarily stockpiled will be removed using both front end loaders and large track mounted dozers. The soil thus removed will be taken to a temporary stockpile, to be located near the North and Middle Fork road junction (as shown on Exhibit II-1) and protected from the deleterious effects of erosion by installation of strawbale dikes or temporary runoff diversions around the perimeter of the stockpile.

After the appropriate areas have been backfilled or significantly regraded, the stockpiled topsoil will be redistributed. It is anticipated that only a very small percentage of the total area will require these measures. A majority of the area can achieve the final grade without significant regrading and without temporarily stockpiling the topsoil, as only the upper few inches of topsoil have been previously disturbed, the present grade is near the proposed final grade and the soils present have sufficient chemical and physical properties to support vegetative regrowth and enhance reclamation. Laboratory tests (Table II-13) substantiate that the soil materials in the

preparation plant area are adequate (both chemically and physically) to support vegetation and that no additional soils will need to be added to the area to enhance reclamation.

When the final grade has been achieved with a stable area having positive drainage, then the area will be prepared for seeding. Initially the soils will be ripped, to a depth of 12 inches, and disced along the contour. Next, the seed and fertilizer will be applied by either broadcasting, drilling or hydroseeding. Mulch will be applied at the rate of one ton per acre and will be either crimp-disced into the soil or bound to the soil with a binding agent added in the hydroseed mixture.

Slurry Ponds and Refuse Embankments Area

To reclaim this area U.S. Fuel Company will regrade the slurry and refuse piles and cover them with available topsoil from substitute soil borrow sites east of the preparation plant and slurry ponds. Because of the volume of slurry and refuse, regrading will not be done to original contour. The embankment slopes will be made less steep in order to reduce erosion. Structural foundations will be covered with available backfill material.

Sedimentation ponds and diversion structures will be removed and backfilled. Topsoil has been salvaged in the cases of the sedimentation ponds. Once they are regraded topsoil will be redistributed.

Revegetation will be primarily native species selected from reference areas on the property. Chapter III provides a complete list of the seed mixes to be used. Planting will occur during periods of greatest moisture conditions.

Proposed post-mining grading plans for the Hiawatha Plant site and loadout area are shown on Exhibits in Chapter V. Due to the amount of waste material stored at this site, no attempt will be made to achieve a final configuration similar to an assumed predisturbance configuration.

After the surface facilities and saleable coal materials are removed from the site, regrading operations will commence. The waste material piles will be flattened out and covered with fill material. All pond embankments will be removed and used for fill or cover materials in the regrading operations.

A shrink factor of five percent was used in the earth work cut and fill volume calculations. The earth work volume computations are based on the cross sections shown on Exhibits in Chapter V. Quantity computations, based on planimetered cross section areas and the average end area method, are included in Appendix V-2. The total cut volume available is 1,452,315 cubic

yards and the total fill volume is 1,452,114 cubic yards.

The existing sediment ponds and collector and cutoff ditches will be left in place until successful revegetation has been demonstrated and approved by DOGM. At this time they will be removed, regraded and revegetated.

Regrading Refuse Materials

Exhibits in Chapter V depicting refuse storage areas are representative of the coal refuse storage areas for the next five years. They depicts the projected regrading of the ponds when the fines from slurry ponds 1 and 4 are sold and removed, and the coal refuse is regraded and recontoured. Negotiations are currently in progress for the sale of the coal slurry in the ponds. The new coal refuse generated in the next five years will be placed on top of the existing coal refuse piles and embankments. Based on an average mining rate of one million tons per year, with 30 percent of the materials mined being immediately non-salvageable (20 percent is coal fines and is deposited in the slurry ponds and 10 percent being coal refuse), the mine will produce approximately 100,000 tons of coal refuse and 200,000 tons of coal fines. The coal fines have an approximate inplace density of 45 pounds per cubic foot and the coal refuse has an average inplace density of 90 pounds per cubic foot. Over a five year period the mine will produce 1,086,956 cubic yards of coal fines, which will easily fit into existing Slurry Pond No. 5, now empty and No. 1, when the fines are sold. (Pond No. 5 has a 500 acre-foot capacity and Pond No. 1 has a 230 acre-foot capacity).

The 411,522 cubic yards of coal refuse produced in the five year period will be placed on the southern and eastern portion of Slurry Pond #5 and over Slurry Pond #4, except over the slurry itself. These measures will increase the top width and height of the existing refuse piles without going beyond the existing disturbed boundaries. It is anticipated that after the fines have been removed from Slurry Pond #5a that this area will be used to store coal refuse.

Five coal refuse banks currently exist and act as embankments for the slurry ponds. After mining activities have ceased and the preparation plant has been shut down, any water contained in the ponds will be allowed to evaporate. As has been the ongoing practice, the remaining coal fines and associated materials within the slurry ponds will then be sold and removed. (The current and long term coal market indicates that all of the material within the slurry ponds is highly marketable and will remain so).

For final reclamation, after the slurry ponds have been cleaned out, the coal refuse embankments will be used to fill in the ponds. Starting at the top of the slurry pond embankments the coal refuse material will be moved to the bottom of the slurry

ponds then spread and compacted. Activities will continue until a uniform, positive grade has been established. The final surface will be slightly convex with the outer slopes stabilized at a maximum slope of 2 horizontal to 1 vertical. The surface of the stabilized graded coal refuse pile will be scarified to prevent slippage of the subsequent topsoil layer and to aid in revegetation. The final thickness of the stabilized refuse piles will vary from 0 to approximately 20 feet in depth.

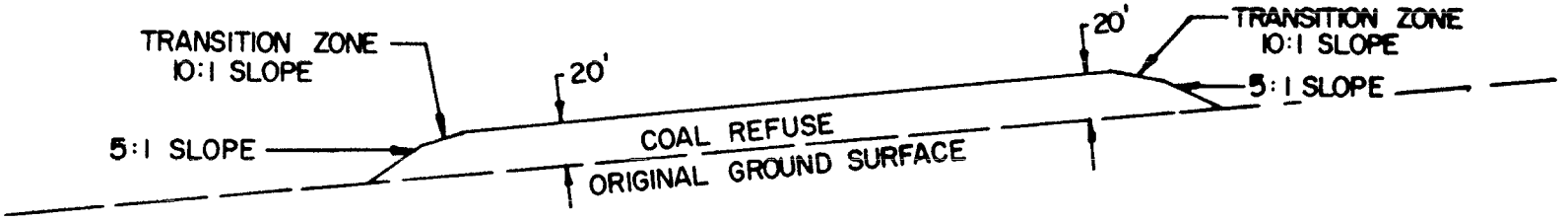
A typical generalized cross-section of the stabilized coal refuse pile is shown in Figure II-1. (Note that the thickness of the refuse under the side slopes diminishes in thickness from the crest of the pile to the toe). The final regraded slopes will generally repose at 4:1 or 5:1, or greater, horizontal to vertical scale: however due to variable topography, in a few places the slope could be as high as 2:1. To ensure geomorphic stability a 10:1 transition zone will be installed at the contact between the nearly flat top and the 5:1 side slope.

Vegetation is currently growing on the coal refuse embankments and on areas contiguous to the embankments. The presence of vegetation plus the laboratory analysis substantiate that higher than acceptable limits of toxic or acidic elements are not present in the refuse or slurry.

As proven by laboratory analyses of trace metals, the coal refuse in non-toxic and non-acid forming, therefore does not require burial. Field test plot studies based on a 6, 12 and 16 inch cover of topsoil have been suggested for implementation. A sixteen inch cover of topsoil will be used for the purpose of costing reclamation and then obtaining a reclamation bond. It is the full intent of U.S. Fuel to demonstrate, over the next five years, that the coal refuse can successfully be revegetated utilizing six inches of substitute topsoil over the "worst case" coal refuse materials. The 12 and 16 inch thick layers of substitute topsoil suggested in the field trial demonstration is provided for the purpose of a comparative study only. It is anticipated that at the end of the five year permit period, sufficient data will be available to allow revision of the permit application and reduction of the reclamation bond to correspond with a decreased cover of topsoil.

Therefore, U.S. Fuel plans to cover the 37.69 acres at the preparation plant and the 111.5 acre area associated with the coal refuse banks and slurry ponds with the needed amount of substitute topsoil as determined by the test plot studies. For the purpose of establishing a worst case condition to determine the reclamation bond, a sixteen inch cover has been suggested. To place a 16 inch cover of substitute topsoil material over the area will require 312,901 cubic yards. The substitute topsoil will come from Borrow Area A, B, C and D. These borrow areas are located as shown on Exhibit II-1.

TYPICAL CROSS SECTION
OF
STABILIZED COAL REFUSE PILE



SCALE 1" = 100'

FIGURE II-1

The substitute topsoil will be transported to the slurry pond area by scrapers, belly dumps, and/or dump trucks and spread by a road type grader. Grade stakes will be placed on 200 foot centers to aid in establishing a uniform layer. After the topsoil has been spread over the area, random samples will be collected to determine the required amounts of nutrients and soil amendments for the redistributed topsoil and/or to confirm that the designated applications of nutrients and soil amendments have been applied. A minimum of twelve random samples will be submitted for laboratory analyses to determine the nutrient levels. This sampling will also serve as a final check to verify that the designated minimum of topsoil has been uniformly spread over the area.

Immediately prior to fertilizing, mulching and seeding, the soil will be disced along the contour to eliminate the detrimental effects of compaction which occurred during distribution; to reduce erosion potential; and to promote root penetration. Fertilizer will also be applied during this operation. Mulch and seed will be applied either by hand, with farm type equipment, or by hydroseeding. The necessary amounts of nutrients and soil amendments based on the December 1983 laboratory test results are listed in Table II-7.

Reclamation Plan - Substitute Topsoil Requirements

U.S. Fuel Company proposes to utilize topsoil and substitute topsoil materials from borrow areas A, B, C and D (Exhibit II-1) to reclaim the 91.14 acre area associated with the Hiawatha Preparation Plant, the 111.5 acre area associated with the slurry ponds and coal refuse embankments, and the 1.1 acre area associated with the North Fork area. Of the 91.14 acres at the Preparation Plant, 53.45 acres will be reclaimed utilizing the insitu disturbed soils. Sufficient volumes of topsoil and substitute topsoil are available so that the remaining 37.69 acres could be covered with sixteen inches of topsoil or substitute topsoil materials. However, the sixteen inch cover depth is presented here only to show that adequate volumes of suitable materials are available, and for determining the worst case conditions for reclamation. The final reclamation plan will be revised to incorporate the results of the test plot studies. Using sixteen inches would require 79,048 cubic yards for the 37.69 acres of coal refuse area at the Preparation Plant; 233,853 cubic yards for the refuse piles and slurry ponds east of the railroad tracks; 887 cubic yards (utilizing a six inch cover) for the North Fork area; and 810 cubic yards for a portion of the South Fork Loadout for a total of 313,598 cubic yards of materials required for reclamation.

U.S. Fuel Company proposes to leave the substitute topsoil borrow sites in their current in-situ condition until reclamation

activities have commenced. Area A will be initially utilized and then Area D until the needed volumes of substitute topsoil materials have been obtained. Prior to commencing with soil salvage activities in Area D or developing the access road through the riparian zone U.S. Fuel will consult with the regulatory authority to determine if any design changes in connection with the stream crossing are required.

Each borrow area will be cleared of vegetation immediately prior to utilizing the substitute topsoil material from that area. The vegetation will be stacked near the perimeter of the borrow area to provide for additional wildlife habitat.

A combination of scrapers, front end loaders, track mounted tractors, belly dumps, and/or trucks will be used to load, transport and redistribute the substitute topsoil material. When the desired volumes have been obtained and removed from the borrow areas, reclamation procedures will commence.

Topsoil Stockpiles - Hiawatha Area

Two stockpile sites exist to the east of the Hiawatha Preparation plant facilities. One stock pile was created when the toe of Slurry Pond #5 was extended eastward in 1983. This topsoil, located within the bounds of the defined disturbed area and shown on Exhibit II-1, is protected from erosion by both a primary runoff control diversion which is constructed around the topsoil pile and a diversion ditch furthur to the west which will intercept all flow from upstream runoff. The topsoil pile has also been revegetated in order to control erosion by means of plant growth stabilization. Currently the dimensions of the stockpile are 48 by 68 by 8.5 feet high and contains 1,028 cubic yards of topsoil.

The second topsoil pile is located below Slurry Pond #4 and was created when the refuse pile was extended below Slurry Pond #4 in 1988. The dimensions of the pile are 130 feet long by 60 feet wide and six feet high. The minimum slope of this pile is 0, the top is flat. The maximum slope is 37 degrees. The stockpile contains approximately 1,488 cubic yards of topsoil. The pile has been revegetated and is protected by a berm-ditch arrangement around the toe of the stockpile.

The topsoil which has been stockpiled at these locations is protected for long term storage by the following methods: the topsoil was stripped from its in-situ location and moved to the storage site. The previous surface of the storage site was prepared prior to stockpile placement by removing existing vegetation and by scarifying the surface. The new material was then placed with sufficient compaction to ensure long term stability, but without creating a deleterious condition which prevents plant root growth and then seeded and mulched.

Equipment Storage Yard East of Slurry Pond No. 5

The Equipment Storage Yard is a 5.5 acre fenced storage area located east of Slurry Pond #5. It is shown on Exhibit II-1.

Topsoil removal: The Equipment Storage Yard was constructed in 1978. Prior to using the area to store equipment, the upper six inches of topsoil materials were excavated and stockpiled. A patrol grader was used to remove a uniform depth of soil. During each pass of the grader the blade would be set on an angle. As the grader moved forward the soil would be excavated and windrowed on the side. A large scraper would then move along the windrow picking up the soil. The soil was then hauled to the stockpile and stabilized. Between two or three passes were made by the grader before topsoil salvage activities were completed. On the upper portion of the equipment storage yard over six inches of soil was excavated to create a relatively flat surface for the site. A total of 4,480 cubic yards of topsoil was salvaged and stockpiled.

Topsoil stockpile and protection measures: The topsoil is stockpiled in a long low berm immediately west of the Equipment Storage Yard. The stockpile measures 515 feet long, 50 feet wide and has a broad twelve foot top width and two and one-half horizontal to one vertical sideslopes. It has a flat top and a maximum slope of 27 degrees. The stockpile is located on a relatively flat slope (less than 8 percent). The topsoil was emplaced with sufficient compaction to ensure stability but still allow the growth of vegetation. The topsoil storage area has limited access which protects it from vehicular traffic and is not located on any drainage ways. Native plant species have been established and protect the stockpile from adverse effects of wind and water erosion. The stockpile has been stable since its construction. The area is inspected regularly to ensure the detection of any adverse conditions.

This area will be used as a substitute topsoil borrow site for final reclamation and is included within Borrow Area A. The physical and chemical characteristics of the soils in the Equipment Storage Yard are identical, the same soil series and phase of that series, to the soils in Borrow Area A. Therefore, the laboratory test results, located in Table II-5 are representative of the soils in the Equipment Storage Yard.

During April, 1985 a seven foot deep test pit was dug in the middle of the Equipment Storage Yard and a channel sample of the soil was taken for laboratory analysis to verify its similarity to those samples taken for Borrow Area A. The sample results are presented in Table II-21 and can be compared with those in Table II-1. The results show that the two sites are quite similar and can be treated as a single borrow area.

Table II-21

Equipment Storage Yard Soil Analyses

Sample Number	Sample Depth	meq/l in sat. ext. Ca	Mg	Na	pH	EC	% OM	Sat. %
1	0 - .5	1.9	.8	.7	8.1	.3	2.09	40.2
2	.5 - 1.67	1.5	.6	.7	8.2	.2	1.69	45.3
3	1.67 - 3.83	.8	1.5	.8	8.4	.2	1.10	55.8
4	3.83 - 7.0	1.0	4.1	6.7	8.6	1.1	1.22	45.6

Sample Number	HCO_3	ppm NO_3-N	% N	P	K	Hydrometer % Sand	% Silt	% Clay	Tex.
1	1.2	3.4	.08	1.9	131	41	46	13	L
2	1.1	2.1	.04	1.3	73	29	44	27	L
3	1.6	2.2	.11	5.3	77	16	52	32	SiCL
4	2.1	2.2	.05	10.1	107	30	42	28	CL

L = Loam SiCL = Silty Clay Loam CL = Clay Loam

Soil analyses from test pit dug in Equipment Storage Yard.

Table II-22

Reclamation Timetable
Hiawatha Processing Plant and Loadout Facility

ACTIVITY	START	FINISH	YEAR
Cease Operating			1
Dismantle Surface Buildings Structures and Equipment	May 1	Oct 1	1
Remove Exposed Concrete	Sept 1	Nov 1	1
Regrade Site	May 1	Aug 15	2
Non-toxic Fill Placement	July 15	Aug 15	2
Place Topsoil	Aug 1	Sept 1	2
Remove Sediment Ponds	Aug 1	Sept 15	2
Soil Nutrient Tests	Aug 1	Aug 15	2
Nutrient/Fertilizer Placement	Aug 15	Sept 15	2
Seeding and Planting	Sept 1	Oct 15	2
Mulching	Oct 15	Nov 1	2
Final Acceptance		Within 5 Years	

Middle Fork Reclamation

Mining in Middle Fork Canyon had commenced in the early 1900's. Surface areas related to mining in King 4 and 5 were disturbed prior to the Surface Mining Control and Reclamation Act therefore, no topsoil was removed and stockpiled for future reclamation. At the time of reclamation substitute topsoil material from the pad itself will be salvaged. Surface structures will be removed and the foundations backfilled. Compacted topsoil will be scarified before revegetating. Highwalls connected with portals, embankments and benches will be terraced in the form of highwall slope reduction to control erosion. Portals will be back filled and graded to prevent access.

Proposed post-mining grading plans for the Middle Fork area are shown on Exhibits in Chapter V. No contour maps which show predisturbance surface configuration are available for this area, therefore, the proposed final surface configuration was developed to provide a balanced cut and fill situation and configuration similar to other canyons in the area. A shrink factor of 5 percent was used in balancing the cut and fills.

Calculations for the earthwork volumes are based on the cross-sections shown on Exhibits in Chapter V. Quantity computations, based on planimetered cross-section areas and the average end-area method, are included in Appendix V-2. The total cut volume calculated is 74,115 cubic yards and the fill volume is 73,477 cubic yards. If, during regrading operations, it is found that the earth work volumes will not balance as planned, the grading plans will be adjusted to achieve a balanced condition.

After completion of surface facility removal and sealing of all the entry portals except for the Hiawatha II mine portal, the regrading operations will commence. Fill material will be pushed up against the highwalls as high as possible. All fills will be constructed at a slope of 2 horizontal to 1 vertical. The mine pad will be covered with the best available material (substitute topsoil material) salvaged from the mine pad area. The existing culverted stream diversions will be removed during the regrading operation. The existing diversion cut-off ditches and sediment pond will be left in place until the end of the regrading. Prior to removal of the sediment ponds, traps will be constructed in the existing stream bed below the site. The traps will not be removed but will be allowed to fill in with sediment from the reclaimed site. The sediment traps are shown on the Middle Fork Final Surface Configuration map in Chapter V.

After placement of the substitute topsoil (best available onsite material) and the stockpiled topsoil, the entire area will be scarified and fertilized to prepare the soil for planting. Scarification will be done on the contour where feasible with patrol graders and farm-type disc equipment.

Vegetative test plots, as required by OSM, have been established to test various soils for their capability to produce adequate revegetation results. The test plots are discussed in detail in Chapter III, Appendix III-5 due to their emphasis on vegetation.

Seeding, fertilizing, and mulching will be done during the first September or October following regrading of the site. Seed will be drilled on all areas where the slope allows. Steeper slopes will be hydroseeded or broadcast and hand raked. All seeded areas will be mulched at a rate of 1 ton per acre. Seeded and mulched areas on slopes 2:1 or steeper will be covered by a stapled netting to maintain position and integrity of mulch.

Table II-23

Reclamation Timetable

Middle Fork Mining Operations

Activity	Start	Finish	Year
Cease Operation			1
Remove Mining Equipment	May 1	July 1	1
Dismantle Surface Buildings Structures and Equipment	July 1	Aug 15	1
Remove Exposed Concrete	Aug 15	Sept 15	1
Seal Portals	Aug 15	Sept 30	1
Install Sediment Traps	May 1	June 1	2
Regrade Site	May 15	June 1	2
Remove Stream Diversions	May 15	June 1	2
Stockpile Substitute Topsoil Material	June 1	Aug 15	2
Remove Sediment Pond	Aug 1	Aug 15	2
Place Substitute Topsoil	Aug 1	Sept 1	2
Soil Nutrient Tests	Aug 15	Sept 1	2
Surface Scarification and Preparation	Aug 15	Sept 1	2
Nutrient/Fertilizer Placement	Sept 1	Sept 15	2
Seeding and Planting	Sept 15	Sept 30	2
Mulching	Sept 30	Oct 15	2
Final Acceptance		Within 5 Years	

South Fork Reclamation

The South Fork Mine yard is located on an area previously disturbed by the King 3 mine which halted operations in 1975. U.S. Fuel Company reconditioned the facilities when starting operations in the King 6 mine in 1981. Previously disturbed areas in South Fork will be reclaimed in the same manner as the Middle Fork mine yard. Following mining operations, projected past the year 2000, the surface structures will be dismantled and removed. The mine yard will be disced and foundations covered with backfill material. Portal openings for the King 6 mine will be backfilled to the angle of repose. No hydraulic mine seals will be necessary. Sedimentation ponds and diversion channels will be regraded.

Revegetation will consist of native species selected from the reference areas on the U.S. Fuel Company property. These areas can be found in Chapter III, Vegetation. Planting will occur during periods of greatest moisture conditions.

Most of the facilities in the South Fork area were constructed prior to the current regulations. Therefore, no topsoil was stockpiled for reclamation. The overland conveyor and loadout facilities shown on exhibits in Chapter III were constructed after the regulations were in force.

Topsoil was stripped and stockpiled for these areas. The locations of the stockpiles are shown on Exhibit II-2. The topsoil stockpiles, the cut and fill slopes of the conveyor and loadout area, and the sediment pond embankment have been revegetated. The areas which have been reclaimed are shown on exhibits in Chapter III.

Proposed post-mining grading plans for the South Fork area are shown on exhibits in Chapter III. Predisturbance contour maps of the area are not available, therefore, the proposed final surface configuration was developed to provide a balanced cut and fill situation and a configuration consistent with other canyons in the area. Substitute topsoil material segregated from the pad fill will be used on the 9.3 acre mine pad site after it has been regraded. The South Fork Loadout will be reclaimed using material from the topsoil stockpile and the South Fork Loadout sediment pond. The road will be reclaimed using regraded in place materials.

A shrink factor of 5 percent was used in balancing the cut and fills. Calculations for the earth work volumes are based on cross-sections shown on exhibits in Chapter V. Quantity computations, based on planimetered cross-sectional areas and the average end area method, are included in Appendix V-2.

The total calculated cut volume for the mine yard and truck loadout is 30,351 cubic yards. The total calculated fill volume

is 29,788 cubic yards. Sufficient material should be available to regrade this 9.3 acre site.

After completion of surface facility removal and sealing of the portals, the regrading operation will commence. Fill material will be pushed up against the highwalls as high as possible. All fills will be constructed at a slope of 2:1. The mine pad and disturbed areas will be covered with the best available material (substitute topsoil) salvaged from the mine pad during recontouring. Regrading and redistribution will be performed as described previously for Middle Fork.

During reclamation and regrading of the site, those materials suitable for use as a topsoil substitute (as determined visually by a high percentage of fines, high organic matter content and low coarse fraction) will be segregated. The regraded slopes will be roughened either by hand or using equipment depending on the steepness of the slope. This will be undertaken to provide for bonding the topsoil to the regraded materials. The topsoil substitute will then be spread on the site along with the stockpiled topsoil. A uniform layer of six inches of soil material will be spread over the entire regraded site unless test plot results show that less can be used. During spreading operations equipment travel will be held to a minimum to reduce compaction of the topsoil.

After spreading, the topsoil will be scarified with a grader or farm type disc. Scarification will be done on the contour where feasible. Fertilizer will also be distributed during this operation.

The disturbed area at the South Fork truck loadout amounts to 3.0 acres, including the loadout sediment pond. This acreage determination can be found in Table 1 of the June 18, 1982 Interim Revegetation Plan under Appendix III-4.

Sufficient material is available in the South Fork loadout sediment pond embankments for the pond itself. This amounts to .5 acre which will be reclaimed after the revegetation period.

The other 2.5 acres of the loadout will be covered with a minimum of six inches of stockpiled topsoil material. The 1,206 cubic yards of topsoil stored at the Lamb's Trailer site will cover 1.5 acres. The residual area will be covered with 810 cubic yards of substitute material obtained from the borrow site A east of slurry pond no. 5.

Seeding, fertilizing and mulching will be done during the first September or October following regrading of the site. Seed will be drilled on all areas where the slope allows. Steeper slopes will be hydroseeded or broadcast and hand raked. Refer to Table II-24 Reclamation Timetable for South Fork Operations.

South Fork Topsoil Storage

Detailed data concerning the origin, storage, physical and chemical characteristics, stockpile protection and redistribution plans are available for the soil stockpiles in the South Fork Area. It is contained in the "Topsoil Plan for the King VI Mine". Prepared for U.S. Fuel by Bio West, Inc. and located in Appendix II-3.

A topsoil stockpile storage site was created in South Fork canyon to store soil materials removed from the South Fork Loadout area. It is shown as a topsoil stockpile on Exhibit II-2 and is composed of three adjacent stockpiles surrounded by a berm-ditch system. The stockpile is located in a relatively flat area and is not subject to erosion from concentrated channel flows. The first pile is 45 feet by 55 feet and six feet high. It is flat on top. Its maximum slope is 25 degrees. The second pile is 35 feet in diameter by four feet high. It is flat on top and has a maximum slope of 40 degrees. The last pile is 145 feet long by 52 feet wide. It has an average depth of four feet and a minimum slope of 10 degrees. The maximum measured slope is 35 degrees. The total volume of soil contained in all three stockpiles is 1206 cubic yards.

The stockpile was seeded with an approved DOGM seed mix. The stockpile is clearly identified with signs. Native grasses and shrubs cover the surface. Any future reseeding that may be required will be done using seed mixture no. 1, excluding the shrub species. The seeds will be applied by broadcasting using the rates given in Chapter III, Table III-4. Hydromulch (Conweb-2000) with tackifiers (binding agents) will be applied at a rate of one ton per acre. The rationale for using seed mixture no.1 (less shrubs) is that it is best to use a seed mixture for interim reclamation that will also be used in final reclamation. The proposed seed mixture no.1 contains legumes for nitrogen fixation, and forbs and grasses for soil stabilization. Regulations permit soil stockpiles in Utah to be stabilized with a single plant species or even none if some other method of soil stabilization and protection is used such as a straw mulch tied down by a nylon net.

Table II-24

Reclamation Timetable
South Fork Mining Operation

ACTIVITY	START	FINISH	YEAR
Cease Operating			1
Remove Mining Equipment	May 1	July 1	1
Dismantle Surface Buildings Structures and Equipment	July 1	Aug 15	1
Remove Exposed Concrete	Aug 15	Sept 15	1
Seal Portals	Aug 15	Sept 30	1
Install Sediment Traps	May 1	June 1	2
Remove Sediment Pond	June 1	June 15	2
Remove Stream Diversions	June 1	July 1	2
Regrade Site	June 1	Aug 15	2
Stockpile Substitute Topsoil	June 1	Aug 15	2
Clear Topsoil Stockpiles	Aug 1	Aug 15	2
Strip Topsoil From Past Interim Reclamation Areas	Aug 1	Aug 15	2
Place Topsoil and Topsoil Substitute Material	Aug 15	Sept 1	2
Final Surface Scarification and Preparation	Sept 1	Sept 15	2
Soil Nutrient Tests	Sept 1	Sept 15	2
Nutrient/Fertilizer Placement	Sept 15	Oct 1	2
Seeding and Planting	Oct 1	Oct 15	2
Mulching	Oct 15	Nov 1	2
Final Acceptance	Within 5 Years		

North Fork Reclamation

The intake ventilation portal in North Fork was constructed in 1979-80 for the King 4 mine. Trees and large brush were cleared from the site before topsoil was removed. Topsoil was salvaged and redistributed on the regraded slopes after completion of the portal. Following the topsoil redistribution, the site was seeded to protect against erosion. A list of the seed mix applied, as recommended by the Division of Oil, Gas and Mining, is included in Appendix V-1 along with the plan approval by DOGM and OSM.

Postmining grading plans for the North Fork portal area are shown on exhibits in Chapter V. Pre-disturbance contour maps of this area were not available, therefore, the proposed final surface configuration was developed to provide a balanced cut and fill situation and a configuration consistent with the surrounding area.

* A shrink factor of 5 percent was used in balancing the cut and fill. Calculations for the earthwork volumes are based on the cross-sections shown on exhibits in Chapter V. Quantity computations, based on planimetered cross-section areas and the average end method are included in Appendix V-2. The total calculated cut volume is 3,122 cubic yards. The total fill volume is 3225 cubic yards. If suitable material for substitute topsoil cover can not be segregated during the regrading operation, approximately 887 cubic yards of substitute material will be trucked to this site from borrow area D. Approximately 887 cubic yards in borrow area D has been dedicated to this site should it be needed for final reclamation. This would allow a six inch cover of substitute topsoil material over the 1.1 acre regraded area.

The only surface structure which exists on the 1.1 acre North Fork Intake Portal pad is a ventilation portal. After the ventilation portal has been sealed, regrading of the pad will be done. Soil will be pushed up against the highwall. All fills will be constructed on 2:1 slopes or greater.

Seeding, fertilizing and mulching will be done during the first September or October following the site regrading. Refer to Table II-25 , Reclamation Timetable for the North Fork Mining Operation for the reclamation schedule. Seed will be drilled on all areas where the slope allows. Steeper slopes will be hydroseeded or hand broadcast and raked. All seeded areas will be mulched, as described in the general reclamation plan.

Reclamation will be monitored for erosion and when gullies occur they will be regraded and reseeded.

Table II-25

Reclamation Timetable
North Fork Mining Operations

Activity	Start	Finish	Year
Cease Operation			1
Seal Portal	June 1	June 15	1
Install Sediment Traps	June 15	July 1	1
Regrade Site	July 1	Aug 15	1
Place Topsoil*	July 1	July 15	1
Soil Nutrient Tests	July 15	Aug 1	1
Nutrient/Fertilizer Placement	Aug 1	Aug 15	1
Seeding and Planting	Sept 1	Sept 15	1
Mulching	Sept 15	Oct 1	1
Final Acceptance		Within 5 Years	

*Topsoil will be borrowed from the substitute topsoil borrow areas located east of the Hiawatha plant and loadout facility.

Reclamation of Substitute Topsoil Borrow Areas

Reclamation of Borrow Area A

It is the plan of U.S. Fuel Company to remove 194,084 cubic yards of substitute topsoil material from Borrow Area A, which includes the equipment storage yard, by excavating the 20.05 acre area to a depth of six feet. After the borrow materials have been removed, Borrow Area A will be prepared for reclamation by: shaping and grading the side slopes and floor of the borrow area; installing diversion and erosion control features (as detailed subsequently); seedbed preparation, including the addition of nutrients and soil amendments; and revegetation.

To eliminate the deleterious effects of compaction from the machinery used to remove the substitute topsoil material, to promote root penetration, to aerate the soil, and to increase permeability, the in-situ soil remaining in the borrow area will be ripped, using a large track-mounted tractor. The soil will be ripped along the contour to a depth of 12 inches.

Immediately prior to the application of the soil nutrients and amendments, a minimum of six soil samples will be collected and submitted for laboratory analyses to identify any fertility deficiencies. This will ensure that plans are based on soil conditions at the time of reclamation and not on conditions as they exist at the present time. The area will then be disced, along the contour, as the final step in preparing the seedbed. The necessary amounts of soil nutrients and amendments for current soil conditions which would be used for reclamation of Borrow Area A are shown in Table II-26.

Based on the results of current laboratory tests, the C_2 horizon in Borrow Area A (i.e., that horizon to be reclaimed following borrowing) has inadequate levels of nitrogen. With less than 0.1 ppm of nitrate nitrogen (NO_3-N) in horizon C_2, a 45-0-0 mix of sulfur coated urea is recommended. Approximately 88 pounds per acre would need to be broadcast prior to seeding the area. At 1.05 percent, the organic material present in the C_2 horizon is only fair. Application of approximately 2000 pounds per acre of straw or native grass hay will be applied by either broadcasting and crimping into the soil by discing or by hydroseeding and adding a binder to the hydroseed mixture.

The phosphorus level in the C_2 horizon (at 3.1 ppm) is very low. Approximately 65 pounds per acre of a 0-46-0 treble superphosphate, or similar mixture, needs to be applied by broadcasting prior to, or in conjunction with, seeding. The potassium level at 38 ppm is relatively low. Approximately 68 pounds per acre of a potassium chloride 0-0-60 or potassium nitrate 13-0-44 needs to be added to the soil to enhance vegetation.

TABLE II-26

Nutrient And Soil Amendments For Reclamation Of Borrow Area A

	pH	Percent OM	ppm NO_3-N	ppm P	ppm K
Present Level[a]	8.4	1.05	-.1	3.1	38
Lbs/Acre Needed		2000[b]	40[c]	30[d]	30[e]

a = In present C_2 horizon

b = Native grass hay, straw or other acceptable organic additive

c = Sulfur coated urea 45-0-0

d = P_2O_5

e = K_2O

- = Less than

Reclamation of Borrow Area D

U.S. Fuel Company proposes to remove approximately 30,114 cubic yards of substitute topsoil material from Borrow Area D by excavating the 10.2 acre area to a depth of 1.83 feet. After the borrow materials have been removed, Borrow Area D will be prepared for reclamation by: shaping and grading the side slopes and floor of the borrow area; installing diversions and erosion control features; seedbed preparation, including the addition of nutrients and soil amendments; and revegetation.

To eliminate the deleterious effects of excessive compaction created by the machinery used to remove the substitute topsoil material, to promote root penetration, to aerate the soil, and to increase the permeability, the in-situ soil will be ripped, using a large cat track-mounted tractor. The soil will be ripped along the contour to a depth of 12 inches.

Immediately prior to the application of nutrients and soil amendments, a minimum of six samples will be collected and submitted for laboratory analyses to identify any fertility deficiencies and to provide a final basis for the application of nutrients and soil amendments. Again, this will ensure that reclamation efforts are based on soil conditions at the time of reclamation. The area will be disced, along the contour, as the final step in preparing the seedbed. The necessary amounts of nutrients and soil amendments for reclamation of Borrow Area D are found in Table II-27.

The C_3 horizon in Borrow Area D (i.e. that horizon to be reclaimed following borrowing) has inadequate levels of nitrogen. With less than 0.3 ppm of nitrate nitrogen (NO_3-N) in horizon C_3, 88 pounds per acre of sulfur coated urea needs to be broadcast on the area prior to planting. At 1.21 percent, the organic matter present in the C_3 horizon is fair. To promote more rapid revegetation, to control erosion, and to increase the efficiency of the fertilizer, approximately 2000 pounds per acre of organic materials will be added. The organic materials will be either native grass hay, straw or some other appropriate material. The organic material will be applied by either broadcasting and crimping into the soil by discing, or by hydroseeding and adding a binder to the hydroseed mixture.

The phosphorus level at less than 0.5 ppm is very low. Approximately 30 pounds per acre of a 0-46-0 treble superphosphate, or similar mixture, needs to be applied by broadcasting prior to, or in conjunction with seeding.

The potassium level at 48 ppm is relatively low. Approximately 30 pounds per acre of potassium chloride 0-0-60 or potassium nitrate 13-0-44 needs to be added to the soil by either broadcasting prior to, or in conjunction with, seeding.

TABLE II-27

Nutrient And Soil Amendments For Reclamation Of Borrow Area D

	pH	Percent OM	ppm NO_3-N	ppm P	ppm K
Present Level[a]	8.3	1.05	-.1	-.5	48
Lbs/Acre Needed		2000[b]	40[c]	30[d]	30[e]

a = In present C_2 horizon

b = Native grass hay, straw or other acceptable organic additive

c = Sulfur coated urea 45-0-0

d = P_2O_5

e = K_2O

\- = Less than

Reclamation of Borrow Areas B and C

U.S. Fuel has available 153,912 cubic yards of substitute material from the combined 21.2 acre area of Borrow Areas B and C, 12.35 and 8.85 respectively. To obtain this volume will require stripping the upper 4.5 feet from each of the two areas. Since gemorphically, pedogenically, geologically, physically and chemically the soils are the same, the area will be treated as one unit for obtaining substitute topsoil and for reclamation. After the borrow materials have been removed, Borrow Areas B and C will be prepared for reclamation by: shaping and grading the side slopes and floor of the borrow area; installing diversions and erosion control features; seedbed preparation, including the addition of nutrients and soil amendments; and revegetation.

To eliminate the deleterious effects of compaction, to promote root penetration, to aerate the soil and to increase permeability, the in-situ soil, remaining in the borrow area will be ripped, using a large track-mounted tractor. The soils will be ripped along the contour to a depth of 12 inches.

Immediately prior to the application of nutrients and soil amendments, a minimum of six soil samples will be collected, submitted to a laboratory for analyses, and the laboratory test results analyzed to identify any fertility deficiencies and to provide a final basis for the application of nutrients and soil amendments. This will ensure that reclamation designs are based on the soil conditions at the time of reclamation. The area will then be disced along the contour as the final step in seedbed preparation. The necessary amounts of nutrients and soil amendments for reclamation of Borrow Areas B and C are listed in Table II-28.

The C_4 horizon in Borrow Area B and C has inadequate levels of nitrogen and requires the addition of 40 lbs/acre of nitrogen which can be obtained by adding 88 pounds per acre of a sulfur coated urea 45-0-0. The organic matter will be applied by broadcasting and will be firmly fixed to the soil by either disc-crimping or by hydroseeding and adding a binder to the hydroseed mixture.

The phosphorus concentration is low and 30 pounds per acre is needed to enhance vegetative regrowth. This can be supplied by adding 65 pounds per acre of a 0-46-0 treble superphosphate. No additional potassium is needed.

The existing road between the preparation plant and borrow areas B and C will be used to haul the topsoil materials to the required locations. After redistribution efforts are completed then the roads will be reclaimed by ripping, disking etc. The roads will receive the same reclamation treatment as the borrow areas to ensure that a successful stand of vegetation is established.

The reclamation plans call for the preparation plant and associated facilities and equipment to be salvaged and/or destroyed and removed. Backfilling and grading operations would then be conducted to provide for a stabilized area, with positive drainage. Prior to the distribution of the topsoil and substitute topsoil materials from Borrow Areas A, B, C and D, the surface would be scarified to aid in the stability of the topsoil and to assist in the revegetation activities. The topsoil would be carried to the site from the borrow areas in belly dumps, scrapers or dump trucks. Patrol graders would be used to evenly spread the topsoil over the area. Grade stakes indicating the necessary depth of fill would be placed on 200 foot centers. After the topsoil has been evenly spread over the area, random samples will be collected as a final check to ensure that topsoil has been uniformly spread over the area.

Immediately prior to seeding, mulching and fertilizing, the soil will be disced parallel to the contours to eliminate any detrimental compaction which occurred during topsoil distribution and to reduce erosion potential. Seed, mulch and fertilizer would be applied by hand, with farm type equipment or with hydroseeders. Mulch (either hydromulch, straw or native grass hay) will be applied at the rate of 1.0 ton per acre. If applied by hand or by farm type equipment, a nylon overnet will be placed directly on the mulch and tacked to the soil, or crimped into the soil by discing. If hydroseeding is utilized, a binder or adhesive additive would be utilized to ensure the seed, mulch and amendments remain in place. In either case the recommended application is critical to reducing the erosion potential, controlling runoff and reestablishing vegetation. Topsoil would be applied during late August and the month of September to miss the seasonal high intensity summer thunderstorms.

TABLE II-28

Nutrient And Soil Amendments For Borrow Areas B And C

	pH	Percent OM	ppm NO_3-N	ppm P	ppm K
B - Present Level	8.2	2.95	-.24	-.5	252
Lbs/Acre Needed		2000[a]	40[b]	30[c]	0
C - Present Level	8.1	1.00	-.10	-.5	121
Lbs/Acre Needed		2000[a]	30[c]	30[c]	0

a = Native grass hay, straw or other acceptable organic additive

b = Sulfur coated urea 45-0-0

c = P_2O_5 0-46-0

d = K_2O

- = Less than

Table II-29

Reclamation Timetable

Substitute Topsoil Borrow Sites

Activity	Start	Finish	Year
Cease Operation (Hiawatha Facility)			1
Install Cutoff and Sediment Trap Ditches	June 1	July 1	2
Clear and Grub Sites	July 1	Aug 1	2
Excavate/Remove Topsoil and Nontoxic Fill	July 15	Sept 1	2
Scarify and Prepare Final Surface	Sept 1	Sept 15	2
Nutrient/Fertilizer Placement	Sept 15	Oct 1	2
Seeding and Planting	Oct 1	Oct 15	2
Mulching	Oct 15	Nov 1	2
Final Acceptance		Within Five Years	

Reclamation of The Roads

The roads in South Fork, Middle Fork and North Fork will be reclaimed after the mine pads and portals have been reclaimed. (Some portals may temporarily be left open for disposal of abandoned materials.) Reclamation activities for the roads will begin at the upper end of the roads and progressively proceed toward the Town of Hiawatha until the entire length of the haul and access roads have been completed.

The initial step in reclaiming the roads will involve removing the asphalt and hauling it to the slurry ponds for disposal. The guard rails and corregated metal culverts will be removed from each section, after the asphalt is removed, and prior to commencement of earthwork. The guardrails and culverts will be disposed of in the abandoned mine openings prior to sealing.

The gravel roadbase will be regraded and compacted against the base of the cut slope as a foundation for the remainder of the fill material. The roadfill material will then be worked back into place until the original natural topography is achieved.

It is difficult to anticipate what the actual configuration of the regraded surfaces will be. However, the entire length of the road will be seeded by either drilling where grade permits, hydroseeding in steeper sloped sections or possibly hand broadcasting and hand raking in the event some area has a particularly steep slope. To break seeding down into individual acreages would be of little practicality at this time. It may be best to determine the most applicable technique as the regrading is being done. A rough estimation of the type of reseeding to be done percentage-wise has been made however and is included under the discussion of each area.

Seed will be applied using the rates given in Table III-7 (located in Chapter III). Hydromulch (Conweb-2000) with tackifiers, when used, will be applied at a rate of one ton per acre on regraded areas. Only on the steep slopes, where deemed necessary to prevent erosion, will a tacked hay mulch be applied also at a rate of one ton per acre.

The fill will be covered with the best available material (substitute topsoil) which will be salvaged from the road area during the regrading process. When the backfilling is completed, the surface will be scarified prior to spreading the substitute topsoil. The substitute topsoil will be applied to achieve a uniform distribution of a minimum of six inches of vegetative growth medium.

The soils in the road fill have the same general characteristics as the materials in the mine pads which were sampled (Table II-14 and II-15). Therefore, the same nutrients and soil amendments will be applied to enhance vegetative regrowth. Additionally,

seed mix #4 will be utilized to revegetate the regraded surfaces. The seed mix and fertilizer will be applied to the prepared surface, prior to placing 2,000 pounds per acre of mulch over the top. The mulch will either be applied by hand and held in place using netting which will be stapled to the soil or will be bound by a tackifier to the soil.

North Fork Road

Approximately 7.4 acres of remedial action measures will be associated with the reclamation of the North Fork road and the diversion pipeline. The North Fork road was constructed in the bottom of the canyon on the existing narrow floodplain and terraces. Because of this, only limited excavation was necessary in order to construct the road. The road will be reclaimed by ripping the surface of the road and then scarifying the disturbed surface parallel to the contour. Seed mix # 4 will be applied with the appropriate application of soil nutrients and amendments. The seeds will be drilled where the slopes are conducive to such. Other areas will be hydroseeded or broadcast and hand raked. All seeded areas will be mulched at the rate of 2,000 pounds per acre. Soil samples will be taken of the North Fork road prior to reseeding in order to determine what soil amendments, if any, are necessary.

Approximately 2,110 feet of 12 inch pipe leads from the North Fork diversion to the old mine entry. Of this length, the pipe is buried for 610 feet and exposed for 1,500 feet. The buried pipe will be left in place and will be capped by welding steel plate on both ends. The exposed pipe will be removed and disposed of.

Middle Fork Road

Reclamation of the Middle Fork road will involve removal and disposal of approximately 5,100 cubic yards of asphalt. As previously described all guard rails and culverts will be removed and the material worked back into place to achieve the near original contour. The best available substitute topsoil material will be salvaged and spread over a scarified surface. Seed will be drilled on areas where the slope allows. Steeper slopes will be hydroseeded or broadcast and hand raked. All seeded areas will be mulched. The method of seeding the Middle Fork road can be broken down percentage-wise. Approximately 50% of the road will be drilled, basically this is the lower half. 40% will be hydroseeded and 10% will be hand seeded and raked.

South Fork Road

Reclamation of the South Fork road will involve removal and disposal of approximately 2,400 cubic yards of asphalt. As previously described, all guard rail and culverts will be removed

and the earthen materials worked back into place to achieve the near original contour. The best available substitute topsoil material will be salvaged during the back-filling process and spread over the scarified surface. Seed will be drilled on all areas where the slope allows. Steeper slopes will be hydroseeded or broadcast and hand raked. All seeded areas will be mulched except when the seeds are drilled.

In an approximate breakdown, 65% of the regraded South Fork road will be seeded by drill while 35% will be hydroseeded due to the steeper slope.

The areas where road cross-culverts presently exist will be reshaped to blend with the upstream and downstream cross-sections and grade. Regraded areas will be seeded with the riparian seed mix and hydromulched or drilled.

Substitute Topsoil Haul Roads

Roads which will be used to access substitute topsoil sites currently exist and have been in place for at least 30 years, no topsoil was salvaged. Except for one short section (200 feet) of cutslope, the topsoil is still in place, although it is highly compacted. Therefore, substitute topsoil materials will be distributed over the regraded road areas only where needed. After the borrow materials from each borrow area have been utilized, then the area will be reclaimed. After completing the reclamation of the given borrow area, the haul road leading to that borrow area will be reclaimed. The roads will be backfilled and/or regraded where necessary to blend with the existing topography. Only the access roads leading directly to the borrow area will be reclaimed, specifically the short access road between the paved highway and borrow area A and the section of road which leads from the top of the bench down to Borrow Areas D, B and C. The road which leads from the paved highway to the top of the bench will continue to be used for access to other properties after mining operations have ceased. Prior to distributing topsoil, in the areas where it will be required (in most of the areas the road runs directly on the in-situ soil profile and this material will be used for the reclamation of that section of road and seeding), the roadbed will be ripped to a 12 inch depth and then disced. In areas where topsoil is needed, from 6 to 12 inches of topsoil will be distributed to supplement the existing disturbed soils. The exact depth distributed will depend on the amount of topsoil that has been lost since the installation of the road. The road will then be seeded and fertilized at the prescribed rate of applicable seed mix which was used for the borrow area. Mulch will be applied at the rate of 2,000 pounds per acre and will either be crimp-disced or hydroseeded. The total acreage for reclamation associated with the haul roads is one acre.

R614-301-242 SOIL REDISTRIBUTION

242.100 Topsoil will be redistributed in a manner that achieves an approximately uniform, stable thickness, prevents excess compaction and protects the materials from wind and water erosion before and after seeding and planting. The regrading of each level area during final reclamation of any portion of the permit area will be done using material from the fill portions of the various sites and any excess cut material which has been stockpiled. This material will be generally pushed back against the cut areas from where it originallycame until the level areas have been eliminated and there is no discernable break in slope. Fill material will be recompacted to 90 percent maximum dry density (AASHTO T99-74 or equal) in lifts no thicker than 2 feet to provide for positive stability. The final lift will not be compacted to allow for root and water penetration. The surface of the final compacted lifts will not be smooth, but irregular to key in and hold the final layer of fill onto the slope. The slope of the regraded surface will be varied to approximate drainages that existed prior to initial disturbance. Generally all regraded areas will have slopes of 2h:1v or less. For areas where fill heights exceed 10 feet the new fill areas will be keyed into the underlying level area. The topsoil will be applied to the regraded area by end dumping the soil in a uniform lift from the back of the dump truck. If belly dump trucks are used, the soil will be dumped in a ridge and then spread with a patrol. The retopsoiling operation will start at one side of the area to be done and progressively work toward the other side so as to minimize travel over the retopsoiled area. The time interval between regrading, retopsoiling and reseeding will be kept to a minimum to prevent erosion. Refer to the individual Reclamation Timetables under R614-301-240.

242.200 Before placing materials on the regraded land or refuse surface, the area will be scarified, if necessary, to eliminate slippage surfaces and to promote root penetration. The final layer will subsequently be furrowed and scarified six inches deep along the contour with a grader or farm disc prior to placing the topsoil or substitute topsoil. After spreading the topsoil a grader or farm disc will be used to scarify the topsoil four to six inches deep and furrow it along the contour where possible.

242.300 No topsoil will be redistributed on approved postmining embankments of permanent impoundments or roads.

R614-301-243 SOIL NUTRIENTS AND AMENDMENTS

Soil nutrients will be applied to the redistributed soil material when necessary to establish vegetative cover. After topsoil is spread a grader or farm disc will be used to scarify the topsoil and furrow it along contour where possible. Fertilizer will also be applied at this time if it is required to promote vegetative cover equal in extent to the natural vegetation of the area to be reclaimed. Because of the variety of reclamation situations the individual requirements for each location are discussed under R614-301-231.200 and R614-301-240.

R614-301-244 SOIL STABILIZATION

244.100 Exposed regraded surfaces or topsoil material will be protected and stabilized to control erosion and minimize air pollution associated with erosion.

244.200 Suitable mulch and other soil stabilizing practices will be applied where such methods are necessary to control erosion and establish an effective vegetative cover.

244.300 Rills and gullies that form in areas that have been regraded and topsoiled and disrupt the approved postmining land use or the reestablishment of vegetative cover or cause a violation of the water quality standards will be filled, regraded or stabilized and then reseeded.

APPENDIX II-1

SOIL SURVEY AND INTERPRETATIONS

FOR

U.S. FUEL CO. MINE AREA

February, 1981

Important: Place the report entitled "Soil Survey and Interpretations For U.S. Fuel Co. Mine Area" dated February 1981 from the March 1981 Chapter VIII submittal here. It will serve as Appendix II-1. Following page 99 of that report is another report entitled "Vegetation Survey For U.S. Fuel Company" dated February 1981. This report is to follow the soil survey report in Appendix VIII-1. It is numbered pages 1 through 15.

APPENDIX II-2

FOREST SERVICE SOIL IDENTIFICATIONS IN U.S. FUEL COMPANY'S PERMIT AREA

U. S. Fuel Company

May 1990

APPENDIX II-2

FORWARD

This appendix give soil information compiled by the Forest Service for the Price River Watershed of which part of U.S. Fuel Company's permit boundaries are included. Soil information for land types within the permit boundaries was provided by Dan Larsen, Soil Scientist with the Price Ranger District, Manti-LaSal National Forest.

At U.S. Fuel's request, an investigation of present and potential vegetation production from these soils was conducted by George Cook, Range Conservationist with the Soil Conservation Service. Results of his investigation are included as an addendum to this appendix on page 9.

SOIL MAP UNIT DESCRIPTIONS

MAP UNIT 100 GRALIC-BEHANIN-ELWOOD COMPLEX 30 TO 70 PERCENT SLOPES

This mapping unit is mainly on the southerly or easterly exposures of steep and very steep mountain slopes at elevations of 7,600 to near 11,000 feet. It occurs mainly in the area adjacent to and east of Castle Valley Ridge. The average annual air temperature is 32 deg. to 38 deg. F. The average summer temperature is 50 deg. to 55 deg. F. Average annual precipitation is 25 to 30 inches. Freeze-free period is 20 to 30 days. The soils are deep, well drained, very gravelly or very cobbley loams, clay loams, or fine sandy loams. They are developed in colluvium from sandstone and shale. Slopes are 10 to 70 percent. Vegetation is snowberry, mountain big sagebrush, grasses, forbs, serviceberry, and some oak on the lowest slopes.

MAP UNIT 402 ROXAL-MERINO-GRALIC COMPLEX 8 TO 60 PERCENT SLOPES

This mapping unit is mainly on ridges and the adjacent side slopes of steep mountain slopes at elevations of 8,000 to near 11,000 feet. It occurs mainly in the Castle Valley Ridge area. The average annual air temperature is 32 deg to 38 deg. F. The average summer terperature is near 50 deg. F. The average annual precipitation is 25 to 30 inches. The freeze-free period is 20 to 30 days. The shallow very cobbly soils occupy the ridge tops. The deeper soils are below them on the mountain slopes. These soils are all well drained and most of them are very gravelly or very cobbly loams or sandy loams. They developed in colluvium and residuum from snadstone and shale. Slopes are 8 to 60 percent. Vegetation is grasses, forbs and in some places mountain big sagebrush.

MAP UNIT 573 ELWOOD-BICKMORE MODERATELY DEEP FAMILIES COMPLEX, 0 TO 5 PERCENT SLOPES

This map unit is on nearly level to rolling high plateaus and mountain tops. The present vegetation is grass and forbs with scattered pockets of aspen and spruce/fir. The vegetative community type is big mountain sagebrush and mixed grass-forbs. The geologic parent material is limestone of the North Horn Formation.

MAP UNIT 712 BUNDO-ADEL-ROXAL COMPLEX 8 TO 70 PERCENT SLOPES

This mapping unit is usually on the south or southeast exposures of very steep mountain slopes at elevations of 8,000 to near 11,000 feet. It occurs mainly on the north side of Huntington Canyon from Stuart Guard Station up to Electric Lake. Average annual air temperature is 32 deg. to 38 deg. F. The average summer temperature is 50 deg. to 55 deg. F. Average annual precipitation is 25 to 30 inches. The freeze-free period is 20 to 30 days. The soils are deep to shallow, well to somewhat excessively drained and are developed in colluvium and alluvium from sandstone and shale. Vegetation is mountain big sagebrush, grasses, forbs, spruce, fir and aspen.

SOIL DESCRIPTIONS

ADEL FAMILY

The Adel family consists of deep, well drained soils. These soils are on mountain slopes and have slopes of 30 to 70 percent. Permeability is moderately rapid. Parent materials are alluvium and colluvium from sandstone and shale. Average annual precipitation is about 28 inches and mean annual air temperature is about 34 degrees F.

Taxonomic Classification: Pachic Cryoborolls fine-lomy, mixed

A reference pedon of the Adel family is in Map Unit 401, 30 to 60 percent slopes; SW 1/4, Sec. 7, T. 4S, R. 7E. This soil is also in Map Units 32, 570, 711, 712, 713 and 820.

A1 - 0 to 4 inches; brown (10 yr 5/3) dry, dark brown (10 yr 3/3) moist, loam; moderate, fine granular structure; soft, friable, slightly sticky and slightly plastic; noncalcareous; medium acid.

A2 - 4 to 28 inches; brown (10 yr 5/3) dry, dark brown (10 yr 3/3) moist, loam; weak medium subangular blocky structure; soft, friable, , slightly sticky and slightly plastic; noncalcareous; medium acid.

Bw - 28 to 42 inches; pale brown (10 yr 6/3) dry, brown (10 yr 4/3) moist; loam, weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; 10 percent gravel; noncalcareous; medium acid.

C1 - 42 to 50 inches; pale brown (10 yr 6/3) dry, brown (10 yr 4/3) moist, gravelly silt loam; massive; slightly hard, dry, friable, slightly sticky and slightly plastic; 15 percent gravels; noncalcareous; medium acid.

Cr - 50 inches; weathered shale.

Surface thickness is 18 to 44 inches. Surface texture is loam with 0 to 10 percent rock fragment content. Texture of the particle size control section is loam or gravelly loam with 0 to 20 percent rock fragments. Average clay content ranges from 19 to 27 percent.

BEHANIN FAMILY

The Behanin family consists of deep, well drained soils. These soils are on mountain slopes and have slopes of 10 to 60 percent. Permeability is moderately rapid. Parent materials are colluvium and alluvium from sandstone. Average annual precipitation is about 28 inches and mean annual air temperature is about 36 degrees F.

Taxonomic Classification: Pachic Cryoborolls loamy-skeletal, mixed

A reference pedon of the Behanin family is in Map Unit 561, 10 to 30 percent slopes; SE 1/4, Sec. 25, T. 12S, R. 5E. This soil is also in Map Units 100 and 110.

A1 - 0 to 13 inches; dark brown (10 yr 4/2) dry, very dark brown (10 yr 2/2) moist, loam; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; noncalcareous; neutral.

A2 - 13 to 25 inches; dark brown (10 yr 3/3) dry, very dark brown (10 yr 2/2) moist, very stony loam; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; 35 percent stones; 15 percent cobbles; 5 percent gravels; noncalcareous; neutral.

C1 - 25 to 31 inches; light gray (2.5 yr 7/2) dry, light olive brown (2.5 yr 5/4) moist, extremely stony loam; massive; slightly hard; friable, slightly sticky and slightly plastic; 45 percent stones; 20 percent cobbles; calcareous; mildly alkaline.

C2 - 31 to 45 inches; very pale brown (10 yr 7/3) dry, pale brown (10 yr 6/3) moist, extremely stony clay loam; massive; hard, firm, sticky and plastic; 45 percent stones; 20 percent cobbles; calcareous; mildly alkaline.

Cr - 45 inches; shale and sandstone.

Surface thickness is 17 to 25 inches. Surface texture is loam or stony loam with 0 to20 percent rock fragment content. Texture of the particle size control section is very stony loam, or very cobbly clay loam with 35 to 65 percent rock fragments. Average clay content ranges from 20 to 32 percent. Some pedons have noncalcareous substratums.

BICKMORE FAMILY

The Bickmore family consists of moderately deep (20 to 40 inches) well drained soils. These soils are on high plateaus and have slopes of 0 to 15 percent. Available water capacity is 3 to 6 inches.

Taxonomic Classification: Argic Pachic Cryoborolls, loamy-skeletal, mixed

Reference Profile

1 to 0 inches - litter
0 to 4 inches - dark brown loam
4 to 19 inches - brown cobbly clay loam
19 to 35 inches - pale brown extremely stony clay loam
- to 35 inches - weathered and fractured limestone

BUNDO FAMILY

The Bundo family consists of very deep, somewhat excessively drained soils. These soils are on northerly expolures of mountain slopes and have slopes of 30 to 70 percent. Permeability is moderately rapid. Parent materials are colluvium from sandstone. Average annual precipitation is about 28 inches and mean annual air temperature is about 43 degrees F.

Taxonomic Classification: Typic Paleboralfs loamy-skeletal, mixed

A reference pedon of the Bundo family is in Map Unit 711, 40 to 70 percent slopes; SW 1/4, Sec. 19, T. 14S, R. 7E. This soil is also in Map Units 81, 712 and 820.

O - 3 to 0 inches; slightly decomposed spruce and fir needles, bark, twigs and leaves.

E1 - 0 to 6 inches; pale brown (10 yr 6/3) dry, brown (10 yr 4/3) moist, gravelly fine sandy loam; weak fine granular structure; soft, friable, nonsticky and nonplastic; 20 percent gravel; 5 percent cobble; noncalcareous; slightly acid.

E2 - 6 to 28 inches; very pale brown (10 yr 7/3) dry, light yellowish brown (10 yr 4/3) moist, very cobbly fine sandy loam; massive; soft, very friable, nonsticky and nonplastic; 40 percent gravel; 20 percent cobbles; noncalcareous; medium acid.

E3 - 28 to 50 inches; very pale brown (10 yr 7/3) dry, light yellowish brown (10 yr 6/4) moist, very granuelly fine sandy loam; massive; soft, very friable, nonsticky and non plastic; 35 percent gravel; 15 percent cobble; non calcareous; medium acid.

Bt - 50 to 60 inches; light yellowish brown (10 yr 6/4) dry, yellowish brown (10 yr 5/6) moist; extremely cobbley sandy clay loam; moderate medium subangular blocky structure, hard, firm, sticky and plastic; common moderately 50 percent cobble, and 15 percent gravels; noncalcareous, medium acid.

Surface thickness is 0 to 4 inches. Surface texture is loam or fine sandy loam with 15 to 45 percent rock fragment content. Texture of the particle size control section is very gravelly or very cobbly fine sandy loam with 40 percent rock fragments. Average clay content ranges from 10 to 15 percent.

ELWOOD FAMILY

The Elwood family consists of very deep, well drained soils. These soils are on steep mountain slopes and have slopes of 40 to 70 percent. Permeability is moderate Parent materials are colluvium from sandstone

and shale. Average annual precipitation is about 25 inches and mean annual air temperature is about 34 degrees F.

Taxonomic Classification: Argic Cryoboroll, loamy-skeletal, mixed

A reference pedon of the Elwood family is in Map Unit 109, 40 to 70 percent slopes; SE 1/4, Sec. 2, T. 12S, R. 6E. This soil is also in Map Unit 100.

A - 0 to 7 inches; grayish brown (10 yr 5/2) dry, very dark brown (10 yr 2/2) moist, loam; moderate fine granular structure; slightly hard friable, slightly sticky and slightly plastic; noncalcareous; neutral.

Bt1- 7 to 15 inches; grayish brown (10 yr 5/2) dry, very dark brown (10 yr 2/2) moist, very cobbly clay loam; moderate coarse-angular blocky structure; very hard, firm, sticky and plastic; moderately thick clay films on ped faces; 20 percent cobbles; 10 percent gravels; 5 percent stones; noncalcareous; slightly acid.

Bt2- 15 to 23 inches; pale brown (10 yr 6/3) dry, grayish brown (10 yr 5/3) moist, very cobbly loam; weak medium angular blocky structure; hard, friable, slightly sticky and slightly plastic; few thin clay films on ped faces; 20 percent cobbles, 10 percent gravels; 5 percent stones; noncalcareous; slightly acid.

C1 - 23 to 39 inches; pale brown (10 yr 6/3) dry, brown (10 yr 5/3) moist, extremely cobbly loam; massive; soft friable, slightly sticky and slightly plastic; 45 percent cobbles; 15 percent gravels; 2 percent stones; noncalcareous; medium acid.

C2 - 39 to 50 inches; light gray (10 yr 7/2) dry, light brownish gray (10 yr 5/3) moist, cobbly clay loam; massive, hard, firm, sticky and plastic; 15 percent cobbles, 10 percent gravel, noncalcareous; medium acid.

C3 - 50 to 60 inches; pale brown (10 yr 6/3) dry, brown (10 yr 5/3) moist, very cobbly fine sandy loam; massive, soft, firm, slightly sticky and slightly plastic; 30 percent cobbles; 10 percent gravels; noncalcareous; medium acid.

Surface thickness is 7 to 14 inches. Surface texture is loam with 35 to 55 percent of the surface covered by rock fragments. Testure of the particle size control section is very cobbly clay loam, or very cobbly loam which could range to 45 percent rock fragments. Average clay content ranges from 30 to 35 percent. Some pedons are calcareous in the lower horizons.

GRALIC FAMILY

The Gralic family consists of deep, somewhat excessively drained soils. These soils are on mountain slopes and ridges and have slopes of 10 to 50 percent. Permeability is moderately rapid. Parent materials are colluvium from sandstone and shale. Average annual precipitation is about 28 inches and mean annual air temperature is about 34 degrees F.

Taxonomic Classification: Typic Cryorthents, loamy-skeletal, mixed (calcareous)

A reference pedon of the Gralic family is in Map Unit 402, 10 to 50 percent slopes; SE 1/4, SE 1/4, Sec. 11, T. 14S, R. 7E. This soil is also im Map Units 100 and 300.

A1 - 0 to 5 inches; pinkish gray (7.5 yr 6/2) dry, brown (7.5 yr 5/4) moist, cobbly fine sandy loam, weak fine granular structure; soft, very friable, nonsticky and nonplastic; 20 percent cobbles; noncalcareous, slightly acid.

C1 - 5 to 25 inches; pink (7.5 yr 7/4) dry, brown (7.5 yr 5/4) moist, very cobbly, sandy loam; massive, soft very friable, nonsticky and nonplastic; 25 percent cobbles; 25 percent pebbles; noncalcareous; slightly acid.

C2 - 25 to 60 inches; reddish yellow (7.5 yr 6/6) dry, strong brown (7.5 yr 5/6) moist; massive; soft, very pliable, nonsticky and nonplastic; 30 percent cobbles, 25 percent pebbles; calcareous; moderately alkaline.

Surface thickness is 3 to 6 inches. Surface texture is cobbly fine sandy loam or cobbly loam with 5 to 20 percent rock fragment content. Texture of the particle size control section is cobbly fine sandy loam or cobbly sandy loam with 50 percent rock fragments. Average clay content ranges from 12 to 20 percent.

MERINO FAMILY

The Merino family consists of shallow, somewhat excessively drained soils. These soils are on ridge tops and have slopes of 10 to 60 percent. Permeability is moderately rapid. Parent materials are residuum and collurium from sandstone. Average annual precipitation is about 28 inches and mean annual air temperature is about 34 degrees F.

Taxonomic Classification: Lithic Cryorthents, loamy-skeletal, mixed (nonacid)

A reference pedon of the Merino family is in Map Unit 401, 10 to 60 percent slopes; SE 1/4, Sec. 36, T. 13S, R. 6E. This soil is also in Map Unit 402.

A1 - 0 to 5 inches; brown (10 yr 5/3) dry, dark brown (10 yr 3/3) moist, cobbly loam, weak, fine granular structure; soft, friable slightly sticky and slightly plastic; 25 percent cobbles; 10 percent gravels; noncalcareous; neutral.

C1 - 5 to 12 inches; pale brown (10 yr 6/3) dry, yellowish brown (10 yr 5/4) very cobbly loam, massive; slightly hard, friable, slightly sticky and slightly plastic; 35 percent cobbles; 25 percent gravels; noncalcareous; neutral.

Surface thickness is 3 to 5 inches. Surface texture is very cobbly loam; very cobbly clay loam, very cobbly snady loam with 35 to 40 percent rock fragment content. Texture of the particle size control section is very cobbly loam, very gravelly loam, or very cobbly clay loam with 35 to 60 percent rock fragments. Average clay content ranges from 15 to 20 percent.

ROXAL FAMILY

The Roxal family consists of shallow, well drained soils. These soils are on ridgetops and have slopes of 8 to 80 percent. Permeability is moderately rapid. Parent materials are residuum and colluvium from sandstone and shale. Average annual precipitation is about 28 inches and mean annual air temperature is about 34 degrees F.

Taxonomic Classification: Typic Cryorthents, loamy, mixed (nonacid)

A reference pedon of the Roxal family is in Map Unit 712, 8 to 50 percent slopes; SW 1/4, Sec. 22, T. 14S, R. 7E. This soil is also in Map Units 300 and 401.

A1 - 0 to 5 inches; grayish brown (10 yr 4/2) dry, dark grayish brown (10 yr 4/2) moist, clay loam; weak fine subangular blocky structure, hard, firm, sticky and plastic; noncalcareous; neutral.

C1 - 5 to 17 inches; grayish brown (10 yr 4/2) dry, dark grayish brown (10 yr 4/2) moist, cobbly clay loam; massive; hard, firm, sticky and plastic; 20 percent cobbles; noncalcareous, neutral.

Cr - 17 inches fractured sandstone and shale.

Surface thickness is 3 to 6 inches. Surface texture is loam or clay loam with 0 to 5 percent rock fragment content. Texture of the particle size control section is loam, cobbly clay loam or clay loam with 0 to 20 percent rock fragments. Average clay content ranges from 25 to 35 percent.

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

350 North 4th East
Price, Utah 84501

June 11, 1990

Robert Eccli
Senior Engineer
U.S. Fuel Company
P.O. Box A
Hiawatha, Utah 84527

Listed below is the information you requested:

SOILS	CONDITION	PRESENT PRODUCTION	POTENTIAL PRODUCTION
ADEL	Good	1000	1200
BUNDO(*)	Good	175	175
CLAPPER	Good	525	600
ELWOOD	Good	1050	1200
GRALIC	Good	1100	1200
HARPOLE	Good	1100	1200
MERINO	Good	1000	1200
ROXAL	Good	750	700

In this area, most of the rangeland and forestland is in good condition. There are some areas that may be in fair condition, but these areas are very small compared to overall. Production on these sites seem low. The reason is that the slopes are very steep.

* Production on woodland sites are just the understory vegetation. That is why the total production is so low. The woodland production is based on timber products.

I have enclosed a map for your use.

George S. Cook

George S. Cook
Range Conservationist

Enclosure

APPENDIX II-3

TOPSOIL PLAN FOR THE KING VI MINE

July 16, 1982

TOPSOIL PLAN FOR THE KING VI MINE

PR-69-2

Prepared by

John A. Rice
and
William R. Glenn

BIO/WEST, Inc.
P. O. Box 3226
Logan, Utah 84321

Prepared for

U.S. Fuel Company
136 East South Temple
Salt Lake City, Utah 84111

U.S. Fuel Purchase Order No. H-16597

July 16, 1982

July 16, 1982

Stipulation 7-81-2

Topsoil Plan

Sediment Pond, Coal Pile, Truck Turnout, and Conveyor Areas

During construction activities at the King VI Mine, topsoil and subsoil were mixed during excavation and backfill activities at the coal pile, truck turnout, and overland conveyor belt areas. During construction of the sedimentation pond, topsoil was re-established on the side walls of the pond. In addition, some topsoil has been stockpiled immediately north of the intersection of the South Fork and Middle Fork roads in the location known as "Lambs Trailer." Chemical and physical analyses of the soils in these areas can be found in Attachment 1.

The quantities and locations of soil materials stored and the quantities estimated to be used for final reclamation have been submitted to Mr. Wayne Hedberg (April 12, 1982). Based on these estimates, final grading will result in a uniform, stable, thickness of about 6-8 inches of topsoil. Topsoil will be redistributed over a scarified surface to reduce slippage at the topsoil/subsoil interface and to promote root penetration. Due to the limited availablility of topsoil, it will be necessary to maintain as much of the present physical condition as possible. By working the topsoil at optimum moisture (well below field capacity), compaction and puddling will be minimized. To further reduce the probability of physical deterioration of soil structure and amount of topsoil loss through moving, topsoil will be moved only once, from the stockpile to its final re-topsoiled position. Wooden lathes, or other appropriate markers, will be placed into the subsoil on 100-200'

centers or other appropriate pattern suited for effective monitoring and equipment operation. Markers will be painted to the height at which topsoil is to be replaced. While the topsoil is being replaced, it will be probed to confirm the depth of replacement. Soil samples will be randomly taken during topsoil probing and analyzed to determine nutrient levels in the replaced topsoil. Nutrients and amendments shown to be required by soil analyses will be applied to the redistributed soils during revegetation (see Revegetation Plan). All retopsoiled areas will be seeded the same year topsoil is replaced to achieve rapid vegetative stabilization.

Topsoil stockpiles have been protected from runoff by construction of berms and diversions. During the fall of 1982, stockpiles will be seeded with the mix, rate, and method of application described in the Interim Revegetation Plan. Two thousand pounds per acre of straw mulch will be overlaid with nylon netting to protect the stockpiles from wind and water erosion.

South Fork Road

The South Fork road (surface and bed) will be dismantled and removed. Since no topsoil is available, U.S. Fuel Company proposes to substitute the soil under the road for topsoil. Assuming that soil under the road is similar to that already tested (Attachment 1), the soil should provide a suitable growth medium for plants. The results of Interim Revegetation should demonstrate the feasibility of this substitution. The former road area will be ripped to a depth of about 16 inches, fertilized based upon recommendations of soil tests and revegetated according to the Final Revegetation Plan.

Soil Monitoring Plan

The locations of soil sample sites have been marked with wooden stakes. These sample sites will be monitored at five-year intervals, providing an indication of change in soil parameters over time. In addition, during the first, third, and fifth years, following Interim Revegetation and Final Revegetation, soils will be sampled and analyzed for fertility (N-P-K). This information will be used to formulate fertilizer recommendations to enhance revegetation.

ATTACHMENT 1

Report on Soils Investigations with Implications for Revegetation and Reclamation

by

William R. Glenn
Certified Professional Soil Scientist

1.0 Introduction

The U.S. Fuels, King VI mine is located a few miles west of Hiawatha, Utah, in a small canyon. The mine and associated conveyor belt, coal pile area, and truck turnaround at the loadout facility are on the toe of the south-facing slope in the canyon. Native vegetation is a pinyon-juniper community. The soils are formed in colluvium from calcareous sandstone. The toeslope colluvium consists of unsorted water and gravity transported sandy loam material intermixed with sandstone fragments that range from small gravel size to large boulders. No investigations were made on undisturbed soils in the area. An existing soil survey provides that information. All investigations contained in this report pertain to disturbed soil material.

2.0 Objectives and Methods

The objectives of this study are to determine the physical and chemical properties and site characteristics of disturbed soils on cuts, fills, and topsoil stockpiles in order to predict their revegetation potential, the need for soil amendments such as fertilizer to enhance revegetation, and to assist in selecting revegetation and site stabilization methods such as mulching and species selection.

Soil and site features observed in the field consisted of the following:

1. Steepness, length, and shape of slopes
2. Aspect

3. Soil stability
4. Soil structure
5. Soil permeability
6. Soil compaction
7. Coarse fragments
8. Field texture estimates
9. Surface and subsurface drainage characteristics
10. Whether the disturbed soil material was from surface or substratum soil zones.

Samples were collected for laboratory analysis. Characteristics that were analyzed by the Utah State University Soils Laboratory consist of the following:

1. Percent sand, silt, and clay to determine texture
2. Percent calcium carbonate
3. Water soluble sodium and calcium plus magnesium
4. Sodium absorption ratio (SAR)
5. Percent larger than 2 mm
6. pH
7. Electrical conductivity
8. Phorphorus, potassium, and nitrogen
9. Percent organic matter

Note on Laboratory Results

Due to the small sample size (several quarts), and method of sampling for some samples (bucket auger), a good representation of

2. Length and shape of slopes - The slopes are up to 30 feet in length on the higher fills and range down to a few feet in length on low fills. The slopes are smooth and straight.

3. Aspect - The south aspect is warm and droughty.

4. Surface stability - Some small sloughs and settlement of the fresh fill occurred this spring when the fill was wet. Additional small sloughs and settlement may continue for a few years until the fill stabilizes. Also due to the steepness of the fill, the dry surface tends to "run" when disturbed by any kind of foot or wildlife trampling.

The unstable surface will result in seedlings being torn out or covered and is particularly a problem in the initial seedling establishment years. The surface can be stabilized by anchoring mulch in place.

5. Erosion potential, bare surface - The erosion potential of the higher sections of fill is high with 40 to 60 tons per acre per year of potential soil loss. The potential decreases to a few tons per acre per year on the low fills. The erosion potential can be handled with mulch that is anchored in place.

6. Source of surface soil - The surface soil on the fills is mostly substratum material and perhaps a small amount of topsoil from the natural soils as evidenced by the low organic matter and nutrient levels. The natural soils along the conveyor belt have thin topsoil layers that are seldom more than 6 inches thick.

7. Soil texture - The fill material has sandy loam texture which is favorable for revegetation.

8. Coarse fragments - Sandstone fragments make up about 35 to 50 percent by volume of the fill material. Average fragment content is 25

percent less than 3 inches, 10 percent 3 to 10 inches, and 5 percent larger than 10 inches. The coarse fragments tend to reduce the erosion hazard but also reduce the available water capacity in proportion to their volume.

9. Available water capacity - The available water capacity per foot of soil is about 0.8 to 1.0 inch. In qualitative terms, the soil has a fair water supplying capacity for revegetation.

10. pH and calcium carbonate - The pH is 8.2 to 8.4 and the calcium carbonate percentage is 20.7 to 21.7 percent. The qualitative rating for this level of calcium carbonate is fair for a vegetation growth medium. An effect of the lime and pH is to reduce phosphorus availability.

11. EC and SAR - These measures of salt and sodium are low and indicate no problems.

12. Soil structure - The structure is fine granular or crumb and is favorable for root development.

13. Soil compaction - There is no evidence of compaction in the loose fill material.

14. Soil drainage and permeability - The soils are well drained and have moderately rapid permeability for water. No restrictive layers for water or roots were noted.

15. Soil nutrients - Nitrogen and phosphorus levels are extremely low. Potassium levels are moderate. Fertilizer will definitely need to be added to the soils.

Summary and Management Recommendations - Conveyor Belt

The primary limiting factors for revegetation are steep slopes, erosion hazard on the longer fills, infertility, and moderate water holding capacity.

The soil surface can be stabilized and protected from rapid drying during seedling establishment by mulching. The mulch should consist of 1.5 to 2.0 tons per acre of hay, straw, or hydromulch. A hay or straw mulch would need to be held in place with netting that is stapled into the soil. The netting would need to be cut out to fit around stones and maintain contact with the hay or straw. A considerable amount of labor would be required for proper installation. Hydromulch should be held in place with a tackifier.

Fertilizer will need to be applied to overcome infertility. The initial fertilization at seeding should be 40 to 50 pounds of available nitrogen, 80 to 100 pounds of phosphate, and 40 to 50 pounds of potash per acre. Annual fertilization will be needed for several years during vegetation establishment. The annual refertilization should consist of 30 to 40 pounds of nitrogen and phosphate and about 20 pounds of potash per acre.

3.2 Coal Pile Fill (Lab Identification 3-1 to 3-7 and 4-1 to 4-4)

The largest fill in the project area is on the outside edge of the flat bench that was cut out for the coal pile. Two holes were hand augered into the outside edge of the fill to determine its characteristics with depth. Augering was very difficult due to sandstone

fragments. At hole 3, buried topsoil was reached at the bottom of the hole. At hole 4, augering was stopped by sandstone fragments at 72 inches.

1. Steepness of slopes - Slopes are about 75 percent on most of the coal pile fill, but are undercut to about 100 percent on the south and east sides by the truck turnaround and the access road to the coal pile. These steeper cuts are actually in natural or undisturbed soil with the coal pile fill resting on the top edge of these cuts.

2. Length and shape of slopes - The slopes are about 20 to 30 feet long and are smooth and straight.

3. Aspect - The south and southeast aspect is warm and droughty.

4. Surface stability - Due to the steep slopes, the granular surface soil "runs" when dry, particularly when disturbed by any kind of foot or wildlife trampling. Surface sloughing could also occur if the fill material becomes water saturated.

The unstable surface will result in seedlings being torn out or covered and is particularly a problem in the initial seedling establishment years. The surface can be stabilized somewhat by anchoring mulch in place.

5. Erosion potential, bare surface - The erosion potential on the coal pile fill is high with about 40 to 60 tons per acre per year of potential soil loss. The erosion potential can be reduced by mulch that is anchored in place.

6. Source of surface and subsurface soil in the fill - At hole 3, the upper 72 inches of the fill is dominantly substratum material from the original soils. From 72 to 90 inches, the fill is a mixture of

substratum and surface soil material. From 90 to 108 inches, the fill is dominately surface soil with dark color, and between 108 and 126 inches, original topsoil was encountered. The original soil in this part of the fill is essentially turned upside down.

At hole 4, the upper 18 inches of the fill is a mixture of substratum and surface soil. Below 18 inches and until augering was stopped by rock fragments, the fill material is substratum material from the original soils.

7. Soil texture - The fill material has sandy loam texture which is favorable for revegetation.

8. Coarse fragments - Sandstone fragments make up about 30 to 40 percent of the volume of the fill material. The fragments are mostly less than 3 inches in diameter with lesser amounts of large pieces. The fragments tend to reduce the erosion hazard but also reduce the available water capacity in proportion to their volume.

9. Available water capacity - The available water capacity per foot of soil is about 1.0 to 1.2 inches. In qualitative terms, the soil has a fair water supplying capacity for vegetation.

10. pH and calcium carbonate - The pH is 8.3 to 8.5 and the calcium carbonate percentage is 9.9 to 15.5. The calcium carbonate may limit phosphorus availability.

11. EC and SAR - These measures of salt and sodium are low and indicate no problems.

12. Soil structure - The structure is fine granular or crumb and is favorable for root development.

13. Soil compaction - There is no evidence of compaction in the loose fill material.

14. Soil drainage and permeability - The soils are well drained and have moderately rapid permeability for water. No restrictive layers for water or roots were noted.

15. Soil nutrients - Nitrogen and phosphorus levels at the surface of the fill material is extremely low. Potassium levels are moderate. Fertilizer will definitely have to be added to the soils.

Summary and Management Recommendations - Coal Pile Fill

The primary limiting factors for revegetation are steep, unstable soil surface, erosion hazard, infertility, and moderate water holding capacity. Very little revegetation can be expected on the very steep slopes on the lower edges of the fill.

Stability of the surface soil can be improved and it can be protected from rapid drying during seedling establishment by mulching. The mulch should consist of 1.5 to 2.0 tons per acre of hay, straw, or hydromulch. A hay or straw mulch would need to be held in place with netting that is stapled into the soil. The netting would need to be cut out to fit around stones and maintain contact with the hay or straw. A considerable amount of labor would be required for proper installation. Hydromulch should be held in place with a tackifier. The mulch will have to be firmly anchored to have a chance of stabilizing this slope.

Fertilizer will have to be applied to overcome infertility. The initial fertilization with the seeding should be 40 to 50 pounds of

nitrogen, 80 to 100 pounds of phosphate, and 40 to 50 pounds of potash per acre. Annual fertilization will be needed for several years during vegetation establishment. The annual refertilization should consist of 30 to 40 pounds of nitrogen and phosphate and about 20 pounds of potash per acre.

3.3 Cutslope above loadout and truck turnaround (Lab identification 5-1 and 2 and 6-1 and 2)

The cutslope above the loadout and truck turnaround has been topdressed for revegetation. Samples were taken from two holes to get information on characteristics of the topdressing material and the upper part of the "in place" soil on the cut.

1. Steepness of slopes - Slopes are about 60 percent on the west part of the cut and 45 percent on the east side of cut, but are undercut to about 75 to 100 percent on the lower edge where the truck turnaround was evidently enlarged.

2. Length and shape of slopes - The slopes are about 30 to 50 feet in length and are generally smooth and straight except for concave depression on the east side of the cut.

3. Aspect - The south aspect is warm and droughty.

4. Surface stability - The surface of the soil is generally stable over most of this cut. The exception is on the oversteepened cut on the lower edge where the surface soil will "run" when dry. Very little or no topdressing is on this lower cut and it will be very difficult to get soil to stay on it.

5. Erosion potential - bare soil - The erosion potential is high with about 30 to 60 tons per acre per year of potential soil loss. The erosion potential can be handled with mulch that is anchored in place.

6. Nature of surface and subsurface soil on the cut - The topdressing on the cut appears to be original surface soil as evidenced by roots and twigs in it, and slightly higher organic matter content and lower coarse fragment content compared to the "in place" soil on the cut. However, the nutrient level in this material is still low. The topdressing on the cut averages about 12 inches thick except on the lower steep break where little or no topdressing exists.

The soil material below 12 inches is "in place" substratum material. The natural soils in this area have very little development and significant amounts of good quality topsoil were not available.

7. Soil texture - The topdressing and underlying soil have sandy loam texture which is favorable for revegetation.

8. Coarse fragments - Sandstone fragments make up about 30 to 40 percent of the topdressing volume and 50 to 60 percent of the volume of the underlying soil. The fragments are mostly less than 3 inches in diameter with lesser amounts of fragments larger than 3 inches. The fragments tend to reduce the erosion hazard but also reduce the available water capacity in proportion to their volume.

9. Available water capacity - The available water capacity for the one foot of topdressing is about 1.0 to 1.2 inches. The available water capacity for the soil material below 12 inches is about 0.7 to 0.8 inch per foot. In qualitative terms, the soil has a fair water supplying capacity for vegetation.

10. pH and calcium carbonate - The pH is 8.2 to 8.5 and the calcium carbonate percentage is 16.3 to 19.7. The qualitative rating for this level of calcium carbonate is fair for a vegetation growth medium. An effect of the lime and pH is to reduce phosphorus availability.

11. EC and SAR - These measures of salt and sodium are low and indicate no problems.

12. Soil structure - The structure is fine granular or crumb and is favorable for root development.

13. Soil compaction - There is no evidence of compaction on this slope.

14. Soil drainage and permeability - The soils are well drained and have moderately rapid permeability for water. No restrictive layers for water or roots were noted.

15. Soil nutrients - Nitrogen and phosphorus levels are extremely low. Potassium levels are also low. Fertilizer will definitely have to be added to the soils.

Summary and Management Recommendations - Cut Above Loadout

The primary limiting factors for revegetation are steep slopes, erosion hazard, infertility and moderate water holding capacity. Very little revegetation can be expected on the very steep slopes on the lower edge of the cut.

The erosion hazard can be reduced and the surface soil protected from rapid drying during seedling establishment by mulching. The mulch should consist of 1.5 to 2.0 tons per acre of hay, straw or hydromulch.

A hay or straw mulch would need to be held in place with netting that is stapled into the soil. The netting would need to be cut out to fit around stones and maintain contact with the hay or straw. A considerable amount of labor would be required for proper installation. Hydromulch should be held in place with a tackifier.

Fertilizer will have to be applied to overcome infertility. The initial fertilization with the seeding should be 40 to 50 pounds of nitrogen, 80 to 100 pounds of phosphate, and 40 to 50 pounds of potash per acre. Annual fertilization will be needed for several years during vegetation establishment. The annual refertilization should consist of 30 to 40 pounds of nitrogen and phosphate and about 20 pounds of potash per year.

3.4 Fill at Loadout (Lab Identification 7-1 to 3)

The moderately sloping fill below the loadout was sampled to determine the characteristics of the material at the surface and with depth. Because of rock fragments, sampling with shovel and hand auger was stopped at 48 inches.

1. Steepness of slopes - Slopes are about 20 percent across most of the fill. The outside edge of the top of the fill that may be revegetated is relatively flat.

2. Length and shape of slopes - The slope is about 30 to 40 feet in length and is generally smooth and straight.

3. Aspect - The south aspect is warm and droughty.

4. Surface stability - The surface of the fill is stable.

5. Erosion potential, bare soil - The erosion potential is moderate with about 7 to 10 tons per acre per year of potential soil loss. The erosion potential can be handled with mulch.

6. Source of surface and subsurface soil in the fill - The soil in the fill is dominantly substratum material from the original soils. The natural soils in this area have very little topsoil or soil development.

7. Soil texture - The texture of the fill is sandy loam which is favorable for revegetation.

8. Coarse fragments - Sandstone fragments make up about 35 to 50 percent of the soil volume. The fragments are mostly less than 3 inches in diameter with lesser amounts of fragments larger than 3 inches. The fragments tend to reduce the erosion hazard but also reduce the available water capacity in proportion to their volume.

9. Available Water Capacity - The available water capacity is about 0.8 to 1.0 inches per foot of soil. In qualitative terms, the soil has a fair water supplying capacity for vegetation.

10. pH and calcium carbonate - The pH is 8.5 to 9.0. The pH of 9.0 in the 36 to 48 inch depth seems unusually high. This high pH can indicate a high level of sodium, but the laboratory data for sodium and SAR do not show any increase in comparison to the other samples.

The calcium carbonate percentage is 18.1 to 18.9. The qualitative rating for this level of calcium carbonate is fair for a vegetative growth medium. An effect of the lime and pH is to reduce phosphorus availability.

11. EC and SAR - These measures of salt and sodium are low and indicate no problems.

12. Soil structure - The flat outer edge on the top of the fill that may be vegetated has massive cloddy structure in the upper 18 inches with granular or crumb structure below 18 inches. The massive surface layer is restrictive to root development.

The sloping sides of the fill have a hard, dry surface crust and granular crumb structure through the rest of the fill. The surface crust needs to be scarified and broken up to help get better seed contact with the soil.

13. Soil compaction - The surface 18 inches of the flat top of the fill is compacted due to vehicle traffic as evidenced by the massive, cloddy structure and firm, moist consistence.

14. Soil drainage and permeability - The soils are well drained and have moderately rapid permeability for water. The compacted surface on the flat top of the fill has restricted water intake and permeability in the surface 18 inches. No other restrictive layers were noted.

15. Soil nutrients - Nitrogen and phosphorus levels are extremely low. Potassium levels are also low. Fertilizer will definitely have to be added to the soils.

Summary and Management Recommendations, Fill at Loadout

The primary limiting factors for revegetation are infertility, compaction on the flat top of the fill, moderate erosion, and moderate water holding capacity.

The flat area on the top of the fill that is to be revegetated should be ripped to 18 inches. Light scarification of the surface crust over the remainder of the fill would aid in seedling establishment.

The erosion hazard can be reduced and the surface protected from rapid drying during seedling establishment by mulching. The mulch should consist of hay, straw or hydromulch. A hay or straw mulch would need to be fastened in place to prevent blowing.

Fertilizer will have to be applied to overcome infertility. The initial fertilizer with the seeding should be 40 to 50 pounds of nitrogen, 80 to 100 pounds of phosphate, and 40 to 50 pounds of potash per acre. Annual fertilizer will be needed for several years during vegetation establishment. The annual refertilization should consist of 30 to 40 pounds of nitrogen and phosphate and about 20 pounds of potash per year.

3.5 Lower Sediment Pond (Lab Identification 9-1 to 4)

The backslope of the embankment of the existing sediment pond is sloughing into the adjacent creek. Plans are to reconstruct the sediment pond and vegetate the embankments. The existing embankment was sampled from the surface to "in place" buried topsoil.

1. Steepness of slopes - The existing sediment pond has very steep backslopes that are sloughing. Slopes on the reconstructed pond are not known but will probably have 2:1 or 3:1 slopes on the embankments.

2. Length and shape of slopes - The length of slopes on the reconstructed sediment pond will probably be about 20 feet and smooth and straight.

3. Aspect - Parts of the semi-circle embankment will be facing all aspects.

4. Surface stability - The present embankment is very steep and unstable on the backslope. Slopes of 2:1 (50%) should be stable.

5. Erosion potential, bare soil - The erosion potential is moderately high with about 15 to 30 tons per acre per year of potential soil loss. The erosion potential can be handled with mulch.

6. Source of soil in the fill - The soil in the fill is a mixture of topsoil and subsoil from soils at the site. The soils in this area are on a gently-sloping alluvial fan where they are more fertile and have few coarse fragments in comparison to the colluvial toeslopes where the other facilities are located.

The fill at the site that was sampled is 63 inches deep with "in place" buried topsoil at 63 inches.

7. Soil texture - The soil in the fill has sandy loam texture and the underlying topsoil has loam texture which is favorable for vegetation establishment.

8. Coarse fragments - The fill material contains about 15 percent gravel by volume.

9. Available water capacity - The available water capacity is about 1.3 to 1.5 inches per foot of soil. In qualitative terms, the soil has good water supplying capacity for vegetation.

10. pH and calcium carbonate - The pH is 8.2 to 8.4 and the calcium carbonate percentage is 18.9 to 20.6 in the fill. The qualitative rating for this level of calcium carbonate is fair for a regetative growth medium. An effect of the lime and pH is to reduce phosphorus availability.

11. EC and SAR - These measures of salt and sodium are low and indicate no problems.

12. Soil structure - The reconstructed embankment will have granular or crumb structure if not compacted and will be massive or platy if compacted.

13. Soil compaction - It is not known to what degree the reconstructed embankment will be compacted. Surface compaction will restrict root development and vegetative growth.

14. Soil drainage and permeability - The soils are well drained and have moderately rapid permeability when not compacted. Permeability will be restricted by compaction.

15. Soil nutrients - Nitrogen levels are adequate for vegetative growth in all samples except the 36 to 63 inch layer which has a moderate level of nitrogen. Phosphorus is low in all of the fill material. Potassium levels are adequate.

Summary and Management Recommendations, Lower Sediment Pond

The soils generally have a good potential for revegetation on the sediment pond embankment. The primary limiting factors are a low phosphorus level, moderately high erosion hazard, and restricted rooting if the embankment is compacted.

If the reconstructed embankment is compacted, it is recommended that at least one foot and preferably two feet of surface fill on the embankment be left uncompacted to enhance vegetative growth.

The erosion hazard can be reduced and the surface soil protected from rapid drying during seedling establishment by mulching. The mulch should consist of 1.5 to 2.0 tons of hay, straw or hydromulch. A hay or straw mulch would need to be held in place with netting, or hydromulch would need a tackifier.

Fertilizer will be needed to make up for the phosphorus deficiency. It is recommended that the same fertilizer mix be used for the sediment pond area as on the rest of the project rather than use a separate treatment for this small area. The extra nitrogen will help make up for the possible nitrogen demand by the mulch. The initial fertilization at seeding time should be 40 to 50 pounds per acre of nitrogen, 80 to 100 pounds of phosphate and 40 to 50 pounds of potash per acre. Annual refertilization is probably not necessary on this area.

4.0 Characteristics of Topsoil Piles and Fill, Samples Taken From Scattered Locations

4.1 Topsoil Piles About a Mile Below the Mine at Lamb's Trailer (Lab Identification 10 and 11)

Two small piles of topsoil are located next to each other on the north side of the road. The east pile has been there for a year or more and the west pile has just been hauled in.

The east pile (Lab Identification 10) is good quality topsoil.

The west pile (Lab Identification 11) generally has good characteristics except that it contains about 20 percent rock fragments less than 3 inches in diameter and 15 percent rock fragments that are 3 to 10 inches in diameter. The calcium carbonate percentage is also a little high. Due to the scarcity of topsoil in the mine area, this material should definitely be saved for topdressing. The rock fragments can cause some problems for spreading and seeding and reduces available water, but is much more suitable for vegetation than the unproductive soils on many of the cuts and fills in the mine area.

4.2. Fill at Junction of the South Fork and North Fork Roads Just West of Hiawatha (Lab Identification 12-1 and 2)

From a few brief observations in this area, it is apparent that at least several kinds of fill material have been hauled in and spread in layers. Much of the material has a high content of rock fragments--35 to 50 percent. This coarser material is represented by sample 12-1.

A layer which has finer texture and fewer coarse fragments is represented by sample 12-2. (The sampling and lab data doesn't accurately reflect the coarse fragment content of these soils.) The layer represented by sample 12-2 has favorable characteristics for topdressing but it could be difficult to separate out the layers of fill.

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Bio-West Inc.
1063 S 1400 N
Logan, UT 84321

SOIL, PLANT and WATER
ANALYSIS LABORATORY
UMC 48

23 June 1982

Samples received 6/14/82

USU Log #	Ident.	%>2 mm	pH	mmhos/cm ECe	ppm P	ppm K	ppm NO_3-N	% Organic Matter
82-1249	#1 Road Fill 0-18	39.7	8.4	.7	1.2	40	1.4	1.71
1250	#2 Con. Belt 0-18	44.1	8.2	1.7	1.5	51	1.7	1.74
1251	3-1 Coal Pile 0-18	34.5	8.4	.7	1.3	42	1.1	.86
1252	3-2 " 18-36	22.7	8.4	.5	1.6	54	1.3	.90
1253	3-3 " 36-54	31.4	8.5	.5	1.4	42	.4	.84
1254	3-4 " 54-72	16.3	8.4	.5	.9	47	.7	.90
1255	3-5 " 72-90	21.1	8.4	.6	1.0	55	2.0	1.17
1256	3-6 " 90-105	27.0	8.3	.5	.7	59	2.0	1.41
1257	3-7 " 108-126	29.6	8.4	.5	.8	60	1.8	1.58
1258	4-1 " 0-18	25.7	8.4	.4	1.0	49	1.9	1.17
1259	4-2 " 18-36	31.2	8.4	.4	.7	42	1.3	.88
1260	4-3 " 36-54	20.6	8.4	.5	.8	46	.4	.88
1261	4-4 " 54-72	28.5	8.5	.6	.7	41	1.0	.88
1262	5-1 Load Cut 0-12	39.0	8.5	.4	.3	32	.9	.90
1263	5-2 " 12-24	54.4	8.4	.4	.1	17	.1	.72
1264	6-1 " 0-12	35.9	8.2	.4	.3	38	.6	1.47
1265	6-2 " 0-12	42.5	8.4	.4	.1	25	.2	1.10
1266	7-1 "Fill 0-18	41.9	8.5	.5	.2	37	.3	1.07
1267	7-2 " 18-36	48.8	8.5	.5	.3	36	.8	.90
1268	7-3 " 36-48	40.2	9.0	.5	.7	36	.9	1.07
1269	8-T.P.U.S.P. 15-20	20.7	8.2	1.1	6.2	127	3.6	4.00
1270	9-1 L.S.P. 0-18	18.0	8.2	.7	.7	80	20	2.64
1271	9-2 " 18-36	18.8	8.3	.6	.6	90	14	2.27
1272	9-3 L.S.P. 36-63	14.2	8.4	.4	.3	79	9.3	2.81
1273	9-4 " 63-80	7.7	8.2	.3	4.4	201	15	5.78
1274	10 T.P.L.T. 0-24	21.3	7.9	.6	5.7	179	19	5.34
1275	11 " Sandy Marks 0-24	26.6	8.1	2.1	1.5	109	14	7.84
1276	12-1 So.Fork 20-30	35.6	8.4	.6	1.0	47	2.9	1.15
1277	12-2 " Jarnt. 20-30	40.4	8.1	2.7	8.4	205	4.6	1.74

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USU Log #	Ident.	Mechanical Anal.-- Hydrometer %Sand	%Silt	%Clay	Texture	$\%CaCO_3$	H_2O Sol. meq/l in Sat. Ext. Na	Ca+Mg	SAR
82-1249	#1 0-18	62	24	14	Sandy Loam	21.7	1.5	3.7	1.1
1250	#2 0-18	58	27	15	Sandy Loam	20.7	3.5	15.5	1.3
1251	3-1 0-18	64	21	15	Sandy Loam	13.3	1.6	3.3	1.7
1252	3-2 18-36	66	20	14	Sandy Loam	9.9	1.2	3.7	.9
1253	3-3 36-54	68	19	13	Sandy Loam	13.2	1.6	3.8	1.2
1254	3-4 54-72	65	20	15	Sandy Loam	12.0	1.3	3.7	1.0
1255	3-5 72-90	65	20	15	Sandy Loam	11.5	1.6	5.1	1.0
1256	3-6 90-105	72	14	14	Sandy Loam	12.2	.89	3.7	.7
1257	3-7 108-126	68	17	15	Sandy Loam	14.0	.92	3.5	.7
1258	4-1 0-18	62	23	15	Sandy Loam	15.5	1.1	2.7	.9
1259	4-2 18-36	65	22	13	Sandy Loam	15.5	1.0	3.3	.8
1260	4-3 36-54	65	21	14	Sandy Loam	14.0	1.4	3.5	1.1
1261	4-4 54-72	66	21	13	Sandy Loam	15.1	1.2	3.2	.9
1262	5-1 0-12	63	22	15	Sandy Loam	16.3	.87	2.7	.7
1263	5-2 12-24	71	16	13	Sandy Loam	19.0	1.5	3.5	1.1
1264	6-1 0-12	61	25	14	Sandy Loam	17.8	1.3	4.0	.9
1265	6-2 0-12	61	27	12	Sandy Loam	19.7	1.4	2.9	1.2
1266	7-1 0-18	65	21	14	Sandy Loam	18.1	2.0	3.3	1.6
1267	7-2 18-36	65	22	13	Sandy Loam	18.8	1.6	3.3	1.2
1268	7-3 36-48	65	22	13	Sandy Loam	18.9	1.9	3.5	1.5
1269	8 15-20	63	22	15	Sandy Loam	14.8	3.9	2.5	3.5
1270	9-1 0-18	57	28	15	Sandy Loam	18.9	2.4	9.8	1.1
1271	9-2 18-36	60	27	13	Sandy Loam	20.1	1.4	9.9	.6
1272	9-3 36-63	58	28	14	Sandy Loam	20.6	1.7	6.4	1.0
1273	9-4 63-80	50	34	16	Loam	18.5	1.1	5.6	.7
1274	10 0-24	61	26	13	Sandy Loam	15.4	1.8	7.6	.9
1275	11 0-24	49	30	21	Loam	20.8	2.8	23.1	.8
1276	12-1 20-30	62	26	12	Sandy Loam	21.1	1.7	4.7	1.1
1277	12-2 20-20	38	39	24	Loam	16.0	9.1	25.0	2.6

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R614-301-410 LAND USE

R614-301-411 ENVIRONMENTAL DESCRIPTION

411.100 PREMINING LAND-USE INFORMATION

U.S. Fuel Company has been operating coal mines in the Hiawatha area since the early part of the century. Land use has remained relatively unchanged in the various topographies on the property over the years and is not expected to change significantly in the future. The land use picture is still and will remain primarily wildlife habitat and limited grazing. U.S. Fuel Company mining operations are located in the narrow canyons that lead to the top of the Wasatch Plateau, therefore, no cropland or prime farmland is within the mine area. Control measures needed to mitigate impacts shall include steps necessary to protect ground and surface water, soil resources, vegetation, wildlife and air quality.

A description of the condition and capability of the land within the permit area, excluding Forest Service land, is given by the Soil Conservation Service in the publication Soil Survey of Carbon Area, Utah dated June, 1988. This publication describes soil resources and gives estimates of rangeland and woodland understory production, recreational development, wildlife habitat and water management as they relate to soils. A statement of the condition of rangeland and forestland within the Forest Service boundaries of the permit area is given in Chapter II on page 9 of Appendix II-2.

411.110 USES OF THE LAND EXISTING AT TIME OF FILING

The uses of the land existing at the time of the filing of the permit application were coal mining, wildlife habitat, livestock grazing and outdoor recreation. Exhibit IV-4 shows existing livestock range sites. Exhibit IV-5 shows locations of existing and abandoned mine sites.

The mine plan area contains habitat for numerous wildlife species. The varied topography and diversity of vegetative environments ranging from semi-desert shrubs to high mountain forests provide a varieaty of life zones for game and nongame animals. The mine plan area and surrounding lands contain both summer and winter range for big game animals and are included in deer management area numbers 33 and 34, and elk management area number 21. See Exhibits III-1 and III-2.

There are no developed recreation sites in the area, though dispersed recreation such as camping, hiking, sightseeing and especially big game hunting have been and are increasingly prevalent.

The upper reaches of Miller Creek and Cedar Creek are municipal water sheds, providing domestic water for the town of Hiawatha, industrial water for mining and coal processing, and agricultural water for irrigating farm lands further downstream. Stream flow, depending on seasonal variations, is from 0.1 to 4 cubic feet per second for Miller Careek and 0.8 to 4.5 cubic feet per second for Cedar Creek.

Some oil and gas exploration has been done in the past and most likely will continue due to increased demand. Although there are no oil or gas wells in the mine plan area, several have been drilled on adjacent lands. The potential for oil and gas discovery in this area is high with estimated reserves for the Gentry Mountain area averaging 28 billion cubic feet of gas and 12 billion barrels of oil.[4]

411.120 CAPABILITY OF LAND TO SUPPORT A VARIETY OF USES

Regional land use consists primarily of mining, grazing, recreation, and forestry related activities. No developed recreation sites exist in the area. There is some dispersed recreation associated with camping, hiking, sightseeing and big game hunting in the fall.

Land use in the mine plan area has remained pretty much unchanged since the early part of this century. These uses include livestock grazing, logging, mining, wildlife habitat, watershed, dispersed recreation and oil and gas exploration.

The first significant use of the land was for livestock grazing. In the 1880's the Miller Brothers ranged large herds of cattle and sheep on the Wasatach Plateau and surrounding lowlands from Scofield to the Colorado River. Their headquarters were at the Millerton Ranch (now owned by U.S. Fuel Company) on Miller Creek approximately four miles east of Hiawatha. The ranch and mountain rangelands are still being used though at a lesser intensity.

Some logging had been done in this area in earlier days. Historical accounts note that a saw mill was located near the forks of Miller Creek around the turn of the century. Since that time, and into the early 1930's logging intensified somewhat due to the need for mine props for roof support in coal mines which began operating around 1909. Very little logging has been done in recenat years since better quality and less expensive mine props can be shipped from the Uinta Basin.

In the Manti-LaSal National Forest, of which part of the mine plan is included, the Forest Service estimates standard component sawtimber volumes of 10,000 board feet per acre for conifers and 5,300 board feet for aspen.[2] An extensive timber survey was performed by the Forest Service in 1929 in connection with mine prop logging on U.S. Fuel Company property near Hiawatha. The survey notes that there were no even aged stands of timber except aspen. "The coniferous species are all adapted to growing under considerable shade and consequently have developed all age stands".[3] The following data derived from the survey is included as a guide to existing conditions since little logging or unnatural changes have occurred since that time.

TIMBER SPECIES DISTRIBUTION - HIAWATHA AREA 1929

FOREST TYPES	ACRES	PERCENT OF TOTAL AREA
60% or more Douglas fir with alpine fir, white fir and spruce	1,651	7
60% or more white and alpine fir with Douglas fir and spruce	1,538	6
Varying mixtures of alpine and subalpine species	241	1
60% or more Aspen often nearly pure but also with conifers	2,069	11
Pinyon-Juniper, Grassland-Brush scattered or stunted spruce-fir	13,707	75

AGE DISTRIBUTION (CONIFERS ONLY)

	AGE	DIAMETER	PERCENT OF TIMBERED AREA
Saplings	0 - 40 years	Under 4"	0.5
Poles	40 - 80 years	4" to 8"	9.0
Intermediate	80 to 160 years	8" to 12"	39.0
Mature	120 to 160 years	Over 12"	14.0
Overmature	Over 160 years	Over 12"	15.0

Oil and gas ownership on the property is comprised of fee and federal lands. In the past, two oil and gas wells were drilled in the proximity of the property but both resulted in dry holes. There is currently no oil and gas production on the United States Fuel Company property. Federal oil and gas leases on the property are as detailed in Table IV-1.

411.130 LAND USE CLASSIFICATIONS UNDER LOCAL LAW

The mine plan and surrounding areas are classified as recreation, forestry, grazing and mining lands under local county zoning ordinances. Due to rugged topography however there are no croplands in the area.

411.140 CULTURAL AND HISTORICAL RESOURCES INFORMATION

A site searach conducted by Utah's Division of State History located no known archaeological or cultural sites. Sites have been identified in the area but none are located on the property. See Attachment IV-1. In the event any paleontological remains are discovered during mining operations, U.S. Fuel Company will notify the Division of State History.

Compliance with E011593 and the National Historic Preservation Act

U.S. Fuel contracted with Brigham Young University (B.Y.U.) through Asa Nielsen of the Department of Anthropology to conduct a field survey necessary for compliance with E011593. This survey was conducted at the Middle Fork mine yard area where a new portal breakout was proposed. This comprises about 0.5 acre and is attached directly on it's south boundary to the King IV mine yard. No artifacats or sites were located here. Refer to Appendix IV-1. An archaeological field survey was also conducted in the vicinity of the King VI mine. No cultural resources of any significance were encountered in this area either. See Appendix IV-2.

No new disturbance under the term of this permit is projected at this time. Any new construction will be done on presently disturbed areas and no survey will be required.

U.S. Fuel Company commits to maintaining a file of historical information pertaining to the town of Hiawatha. The file will attempt to collect available information on the history of Hiawatha.

ATTACHMENT IV-1

SCOTT M. MATHESON
GOVERNOR

STATE OF UTAH
DEPARTMENT OF COMMUNITY AND
ECONOMIC DEVELOPMENT

Division of
State History
(UTAH STATE HISTORICAL SOCIETY)

MELVIN T. SMITH DIRECTOR
307 WEST 2ND SOUTH
SALT LAKE CITY, UTAH 84101
TELEPHONE 801/533-5755

March 3, 1980

Mr. Robert Eccli
Mine Engineer
United States Fuel Company
Hiwatha, Utah 84527

Dear Mr. Eccli:

As requested by your letter of February 22, 1980, a site search was completed of the area located on the map furnished by your office. The search located no known archeological or cultural sites. There are a number of known sites in the area, but none are located on your property. Also enclosed is a copy of 36 CFR 800 and a list of surveyors as requested.

If our office can be of further help on advise, please contact me.

Sincerely,

Jim Dykman
Compliance Administrator

JLD:re

Enclosure:

TABLE IV-1

FEDERAL OIL AND GAS LEASES IN THE MINE PERMIT AREA

		LeaseNumber
Township 15 South, Range 7 East		
Sections 13:	S½	U-17537
24:	N½, SW¼, N½SE¼, SW¼SE¼	U-17534
25:	W½, W½E½	U-17535
36:	SE¼, E½NE¼	U-21236
36:	W½NE¼	U-17535
Township 15 South Range 8 East		
Sections 31:	S½	U-42783
34:	S½SE¼	U-31707
35:	SE¼SE¼	U-31707
Township 16 South, Range 7 East		
Sections 1:	SE¼	U-36982
12:	All	U-38968
13:	All	U-23270
Township 16 South, Range 8 East		
Sections 3:	E½	U-21129
9:	NE¼NE¼, NE¼SE¼	U-22011
9:	SE¼NE¼	U-42784
10:	N½, N½S½	U-14454
11:	N½, N½SE¼, NW¼SW¼	U-14454
15:	SW¼NW¼, NE¼SW¼ SE¼NE¼, E½SE¼, W½SE¼	U-34988
19:	S½N½, SE¼, SW¼	U-23794
20:	SE¼NW¼, NW¼SW¼, E½SW¼	U-23794
	SW¼NW¼, SW¼SW¼	U-42784
21:	SE¼SW¼, S½SE¼	U-23852
21:	NE¼SE¼	U-42784
22:	SE¼	U-17416
22:	SW¼, W½NE¼, S½NW¼, NE¼NW¼	U-14455
23:	SE¼	U-19013
23:	N½NW¼, SW¼SW¼	U-17416
23:	NE¼, S½NW¼, N½SW¼, SE¼SW¼	U-14454
27:	SE¼	U-17416
28:	NE¼NW¼, NW¼SE¼, SW¼SW¼	U-26309
28:	NE¼, E½SE¼, SW¼SE¼,	U-20763
	SE¼SW¼, N½SW¼, S½NW¼, NW¼NW¼	U-20763
29:	SE¼SE¼	U-45422
29:	SW¼SE¼, SW¼SW¼, SE¼NW¼	U-26309
29:	NW¼SE¼, SW¼NE¼, SE¼SW¼, N½SW¼, N½NW¼, SW¼NW¼	U-20763
30:	All except SE¼NE¼	U-23794
33:	SE¼NW¼, SE¼SW¼	U-26309
33:	E½, N½NW¼, SW¼NW¼, NE¼SW¼, W½SW¼	U-20763
34:	N½SE¼	U-34988
34:	W½, NE¼, SE¼SE¼	U-14455

411.141 CULTURAL AND HISTORIC RESOURCES MAPS

Not applicable see 411.140.

411.142 COORDINATION WITH STATE HISTORIC PRESERVATION OFFICER

Prior to the initiation of any new ground disturbance, U.S. Fuel Company will consult with OSM, the Utah Division of Oil, Gas and Mining and the State Historical Preservation Organization as to the need for a cultural resource inventory to be conducted on the area to be disturbed. If an inventory is required, all cultural resources will be properly evaluated in terms of the National Register of Historic Places eligibility criteria. Appropriate impact mitigation measures will be developed, in consultation with the appropriate agencies, when if any such significant sites to be affected are discovered.

411.143 IDENTIFICATION OF HISTORIC AND ARCHEOLOGICAL RESOURCES

See 411.142

411.144 PROTECTION OF HISTORIC OR ARCHEOLOGICAL PROPERTIES

See 411.142

411.200 PREVIOUS MINING ACTIVITY

Coal mining in this area began just after the turn of the century. During that time, the Consolidated Fuel Company, the Blackhawk Coal Company and the Castle Valley Coal Company opened mines in the canyons west of Hiawatha and Mohrland. Early mining was almost exclusively in the Hiawatha seam which has been the predominate coal producing seam in the area. The United States Fuel Company acquired the properties of the above mentioned companies in 1915 and since then has mined in the Hiawatha seam, the A seam (0 to 60 feet above the Hiawatha seam) and the B seam (50 to 120 feet above the Hiawatha). Eight significant mines have developed since the beginning of mining in this area. Five of these have been abandoned, one is currently operating and two are currently inactiave. See Exhibit IV-5. Coal extraction has been entirely by the room and pillar mining method. Mining has continued uninterrupted for a period of over 80 years with a total production of over 50 million tons.

R614-301-412 RECLAMATION PLAN

412.100 POSTMINING LAND-USE PLAN

After the recoverable coal reserves have been extracted from the United States Fuel Company property it is expected and anticipated that the current status of the existing land use area will remain unchanged. Mining in this immediate area has been ongoing since the turn of the century without any significant disruptions to existing land use.

The postmining land use of the equipment storage yard east of Slurry Pond No. 5 will be for wildlife use and grazing.

The postmining land use for the railroad corridor will be dictated by the railroad and it's acativities.

The equipment storage yard south of the mine office building will be dedicated to the town of Hiawatha for use as municipal vehicle storage and equipment and maintenance facilities. An agreement has been drawn up between U. S. Fuel Company and the town of Hiawatha for the maintenance and repair of the roads leading to municipal and culinary water supplys. See attachment IV-2.

The Soil Conservation Service, at the request of U.S. Fuel Company, compiled a grazing plan for the mine property area. This plan idenatifies five range types and addresses soils, vegetation and productivity. The plan is given in Appendix IV-3. The range site locations are shown on Exhibit IV-4.

412.200 LAND OWNER OR SURFACE MANAGER COMMENTS

Surface land status of the mine plan area is a combination of fee lands on the eastern side and the Manti-LaSal National Forest lands on the western portion.

Ownership of the surface is detailed on Exhibit IV-1 with the subsurface ownership detailed on Exhibit IV-2. Specific legal descriptions of property control are provided in Chapter I, Table I-1.

Surface managing authorities consist of two separate and distinct agencies. United States Fuel Company fee lands are bordered on the east, southeast and northeast by the Bureau of Land Management, with the United States Forest Service Manti-LaSal National Forest bordering the fee lands on the west, southwest and northwest. Federal surface control is illustrated on Exhibit IV-1.

Utility corridors traversing the eastern edge of the United States Fuel Company property consist of two Utah Power & Light Company transmission lines. The first transmission

ATTACHMENT IV-2

AGREEMENT

THIS AGREEMENT, entered into as of this 8 th day of February, 1984, by and between UNITED STATES FUEL COMPANY and the TOWN OF HIAWATHA.

United States Fuel Company is the owner of access roads and related drainage control structures serving coal mine facilities in the Left, Middle and Right forks of Miller Creek Canyon in Carbon County, Utah. In accordance with regulations pertaining to Surface Effects of Underground Coal Mining Activities, specifically UMC 784.15 and UMC 817.133 (Postmining Land Use), U.S. Fuel Company proposes to retain these roads upon final reclamation of mine facilities.

In consideration of access necessary for maintenance and repair of vital municipal and culinary water supply systems, U.S. Fuel Company proposes to grant these roads to the town of Hiawatha following final reclamation of mine facilities. The roads as well as the town water supply systems are located within the boundaries of the incorporated town of Hiawatha.

The town of Hiawatha agrees to accept and maintain the roads and related drainage structures in compliance with maintenance standards existing at the time of transferal.

UNITED STATES FUEL COMPANY

By: _____
Vice President and General Manager

TOWN OF HIAWATHA

By: _____
Mayor

_____
Notary Public
5-21-84

line is a 340 KV north-south line connecting Huntington to Provo, Utah. The second transmission line is a 45 KV north-south line connecting into a substation southeast of the town of Hiawatha that supplies electricity to the mine and town. The Utah Railway Company holds title to a railroad corridor bisecting the eastern portion of the property.

Special use permits and leases are limited primarily to grazing leases issued by the Bureau of Land Management and the United States Forest Service Manti-LaSal National Forest region.

The only coal leases on the property are federal leases which are listed below:

SL-069985
SL-025431
U-026583,058261 (combined)
U-51923

These leases are confined mainly to the western portion of the property and are illustrated on Exhibit IV-2. Table I-1 in Chapter I gives the legal description and land area of each lease. Comments and stipulations relating to these federal lands are made a part of each lease document. Appendix IV-4 gives a listing of these comments and stipulations.

Mineral ownership in the area is comprised of fee and federal lands. Coal is the only valuable commodity mined in the area.

412.300 SUITABILITY AND COMPATIBILITY

Plans for final fills and surface regrading operations for each disturbed site are discused in Chapter V. Materials to be utilized for final reclamation have all proven to be of a quality suitable for reclamation purposes. See Chapter II, (Soil Resources) and the five year vegeatation test plot study given in Appendix III-5.

R614-301-420 AIR QUALITY

421 COMPLIANCE WITH CLEAN AIR ACT

Coal mining and reclamation operations at U.S. Fuel Company's properties are conducted in compliance with the Clean Air Act and the Utah State Department of Health Air Conservation Regulations. All new and previously existing potential sources of air pollution are inspected on a regular basis by the Utah Bureau of Air Quality.

422 COORDINATION AND COMPLIANCE WITH UTAH BUREAU OF AIR QUALITY

All new installations which could be a source of air pollution constructed after the implementation of the Clean Air Act have been reviewed by and received approval orders from the Utah Bureau of Air Quality. U.S. Fuel submits annual emission inventory reports which include the rate and period of emissions, specific plant sources of pollution, composition of contaminants and types and efficiencies of control equipment.

423 AIR POLLUTION CONTROL PLAN

U.S. Fuel Company does not project production rates exceeding 1,000,000 tons of coal per year during the term of this permit, therefore, no air quality monitoring program is required.

Fugitive dust is controlled by enclosed facilities, conveyor belt covers, transfer chute covers and watering of unpaved haul roads.

BIBLIOGRAPHY

Doelling, H.H., 1972, Wasatach Plateau Coal Field, In Doelling, H.H.(ed.) Central Utah Coal Fields; Sevier-Sandpete, Wasatach Plateau, Book Cliffs and Emery, Utah Geological and Mineralogical Survey Monograph Series No. 3, Salt Lake City, Utah.

U.S. Forest Service, Intermountain Region, 1979, Land Management Plan, Ferroan-Price Planning Unit, Manti-LaSal National Forest, Price, Utah.

U.S. Department of the Interior, Final EIS, Development of Coal Resources in Central Utah, 1979.

FOOTNOTES

1. Cook, Moreau and Peterson, Soil and Water Conservation Plan For U.S. Fuel Company, Price River Conservation District, USDA Soil Conservation Service, May, 1979.

2. U.S. Forest Service, Intermountain Region, 1979, Land Management Plan, Ferron-Price Planning Unit, Manti-LaSal National Forest, Price, Utah, 1979, page 28.

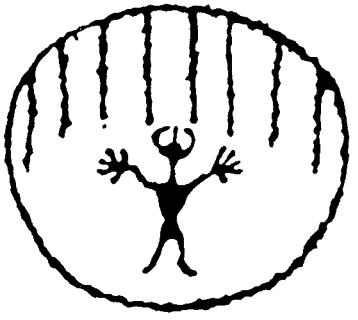
3. Clayton W. Scribner, Timber Survey, Hiawatha Compartment of Manti Working Circle, Manti National Forest, Nov. 1929, page 28.

4. Forest Service, OP. CIT., p. 165.

APPENDIX IV-1

CULTURAL RESOURCE INVENTORY OF MIDDLE FORK SURFACE FACILITIES

Nov. 4, 1983



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DEPARTMENT OF ANTHROPOLOGY
TECHNICAL SERIES NO. 83-60

A CULTURAL RESOURCE INVENTORY OF MILLER CREEK SURFACE FACILITIES IN CARBON COUNTY FOR U.S. FUELS

by
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prepared for
Ford, Bacon and Davis, Inc.
Salt Lake City, Utah

4 November 1983

ABSTRACT

CRMS/BYU has completed a three-acre survey for expansion of U.S. Fuels mine facilities in Carbon County, Utah. No cultural resource materials were observed within the survey area, and CRMS recommends to the Utah State Historic Preservation Office that a cultural resource clearance be granted to Ford, Bacon and Davis, Inc. for this project.

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A CULTURAL RESOURCE INVENTORY OF MILLER CREEK SURFACE FACILITIES IN CARBON COUNTY FOR U.S. FUELS

INTRODUCTION

One 2 November 1983 Dean Schleisman, of the Cultural Resource Management Services (CRMS), Brigham Young University, conducted a cultural resource inventory of about 3 acres in Carbon County, Utah, for U.S. Fuels. The inventory area is the proposed location for new surface mine facilities for the expanding U.S. Fuels mine near Hiawatha, Utah. The work was requested by Dr. Jack Elder, of Ford, Bacon and Davis Inc., mine consultants for U.S. Fuels. The survey area is entirely on private land, hence no Federal or State permits were requested. Survey conditions were ideal and ground visibility excellent. The report was prepared by Dean Schleisman and Asa S. Nielson, and Ted Duffin processed the manuscript.

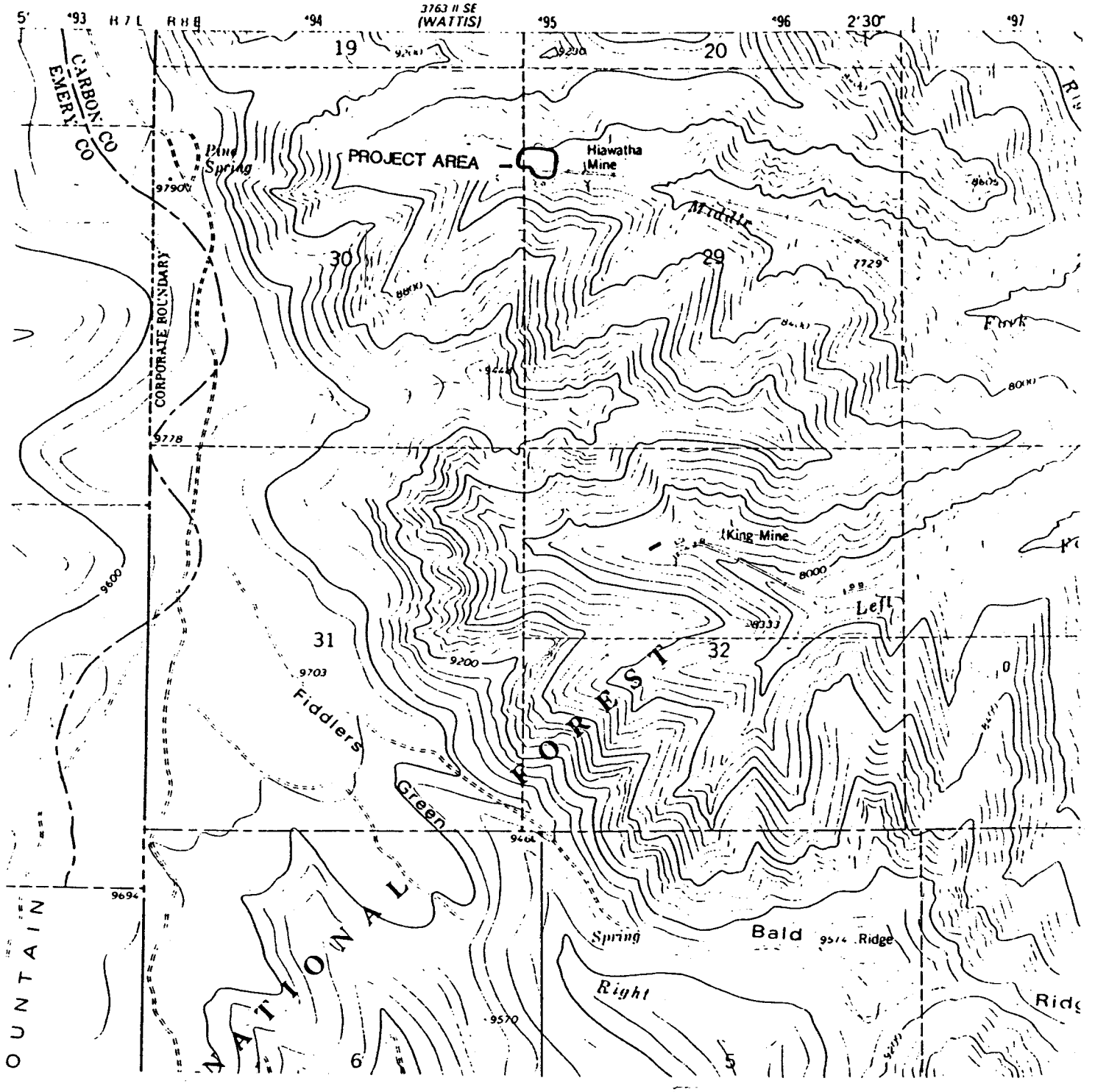
LOCATION

The proposed mine facility (Figure 1) is located about 2.7 miles due west of Hiawatha, Carbon County, Utah. It is in the upper portion of the Middle Fork of Miller Creek, in the SW1/4 NW1/4 NW1/4 of Section 29, T15S R8E (Hiawatha Quadrangle, Utah, 7.5-minute series topographic). Access to the area is by an existing road leading past the existing Hiawatha Mine.

ENVIRONMENT

The survey area is part of the Wasatch Plateau Subsection of the Basin and Range-Colorado Plateau Transition (Stokes 1977). This area is characterized by deeply entrenched east-to-west canyons which empty into the Mancos Shale Lowlands. Miller Creek has cut its was through successive layers of Cretaceous Black Hawk and Price River Formations, and Paleocene North Horn Formation (Hintze 1980). The mine area is predominantly Black Hawk Formation covered with a thin veneer of talus and colluvial soil. The canyon bottom has in excess of one meter of Recent alluvial deposits of sandy, rocky stream clays.

Flora observed was restricted to big sage, mountain mahogany, pinyon, scrub oak, broom grass and cactus. No fauna were directly observed in the survey area. However, tracks of mule deer and rabbit were observed.



SCALE 1:24000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

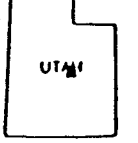
N

PROJECT: U.S. Fuels Hiawatha Mine Expansion T. 15S R. 8E

COUNTY: Carbon

QUAD: Hiawatha, Utah
7.5-minute

LEGEND: Project Area



QUADRANGLE LOCATION

Figure 1

PREVIOUS RESEARCH

Overviews of the culture history of the area are available elsewhere and need not be repeated in detail here. In addition, Ford, Bacon and Davis Inc. is in the process of negotiating a complete overview of the Hiawatha area in addition to proposed additional survey next Spring. Records searches at the Utah Division of State History revealed no known cultural resources in the proposed mine facility area. Consultation with the State and National Registers of Historic Places also revealed no known National Register sites within the survey boundaries.

SURVEY METHODS

The survey was accomplished by completing several parallel transects back and forth over the area of proposed disturbance. Much of the surface is dominated by a moderate hill slope. All possible overhangs, level areas or other potential areas were examined.

SURVEY RESULTS

No cultural resource sites or isolated artifacts were noted during the inventory. The historic Hiawatha Mine is about 300 m due east, but will not be impacted by the new mine facilities. No significant cultural resources will be directly impacted; therefore, CRMS recommends to the Utah State Historic Preservation Office that a cultural resource clearance be granted for this phase of the project, with the following restrictions:

1. that personnel and equipment associated with the development be restricted to those areas cleared for the project:

2. that personnel associated with the project refrain from collecting or otherwise disturbing cultural materials which may be encountered during development; and

3. that should unreported cultural materials be encountered during development, activities in the affected area(s) should cease immediately and the Utah State Historic Preservation Office notified prior to resuming such activities.

BIBLIOGRAPHY

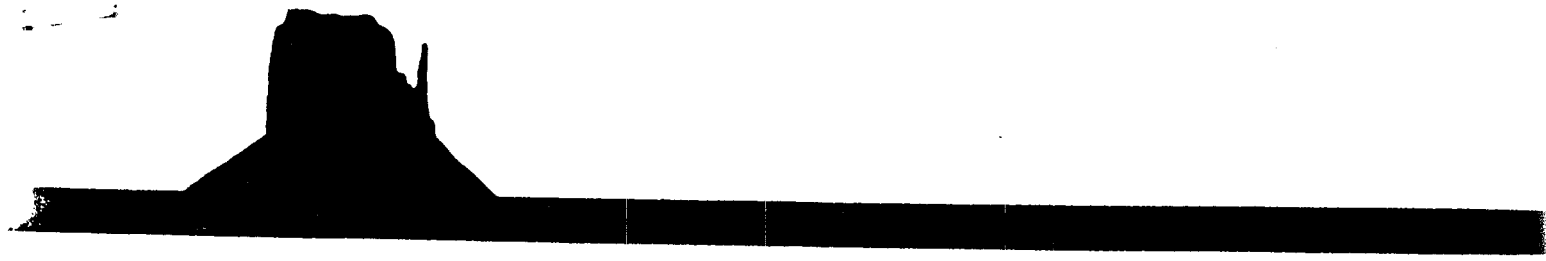
Hintze, Lehi F.
1980 Geologic Map of Utah. Utah Geological and Mineral Survey. Salt Lake City.

Stokes, William Lee
1977 Subdivisions of the Major Physiographic Provinces in Utah. Utah Geology 4(1). Utah Geological and Mineral Survey. Salt Lake City.

APPENDIX IV-2

ARCHAEOLOGICAL RECONNAISANCE OF A PROPOSED COAL FACILITY AT THE KING VI MINE

April 17, 1981



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FIELD OFFICE: P.O. BOX 1147 • MONTICELLO, UTAH 84535

SUBJECT: Archaeological Reconnaissance of A Proposed Coal Facility At The King #6 Mine, United Fuel Company, Hiawatha, Utah

AUTHOR: Clayton W. Cook
Staff Archaeologist

DATE: April 17, 1981

PROJECT: USF-81-1

PERMIT: #80-Ut-137

PREPARED FOR:

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ARCHAEOLOGICAL RECONNAISSANCE OF A PROPOSED COAL FACILITY AT THE KING #6 MINE, UNITED FUEL COMPANY, HAIWATHA, UTAH

INTRODUCTION

On April 14, 1981 Utah Archaeological Research Corporation was contacted by United States Fuel Company of Hiawatha, Utah to conduct a cultural survey of a proposed coal facility in the south fork of Miller Creek. The project area is privately owned and the legal description is as follows (see attached map):

Township 15 South, Range 8 East, Section 32 S½, NE¼

UTM Zone 12, Easting 496000, Northing 469750

The project consists of building a coal conveyor just to the north of an existing road, a truck load-out and turn around, and a sedimention pond. The conveyor will be approx. 3000 feet long and will carry the coal from the mine to the load-out. The project will disturb approx. 3 acres of area. The field work was conducted by Clayton Cook, UTARC Staff Archaeologist on April 15, 1981.

ENVIRONMENTAL SETTING

The project is located in a east trending canyon which washes off the east face of the Wasatch Plateau and into the Castle Valley Area; the creek is known as the South Fork of Miller Creek. The project area is 2½ miles west of the present town of Hiawatha. The project is located in the Montane Vegitational Zone. The area has about 80% vegitational coverage with 20% sage, 40% conifers (Abies concolor, Pseudotsuga menziesii, etc.) and 40% miscellaneous grasses

and forbes. Sediments in the area are basically colluvial. Faunal observed consisted of deer and various small rodents. The land has been utilized mostly for mining since 1915. Before the 1900's, there was some stock ranging in the area.

HISTORICAL SETTING

Coal mining has long been an important part of Carbon County's economical base and has been responsible for the founding of several small communities in the county, including Hiawatha. The first large mines to be opened on the east front of the Wasatch Plateau were opened from 1909 to 1911 in Miller and Cedar Creek Canyons. These operations were soon consolidated into one operation known as King Mine.

The Consolidated Fuel Company organized in 1907 was the first to mine in the area. It built the old Southern Utah Railroad from Price to Hiawatha and opened the mine known as West Hiawatha. A year later the railroad was extended up Cedar Creek Canyon to the Mohrland Mine which was owned and operated by the Castle Valley Coal Company. In 1911, the Blackhawk Coal Company opened the Black Hawk Mine on the mountainside approximately 1000 feet above the present town of Hiawatha. The United States Fuel Company was organized in 1915, and in 1916 commenced operation by taking over the properties owned by the Consolidated Fuel Company, Castle Valley Coal Company, Black Hawk Coal Company, and the Panther Coal Company at Hiener, Utah. The King Coal operations at Hiawatha, owned and operated by United States Fuel, are the longest continuously operated mines in Utah.

In 1948, the King #3 Mine was opened in the South Fork of Miller Creek. The #3 Mine operated until 1975, when it was shut down. Operations at #3, consisted of the portal and vent shaft, showers and office, shop buildings and stock pile.

The proposed operation of King #6, is to reopen the King #3 Mine. This will be accomplished by opening a new portal and bypassing the old #3 portal. Many of the existing buildings will be renovated and reused. The conveyor, as mentioned, will carry the coal to the new load-out facility. These are the only operations which will be constructed on areas that were not previously disturbed by construction of King #3.

FILE SEARCH

A file search was conducted at the Utah State SHPO Office and at the State Bureau of Land Management Office prior to entering the field. No cultural resources have been recorded in Section 32 in past work. However, sites have been recorded in Sections 10, 11, 23, 24, 25, and 26 of the same Township and Range. Most of these sections are on ridge tops and not in steep walled canyons such as Section 32. There could possibly have been some aboriginal hunting activity in the area but, no evidence has been encountered as of yet.

METHODOLOGY

Field Survey of the proposed construction was conducted by walking parallel transects spaced at 10 foot intervals across the area where the sedimentation pond and turn around will be constructed. A corridor of

approximately 100 feet was walked along the proposed location of the conveyor. This way all areas of potential impact were throughly checked for cultural resources.

RESULTS AND RECOMMENDATIONS

Two existing structures will be torn down during the construction of the turn around and load-out. These structures consist of one powder magazine and one cap magazine. These buildings were built in the late 1940's. They are not considered to be significant because they are not unusual or unique in their construction or function.

No cultural resources of any significance were encountered in the area of the proposed construction. Therefore, clearance is recommended with the stipulation that if buried resources are encountered during construction, work be stopped and a qualified archaeologist be contacted to determin their significance.

"Reference Cited"

Thirty Years of Coal Mining - Pamphlet Published by The United States Fuel Company, Salt Lake City, Utah 1946.

View looking East - Conveyor will run along, and to the left of, the existing road.

View of proposed turn around and load-out looking NW.

View looking SE of proposed sedimentation pond location.

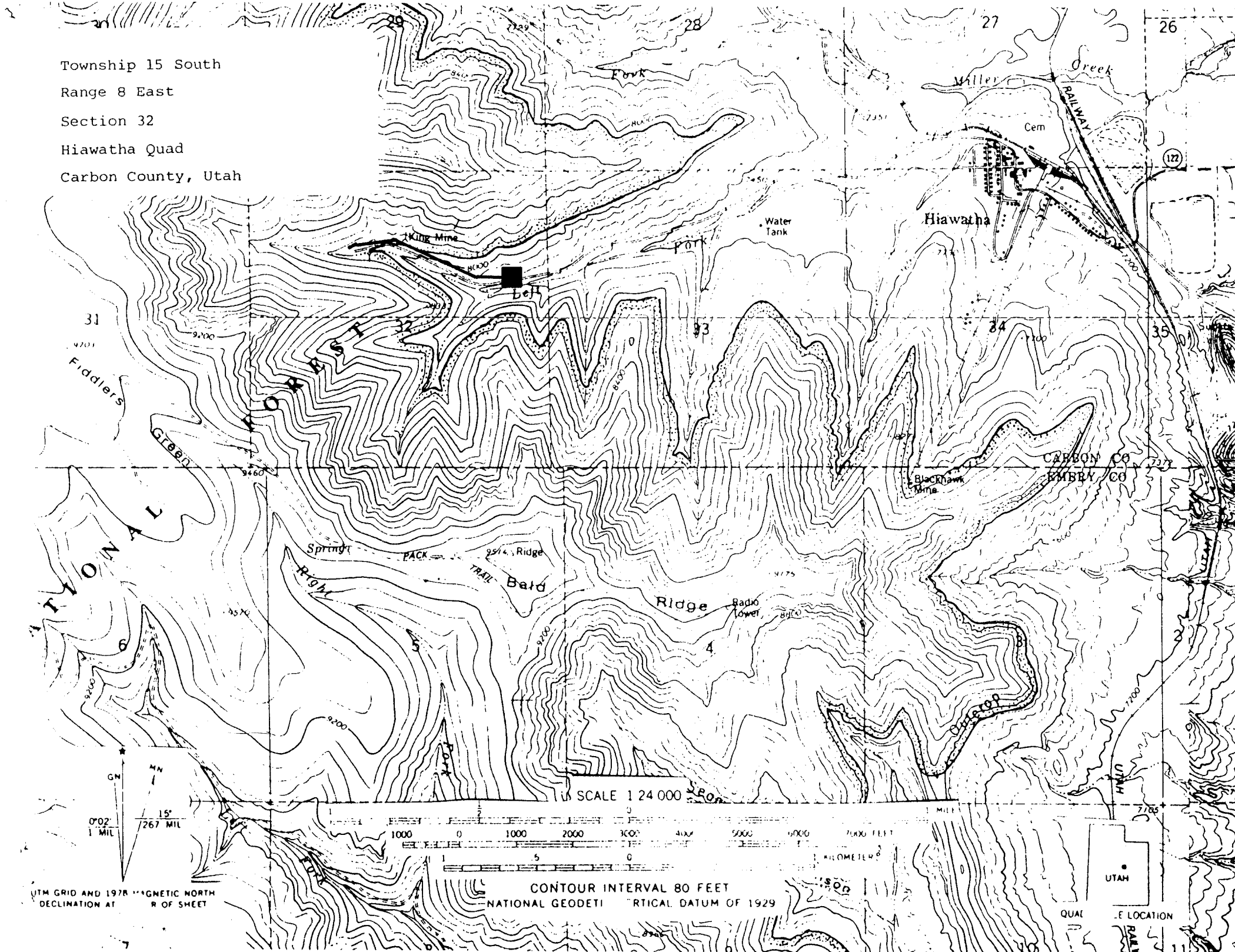
Township 15 South

Range 8 East

Section 32

Hiawatha Quad

Carbon County, Utah



APPENDIX IV-3

LIVESTOCK GRAZING PLAN FOR U.S. FUEL CO.

May 16, 1979

RECORD OF COOPERATOR'S DECISIONS
AND PROGRESS IN APPLICATION

DATE 5-79

FIELD NO.	PLANNED		APPLIED		LAND USE AND TREATMENT
	AMOUNT	YEAR	AMOUNT	MONTH AND YEAR	
1,2,3	12,800	1979			Range 12,800 acres Proper Grazing use Graze at an intensity which will maintain enough to cover to protect soil and maintain or improve the quality and quantity of desirable vegetation. (rule of thumb: take half and leave half and both halves will get bigger.) see job sheet #1 for proper use of key species.
1-3	12,800	1979			Planned Grazing System See job Sheet No. 2 use either alternate #1 which is a rest rotation system or alternate #2 which is a deferred rotation grazing system.
1-3	5 each	1979-1980			Water Development Ponds will be made & springs will be maintained and developed where needed.
1-3			2 mi.	1977	Fencing Fences will be constructed where needed to better control and distribute livestock.

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e RANGE-16

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Job Sheet #1
PROPER GRAZING USE

PERATOR U.S. Fuel

NG T	ACRES	SPECIES OF GRAZING ANIMAL	SEASON OF USE	LOCATION OF KEY GRAZING AREA	KEY PLANT(S) FOR JUDGING PROPER GRAZING USE	PLANNED USE OF KEY SPECIES AT END OF GRAZING PERIOD	ESTIMATED USE OF KEY SPECIES BY WEIGHT				
							19 79	1980	1981	1982	1983
		Cattle	Sum.	High Mt. Loam Range Site South	Little & Tall	Not to exceed					
				side of unit	Native bluegrass	50%					
		Cattle	Sum.	Mt. Shallow Loam (Sec. 30)	Little & Tall	50%					
					Native bluegrass						
		Cattle	Sum.	Mt. Shallow (Sec. 30)	Little & Tall	50%					
					Native bluegrass						
		Cattle	Sum.	Mt. Shallow Loam (Sec. 31)	Little & Tall	50%					
					Native bluegrass						
		Cattle	Sum.	Section 17	Bluebunch	50%					
		Cattle	Sum.	Mt. Shallow Loam	Bluebunch	50%					

Conservationist Assisting with Planning

Gary D Morgan 5/16/79
NAME AND DATE

Initials of Conservationist Assisting with Application

Dates of Application Checks

Job Sheet #2

ALTERNATE #1 Rest Rotation

	Graze	Rest
Year 1	1&2	3
Year 2	2&3	1
Year 3	3&1	2
Year 4	1&2	3
Year 5	2&3	1
Year 6	3&1	2

Use Job Sheet #1 as a guide to change pastures with livestock.

ALTERNATE #2 Rotation Deferred

Year 1	1,2&3
Year 2	3,2,&1
Year 3	2,1,&3 if needed

Use the use factor on the key plants as an indicator as listed in Job Sheet #1 to rotate pastures.

ce Site & Woodland Site	Acres	Prod	Total Herbage	% Utilization	Available Forage	Proper use %	Useable Forage	Aums	Potential Aums
Mtn. Loam	735	1000	735000	35	257250	50	128625	160	800
n Grass	735	1000	735000	40	294000	50	147000	183	500
Shallow Loam	1475	11000	1622500	25	405625	50	202812	253	500
ce Fir	240	700						25	
s Vill	735	-						-	
Stony Loam	980	1200	1176000	35	411600	50	205800	257	550
Total	4900							853	2350
Mtn. Loam	325	1000	325000	30	975000	50	48750	60	350
en Grass	650	1000	650000	40	260000	50	130000	162	480
Shallow Loam	975	1100	1072500	25	268125	50	134062	167	335
Stony Loam	325							24	
ce Fir	1950							-	
and Shallow Loam PJ	1300	700	910000	35	318500	50	159250	199	
Total	6500							843	1715
h Mtn. Loam	280	1200	336000	75	252000	50	126000	157	300
en Grass	350	1200	420000	70	294000	50	147000	183	260
Shallow Loam	490	1100	539000	30	161700	50	80850	101	170
uce Fir	140							24	
ss Vill	140							-	
Total	1400							441	730
tal								2137	4795
Difference									2658

Possible stocking Rate of 400 - 425 head for 5 months but, would try 300 - 350 for a season or two.

RANGE SITE DESCRIPTIONS

HIGH MOUNTAIN LOAM (ASPEN)

This site occurs in a rainfall belt of 22 inches or greater. Fifty percent or more of this comes during the growing season. The soils are medium textured and deep. The infiltration rate and the waterholding capacity are good. An over-story of aspens identifies this site.

Mountain and nodding brome grass, blue wildrye, bearded and slender wheatgrass, peavine, butterweed and aspen make up the bulk of the potential plant community. Potential production for this site ranges from 2750-4000 pounds per acre.

HIGH MOUNTAIN LOAM

This site occurs in association with your High Mountain Loam (Aspen) site but does not have aspen on it. The soils making up this site are medium textured. Infiltration rates and waterholding capacity are good. This site occurs in a rainfall belt of greater than 22 inches. Potential production can reach 2700 pounds in favorable years.

Bearded and slender wheatgrass, mountain brome, columbia needlegrass, big sagebrush, snowberry and oakbrush make up the bulk of the potential plant community.

MOUNTAIN STONY LOAM

Medium textured soils make up this site. The soil profile has 50% or more of stones. Although the site is in a favorable rainfall belt (16-22 inches) the stoniness limits the waterholding capacity. This affects total production. Deep rooted plants are a "natural" for this site as moisture percolates deep.

Mountain mahogany, bitterbrush, sagebrush, and bluebunch wheatgrass make up the bulk of the potential plant community. Potential production ranges from 750 to 2000 pounds per acre.

MOUNTAIN SHALLOW LOAM

This site occurs in a rainfall belt from 16 to 22 inches. Fifty percent or more comes during the growing season. Soils in this site are stony or cobbly, shallow and well drained.

MOUNTAIN SHALLOW LOAM (Continued)	Bluebunch wheatgrass, Indian ricegrass, Great Basin wildrye, prairie junegrass, balsamroot, native bluegrass, bitterbrush, and big sagebrush are potential plants for the bulk of the production. Potential production for the site is 750-1500 pounds depending on how favorable the year.
UPLAND LOAM (PINON-JUNIPER)	This is a woodland range site as pinon-juniper dominates the site. Soils making up the site are medium textured, have a good infiltration rate and store all the moisture that normally falls. The site occurs in the 12-16 inch rainfall belt. Potential production for the site is 950-2600 pounds per acre. Pinon-juniper, bluebunch wheatgrass, Indian ricegrass, sandberg and western wheatgrass yield the bulk of the production.
UPLAND STONY HILLS (JUNIPER) (Summer Precipitation)	Soils of this site are stony, cobbly and shallow. Waterholding capacity is limited by the shallow depth and the high percentage of stone in the soil. The site occurs in the 12-16 inch rainfall belt. Juniper, Indian ricegrass, needle-and-thread, blue grama, sedge and yellowbrush make up the bulk of the potential plant community.
UPLAND STONY LOAM (PINON-JUNIPER)	This is a pinon-juniper tree site. The soils are medium textured and occur in the 12-16 inch rainfall belt. Limited rainfall as well as a high percentage of stones in the soil limits production. Fifty percent of the total production can be expected from pinon and juniper. Other potential plants for the site are bluebunch wheatgrass, needle-and-thread, bluegrasses, bitterbrush, big and black sagebrush.
CLASS VIII LAND	Land that is too steep, barren, or inaccessible to livestock.

ASPEN GRASS ECOSYSTEM

Soils

Soils are deep, well-drained - surface layers being loam, silt loam as clay loam and in places stony, gravelly cobbly or very cobbly. Intake rate is moderate to rapid and water movement through the soil is good. Water holding capacity is high (ten to fourteen inches in a six foot protite.)

Potential Native Plant Community

Overstory - Quaking Aspen - 40
Understory Grass - 60
Shrub - 610
Forb - 20 30

Density

Overstory - 25-70%
Understory - 80%

Grainy Valve

Potential forage valve rating 60%
heavy weight of desirable species

Important Species

Columbia Needlegrass
Mountain Brome
Letterman's Needlegrass
Western Wheatgrass
Slender Wheatgrass
Lupine
Aspen Peavine
American Vetch

ENGELMANN SPRUCE WOODLAND SUITABILITY GROUP

Vegetation	Overstory - Engleman Spruce Understory - Mountain Brome and Brand of forbs.
Productive Capacity	Site Class VI site index (unavailable) Productive Rating low for Engelmann Spruce
Soils	Extremely Stony Loam
Hazards and Limitations	High percentage of Rock, steep slopes.
Yield Data	unavailable

13. HIGH MOUNTAIN LOAM

Topography	This site occurs on gently sloping to very steep mountain slopes. On this site slope range from 30 to 60%. It will be found primarily on north and east exposures.
Soils	The soils are deep, well-drained soils. Infiltration and internal water movement are good. The soil has a high water holding capacity ranging from about 10 to 14.5 inches in a six foot profile. Amount of stone, cobble or gravel is variable throughout the profile but is less than 50%
Potential Native Plant Community	Grass - 45 Shrubs - 30 Forbs - 25%
Potential Production	1300 pounds in unfavorable years to 2700 pounds in favorable years.
Density	A potential density of herbage cover by ocular estimate is 70 to 75%
Important Plants	Mountain Brome Slender Wheatgrass Bullgrass Western Wheatgrass Letterman's Needlegrass Columbia Needlegrass Lupine Tall Larkspur Big Sagebrush

38. MOUNTAIN SHALLOW LOAM

Physiographic Factors	This site will be found on steep mountain slopes ranging from 30 to 65%. On this site it will be found primarily on south and west exposures, and ridge tops. Elevation 7500 to 9000 feet.
Soils	The soils are stony or cobbly and shallow over bedrock (10 to 20 inches) They are well drained. Water intake rate is moderate to slow. Water holding capacity is low due to the shallow depth and rock fragment content. It ranges from 1.5 to 3.0 inches with a water supplying capacity of 5 to 8 inches.
Potential Native Plant Community	Grass - 50% Shrubs - 45% Forbs - 5%
Potential Production	600 pounds in unfavorable years to 1700 pounds in favorable years.
Density	Potential density of herbage by ocular estimatated is 45 to 50%
Important Plants	Letterman's Needlegrass Longtongue Muttongrass Big Sagebrush Bullgrass Mountain Snowberry

43. MOUNTAIN STONY LOAM

Physiographic Features	This site will occur on all exposurs but primarily on the north and east slopes. The slopes will vary from 30 to 60%. Elevation ranges from 7000 to 9000 feet.
Soils	The soils are deep well-drained and very gravelly, very stony or very cobbly over 50% by volome throughout the profile. Lafiltration ane internal water movement are good. Water holding capacity is moderate due to the high contents of rock fragments.
Potential Native Plant Community	Grass - 65 - 75% Shrubs - 15 - 20% Forbs - 5 - 10 %
Potential Production	1000 pounds per acre in unfavorable years to 2500 pounds in favorable years.
Density	Potential density by ocular estimate, overstory 10 - 20%, understory 40 to 45%.
Important Plants	Bullgrass Muttongrass Letterman's Needlegrass Lupine Big Sagebrush Mountain Snowberry

APPENDIX IV-4

COMMENTS AND STIPULATIONS RELATING TO FEDERAL LEASE LANDS

PART II. TERMS AND CONDITIONS

Sec. 1.(a) RENTAL RATE - Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $3.00 for each lease year.

(b) RENTAL CREDITS - Rental shall not be credited against either production or advance royalties for any year.

Sec. 2.(a) PRODUCTION ROYALTIES - The royalty shall be 8 percent of the value of the coal as set forth in the regulations. Royalties are due to lessor the final day of the months succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES - Upon request by the lessee, the authorized officer may accept for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS - Lessee shall maintain in the proper office a lease bond in the amount of $5,000. The authorized officer may require an increase in this amount when additional coverage is determined appropriate.

Sec. 4. DILIGENCE - This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years shall terminate the lease. Lessee shall submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after lease issuance.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. LOGICAL MINING UNIT (LMU) - Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease shall become a LMU or part of a LMU, subject to the provisions set forth in the regulations.

The stipulations established in a LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION - At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all times for the inspection of any duly authorized officer of lessor, the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps,

and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee shall allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS - Lessee shall comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee shall not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area shall be submitted to the authorized officer.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee shall take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits, not covered hereunder and approving easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY - Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and revelant orders of the Secretary of Labor. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 9.(a) TRANSFERS

|X| This lease may be transferred in whole or in part to any person, association, or corporation qualified to hold such lease interest.

☐ This lease may be transferred in whole or in part to another public body, or to a person who will mine the coal on behalf of, and for the use of, the public body or to a person who for the limited purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.

☐ This lease may only be transferred in whole or in part to another small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest must be approved in accordance with the regulations.

(b) RELINQUISHMENT - The lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee shall be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC. - At such time as all portions of this lease are returned to lessor, lessee shall deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, lessee shall remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, shall become the property of the lessor, but lessee shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is owned by third parties, lessor shall waive the requirement for removal, provided the third parties do not object to such waiver. Lessee shall, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by lessee's activity or activities incidental thereto, and reclaim access roads or trails.

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT - If lessee fails to comply with applicable laws, existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the lessor only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS - IN-INTEREST - Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION - Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the lessee's activities and operations under this lease.

Sec. 14. SPECIAL STATUTES - This lease is subject to the Federal Water Pollution Control Act (33 U.S.C. 1151 - 1175); the Clean Air Act (42 U.S.C. 1857 et seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.).

Sec. 15. SPECIAL STIPULATIONS -

The Regulatory Authority shall mean the State Regulatory Authority pursuant to a cooperative agreement approved under 30 CFR Part 745 or in the absence of a cooperative agreement, Office of Surface Mining. The Authorized Officer shall mean the State Director, Bureau of Land Management. The Authorized Officer of the Surface Management Agency shall mean the Forest Supervisor, Forest Service. Surface Management Agency for private surface is the Bureau of Land Management.

The Authorized Officers, of the Bureau of Land Management, Office of Surface Mining (Regulatory Authority), and the Surface Management Agency (Forest Service) respectively, shall coordinate, as practical, regulation of mining operations and associated activities on the lease area.

1. In accordance with Sec. 523(b) of the "Surface Mining Control and Reclamation Act of 1977", surface mining and reclamation operations conducted on this lease are to conform with the requirements of this act and are subject to compliance with Office of Surface Mining regulations, or as applicable, a Utah program equivalent approved under cooperative agreement in accordance with Sec. 523(c) and final determination of suitability for mining. The United States Government does not warrant that the entire tract will be susceptible to mining.

2. Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service - Manti-LaSal National Forest.

The following stipulations pertain to the lessee responsibility for mining operations and the lease area and on adjacent areas as may be specifically designated on National Forest System Lands.

3. Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the Lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the Lessee, prior to disturbance, shall immediately bring them to the attention of the appropriate authorities. Paleontological remains of significant scientific interest do not include leaves, ferns, or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

4. If there is reason to believe that threatened or endangered (T&E) species of plants or animals, or migratory species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. A listing of migratory birds of high Federal interest in Federal coal producing regions is published by the U.S. Fish and Wildlife Service, Migratory Bird Management Office, Washington, D.C. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

5. The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data is adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the inter-relationship of the geology, topography, surface hydrology, vegetation, and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

6. Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

7. The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access road, are factors which will determine the ultimate size of the surface area utilized for the mine. A site specific environmental analysis will be prepared for each new mine site development and for major modifications to existing developments to examine alternatives and mitigate conflicts.

8. Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternative involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed, to reduce visual impacts, and where possible achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural lands forms and vegetative landscape features will be avoided.

9. The Lessee shall be required to establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

10. The Lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), Lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

11. Except at specifically approved locations, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to existing surface structures, and (3) damage or alter the flow of perennial streams. The Lessee shall provide specific measures for the protection of escarpments, and determine corrective measures to assure that hazardous conditions are not created.

12. In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specific approved locations.

13. If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

14. The coal contained within, and authorized for mining under this lease shall be extracted only by underground mining methods.

15. Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

16. In order to protect big game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other critical wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specified periods of the year.

17. Support facilities, structures, equipment, and similar developments will be removed from the lease area within two years after the final termination of use of such facilities. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages re-established, and the areas returned to a premining land use.

18. The Lessee, at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged disturbed or displaced land monuments (section corners, 1/4 corners, etc.)

their accessories and appendages (witness trees, bearing trees, etc.) or restore them to their original condition and location, or at other locations that meet the requirements of the land net. This work shall be conducted at the expense of the Lessee, by a professional land surveyor registered in the State of Utah, and to the standards and guidelines found in the Manual of Surveying Instructions, United States Department of the Interior.

19. The Lessee at their expense will be responsible to replace any surface water identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses.

The United States of America

U. S. Fuel Co.
Company or Lessee Name

(Signature of Lessee)

Vice Pres & Gen'l Mgr.
(Title)

May 24, 1985
(Date)

By

ROBERT LOPEZ
(Signing Officer)

Chief, Minerals
Adjudication Section
(Title)

SEP 05 1985
(Date)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statement or representations as to any matter within its jurisdication.

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