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STATE OF UTAH

DEPARTMENT OF NATURAL RESOURCES AND ENERGY

DIVISION OF OIL, GAS, and MINING

355 West North Temple

3 Triad Center

Salt Lake City, Utah 84116

APPLICATION FOR MINING PERMIT

This Renewal Application For Mining Permit is submitted pursuant to Title 40, Chapter 10, Utah Code Annotated 1953, as amended; the Cooperative Agreement between the United States Department of Interior and the State of Utah; the Surface Mining Control and Reclamation Act (P.L. 95-87); the Federal Land Policy and Management Act of 1976; and all regulations promulgated under those Acts affecting coal mining operations conducted in the State of Utah.

NAMES, ADDRESSES, and TELEPHONE NUMBERS OF PERMITTEE:	Coastal States Energy Company 175 East 400 South, Suite 800 Salt Lake City, Utah 84111 Area Code (801) 596-7111 and Skyline Coal Company 175 East 400 South, Suite 800 Salt Lake City, Utah 84111 Area Code (801) 596-7111
LOCATION OF MINE AREA:	All or portions of Sections 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35 of Township 13 South, Range 6 East, SLM; All or portions of Sections 17, 18, 19, 20 of Township 13 South, Range 7 East, SLM.
MINERAL TO BE MINED:	Coal
OPERATOR:	Utah Fuel Company, a wholly owned subsidiary of Coastal States Energy Company 175 East 400 South, Suite 800 Salt Lake City, Utah 84111
PHONE NUMBER OF OPERATOR	Area Code (801) 596-7111
HOLDER OF RECORD	Coastal States Energy Company 175 East 400 South, Suite 800 Salt Lake City, Utah 84111 and Skyline Coal Company 175 East 400 South, Suite 800 Salt Lake City, Utah 84111
AGENT FOR SERVICE OF PROCESS (Skyline Coal Company):	C. T. Corporation Systems 811 Dallas Avenue Houston, Texas 77002
RESIDENT AGENT (Coastal States Energy Company):	Vernal J. Mortensen Coastal States Energy Company 175 East 400 South, Suite 800 Salt Lake City, Utah 84111 Area Code (801) 596-7111
RESIDENT AGENT (Skyline Coal Company)	Vernal J. Mortensen Skyline Coal Company 175 East 400 South, Suite 800 Salt Lake City, Utah 84111 Area Code (801) 596-7111

We, the undersigned, hereby certify that the material and information contained in this Application are complete and are correct to the best of our knowledge and belief.

Coastal States Energy Company

By: _____
Senior Vice President

Skyline Coal Company

By: _____
Vice President and General Manager

State of Utah
County of Salt Lake

Subscribed and sworn to and before me this 26th day of February, 1987.

_____
Notary Public for the State of Utah

Residing at: Salt Lake County

My Commission Expires: 12/12/87

1.2 BUSINESS DESIGNATION

Utah Fuel Company, a wholly owned subsidiary of Coastal States Energy Company, operates the Skyline Mines. The Skyline Mines are owned by Coastal States Energy Company and Skyline Coal Company, the Permittees. Coastal States Energy Company is a wholly owned subsidiary of The Coastal Corporation; Skyline Coal Company is a wholly owned subsidiary of Coastal States Energy Company.

O.S. Wyatt, Jr. is the only stockholder of The Coastal Corporation owning more than five percent of the corporation's outstanding common stock. No individual stockholder owns more than 10 percent of the outstanding common stock of The Coastal Corporation.

Utah Fuel Company has not carried on any coal mining activities in any name other than in the name of the company as aforestated. Coastal States Energy Company and thereby The Coastal Corporation (Coastal States Energy Company's parent corporation) owns an underground coal mine (Mine Permit ACT/041/002) located near Salina, Utah, operated as Southern Utah Fuel Company. Coastal States Energy Company has not carried on any coal mining activity during the past five years other than those operations at the SUFCo Mine, the Skyline Mine and the mines owned through McCoy Caney Coal Company, a wholly owned subsidiary of Coastal States Energy Company. The assets, including the mines, of McCoy Caney Coal Company were sold by Coastal States Energy Company on July 7, 1986. Subsequently, all the McCoy Caney permits were transferred to the new owner, and the respective surety bonds were released.

Various contractors and subcontractors will be engaged to perform portions of the mining related activities. At this time however, the names and activities of the specific contractors are unknown.

The officers of Utah Fuel Company are:

James R. Paul	Chairman of the Board
James L. Van Lanen	President and Chief Executive Officer
Vernal J. Mortensen	Executive Vice President-Operations
David A. Arledge	Senior Vice President
Robert J. Hummel	Senior Vice President
Robert A. Feilner	Vice President-Marketing
Glen A. Zumwalt	Vice President-Operations
Austin M. O'Toole	Secretary
Edward P. Gleichauf	Controller
E.C. Simpson	Assistant Vice President
Paul E. Jones, Jr.	Assistant Treasurer
Kevin L. Yocum	Assistant Secretary

The Officers of Skyline Coal Company are:

James R. Paul	Chairman of the Board
James L. Van Lanen	President and Chief Executive Officer
Vernal J. Mortensen	Executive Vice President-Operations
David A. Arledge	Senior Vice President
Robert J. Hummel	Senior Vice President
Robert A. Feilner	Vice President-Marketing
Glen A. Zumwalt	Vice President-Operations
Austin M. O'Toole	Secretary
Edward P. Gleichauf	Controller
E.C. Simpson	Assistant Vice President
Paul E. Jones, Jr.	Assistant Treasurer
Kevin L. Yocum	Assistant Secretary

The Officers of Coastal States Energy Company are:

James R. Paul	Chairman of the Board and Chief Executive Officer
James L. Van Lanen	President
Glen R. Lowe	Executive Vice President
Robert J. Hummel	Executive Vice President
David A. Arledge	Senior Vice President-Finance
Jon Bert McElreath	Senior Vice President
Vernal J. Mortensen	Senior Vice President
Austin M. O'Toole	Secretary
M.T. Arnold	Vice President-Purchasing
Wesley F. Blankenship	Vice President-Reserves
Robert A. Feilner	Vice President-Marketing
Donald J. Appleman	Controller
T.E. Jackson, Jr.	Assistant Vice President (Tax)
E.C. Simpson	Assistant Vice President (Personnel)
Kevin L. Yocum	Assistant Secretary
Francis T. Kelly	Assistant Secretary
Robert A. Shaw, Jr.	Assistant Secretary-Ad Valorem Tax
Paul E. Jones, Jr.	Assistant Treasurer

The addresses and phone numbers for the officers and directors of Utah Fuel Company, Coastal States Energy Company or Skyline Coal Company are the same as those previously listed (Section 1.1 - Application) for the company for which the individuals are officers.

The Coastal Corporation also owns through its wholly owned subsidiary, Colorado Interstate Gas Corporation, the following companies which hold coal mining and reclamation permits:

ANR Coal Company
Apache Coal Company d/b/a Enterprise Coal Company
Brooks Run Coal Company
Virginia Iron Coal and Coke Company

Written correspondence regarding the Skyline Mines should be addressed to:

Senior Vice President

Coastal States Energy Company

175 East 400 South, Suite 800

Salt Lake City, Utah 84111

1.3 MULTIPLE BUSINESS ENTITIES

Neither the companies nor any major stockholder of any company having any interest, either legal or equitable, in the Skyline Mines have had a State or Federal mining permit suspended or revoked or a security deposited in lieu of bond revoked.

1.4 MINING PERMITS - COMPLIANCE INFORMATION

Coastal States Energy Company presently holds an approved Mining Permit (Number ACT/041/002) for its Southern Utah Fuel Company operation located in Sevier County, Utah. The permit was approved and issued by the State of Utah Division of Oil, Gas, and Mining on September 14, 1977 and the mining and reclamation plan for the operation was approved by the U. S. Geological Survey on February 3, 1978. A permanent program mining permit was issued for the SUFCo mine on May 19, 1987.

Coastal States Energy Company also currently holds an approved mining permit Number ACT/007/005 for the Skyline Mines dated November 9, 1982.

Neither the Skyline Mines nor Southern Utah Fuel Company have pending any Notice of Violations as of the date of filing of this Application. A history of recent NOV's and the action taken, as required by UMC 782.14(c), may be found on pages 1-8A through 1-8E.

Skyline Coal Company, formerly Getty Mining Company, was purchased by Coastal States Energy Company in 1985. At the date of purchase, Skyline Coal Company held no coal mining permits other than the Skyline Mines permit. Coastal States Energy Company has no information regarding coal mining operations permits which Skyline Coal Company may have held prior to the date of purchase by Coastal States Energy Company.

TABLE 1.4-1

LIST OF VIOLATIONS

MD: 5/15/87

SOUTHERN UTAH FUEL COMPANY - DIVISION OF OIL, GAS & MINING NOV HISTORY

January 1984 - April 1987

NOV	DATE	VIOLATION DESCRIPTION	ACTIONS TAKEN TO ABATE	CURRENT STATUS	ADMINISTRATIVE OR JUDICIAL PROCEEDINGS CONCERNING THE VIOLATION
		No Violations in 1984			
N85-6-1-1	1/15/85	No fan small area exemption runoff sampling.	Immediately started sampling	1/21/85 Termination of notice. 1/15/85 Effective date.	5/24/85 Proposed assessment of penalties. 5/30/85 Requested assessment conference. 7/16/85 Assessment conference. 7/30/85 Finalized assessment.
N85-6-4-1	3/12/85	Parking pad drainage modification to Sediment Pond without approval.	12/27/84 - Sent in revised plan to eliminate small area exemption and go back to previously approved plan of parking pad drainage to Sediment Pond. 3/14/85 - Sent in plans again to Division that were approved without any revisions on 4/18/85.	4/22/85 Termination of notice. 3/15/85 Effective date.	3/26/85 DOGM modification of notice for 30 days for Division review. 5/24/85 Proposed assessment of penalties. 5/30/85 Requested assessment conference. 7/16/85 Assessment conference. 7/17/85 Follow up letter to the Division. 7/30/85 Finalized assessment.
N85-6-6-1	4/30/85	Failure to analyze for oil and grease in Sediment Pond decant sample.	None - Requested assessment conference.	4/30/85 Termination of notice. 7/14/86 No penalty assessed since assessment conference officer determined that none was warranted	5/5/86 Proposed assessment. 5/19/86 Requested assessment conference. 7/2/86 Assessment conference. 7/14/86 Finalized assessment.
N85-6-7-1	6/21/85	Quality of fan area discharge.	6/11/85 - Sent in request for Division approval to eliminate the main mine fan small area exemption before NOV was written.	9/11/85 Termination of notice. 8/16/85 Effective date.	7/17/85 Proposed assessment. 8/15/85 Finalized assessment.

TABLE 1.4-1 (continued)

LIST OF VIOLATIONS

SOUTHERN UTAH FUEL COMPANY - DIVISION OF OIL, GAS & MINING NOV HISTORY

January 1984 - April 1987

NOV	DATE	VIOLATION DESCRIPTION	ACTIONS TAKEN TO ABATE	CURRENT STATUS	ADMINISTRATIVE OR JUDICIAL PROCEEDINGS CONCERNING THE VIOLATION
N85-6-7-1 (con't)	6/21/85	Quality of fan area discharge.	6/28/85 - Letter submitted to satisfy abatement requirements referencing 6/11/85 submitted plan modification plan. 7/18/85 - Division approval of plans. 8/16/85 - Modification implemented.		
N86-9-6-1	5/1/86	Bypass culvert contaminated with oil - white film on surface of water.	5/2/86 - Inspected culvert. Appeared to be coming from algae growth. 5/3/86 - Cleaned culvert and drainage basin. 5/17/86 - Repaired hole in side of culvert where contaminate was seeping in.	5/27/86 Termination of notice. 5/17/86 Effective date. 7/14/86 Notice of violation vacated as a result of finding that the subject seepage was not surface drainage as contemplated by UMC 817.42 (a) (i).	5/19/86 Proposed assessment. 6/2/86 Requested assessment conference. 7/2/86 Assessment conference. 7/14/86 Finalized assessment.
N86-9-7-1	6/17/86	Failure to meet TDS limitation for Sediment Pond discharge.	6/19/86 - Letter sent to the Division with explanation of what may have caused the high TDS levels and the steps the operator intended to take to prevent a future reoccurrence of the situation.	7/16/86 Termination of notice.	6/30/86 Proposed assessment. 7/17/86 Request for assessment conference or adjustment. 9/26/86 Finalized assessment.

TABLE 1.4-1 (continued)

LIST OF VIOLATIONS

UTAH FUEL COMPANY - DIVISION OF OIL, GAS & MINING NOV HISTORY

JANUARY 1984 - APRIL 1987

NOV	DATE	VIOLATIONS DESCRIPTION	ACTIONS TAKEN TO ABATE	CURRENT STATUS	ADMINISTRATIVE OR JUDICIAL PROCEEDINGS
N84-7-5-2 1 of 2	5/08/84	Failure to construct sediment control facilities in accordance with the approved design. Failure to treat water discharged from disturbed area or underground mine so that it complies with all applicable state and Federal water quality laws and regulations. Failure to construct sediment pond to prevent short circuiting to the extent possible		NOV and penalty vacated No further action	10/15/84 Assessment conference
N84-7-5-2 2 of 2	5/08/84	Failure to monitor sediment pond discharge adequately to demonstrate that the water quality of the discharge from the disturbed area is in compliance with all water quality rules and regulations	Immediately started abatement action.	NOV affirmed Penalty paid	10/15/84 Assessment conference held in SLC/DOGM Office.
N84-2-24-3 1 of 3	12/13/84	Provided false certification		1/11/85 Vacated by issuing officer No further action	
N84-2-24-3 2 of 3	12/13/84	Failure to operate in accordance with approved plan to adequately treat volume of mine discharge water in addition to providing adequate sediment control as approved for a 36 acre disturbance.		Violation left in place. Fine reduced to -0- with 0 points No further action	8/10/85 Assessment conference held in SLC/DOGM office

TABLE 1.4-1 (continued)

LIST OF VIOLATIONS

Page 2

UTAH FUEL COMPANY - DIVISION OF OIL, GAS & MINING NOV HISTORY

JANUARY 1984 - APRIL 1987

NOV	DATE	VIOLATIONS DESCRIPTION	ACTIONS TAKEN TO ABATE	CURRENT STATUS	ADMINISTRATIVE OR JUDICIAL PROCEEDINGS	
N84-2-24-3 3 of 3	12/13/84	Failure to comply with all applicable water quality laws, regulations and permits of sediment pond decant discharges.		NOV vacated No further action	8/10/85	Assessment conference held in SLC/DOGM office.
N85-2-5-1 1 of 1	3/05/85	Failure to prevent addition of suspended solids to stream flow.	Established permanent sediment control measures.	NOV affirmed Penalty points and fine amount reduced and paid.	12/13/85	Assessment conference held in SLC/DOGM Office.
N85-2-7-2 1 of 2	6/03/85	Failure to stockpile coal in compliance with the terms and conditions of the permit.		6/03/85 Vacated by issuing officer No further action		
N85-2-7-2 2 of 2	6/03/85	Failure to inspect the rockwaste disposal site and provide a certified report. Failure to provide DOGM verification that the initial configuration was constructed as approved.	Made required inspection and submitted "as built" plans.	NOV affirmed and paid.	12/13/85	Assessment conference held in SLC/DOGM office
N85-2-9-2 1 of 2	6/20/85	Failure to mark buffer zone to prevent disturbance by surface operations.	Posted required buffer zone markers.	NOV affirmed Penalty assessed and paid.	12/13/85	Assessment conference held in SLC/DOGM office
N85-2-9-2 2 of 2	6/20/85	Failure to provide and maintain appropriate sediment control measures to prevent addition of sediment to stream flow or runoff outside the permit area and to minimize erosion.	Provided necessary control measures.	NOV affirmed Penalty assessed and paid.	12/13/85	Assessment conference held in SLC/DOGM office

TABLE 1.4-1 (continued)

LIST OF VIOLATIONS

Page 3

UTAH FUEL COMPANY - DIVISION OF OIL, GAS & MINING NOV HISTORY

JANUARY 1984 - APRIL 1987

NOV	DATE	VIOLATIONS DESCRIPTION	ACTIONS TAKEN TO ABATE	CURRENT STATUS	ADMINISTRATIVE OR JUDICIAL PROCEEDINGS	
N85-2-16-2 1 of 2	8/30/85	Failure to post mine identification sign.		Civil penalty vacated No further action	2/13/86	Assessment conference held in SLC/DOGM office.
N85-2-16-2 2 of 2	8/30/85	Failure to divert surface runoff away from fill.		NOV vacated No further action	2/13/86	Assessment conference held in SLC/DOGM.
N85-2-18-2 1 of 2	9/05/85	Conducting mining operations without a permit.		9/06/85 Vacated by issuing officer and reissued as NOV 2 of 2 N85-2-19-2. No further action		
N85-2-18-2 2 of 2	9/05/85	Conducting mining operations without a permit. Failure to comply with terms and conditions of the permit in disposal of accumulated sediment from the mine sediment pond at the Scofield Waste Rock Disposal site.		NOV vacated No further action	2/13/86	Assessment conference held in SLC/DOGM office
N85-2-19-2 1 of 2	9/06/85	Failure to comply with terms of the permit by failing to install water discharge recording equipment.		NOV vacated No further action	2/13/86	Assessment conference held in SLC/DOGM office
N85-2-19-2 2 of 2	9/06/85	Failure to conduct mining activities in accordance with the terms & conditions of the permit. Conducting mining operations without a permit by discharging mine water directly into Eccles creek.		NOV vacated No further action	2/13/86	Assessment conference held in SLC/DOGM office

TABLE 1.4-1 (continued)

LIST OF VIOLATIONS

UTAH FUEL COMPANY - DIVISION OF OIL, GAS & MINING NOV HISTORY

January 1984 - April 1987

NOV	DATE	VIOLATION DESCRIPTION	ACTIONS TAKEN TO ABATE	CURRENT STATUS	ADMINISTRATIVE OR JUDICIAL PROCEEDINGS CONCERNING THE VIOLATION
N87-9-4-1	5/11/87	Failure to meet effluent limitations specified in NPDES permit.		Terminated No further action	6/22/87 Assessment paid
N87-9-13-1	10/28/87	Failure to meet effluent limitations as specified in NPDES permit		NOV vacated No further action	2/10/88 Assessment conference held in SLC
N87-9-15-1	12/2/87	Conducting mining activities without a permit		NOV vacated No further action	NOV vacated by administrative decision
N88-15-3-2 1 of 2	10/13/88	Water discharge points not permitted		NOV vacated No further action	NOV vacated by administrative decision
N88-15-3-2 2 of 2	10/13/88	Imminent environmental harm	Emulsion oil used in longwall changed to product containing no nitrate	CO88-15-1-1 issued	CO88-15-1-1 issued
CO88-15-1-1	10/13/88	Imminent environmental harm	Same as for N-88-15-3-2	CO terminated 10/28/89	Assessment paid 11/7/88

1.5 MINE IDENTIFICATION

Since the three mining operations comprising the Skyline Mining Project will utilize surface facilities in the same general area and will mine generally the same area in horizontal extent, the three operations are treated in this Mining Permit Application as a single mining operation to be known as the "Skyline Mines". The "Skyline Mines" will involve a multiseam mining operation of three coal seams with certain areas being mined sequentially at different depths with slight variations due to geological and mining restraints. To distinguish the operations of mining one seam from the others, each operation has been named individually:

Mine Operation	Seam to be Mined
Skyline Mine No. 1	Upper O'Connor
Skyline Mine No. 2	Lower O'Connor "B"
Skyline Mine No. 3	Lower O'Connor "A"

The Mine Safety and Health Administration numbers for the Skyline Mines are:

Skyline Mine No. 1 - 42-01435

Skyline Mine No. 2 - 42-01565

Skyline Mine No. 3 - 42-01566

1.6 RIGHT TO ENTER

The Skyline Mines will be operated on the leasehold interests owned by the Permittee, Coastal States Energy Company and Skyline Mining Company. The lands on which mining is to occur are a part of the Manti-LaSal National Forest (see Map 1.6-1). The waste rock disposal area is on private land as also shown on Map 1.6-1. The leasehold interests involve all or a part of the following coal leases, which have been subleased and/or assigned to Coastal States Energy Company and Skyline Mining Company:

Federal Lease	Issued to	Date of Issuance
Utah - 020305	Emmett K. Olson	3/1/62
Utah - 044076	Armeda N. McKinnon	9/1/65
Utah - 0142235	Malcolm N. McKinnon	10/1/64
Utah - 0147570	Malcolm N. McKinnon	5/1/65
Utah - 073120	Independent Coal and Coke Company	2/1/64

County Lease	Issued to	Date of Issuance
Carbon County Coal Lease	Kanawha and Hocking Coal and Coke Company	5/1/74

The legal description of the above listed coal leases are:

Federal Coal Lease Serial #Utah-020305

T. 13 S., R. 6 E., SL Meridian, Utah
Sec. 13: SW-1/4 SW-1/4 (Lot 7);
Sec. 14: SE-1/4 SE-1/4;
Sec. 23: E-1/2 E-1/2;
Sec. 24: W-1/2 NW-1/4, SE-1/4 NW-1/4, S-1/2;
Sec. 25: All (Lots 1 thru 4, S-1/2 N-1/2, S-1/2);
Sec. 26: E-1/2 E-1/2;
containing 1,439.40 acres;

Federal Coal Lease Serial #Utah-044076

T. 13 S., R. 6 E., SL Meridian, Utah
Sec. 26: W-1/2 E-1/2, W-1/2;
Sec. 27: Lots 1, 2, 3, 4, E-1/2, E-1/2 W-1/2, excluding Lawrence Reservoir;
Sec. 34: Lots 1, 2, 3, 4, 5, 6, 7, 8, and S-1/2 excluding Lawrence Reservoir;
Sec. 35: Lots 1, 2, 3, 4, 5, 6, 7, NE-1/4, E-1/2 NW-1/4, NE-1/4 SW-1/44, N-1/2 SW-1/4;
containing 2357.82 acres;

Federal Coal Lease Serial #Utah-0142235

T. 13 S., R. 6 E., SL Meridian, Utah
Sec. 11: S-1/2 S-1/2;
Sec. 14: W-1/2, SW-1/4 SE-1/4;
containing 520.00 acres;

Federal Coal Lease Serial #Utah-0147570

T. 13 S., R. 6 E., SL Meridian, Utah
Sec. 10: Lots 3 and 4, E-1/2 SW-1/4 and SE-1/4;
Secs. 15 and 22, All;
Sec. 23: W-1/2 E-1/2 and W-1/2;
containing 2,092.70 acres;

Federal Coal Lease Serial #Utah-073120

T. 13 S., R. 6 E., SL Meridian, Utah
Section 13: Lots 1, 2, 3, 4, 5, 6, 8;
Section 14: NE-1/4, N-1/2 SE-1/4;
Section 24: NE-1/4 NW-1/4;
containing 557.22 acres

Carbon County Coal Lease

Township 13 South, Range 6 East SLM
Section 24: Portion of W-1/2 NE-1/4
Containing 65.0 Acres

The leases above listed are subject to that certain Exchange Agreement dated September 9, 1975 between Valley Camp of Utah, Inc. and Energy Fuels Corporation, a Colorado corporation. The effect of the Exchange Agreement was to transfer the ownership of

coal rights such that Energy Fuels Corporation, (now owned by Coastal States Energy Company and Skyline Coal Company), owns or controls the coal which is located north and west of the Connelville Fault. The Connelville Fault is the south-easterly boundary of the Skyline permit area, and the general location of the fault is shown on Map 1.6-1. Acutal location of the fault may vary when encountered through actual mining operations. The result of this agreement is that only a portion of the originally leased property is controlled by the Permittee and included in the permit area.

The right to enter the leaseholds conveyed by the Federal Coal leases is conferred to the lessees by the Mineral Leasing Act of 1920 and the leases themselves. Approximately 6,290 acres are contained in the leaseholds of the leases. Due to limiting factors of "no or thin coal areas and vertical seam proximity areas", restrictions of the Exchange Agreement or other restraints, underground coal mining will occur only on a portion of the Federal leaseholds.

Coastal States Energy Company and Skyline Coal Company, (formerly Getty Mining Company) by the Joint Venture Agreement effective September 8, 1978, have agreed that Utah Fuel Company, a wholly owned subsidiary of Coastal States Energy Company, is to operate the Skyline Mines, and that Utah Fuel Company shall have the right to enter the subject leaseholds.

The permit area will include, in addition to leaseholds of the Federal Coal leases, areas for access roads, conveyor belts,

utilities and facilities for loading unit trains and associated facilities. Rights-of-way and surface easements acquired by Coastal States Energy Company and Skyline Coal Company allow, among other rights, the right to construct, operate and maintain coal storage and train load-out facilities at the mouth of Eccles Canyon. These rights to enter, construct, operate and maintain facilities were conferred by:

(1) A surface lease and easement agreement dated on August 6, 1976 and entered into by and between Helen, Nick and Koula Marakis and Kanawha and Hocking Coal and Coke company allows the exclusive use and possession of the surface of the subject lands for purposes of granting access to and ingress and egress to and from other properties as well as other rights incidental to the transportation of coal across the leased acreage.

(2) On August 3, 1978, Energy Fuels Corporation conveyed its exclusive and perpetual easement to Coastal States Energy Company for the purpose of constructing and maintaining a temporary coal storage and loading facility. The easement had been initially granted by Leon J. Nicolaides, et al, to Kanawha and Hocking Coal and Coke Company, Energy Fuels Corporation's predecessor in title.

(3) A Lease Agreement dated June 10, 1982 between Fotini Telonis, et al, and the Permittee grants the Permittee the right to use a 27.83 acre parcel located near Scofield, Utah, as a waste rock disposal site.

The facilities to be constructed on the surface easements and rights-of-way are a part of the Skyline Mines and these areas of surface use are to be included in the permit area as shown on Map 1.6-1.

The Lawrence Reservoir (Map 1.6-1), proposed in 1938, was never developed. Efforts to pursue the project were discontinued and resulted in case file closure by the Utah State Engineer's Office on August 8, 1961. When Federal Coal Lease Utah 044076 was issued, the site area of the proposed Lawrence Reservoir was excluded from the leased premises. At the time of filing this Application, the Permittee has no leasehold rights to mine the site on the proposed Lawrence Reservoir and, therefore, the area of the formerly proposed Lawrence Reservoir site is excluded from the proposed permit area. The Permittee intends to pursue the acquisition of this excluded acreage as a lease modification of Federal Coal Lease Utah-044076 or as a separate Federal Coal Lease. No surface activity pursuant to underground coal mining or underground coal mining will be carried out within the excluded, unleased area until the acreage is under lease to the Permittee. At the time of acquisition the Permittee will request that the acquired acreage be included in the Skyline permit area.

Due to the great volume of documents involved with the ownership, right-of-entry, etc. of the Skyline properties, photocopies of the agreements have not been included in this Application. The relevant documents are maintained at the offices of Coastal States Energy Company and Skyline Coal Company in Salt Lake City, Utah, and at the Skyline Mine's office. Copies of the agreements can be viewed by interested persons during normal business hours.

The Permittee holds no interest under any real estate contracts covering surface lands or other realty to be affected by mining activities at the Skyline Mines. Also, there are no purchasers of record under real estate contracts with respect to the Skyline properties.

1.7 CONTIGUOUS OWNERS

The following list contains the names and addresses of all owners of surface lands contiguous to the permit boundary (excluding the waste rock disposal area):

Kaiser Steel Corporation
300 Lakeside Drive
Oakland, California 94666

Helen Marakis
160 East 1st South
Price, Utah 84501

Milton A. Oman
61 South Main
Salt Lake City, Utah 84115

Estate of Leon Nicholaides
c/o Law Office of James Jensen
190 North Carbon
Price, Utah 84501

Denver & Rio Grande Railway
1515 Arapahoe
Denver, Colorado 80202

Greek Orthodox Church
PO Box 688
Price, Utah 84501

Utah Power & Light Company
1407 West North Temple
Salt Lake City, Utah 84110

Nick and Koula Marakis
150 East 1st South
Price, Utah 84501

Phelps-Dodge
300 Park Avenue
New York City, New York 10022

United States of America
Department of Agriculture
U. S. Forest Service
599 West Price River Drive
Price, Utah 84501

Kemmerer Coal Company
Frontier, Wyoming 83121

Ward Derryberry
Price, Utah 84501

The following list contains the names and addresses of the owners of mineral acreage contiguous to the permit boundary (excluding the waste rock disposal area):

Carbon County, Utah
Court House
Price, Utah 84501

United States of America
Department of the Interior
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

Kaiser Steel Corporation
300 Lakeside Drive
Oakland, California 94666

Kanawha and Hocking Coal and Coke Company
P. O. Box 507
Clear Creek, Utah 84501

Kemmerer Coal Company
Frontier, Wyoming 83121

Phelps - Dodge
300 Park Avenue
New York City, New York 10022

Utah Power and Light Company
1407 West North Temple
Salt Lake City, Utah 84110

Various organizations hold interest, as overriding royalty interests, in and to the coal within permit area boundaries. The identified holders of overriding interests are:

Kanawha and Hocking Coal and Coke Company
P. O. Box 507
Clear Creek, Utah 84501

Routt County Development, Ltd.
c/o Energy Fuels Corporation
Three Park Central
Suite 900
1515 Arapahoe
Denver, Colorado 80202

The following list contains the names and addresses of the owners of the lands contiguous to the waste rock disposal area:

Surface: Fontini Telonis, et al
PO Box AD
Price, Utah 84501

Coal: Western Reserve Coal Company
Denver, Colorado

1.8 PERMITTEE'S INTEREST IN CONTIGUOUS AREAS

Coastal States Energy Company and/or Skyline Coal Company owns or controls the following interest in lands or minerals, a portion of which is contiguous to the mining permit area:

1. 836.57 acres of minerals less oil and gas acquired by way of a deed dated April 9, 1980, from Kaiser Steel Corporation, a Nevada corporation, to Coastal States Energy Company described as, to wit:

<u>In Township 13 South, Range 6 East</u>

Section 13:	NE 1/4		
	SE 1/4		
Section 24:	NE 1/4	NE 1/4	

<u>In Township 13 South, Range 7 East</u>

Section 17:	S 1/2	SW 1/4	
Section 18:	S 1/2	SE 1/4	
	SW 1/4	SW 1/4	(Lot 4)
	SE 1/4	SW 1/4	
Section 19:	NW 1/4	NW 1/4	Lot 1)
	NE 1/4	NW 1/4	
	N 1/2	NE 1/4	
Section 20:	N 1/2	NW 1/4	

2. 5.0 acres, more or less, of land leased to the Applicant by way of a Lease Agreement dated September 18, 1980 between the Hellenic Orthodox Church and the Applicant, described as, to wit:

> Beginning at a point 330 feet North of the South Quarter Corner of Section 17, Township 13 South, Range 7 East, Salt Lake Meridian, and running thence North along the East boundary line of the Southeast Quarter of the Southwest quarter of said Section 17, a distance of 460 feet, more or less to the point where said East boundary line of the Southeast quarter of Southwest quarter of said Section 17 intersects the center line of Eccles Canyon Creek; thence Southwesterly along the said center line of Eccles Canyon Creek to a point 1000 feet West of the point of beginning; thence East 1000 feet to point of beginning.

No surface disturbance or underground mining will be conducted on the lands controlled by the Permittee lying outside the mining permit area.

None of the corporations involved in this Application (i.e., The Coastal Corporation, Coastal States Energy Company, Utah Fuel Company, and Skyline Coal Company) own or control, indirectly or directly, legally or equitably any interest in the areas contiguous to the permitting area other than the interest described above.

The Permittee has no option, bid, or other interest in any contiguous acreage other than that stated above. No application for leasing unleased Federal lands adjacent to the permit area is currently pending.

1.9 AREAS DESIGNATED UNSUITABLE FOR MINING

The Bureau of Land Management has included the proposed permit area in the Wattis Planning Unit Study to determine the results of the application of the Departmental Coal Unsuitability Criteria as mandated by the Federal Lands Review, Section 552(6) of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87).

The Permittee recognizes, however, that the permit area may possibly undergo further examination during some phase of the permitting process to determine if it should be designated as an area unsuitable for mining. The Permittee believes that the environmental baseline information contained in Volume 1 clearly demonstrates that the permit area should not be so designated as an area which is unsuitable for mining.

The Permittee does not propose to conduct or locate surface facilities within 300 feet of any occupied dwellings.

1.10 PERMIT TERM INFORMATION

The following information is presented to identify permit term requirements and stipulations.

1.10.1 The Date of Construction commenced on June 24, 1980 upon approval of the Mining and Reclamation Plan.

1.10.2 Although the permit application is to cover the next five year period of mining, information is presented below for the life of the mining operation.

	Mine No.1	Mine No.2	Mine No.3
First Coal Produced	June, 1982	1992 Est.	Oct., 1981
Termination of Mining	Dec., 2012	Dec., 2015	Dec., 2015
Horizontal Extent of Mine Workings (Life of Mine)	3,956 acres	3,039.54 acres	4,021.58 acres
Vertical Extent of Mine Workings (Life of Mine)	Surface to 1,500' max	Surface to 1,500' max	Surface to 2,300' max

1.10.3 The anticipated number of total surface land acres to be affected (life of mines) is less than the combined total of the affected acreages for each of the three mines due to the overlapping of mining operations which is inherent to this multiseam mining operation. The total surface acreage to be disturbed by surface facilities associated with underground mining is 59.11 acres.

1.10.4 The following information is based on projection for the next five years (1989 - 1994).

	Mine No. 1	Mine No. 2	Mine No. 3
Extent of Horizontal Workings	1,225 acres	-0-	900 acres
Extent of Vertical Workings	Surface to 1,250' max	-0-	Surface to 2,250' max

The anticipated total acreage to be affected during the five years of operation by underground mining activities is 2,125 acres.

Area of Surface Disturbance

The construction/installation of surface facilities at the mine site, loading area, conveyor belt route, well houses, water tank pad, waste rock disposal site and South Fork Breakout disturbed 59.11 acres.

NEW DISTURBED AREAS PERMITTED AND TO BE RECLAIMED

AREA	ACREAGE
Loadout	13.82
Portal Yard	36.40
Watertanks and Well pads	.26
Conveyor Bench	6.00
Waste Rock Disposal Site & Road	1.67
South Fork Breakout	.96

TOTAL	59.11

EXISTING DISTURBED AREAS PERMITTED AND NOT TO BE RECLAIMED

AREA	ACREAGE
Access Road to Waste Rock Disposal Pit	3.30

TOTAL PERMITTED ACREAGE	62.41

1.11 PERSONAL INJURY AND PROPERTY DAMAGE INSURANCE INFORMATION

This section presents complete reproductions of Certificates of Insurance to cover public liability and property damage. Said Certificates of Insurance are applicable to surface coal mining and reclamation operations as proposed in this Amendment and Mining Permit Application.

Certificate of Insurance

TO: Utah State Division of Oil,
Address: Gas & Mining
355 West North Temple
Three Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Date: February 12, 1987
Re: Skyline Mines

This is to certify that the policies designated below are in force on the date borne by this Certificate.

NAME OF INSURED: The Coastal Corporation /Coastal States Energy Co./Skyline Coal Co. including All Affiliated or Subsidiary Companies

Address: Coastal Tower
Nine Greenway Plaza
Houston, TX 77046

TYPE OF INSURANCE	POLICY #	POLICY PERIOD	POLICY LIMITS/VALUES
Worker's Compensation			Statutory
Employers Liability			$1,000,000 BI/ea. Accident
Texas/Oklahoma	C) SCF-28254799	1/1/87-88	$1,000,000 BI/policy limit-Disease
All Other States	B) SCF-28254805	1/1/87-88	$1,000,000 BI/ea. employee-Disease
Comprehensive General Liability including Contractual & Products - Completed Operations			$500,000 Combined Single Limit any one occurrence/$750,000 C.S.L. aggregate excess of $500,000 Combined Single Limit any one occurrence/$750,000 C.S.L. aggregate S.I.R.
Texas	C) ISLG05115395	1/1/87-88	
All Other States	A) ISLG05115334	1/1/87-88	
Comprehensive Automobile Liability			$1,000,000 Combined Single Limit Bodily Injury & Property Damage
Texas	C) ISA-493757	1/1/87-88	
All Other States	A) ISA-478296	1/1/87-88	

This certificate of insurance neither affirmatively nor negatively amends, extends or alters the coverage afforded by those policy(ies) which numbered above and which issued by companies listed below.

Should any of the above described policies be cancelled before the expiration date thereof, the issuing company will endeavor to mail 30 **days written notice to the above named certificate holder, but failure to mail such notice shall impose no obligation or liability of any kind upon the company, or upon this agency.**

INSURANCE COMPANY(IES) ISSUING COVERAGE:

A) Insurance Company of North America
B) Pacific Employers Insurance Company
C) INA of Texas

P.O. Box 36429
Houston, Texas 77236-6429
Tel. (713) 783-6640

By _____
Authorized Representative

1-22

Certificate of Insurance

TO: U.S. Department of the Interior
Address: Department of Surface Mining
Brooks Tower
1020 15th Street
Denver, CO 80202

Date: February 12, 1987
Re: Skyline Mines

This is to certify that the policies designated below are in force on the date borne by this Certificate.

NAME OF INSURED: The Coastal Corporation /Coastal States Energy Co./Skyline Coal Co. including All Affiliated or Subsidiary Companies

Address: Coastal Tower
Nine Greenway Plaza
Houston, TX 77046

TYPE OF INSURANCE	POLICY #	POLICY PERIOD	POLICY LIMITS/VALUES
Worker's Compensation			Statutory
Employers Liability			$1,000,000 BI/ea. Accident
Texas/Oklahoma	C) SCF-28254799	1/1/87-88	$1,000,000 BI/policy limit-Disease
All Other States	B) SCF-28254805	1/1/87-88	$1,000,000 BI/ea. employee-Disease
Comprehensive General Liability including Contractual & Products - Completed Operations			$500,000 Combined Single Limit any one occurrence/$750,000 C.S.L. aggregate excess of $500,000 Combined Single Limit any one occurrence/$750,000 C.S.L. aggregate S.I.R.
Texas	C) ISLG05115395	1/1/87-88	
All Other States	A) ISLG05115334	1/1/87-88	
Comprehensive Automobile Liability			$1,000,000 Combined Single Limit Bodily Injury & Property Damage
Texas	C) ISA-493757	1/1/87-88	
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INSURANCE COMPANY(IES) ISSUING COVERAGE:

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B) Pacific Employers Insurance Company
C) INA of Texas

P.O. Box 36429
Houston, Texas 77236-6429
Tel. (713) 783-6640

By _____
Authorized Representative

1.12 PERMITS AND LICENSES

Prior to commencement of construction of the mine facilities the Permittee obtained all permits and licenses necessary for construction. Operational permits were obtained prior to start of mining.

A list of all required permits and licenses including names and addresses of the issuing agencies is appended to this section. Identification numbers of applications or permits, if issued, is also contained therein. Many of the agencies listed had review responsibility only and may not have submitted a numbered permit.

1.13 IDENTIFICATION OF PUBLIC OFFICE FOR FILING OF APPLICATION

The Permittee will simultaneously file a complete copy or copies of this Application with the following agencies:

State of Utah Division of Oil, Gas, Mining 3 Triad Center, Suite 350 Salt Lake City, Utah 84180-1203	-14 copies
Department of Surface Mining Brooks Tower 1020 Fifteenth Street Denver, Colorado 80202	- * copies
Bureau of Land Management Utah State Office 324 South State Street, Suite 301 Salt Lake City, Utah 84111	- * copies
United States Forest Service Manti-LaSal National Forest 599 West Price River Drive Price, Utah 84501	- * copies
Carbon County Clerk Carbon County Court House Price, Utah 84501	- 1 copy

*Copies as required provided by the Division of Oil, Gas and Mining.

1.14 NEWSPAPER ADVERTISEMENT AND PROOF OF PUBLICATION

In compliance with Federal regulations, the Permittee published an announcement of its intent to apply for a mining permit in a local newspaper of general circulation. The announcement included a description of lands affected by the mining operation and was published at least once a week for four consecutive weeks. Exhibit 1.14-1 represents the announcement as it appeared.

Proof of publication was forwarded to the Division of Oil, Gas, and Mining and the Office of Surface Mining within four weeks after the final date of publication.

EXHIBIT 1.14-1

ANNOUNCEMENT

LEGAL NOTICE

Coastal States Energy Company and Skyline Coal Company of Salt Lake City, Utah, hereby announce their intent to file an application for a coal mining permit renewal under the laws of the State of Utah and the U.S. Office of Surface Mining (OSM).

The project, which is known as the Skyline Mines, is operated on the leasehold interest owned by Coastal States Energy Company and Skyline Coal Company. The land on which mining is to occur (except for a small tract leased from Carbon County) is a part of the Manti-LaSal National Forest 4 miles southwest of Scofield, Utah, in Eccles Canyon. The entire property is within the USGS 7.5-minute "Scofield" Quadrangle map. The approximately 6,400 acre leasehold interests involve all or part of the following coal leases which have been assigned to Coastal States Energy Company and Skyline Mining Company.

Federal Lease	Issued to	Date of Issuance
Utah - 020305	Emmett K. Olson	3/1/62
Utah - 044076	Armeda N. McKinnon	9/1/65
Utah - 0142235	Malcolm N. McKinnon	10/1/64
Utah - 0147570	Malcolm N. McKinnon	5/1/65
Utah - 043120	Independent Coal and Coke Company	2/1/64

County Lease	Issued To	Date of Issuance
Carbon County Coal Lease	Kanawha and Hocking Coal & Coke Company	5/1/74

EXHIBIT 1.14-1 (cont'd)

ANNOUNCEMENT

The legal description of the above listed coal leases are:

Federal Coal Lease Serial Utah-020305

T. 13 S., R. 6 E., SL Meridian, Utah

Sec. 13: SW-1/4 SW-1/4 (Lot 7);
Sec. 14: SE-1/4 SE-1/4;
Sec. 23: E-1/2 E-1/2;
Sec. 24: W-1/2 NW-1/4, SE-1/4 NW-1/4, S-1/2;
Sec. 25: All (Lots 1 thru 4, S-1/2 N-1/2, S-1/2);
Sec. 26: E-1/2 E-1/2;
containing 1,439.40 acres;

Federal Coal Lease Serial Utah-044076

T. 13 S., R. 6 E., SL Meridian, Utah
Sec. 26: W-1/2 E-1/2, W-1/2;
Sec. 27: Lots 1, 2, 3, 4, E-1/2, E-1/2 W-1/2, excluding Lawrence Reservoir;
Sec. 34: Lots 1, 2, 3, 4, 5, 6, 7, 8, and S-1/2 excluding Lawrence Reservoir;
Sec. 35: Lots 1, 2, 3, 4, 5, 6, 7, NE-1/4, E-1/2 NW-1/4, NE-1/4 SW-1/44, N-1/2 SW-1/4;
containing 2357.82 acres;

Federal Coal Lease Serial #Utah-0142235

T. 13 S., R. 6 E., SL Meridian, Utah
Sec. 11: S-1/2 S-1/2;
Sec. 14: W-1/2, SW-1/4 SE-1/4;
containing 520.00 acres;

EXHIBIT 1.14-1 (cont'd)

ANNOUNCEMENT

Federal Coal Lease Serial #Utah-0147570

T. 13 S., R. 6 E., SL Meridian, Utah

Sec. 10: Lots 3 and 4, E-1/2 SW-1/4 and SE-1/4;

Secs. 15 and 22, All;

Sec. 23: W-1/2 E-1/2 and W-1/2;

containing 2,092.70 acres;

Federal Coal Lease Serial #Utah-073120

T. 13 S., R. 6 E., SL Meridian, Utah

Section 13: Lots 1, 2, 3, 4, 5, 6, 8;

Section 14: NE-1/4, N-1/2 SE-1/4;

Section 24: NE-1/4 NW-1/4;

containing 557.22 acres

Carbon County Coal Lease

Township 13 South, Range 6 East SLM

Section 24: W-1/2 NE

This application also includes, in addition to the federal coal leases, areas for use as access roads and rail loading facilities, located in Township 13 South, Range 7 East over all or portions of Sections 17 and 18. Rights-of-way and surface easements are also included for construction of a coal conveyance system from the mine portal area down Eccles Canyon to the coal storage and loadout facility at the mouth of the canyon. The rights to enter and construct these facilities were conferred by Energy Fuels Corporation.

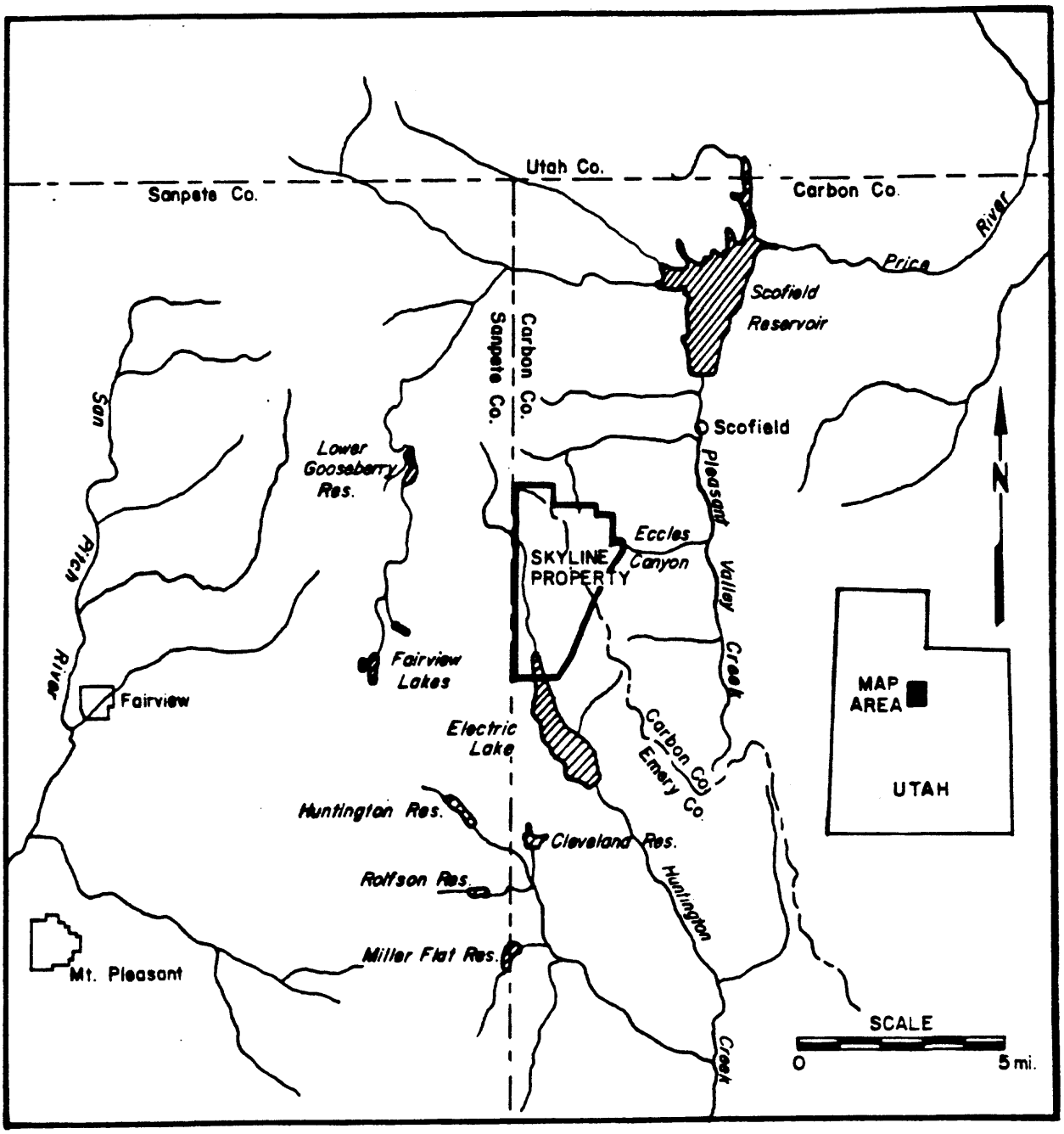
In addition to the above, this application includes an area of leased surface rights for use as access roads and a waste

disposal site from the George Telonis Estate, located in Township 13 South, Range 7 East SLM, Section 4: SW 1/4, NW 1/4, containing approximately 27.83 acres.

Electric Lake overlies about 38 acres of Routt County Lease U-044076 and Scofield Reservoir lies about 4 1/2 miles to the northeast of the portal area.

After filing, copies of the permit application will be available for inspection at the following locations: Utah Division of Oil, Gas, & Mining, Salt Lake City, Utah; Office of Surface Mining, Denver, Colorado; Bureau of Land Management, Salt Lake City, Utah; Carbon County Clerks Office, Price, Utah; Coastal States Energy Company, Salt Lake City, Utah; Skyline Coal Company, Salt Lake City, Utah.

Written comments, objections, or requests for informal conferences on the application may be addressed to the Utah Division of Oil, Gas, & Mining, 355 West North Temple, 3 Triad Center, Salt Lake City, Utah 84180, with copies to Coastal States Energy Company and/or Skyline Coal Company, 175 East 400 South, Box 3, Salt Lake City, Utah 84111.



LOCATION OF THE SKYLINE PROJECT AREA

see page 2-123

APPENDIX A-1

SKYLINE PROJECT

MASTER PERMIT LIST

COASTAL STATES ENERGY COMPANY

AUGUST, 1986

TABLE OF CONTENTS

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Section C - Local Permits	C-1

This document lists permits, agreements, and approvals required for the Skyline Project. The list is not to be interpreted as all-inclusive. Additional permits may be added and listed permits dropped as regulatory clarifications and additions are made.

SPECIAL NOTES

[1] One permit application will be prepared to comply with USGS, OSM, USFS, and Division of Oil, Gas and Mining requirements.

[2] May not be required.

SECTION A

FEDERAL PERMITS

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
U. S. GEOLOGICAL SURVEY 125 South State, Salt Lake City, UT 84138			
Mining & Reclamation Plan[1]	Emphasis on mining operation and coal resources	Prior to Construction 30 CFR 211 revisions out in July 1979	5/80
OFFICE OF SURFACE MINING 1025 15th Street, Denver, CO 80202			
Notice of Intent to Explore		Prior to Exploration	4/79
Secretaries Information Document		Prior to Construction	5/80
Mining & Reclamation Plan[1]	Emphasis on surface operation and reclamation	Prior to Construction	5/80 Permit # ACT/007/005
ENVIRONMENTAL PROTECTION AGENCY 999 18th Street, One Denver Place, Denver, CO 80202-2413			
PSD Permit (Air)	1. Process emissions 2. Impact of secondary growth 3. Air cleaning equipment	Prior to Construction	3/80
Oil Spill Prevention Control and Countermeasure	1. Facility drainage 2. Bulk storage tanks 3. Transfer operations 4. Loading and unloading	On file 6 months after oil storage begins	not required
NPDES Permits (Water)	Processed by State and approved by EPA	180 days prior to discharge	10/82 Permit # UT-0023540

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
CORPS OF ENGINEERS	125 South State, Salt Lake City, UT 84138		
Individual 404 Permit - Loadout Nation-Wide 404 Permit - Mine site	1. Proposed acivities 2. Adjoining property 3. Location information 4. Status of all approvals	Prior to Construction in navigable water, backup water or US water	5/80
SOIL CONSERVATION SERVICE	125 South State, Salt Lake City, UT 84138		
Cooperative Agreement	1. Soil Surveys 2. Vegetation Surveys 3. Recommended Revegetation	Not required but recommended	Not Required
BUREAU OF LAND MANAGEMENT	2370 South 2300 West, Salt Lake City, UT 84119		
Right-of-Ways or Tram Road Permits[2]	Road, power lines, pipelines or other structures on BLM land	Prior to Construction	5/80
U.S. FOREST SERVICE	Manti-LaSal National Forest, 599 West Price River Drive, Price, UT 84501		
Air Quality Monitoring Special Use Permit		Prior to Construction	12/78
Surface Disturbance & Reclamation Plan[1]	Emphasis on subsidance and hydrology	Prior to site preparation	5/80
Exploratory Drilling Permits	Location Depth	Prior to drilling	5/79

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
U.S. FOREST SERVICE (continued)			
Seismic Drilling Permit	Requires approval of plan, proper abandonment and reclamation	Prior to drilling	6/79
Off-Lease Special Roadway Use Permit	1. Description and Purpose 2. Schedule 3. Future plans	Applies to: 1. Roads on USFS land 2. USFS Service Road 3. Non USFS Roads involved with project	4/80 & 8/81 FDR 50222 FDR 50225 FDR 50227 FDR 50221 FDR 50010
Special Use Permit	1. Land description 2. Purpose 3. Size & Improvements	Applies to off-lease activities on or off USFS land associated with a project on USFS land	4/80
COAST GUARD			
Bridge Permit[2] Section 404 Permit	Bridge Engineering	If put bridge across nav. or backup portion of river at loadout	5/80
TREASURY			
Explosive Storage	Use of Explosives During Construction During Operation	 Prior to Usage Prior to Usage	 4/80 12/80

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
FEDERAL COMMUNICATION COMMISSION			
License in the Private Operational Fixed Microwave Radio Service			4/80
FEDERAL AVIATION ADMINISTRATION 2150 West 700 North, Salt Lake City, UT 84116			
Tower Permit	If over regulation height	Prior to construction	4/80
MINE SAFETY & HEALTH ADMINISTRATION 1745 West 1700 South, Salt Lake City, UT 84104			
ID No. and Safety Plans. Operator and Contractors	Specific Mine I.D. No. given when submit plans. Gen. contractors I.D. No.	Prior to construction	--
Legal Identity - Operator and Contractors	Names of operators, mine, partners corporation, agents - 30-82.11	Within 30 days of opening	4/79
Notifications and Preliminary plans	1. Location and Mine I.D. No. 2. Identity and height of coal bed to be developed 3. System(s) of mining to be used 30-75.1721	Prior to construction	Not Required
Roof Control Plan - Slope Construction	Reviewed every 6 months - 75.200	Commencing construction	MSHA

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
MINE SAFETY & HEALTH ADMINISTRATION (continued)			
Ventilation System Methane and Dust Control - Slope Construction	Reviewed every 6 months	Commencing construction	MSHA
Roof Control Plan - Mine	Reviewed every 6 months	Commencing mine development after establishing mine ventilation	MSHA
Ventilation System Methane and Dust Control - Mine	Reviewed every 6 months	Commencing mine development after establishing mine ventilation	MSHA
Escapeway Map	Underground mine	Commencing underground mining	Not Required
Fan Installation Plan		Commencing mine development after construction	Not Required
Fan Stoppage Plan		Commencing underground mining	Not Required
Fire Fighting and Evacuation Plan	Pertains to surface structures	Commencing operations	Not Required
Training Program	Detailed training report 1. 24-hour Miner Training 2. Hazard Review	Commencing mining (Commencing construction -proposed regulation)	Not Required
Program for Smoking Materials	75.1702	Commencing mining	Not Required

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
MINE SAFETY & HEALTH ADMINISTRATION (continued)			
Plan for Sealing Abandoned Sections	Part of ventilation system - methane dust control plan 75.330-1	Commencing mine development after establishing mine	Not Required
Emergency Medical Assistance	75.1713-1	Commencing construction	Not Required
Statement Listing Electrical Equipment		Commencing underground mining	Not Required
Plan for Providing for Safety of Workmen in Slopes		Commencing construction	Not Required
Opening of New Underground Coal Mines		Commencing construction	Not Required
Communications Systems Plan		During construction	Not Required
Fire Fighting & Evacuation Plan & Training	1. Location of fire, equipment escapeways, travel routes 2. Evacuation procedure	During construction	Not Required
Operation Under Water Permit	75.1716	Prior to mining under water body	Not Required
Emergency Shelter Plan	75.1500	During construction	Not Required
Cleanup Program	Cleanup and removal program for accumulation of coal, dust, and other combustibles	During construction	Not Required

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
MINE SAFETY & HEALTH ADMINISTRATION (continued)			
Mining Around Oil or Gas Wells Program	Avoidance or temporarily abandoning well	Prior to mining within 300' of a well	Not Required
Refuse Pile Plan Certification and abandonment	Report within 180 days of acknowledgement of preliminary location letter 1. Construction and maps 2. Drainage and stability 3. Cross section	Prior to starting pile	3/80
Impoundment Plan Certification Inspection and Abandonment - Water, Sediment or Slurry	1. Watershed effecting 2. Foundation 3. Construction material 4. Drawings and graphs 5. Runoff and spillway 6. Slope stability	Prior to construction of ponds of 20 acre feet or dam height of 20 feet or more. Applies to water, sediment or slurry ponds.	4/80

SECTION B

UTAH STATE PERMITS

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
INDUSTRIAL COMMISSION (MINE HEALTH & SAFETY) 160 East 300 South, Salt Lake City, UT 84111			
Notice of Intent to Mine	General mining maps	Start of employment	2/80
Permit to Operate Equipment	Diesel equipment, etc.	Start of equipment operation	9/79
Explosive Storage Certificate of Compliance[2]	1. Location of magazine 2. Explosives to be stored	Prior to storing explosives	1/80
		Start of construction	9/79
Ground Control Plan[2]	Safe control of spoil banks	Prior to mining	1/80
UTAH DIVISION OF OIL, GAS AND MINING 355 West North Temple, Salt Lake City, UT 84180-1203			
Monitoring Well Permit	1. Location and depth 2. Use and method	Prior to drilling new well	7/79
Mining and Reclamation Plan[1]	Implement OSM. Draft of permanent State plan out in June 1979. Includes surety requirements.	Prior to constructon	6/80 Permit # ACT/007/005
		Prior to construction	6/80
DIVISION OF HEALTH 288 North 1460 West, Salt Lake City, UT 84116-0700			
Bureau of Sanitation Sewage and Piping System Approval	Process description Drawings Estimated effluent	Prior to construction of sewage system	2/80

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
DIVISION OF HEALTH (continued)			
Bureau of Water Quality-Disposal Permits for Water Discharge-NPDES	1. Temporary construction camp 2. Sewage discharge 3. Mine water discharge 4. Storm water discharge	Prior to discharge	3/80
Bureau of Water Works Permanent System & Construction Comp. System	1. Soil and ground water 2. Source & treatment process	Prior to construction	5/80
Bureau of Air Quality Air Quality Permit to Construct	1. General 2. Emissions from major sources 3. Combustion sources 4. Control equipment	Prior to construction of conveyors, crushers, boilers, etc.	3/80
Bureau of Air Quality Air Quality Permit to Operate	Same as above	Prior to operation of source equipment	10/81
Bureau of Solid Waste Solid Waste Management Disposal facility Permit	According to 26-15-5 U.C.A. 1. Plot or map 2. Special provisions 3. Type of waste 4. Soil description	Prior to construction Prior to operation	4/80 10/81
STATE INDUSTRIAL DEVELOPMENT COMMISSION			
Certificate of Insurance and Authorization to do business in State	Usually covered under nationwide certificate	Prior to submitting most permits	Not Required

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
ENVIRONMENTAL COORDINATION COMMITTEE			
Environmental Impact Statement Review		Review EIS and make recommendation to Governor concerning sign off.	--
HISTORICAL SOCIETY 300 Rio Grande, Salt Lake City, UT 84101			
Letter of Archaeological Clearance	Inspection arranged by company but done by approved archaeologists	Before earthwork	1/80 & 1/81
DEPARTMENT OF TRANSPORTATION 4501 South 2700 West, Salt Lake City, UT 84119			
Eccles Canyon Road Improvement	Coordination with DOH concerning improvement and funding	Prior to improvement	1/80
Crossing of State 96 Permit	(Other state rights-of-way required from appropriate agency if cross state land)	Prior to construction	3/80
Encroachment Permit	Improvement of entrance onto UT 96 State Highway	Prior to construction	3/80
STATE ENGINEER 1636 West North Temple, Salt Lake City, UT 84116			
Permit to Relocate Stream	If relocating any natural stream channel - 25-3-29	Prior to relocation	8/80

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
STATE ENGINEER (continued)			
Dam & Impoundment Approval Refuse Pond Dam Mine Pond Dam Loadout Pond Dam	1. Location 2. Reservoir type 3. Hydrologic data 4. Subsurface data 75-3-29 5. Profile along axis 6. Cross sections - 73-5-5	30 days prior to start of dam construction if impound 20 acre ft or more or a hazard.	4/80
Point of Diversion Change Applications Upper Eccles Lower Eccles Scofield Reservoir Clear Creek	Applies to 160 acre ft (30 acre ft presently at Upper Eccles)		4/80 & 11/81
100' Buffer Zone Variance	Statement of plans	Construction within 100' of stream (Sedimentation Ponds)	2/80

SECTION C

LOCAL PERMITS

PERMIT NAME	GENERAL REQUIREMENTS AND CONTENTS	ACTION REQUIRING PERMIT	APPROVAL
SOUTHEASTERN UTAH ASSOCIATION OF GOVERNMENTS			
Review[2]	Recommendations to County. 208 Plan compliance		--
CARBON COUNTY			
Right-of-way and Construction Use	Pipelines, railroads, power lines	Before right-of-way construction	4/80
Building Permit	Issued by building inspector. One permit for all structures. Renewed annually as required.	Prior to building construction (substations, foundations, etc.)	3/80
Sewage Disposal System	Input by County Sanitation	Prior to construction	3/80
Grading Permit	1. Grading drawings 2. Calculations 3. Soil reports	Start of construction - Required by 1973 Uniform Building Code	4/80
Burning Permit	Obtain from Sheriff Department	Prior to burning brush - Required to burn excess debris	4/80
Electrical Permits	Temporary construction power	Prior to use	4/80
County Road Overload Approval	Required for transporting excessive loads on county roads	Prior to use	4/80
		Prior to construction	4/80

2.1 GENERAL ENVIRONMENTAL RESOURCES SUMMARY

The environmental resources in the Skyline project area have been individually studied and are addressed in this document. Much of the information presented in this environmental resources summary is either an update of or supplement to the material previously published by the U. S. Department of the Interior in the SITE SPECIFIC ANALYSIS--Part 2 of the final ENVIRONMENTAL STATEMENT OF DEVELOPMENT OF COAL RESOURCES IN CENTRAL UTAH. These documents also reflect updated information for the consultant's reports and should superceed the original documents where differences occur.

The Permittee has attempted to provide pertinent and complete reports for each environmental study discipline through the use of independent consultants who are recognized as experts in their individual fields. It is the Permittee's intent that by so doing, the reviewing agencies will have available to them reliable data for their environmental analysis.

With the exception of the community infrastructure analysis and the climatological and air quality monitoring program, the original environmental studies were sub-contracted through the hydrologic consultant. This approach was adopted to enable a complete integration of the vegetative, fish and wildlife aspects with hydraulic, hydrologic, and water quality considerations. The study area covers all areas to be affected during the entire life of the Skyline Mines.

The hydrologic analyses and coordination of environmental resource studies were contracted to Vaughn Hansen Associates of Salt Lake City. Drs. Stanley Welsh and Joseph Murdock combined their efforts on the vegetative and soils requirements. Dr. Robert Winget, with frequent assistance from personnel of the Utah State Division of Wildlife Resources, conducted the aquatic studies. Dr. Clyde Pritchett supervised the mammals study, and Dr. Clayton White concentrated on the birds with particular emphasis on the area's raptors. Drs. Welsh, Murdock, Winget, Pritchett, and White are all associated with the faculty of

Brigham Young University. The cultural resource surveys were performed by Archeological-Environmental Research Corporation of Salt Lake City with Dr. Rick Hauck serving as project director. A brief history of the Eccles Canyon Coal Mine was performed by Dr. John Bluth, also from Brigham Young University. The geological investigations were conducted by Mr. Roy P. Full, a consulting geologist of Salt Lake City, Utah, Mr. Donald Reitz, President of Resource Technology Corporation, Westminister, Colorado and the personnel of the Permittee. Radian Corporation of Austin, Texas conducted the climatological and air quality monitoring program. Kaiser Engineers of Oakland, California prepared the community infrastructure analysis.

The original application contained copies of each of the consultant's reports. These reports have been summarized and updated, as appropriate, in this document to meet the requirements of the regulations. A summary of the cultural resources reports are presented in this section. The other reports are summarized in Parts 2 and 4 of the Application. Copies of the original reports are included in Appendix Volumes A-1 through A-4. The Permittee is also using aerial photogrammetric techniques for subsidence monitoring. These photos are providing continuing documentation of vegetative and other changes in the project area.

Numerous color photographs have been taken of the area which show both pre-project conditions and conditions as mining has progressed. Photographic subjects included the areas proposed for portal and load-out facilities, existing and proposed roads, the proposed conveyor route, streams, the existing gas pipeline, proposed waste material disposal and soil storage areas, and major geologic features. Photographs were taken from the ground and the air. A helicopter was utilized to obtain a different perspective of the proposed surface facilities area and to reach areas which were inaccessible from the ground. Some of these photographs are included in Volume A-1, the others are in the possession of the Permittee. Additional photographs were taken by the consultants of the vegetative reference plots and are presented in the Vegetation Report of the original Application.

2.1.1 Description of Cultural, Historical and Archaeological Resources

Prior to construction, the Permittee initiated a variety of cultural resource evaluations involving the Skyline permit and adjacent areas. These evaluations included the following:

- A detailed literature search for all known historic and prehistoric sites within the project area utilizing records of the Archeological-Environmental Research Corporation and the files at the State Historic Preservation Office.

- Previous negative-result surface evaluations within the general project area were used as a random sample survey (on the BLM Class II level) for cultural sites; hence additional sample surveys of the project area to determine site presence and density were not taken, nor requested, by federal and state officials.

- All surfaces on both U. S. Forest and private lands disturbed during explorational activities and mine development (e.g., drill holes, access roads, and service areas) were intensively evaluated for historic and prehistoric cultural resources.

No prehistoric or historic cultural resources of any significance were observed during the surveys. The remains of two historic structures were found outside the project boundary. Both are marginal resource value and, since peripheral to the zone of activity, are not endangered by the Skyline project. No cemeteries, National Trails or Wild and Scenic Rivers, public parks or National Register status properties exist on or adjacent to the project area. No surface mines, active or abandoned,

exist on the project mining area. The surface facilities area of the old abandoned underground Eccles Mine has been completely encompassed by the Skyline Mines portal facilities. The waste rock disposal area is an abandoned strip mine.

Investigations as to potential cultural resources within rock disposal and the adjacent areas have been conducted. Results of these investigations are presented in Appendix A-3. Results of the cultural resource investigation were transmitted to the State of Utah Historical Preservation Office (SHPO) concurrently with a request for approval, which was granted on November 12, 1981 (also see Appendix A-3).

2.1.2 Threatened and Endangered Species

No threatened or endangered species, plant or animal, have been identified on the project or adjacent areas with the exception of an occasional transient Bald Eagle, which may pass through the project area during the winter. The mining operation has no impact on these transitory birds.

Should any threatened or endangered species be identified in the future, their discovery will be promptly reported to the Division.

2.2 GEOLOGY

Comprehensive geological evaluations of the Skyline permit area, performed by and for the Permittee, have established the baseline environmental data necessary for mine development. Future studies will be necessary to refine present concepts, monitor the existing geological/hydrological environment and provide additional data to be used for the continual mine planning process. Continuation of this work will maximize the recovery of coal reserves by allowing increased accuracy in predicting coal seam discontinuities and will optimize safety by early identification of geology-related potential mine hazards.

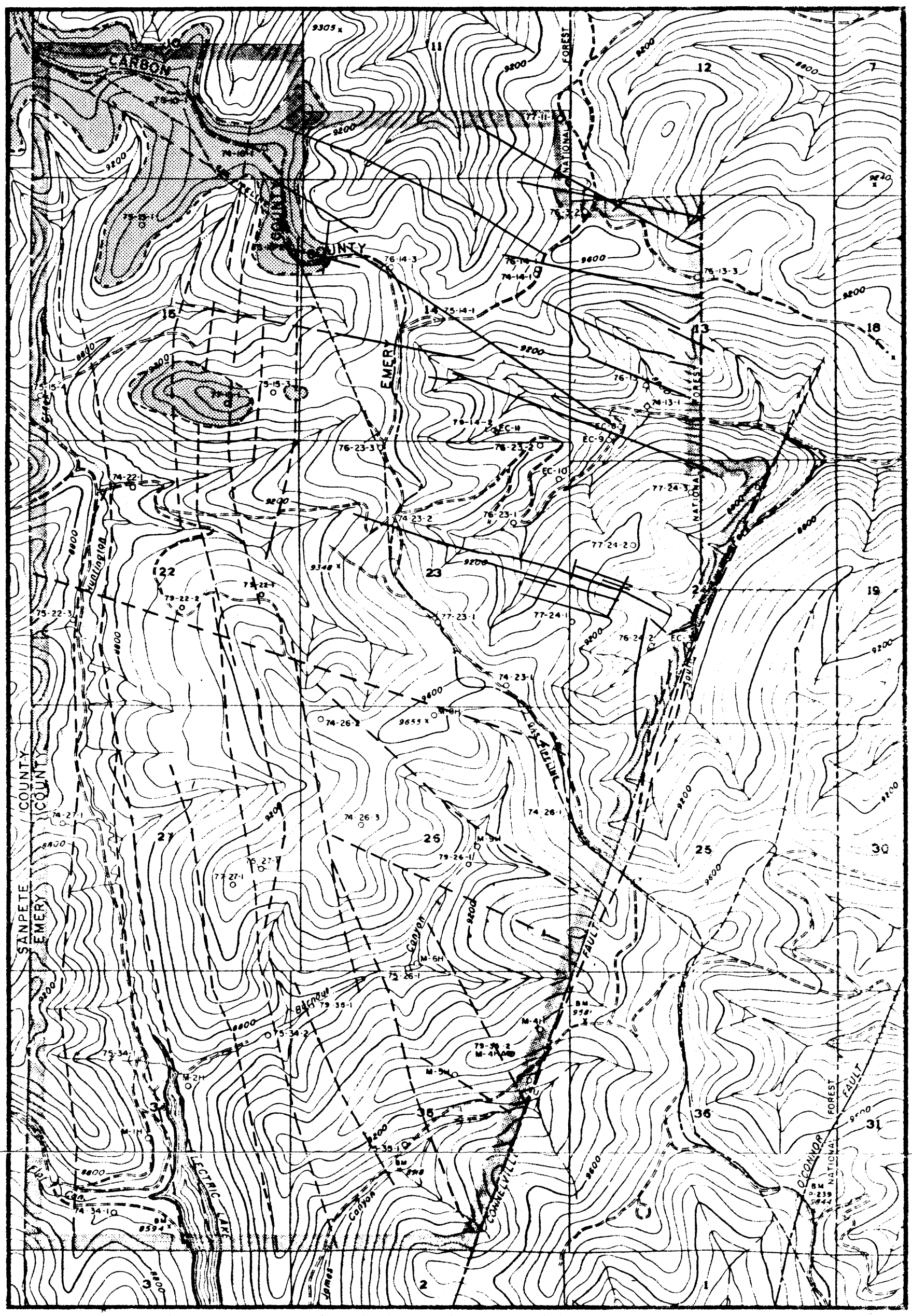
2.2.1 Stratigraphy

Rocks mapped on the Skyline permit area (Plate 2.2-1) and adjacent areas are of Upper Cretaceous age. The oldest, the Star Point Sandstone, underlies and intertongues with the lower portion of the coal-bearing Blackhawk Formation. Overlying the Blackhawk is the Castlegate Sandstone, the basal member of the Price River Formation, and the youngest unit exposed in the area. Figure 2.2-A shows the generalized stratigraphic sequence.

2.2.2 Star Point Sandstone

The Star Point Sandstone is a prominent cliff-former and an important marker horizon throughout the region. The unit is the basal formation of the Mesaverde Group in the Wasatch Plateau, which overlies the Mancos Shale.

Only the upper part of the Star Point Sandstone is exposed in the area as it intertongues with the lower Blackhawk Formation. No outcrops occur in the Skyline permit area, although the formation does outcrop east of the Connelville Fault in the South Fork of Eccles Canyon and about 1,800 feet east of the Manti LaSal National Forest boundary in Eccles Canyon.


R 6 E
R 7 E
T 13 S
T 14 S
CARBON COUNTY
EMERY COUNTY
SANPETE COUNTY
EMERY COUNTY
NATIONAL FOREST
Huntington
CONVEYOR
FAULT
ELECTRIC LAKE
CONNELLVILLE
O'CONNOR
BALLOUT
JAMES
CANYON
9305
9348
9655
9594
9581
9239
9200
9400
9600
9800
8800
EXPLANATION
CASTLEGATE SANDSTONE
BLACKHAWK FORMATION (WITHIN SKYLINE LEASEHOLD)
FAULT
PROJECTED FAULT OR FRACTURE ZONE
DRILL HOLE LOCATION AND NUMBER
76-15-1
SCALE 1000 0 1000 2000 3000 FEET
CONTOUR INTERVAL 80 FEET
BASE MAP FROM U.S. GEOL. SUR. TOPOGRAPHIC MAPS
RECEIVED
JUL 10 1989
DIVISION OF
OIL, GAS & MINING
KW 7-89
LCH 7/89
COASTAL STATES ENERGY COMPANY
SKYLINE PROJECT
TOPOGRAPHIC MAP WITH
SURFACE GEOLOGY
PREPARED BY ROY P. FULL, MINING GEOLOGIST
246 EAST 3900 SOUTH, SALT LAKE CITY, UTAH
JOB NO.
DWG NO.
REVISION MARK BUNNELL JULY, 1989
SCALE AS NOTED
DATE AUG. 1979
MAP OR FIGURE NO. 2.2-1

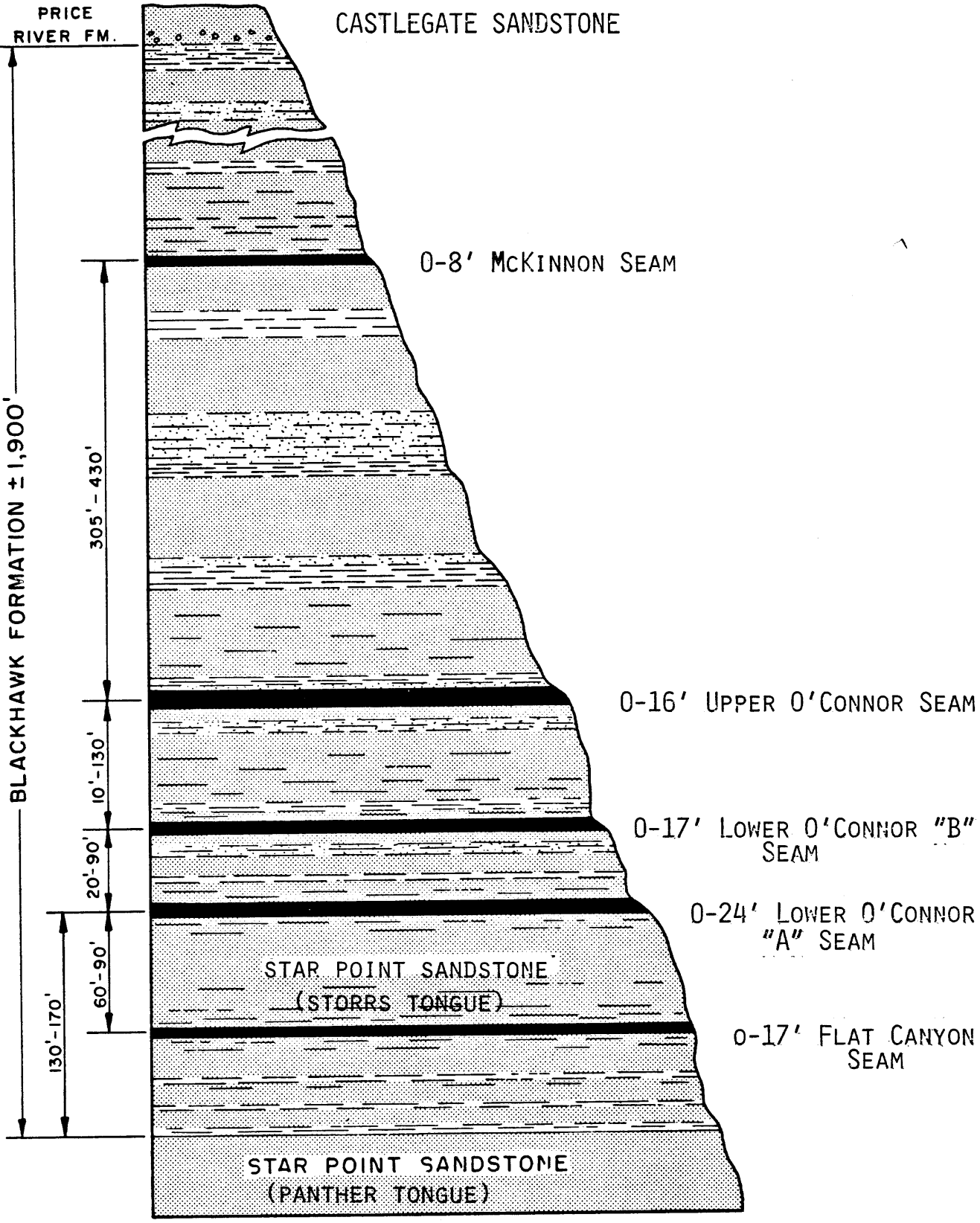


FIGURE 2.2-A GENERALIZED COLUMNAR SECTION - ECCLES CANYON AREA

The upper part of the Star Point Sandstone is mostly a fine to medium-grained, sub-rounded to well rounded, light-colored sandstone, with a "salt and pepper" appearance. Approximately the top 20 feet tend to have a pronounced white appearance in outcrop. The massive beds exposed in the surrounding Skyline area are moderately well consolidated.

2.2.3 Blackhawk Formation

The Blackhawk Formation is the coal-bearing portion of the Mesaverde Group in the Skyline area. The lower formational contact with individual tongues of the Star Point Sandstone is generally sharp. Only on the high ridges in the northwest corner of the permit area is the upper formational contact with the overlying Castlegate Sandstone present. The Blackhawk formation is atypically thick in the Skyline area and ranges from 1,700 to 1,900 feet in thickness where the complete section is present.

Due to its lenticular bedded nature, no persistent marker horizon occurs within the Blackhawk Formation. The lower coal-bearing unit of the Blackhawk consists of 100 feet of fine-grained sandstones and siltstones, with zones of dark, carbonaceous shale and siltstone. The uppermost carbonaceous zone contains, in places, one or more thin lenticular coal beds. The thickest of these beds is usually referred to as the Flat Canyon seam, and is not considered mineable except where it merges with the Lower O'Connor "A" seam in the northwest part of the permit area.

Three mineable coal seams are present in the basal coal zone of the upper coal-bearing unit of the Blackhawk formation. In ascending order, they are the Lower O'Connor "A", the Lower O'Connor "B", and the Upper O'Connor seams. These coals are of high-volatile B rank and in general contain few partings and little pyrite. These coal seams are attrital, with midlustrous attrital being the most common coal lithotype. Some resin is observed in all three seams.

The upper coal zone of the upper coal-bearing unit of the Blackhawk Formation generally contains carbonaceous shales and thin coal beds. This zone occurs from 480 to 590 feet above the Storrs Sandstone tongue of the Star Point. These coals are discontinuous with only local development of mineable thicknesses. In the southeast corner of the leasehold area, a coal bed known as the McKinnon seam appears to be of mineable thickness over an area of approximately 1,100 acres. Similar to the lower mineable coals, the McKinnon seam is of high-volatile B rank. This seam differs from the lower mineable coals in that partings are common and lateral thickness changes are pronounced. In addition, the McKinnon seam is often very rich in megascopic resin.

Rocks of the Blackhawk Formation consist mainly of lenticular sandstone, siltstone and claystone deposits. Because of the lenticular nature of bedding in the formation, it is difficult to correlate individual horizons (with the exception of the major coal seams). The sandstones are thin to thick bedded, ranging in grain size from very fine to coarse. Argillaceous rocks include claystone, clay shale, silty shale and siltstone. Carbonaceous and coaly rocks are present in every gradation ranging from slightly carbonaceous shale to coal.

2.2.4 Intrusive Igneous Rocks

Igneous dikes (recently classified as peridotite) cut the sedimentary rocks in the area. The age of the intrusive rocks is in the 20 to 30 million year range and no dikes have been observed to cut Tertiary rocks in the area. Where dikes cut the coal seams, a band of from one to five feet of metamorphosed coal is found adjacent to the dike. The dominant trend of dikes is almost east/west.

2.2.5 Surficial Deposits

Unconsolidated soil, gravel, alluvium, landslide deposits, etc.,

mask many of the geological features of the Skyline permit area. A description of these deposits is included in the Geotechnical section.

2.2.6 Structural Geology

The Clear Creek anticline is a major structural feature of the northern Wasatch Plateau. In the Skyline area, large faults of the Pleasant Valley fault zone form a north-south oriented graben along the axis of the anticline. The permit area is situated on the western limb of the anticline. Strata dip to the northwest at the north end of the permit area, almost west at Eccles Canyon, and southwest at the south end of the permit area. Dips range from three to six degrees on the permit area.

Major faults are nearly vertical faults trending north-south to northeast-southwest in the area. The largest of these, the Connvelville Fault, forms much of the eastern boundary of the permit area. Within the fault block east of the Connelville Fault, the Belina Mine has encountered very small displacement, east-west faults which deviate from vertical with hades of up to 30 degrees. Of the three major fracture/fault features known to have displacement, only the Connelville Fault is sufficiently developed to displace structural contours. The faults, known locally as the Valentine Fault and the North Joes Valley Fault, are thought to have considerably less displacement than the Connelville Fault. All three faults gradually disappear to the north. The Connelville and Valentine Faults are vertically displaced downward to the west, and the North Joes Valley fault is vertically displaced downward to the east.

The Connelville Fault is a complex zone with a width of up to 1,000 feet. The cumulative displacement across the zone appears to increase from approximately 55 feet in the Winter Quarters Mine north of Skyline to 200 feet or more near the southern edge of the Skyline permit area. Individual faults within the zone

have much smaller, and highly variable displacement. The Connelville Fault, as shown in Plate 2.2-1, is near the western edge of a complex zone, although segments of the zone may be encountered west of the map location shown.

The Valentine Fault is located approximately midway between the eastern and western borders of the permit area and has a curvilinear trace oriented nearly north-south. Similar to the Connvelville Fault, the Valentine Fault has a displacement which diminishes to the north. Plate 2.2-1 shows the interpreted extent of faults within the permit area. Displacement is probably on the order of a few tens of feet along two or more splits in a zone 200 to 300 feet wide.

The North Joes Valley Fault can be traced nearly one mile northward from the southwest corner of the permit area to where it disappears under the alluvial deposits of Huntington Canyon. It has a displacement of 80 to 100 feet approximately one-half mile south of the permit area boundaries and has not been observed in the northern part of the permit area.

Four major jointing and fracture orientations have been mapped on the leasehold. The most common orientation observed within the coalbeds and immediate roof and floor strata are a set of joints spaced approximately 1 to 3 feet apart with a N80^{o}W orientation. This joint set is only occasionally observed in surface outcroppings. A second joint orientation observed in the mines as well as in surface outcroppings are a set of N5W to N5E joints, spaced from 1 foot to over 10 feet apart at the surface. They are only occasionally observed at coalbed depths. The last two orientations are a system of conjugate shear fractures and joints which are more commonly observed on the surface but occasionally appear at depth and are oriented at approximately N60W and S70W respectively.

Section 2.2.7, pages 2-11 through 2-14, has been removed and placed in a CONFIDENTIAL folder.

REPLACES	TEXT
Section 2.2.7 Page 2-11	Section 2.2.7 Page 2-11 Date 07/12/89

2.2.7 Mineable Coal Deposits

The three mineable coal seams in the permit area, the Lower O'Connor "A", the Lower O'Connor "B" and the Upper O'Connor, occur in a zone immediately overlying the Storrs Sandstone Member of the Star Point Sandstone. Characteristics of these seams and their enclosing strata, which affect mineability, are summarized in the following discussion. Analyses of coal seams are tabulated and discussed as well. Analyses of floor and roof materials are summarized later. Map 2.2.7-7 shows abandoned working adjacent to current skyline mine activities.

Lower O'Connor "A" Seam

The Lower O'Connor "A" seam is completely absent or badly split with rock partings in the southeast part of the permit area, but reaches a maximum thickness of 24 feet near the northern boundary of the permit area. The seam is, stratigraphically, the lowest coal which is mineable within the permit area. It rests directly on the Storrs Sandstone Tongue or is separated from it by a few feet of siltstone, mudstone, and shale except where it has merged with the Flat Canyon seam in the northwest part of the permit area. The overlying or roof strata include sandstone, siltstone,

mudstone and shale which are often interbedded and interlaminated. Where sandstone forms the floor or roof, the contact is generally sharp. Several inches of softer carbonaceous or coaly claystone or mudstone may form a gradational contact. Most floor and roof strata are well indurated. The Lower O'Connor "A" seam isopachous map is shown on Plate 2.2.7-1. Plate 2.2.7-2 shows overburden depth.

Lower O'Connor "B" Seam

The Lower O'Connor "B" seam is of mineable thickness over the southern two-thirds of the permit area, but is thin or absent to the north. In the southwest corner of the permit area, the seam reaches its maximum thickness of nearly 17 feet. The floor and roof strata are comprised of rock types found in the Lower O'Connor "A" roof. The interval separating the Lower O'Connor "B" and the uppermost seam of the zone, the Upper O'Connor seam, thickens northward and ranges from less than two feet to more than 100 feet where the Lower O'Connor "B" seam thins to four feet. Plate 2.2.7-3 is an isopachous map of the Lower O'Connor "B" seam. Overburden depth is shown on Plate 2.2.7-4.

Upper O'Connor Seam

The Upper O'Connor seam is thickest in the east central part of the permit area where a maximum thickness of 16 feet is reported. The seam thins to less than six feet in the southwest portion of the permit area, and to less than three feet along most of the northern boundary. Floor and roof strata are interbedded and interlaminated sandstone, siltstone, mudstone, and shale. The upper and lower contacts of the coal may be

either sharp or gradational, as is the case with the previously described seams. The Upper O'Connor seam isopachous map is shown on Plate 2.2.7-5. Plate 2.2.7-6 shows overburden depth.

Coal Reserves

Coal reserves on the permit area are divided into three classifications which include: 1) reserve base or in-place reserves: 2) mineable reserves; and 3) recoverable reserves. The reserve estimates given herein are based on all data available as of December 31, 1984.

In place reserves were calculated utilizing standard methods described in General Mining Order No.1 (U.S.G.S. Federal Register, 1979): Mineable reserves were calculated utilizing a minimum mining thickness of five feet and a minimum interburden thickness of 30 feet. Recoverable reserves were calculated using the following parameters:

a. For thicknesses of 8 to 10 feet, 1 foot of top coal would be left in mine roof.

b. For thicknesses of 11 to 14 feet, 2 feet of top coal would be left in mine roof.

c. For thicknesses of 14 feet or greater, a 12 foot mining height was assumed.

d. Longwall recovery factor of 100%.

e. Room and pillar recovery factor of 70%.

f. Mains recovery factor of 30%.

g. Coal barriers and major faulted zones would have 0% recovery factor.

Estimates of coal seam thickness from boreholes and correlation between boreholes are based on geophysical logs. These are supplemented by sparse outcrop measurements and in-mine drilling. Coal seam isopach maps were constructed by hand using the distance-thickness proportion method. The contour map was refined in sparse data areas, near faults or other coal seam discontinuities, or in other areas where expected or known trends are not adequately interpolated. The maps were planimetered with the use of an electronic planimeter.

Five main coal beds occur on the permit area which include (from upper to lower): 1) the McKinnon seam; 2) the Upper O'Connor seam; 3) the Lower O'Connor B seam; 4) the Lower O'Connor A seam; and 5) the Flat Canyon seam. In-place reserve estimates include all five coal beds, whereas the mineable and recoverable estimates include the Upper O'Connor, Lower O'Connor B, and Lower O'Connor A seams as previously described. The McKinnon and Flat Canyon seams are not considered economically mineable at this time. Mining will be conducted so as to extract coal seams in decending order where recoverable reserves overlap.

Coal reserves on the permit area are tabulated as follows:

Seam	In-Place Reserves*	Mineable Reserves*	Recoverable Reserves*
McKinnon	16.91	--	--
Upper O'Connor	90.36	83.37	29.86
Lower O'Connor B	74.24	72.44	28.78
Lower O'Connor A	104.69	100.10	33.83
Flat Canyon	44.18	--	--
TOTAL	330.38	255.91	92.47

*Millions of Tons

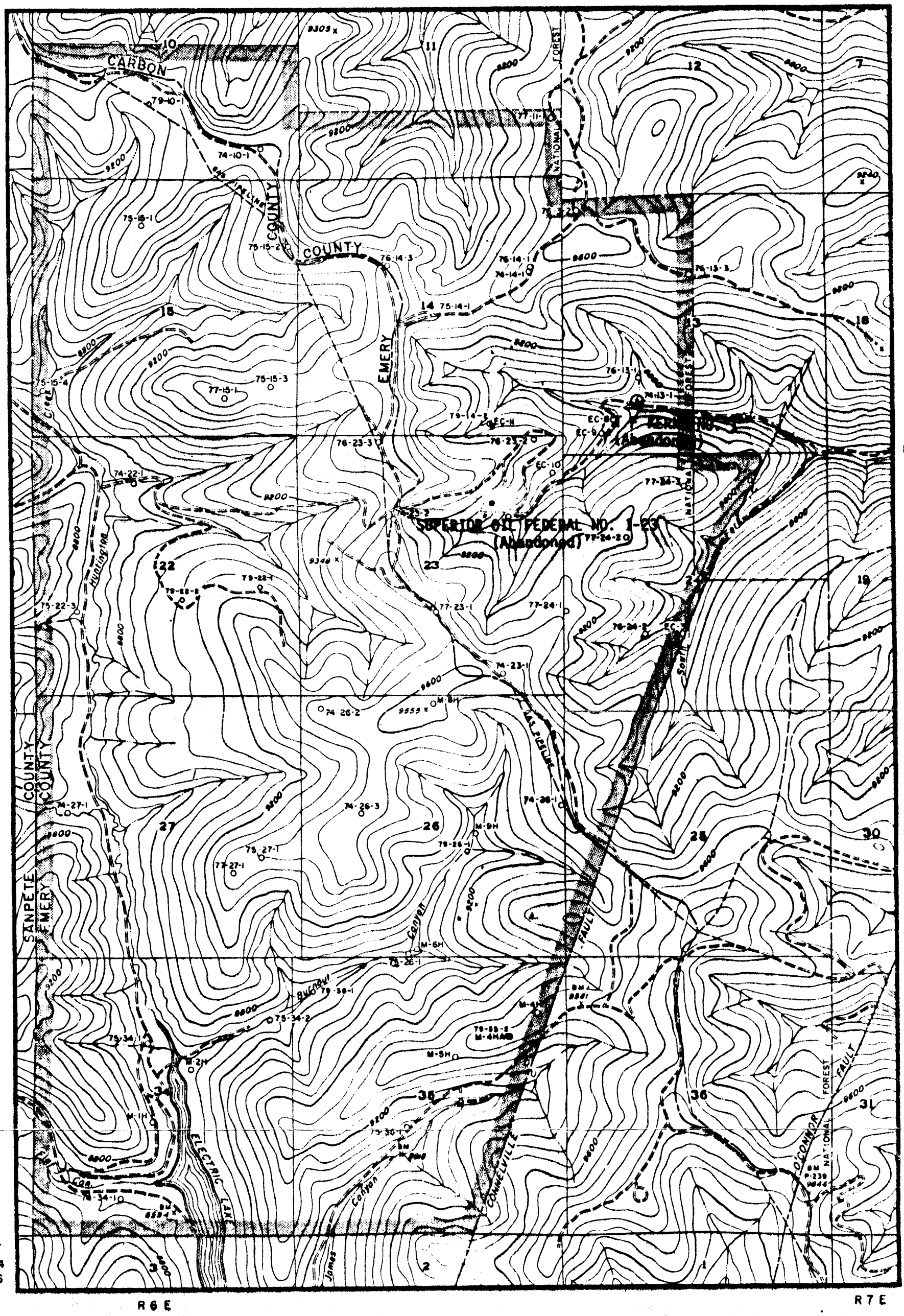
2.2.8 Other Mineral Deposits

Natural gas is the only mineral resource, other than coal, reported in the permit area. The Clear Creek Gas Field was discovered in 1951 and is apparently nearing depletion. Two boreholes, presumably natural gas tests, have been drilled and abandoned on the site area. The T. F. Kerns No. 1 was drilled to a depth of 5,825 feet in Section 13, Township 13 South, Range 6 East. In Section 23 of the same Township and Range, the Superior Oil Federal No. 1-23 was drilled to 362 feet. Plate 2.2.8-1 shows the locations of both wells. Because the Superior Oil well was abandoned and never completed to mining depth or gas depth, full extraction mining will likely occur beneath it. The T.F. Kerns well will be protected by a 100 foot barrier as shown on Plate 2.2.8-1.

Geochemistry

Analyses were performed on 24 core samples of roof and floor strata for each of the three seams to be mined. The potential acid-forming or alkalinity-producing materials in the strata to be affected by mining are assessed (See Table 2.2.8-1). Samples included sandstone, siltstone, and shale material. Many samples contained carbonaceous material. No relationship is apparent between any of the analyses and the lithologic or stratigraphic position of a particular sample. The samples are all slightly alkaline and low in sulfur content.

Clay content of floor samples was not determined analytically. The lithology of the stratum immediately below the mineable coals varies from borehole to borehole. Accordingly, clay content will range from almost 100% in a pure claystone to less than 5% in a submature or mature sandstone.



⊙ Gas well with 100 ft. buffer zone

SCALE: 1000 0 1000 2000 3000 FEET

RECEIVED
JUL 19 1989
DIVISION OF
OIL, GAS & MINING

BASE MAP FROM U.S. GEOL. SUR. TOPOGRAPHIC MAPS

JCH 7/89

COASTAL STATES ENERGY COMPANY
SKYLINE PROJECT

GAS WELL LOCATIONS

PREPARED BY ROY P. FULL, MINING GEOLOGIST
246 EAST 3900 SOUTH, SALT LAKE CITY, UTAH

JOB NO.	SCALE DATE 7-89
DWG. NO.	MAP OR FIGURE NO. 2.2.8-1
REVISION Mark Bunnell 7-89	

2-15A

Pyrite, marcasite, and sulfur content of the three mineable coal seams are determined by the standard "forms of sulfur" analysis (Table 2.2.8-2). Marcasite was not determined directly for the following reasons:

- The standard wet chemical analysis (ASTM D 2492) determines iron soluble in nitric acid, and calculates from this the pyrite content. This test does not separate marcasite values from pyrite values and merely reports the total as pyrite.

- On a dry basis the three mineable seams average from 0.55 to 0.62 percent total sulfur by weight. On the same basis, pyritic sulfur averages from 0.07 to 0.21 percent. Even if all the pyritic sulfur were marcasite, it would not be sufficient to cause acid mine drainage problems.

- The Permittee consulted with Commercial Testing and Engineering Laboratories, Inc. in Denver, Colorado, and Standard Laboratories, Inc. in Charleston, West Virginia, and did not find an accurate and quantitative method to determine marcasite content in coal.

2.2.9 Waste Rock Disposal Site

The stratigraphy of the waste rock disposal site area is very similar to that of the minesite permit area, consisting of inter-bedded sandstone, siltstone, and shale, with numerous carbonaceous and coaly zones. In November of 1976, Sanders Exploration drilled a borehole about 1,300 feet east of the waste rock permit site located in the SE 1/4, NW 1/4, Sec 4, T 13S, R 7E. The drill hole report for the site identified as S-4 can be found in Appendix Volume A-4.

TABLE 2.2.8-1

SUMMARY OF 24 ANALYSES *

ANALYSIS	Max.	Min.	Mean	Standard Deviation
Water Soluble Alkalies				
(Dry Basis)				
% Na_2O	0.025	0.007	0.009	0.004
% K_2O 0.032	0.005	0.018	0.010	
Sulfur Forms				
(Dry Basis)				
% Pyritic	0.83	0.03	0.14	0.18
% Sulfate	0.03	0.00	0.01	0.01
% Organic (Diff)	0.42	0.00	0.05	NA
% Total	1.26	0.02	0.20	0.27
Acidity (pH)				
Equipotential	8.58	7.10	8.04	0.37
1:5	8.92	7.27	8.45	0.39
1:20	9.06	7.10	8.65	0.54

* Individual analyses are available at the mine site.

TABLE 2.2.8-2

Sulfur Forms (Dry Basis)	U. O'Connor Percent	L. O'Connor B Percent	L. O'Connor A Percent
Pyritic	0.22	0.10	0.19
Sulfate	0.00	0.00	0.00
Organic (Diff.)	0.52	0.43	0.40
TOTAL	0.74	0.53	0.59

Geotechnical

The geotechnical data report by Dames and Moore dated October 30, 1979 is included in its entirety in Appendix Volume A-3. Much of that report is interpretive in nature and deals with facilities that have since been constructed.

2.2.10 General Geology of the Rock Disposal Site

The coal-bearing Blackhawk Formation makes up the surface of the rock disposal site. This formation consists of alternating, laterally discontinuous layers of sandstone, siltstone, shale and coal. Only occasional sandstone ledges are exposed at the surface of the proposed site, with the remaining surface being covered with up to 20 feet of soil and weathered rock debris.

Two mineable coal seams occur beneath the site, including the Upper and Lower O'Connor seams. The pertinent data for these coal beds is as follows:

Coal Bed	Thickness	Depth below Surface
Upper O'Connor	8.0'	45'
Lower O'Connor	18.0'	130'

Four faults of undetermined displacement have been mapped near the site. These faults are generally north-south trending and have acted as local barriers to mining in coal mines near the site.

Conversations with Mr. Frank Helsten of Scofield, Utah on September 17, 1981 and May 17, 1982, revealed that the strip mining work was done from 1948 to 1950. Mr. Helsten was the spot hole driller and indicated that no abandoned underground workings were intercepted when drilling the seam lying 45 feet beneath the floor of the pit. Mining of the below-lying seam was planned but not accomplished due to economic conditions at the time.

Two previously drilled exploratory holes in the general area of the proposed disposal site provide the basis of the available geological information (see Appendix A-3). Map 2.2.8-1 presents the location of the exploratory holes in relation to the area to be affected.

2.3 GROUND WATER HYDROLOGY

The principle factor controlling the occurrence and availability of ground water in any area is geology. Nearly all of the region surrounding the project area is underlain by rocks of continental and marine origin, consisting predominately of interbedded sandstones and shales (See Section 2.2). The existence of these relatively impermeable shales tends to limit the ability of the rock units to yield a significant amount of water for extended periods of time due to the recharge impediment.

The project area is located in the headwaters of the Price and San Rafael River Basins (See Figure 3.2-A, page 2-123). Wells in these basins normally yield less than 50 gallons per minute. In the immediate vicinity of the project area essentially dry wells have been experienced. Exceptions to these yield estimates occur where wells penetrate highly fractured sandstones.

Rock strata in the mountainous areas near the project area have low specific yields (0.2 to 0.7 percent) and low hydraulic conductivities. The volume of recoverable water is small, averaging less than 600 acre-feet per square mile in the upper 100 feet of saturated rock.

Ground water quality in the Price and San Rafael River Basins deteriorates in a downstream direction. Dissolved solids content in the ground water ranges from less than 125 milligrams per liter in the headwaters near the Skyline permit area to approximately 4,000 milligrams per liter near the confluence of the two rivers with the Green River. This large increase results from the contact of the water with fine-grained units, particularly the saline Mancos Shale.

Information presented in this section summarizes and updates the original consultants reports found in Appendix Volume A-1. A

more complete discussion and baseline information for summaries presented herein may be found in Volumes 4 and A-1.

2.3.1 Geologic Setting of the Ground Water System

The Skyline permit area lies in the northern end of the Wasatch Plateau, on the west edge of the Clear Creek anticline. As such, the dip of the strata is generally towards the west, varying between six percent (three degrees) and ten percent (six degrees).

With the exception of local alluvial deposits, all of the units exposed on and immediately adjacent to the project area are formations of the Cretaceous Mesaverde Group. The Star Point Sandstone is a massive, medium-grained sandstone which is approximately 1,000 feet thick and nearly devoid of shale in the project area. A generalized columnar section of the Skyline property is shown in Figure 2.2-A.

The Blackhawk Formation, which immediately overlies the Star Point, is an interbedded formation of sandstones, shales, siltstones, and coal. The sands of the Blackhawk Formation are fine-to-medium- grained, tending to have locally high clay contents. The shales of the Blackhawk Formation in the permit area are irregularly bedded and due to their tendency to swell when wet, they should, in most cases, form an effective barrier to vertical movement of ground water.

The youngest geologic unit in the permit area is the Castlegate Sandstone, found only in a small area in the northwestern portion of the permit area. This unit consists of massive medium to coarse grained sandstones with interbedded conglomerates near the base.

Faults within the permit area commonly occur as zones of parallel to in-echelon fault segments with individual slips containing

gouge zones ranging from 6 inches to 4 feet wide. Displacements are normally small (less than 20 feet) with the exception of the Connelville fault zone which forms the eastern boundary of the permit area, and the Upper Joes Valley fault zone in the southwestern portion of the area. It is suspected that faults have only local hydrologic importance within the Blackhawk formation because of its clay content in the permit area. Of 44 individual fault planes encountered to date in Skyline Mines 1 and 3, only 5 contained dripping water. Four of these 5 appeared to intersect water saturated sandstone paleo channels in the immediate mine roof. Water also emerged from the Star Point Sandstone along 2 faults encountered in Skyline Mine 3, resulting in some water drainage from the floor. In both of these cases, no water dripped from the roof.

In most cases it appears the faults within the Blackhawk formation in the permit area are not allowing vertical movement of ground water into the mines. The most logical cause of this apparently low permeability along most of the faults is clay content.

A detailed discussion of the geological characteristics of the project area is presented in the preceding section (Section 2.2).

2.3.2 Characteristics of Seeps and Springs

As a result of field investigations during 1978, 174 seeps and springs were located on and immediately adjacent to the Skyline project area (Volume A-1, Hydrology, page 57) This equates to an average of one water source for approximately every 40 acres existing in the area, not including the perennial streams. The quality of the subsurface water was evaluated at select springs and is shown in Appendix Volume A-1. Additional ground water quality data may be found in the tabulations submitted regularly to the Division of Oil, Gas and Mining and in Volume 4. The travel distance between water supplies is short for the wildlife

and sheep which utilize the area. Therefore, should a frequently-used spring dry up, animals using the water supply would not be greatly affected.

As requested by the Division, the operator conducted a survey of springs in the South Fork of Eccles Creek area where mining will take place during this permit term. This survey, conducted during August of 1988, varies slightly in locations from that found in the consultant's report. The differences are most likely the result of mapping errors. The results of this survey may be found on Figure 2.3.2-1.

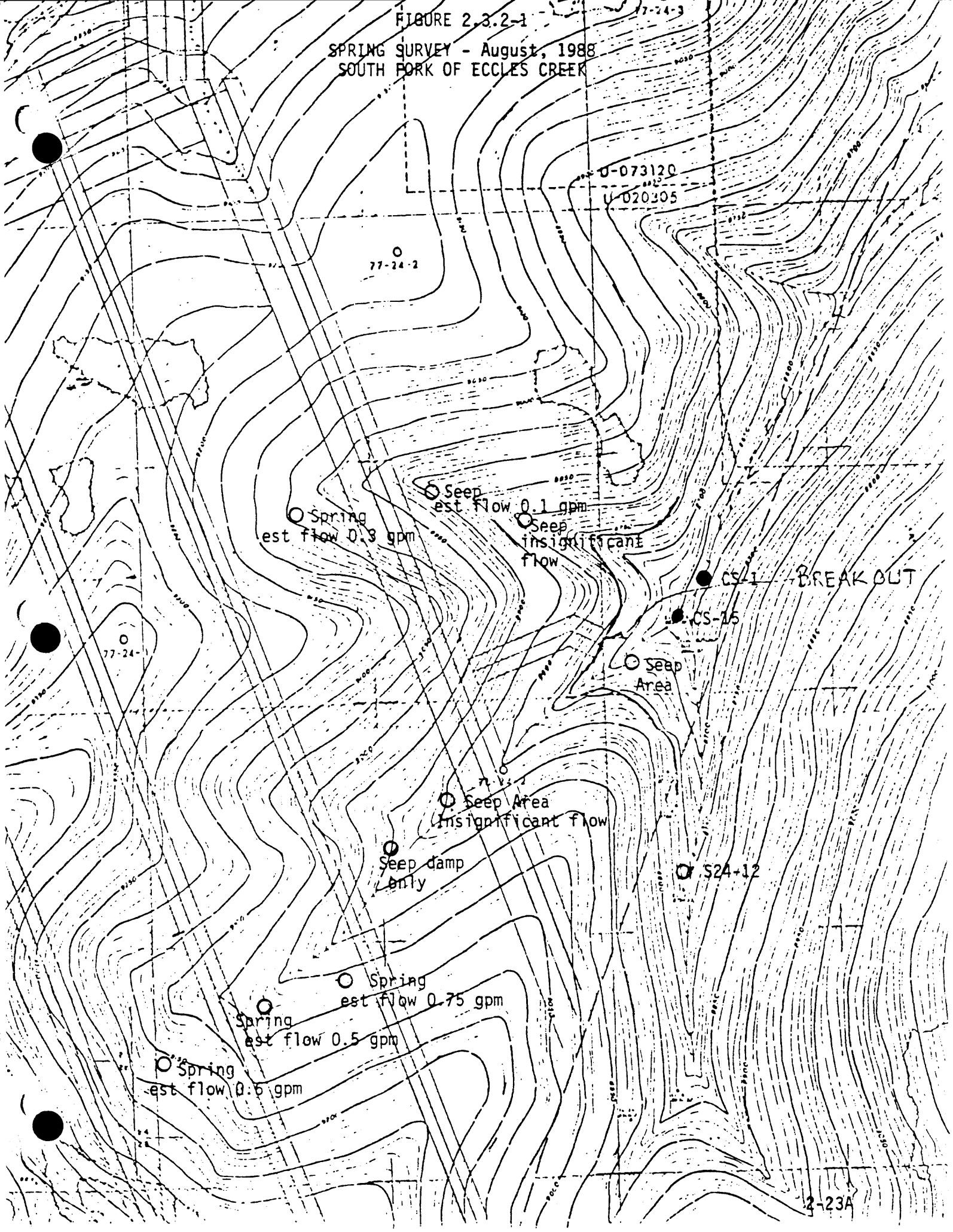
Geologic conditions play an important role in the occurrence of springs in the project area. A majority of the springs issue from west-facing slopes, often at a sandstone-shale interface considerably above the adjacent stream bed. Apparently, water which infiltrates into the soil and is not consumptively used percolates down until an impeding shale lens is met. It then follows the shale member downdip until an outlet is reached (either the surface or a discontinuous sandstone member). Thus, deep ground water recharge is apparently slow in the project area due to the presence of large amount of shale.

Very few seeps and springs in the project area appear to be fault-related, due to the sealing ability of the Blackhawk Formation. Instead, spring water appears to originate in the small surface depressions or basins in the immediate vicinity.

Sustained flows from individual springs tend to be low. Only four of the springs were measured having flows greater than or equal to 10 gallons per minute during the fall, low-flow inventory. Most measurements were two gallons per minute or less. Approximately 30 percent of the sources were seeps. Some of these had dried entirely during previous summers. Flows at a given spring may

FIGURE 2.3.2-1

SPRING SURVEY - August, 1988
SOUTH FORK OF ECCLES CREEK



vary by as much as one order of magnitude during the year, with the higher flows occurring during the snowmelt season. This observation further substantiates the theory that water supplying the springs is generally very local in origin. Water originating from a deeper, more regionalized source would normally provide a more constant flow. It also implies that flows from springs are quite sensitive to the amount of precipitation received during the previous winter.

2.3.3 Stream Seepage

A very small percentage of the average annual flow of Huntington Creek above Electric Lake is contributed by ground water. In contrast, ground water yield accounts for nearly 64 percent (8.59 inches) of the average annual yield of Eccles Creek above Pleasant Valley Creek. The principle cause of the high ground water yield in Eccles Canyon relative to Huntington Creek is the Star Point Sandstone, which is present over approximately 25 percent of the surface of Eccles Canyon but does not appear on the surface in the Huntington Creek Basin.

To better define recharge-discharge conditions for major streams in the area, seepage studies were conducted on the Main Fork of Eccles Creek, the South Fork of Eccles Creek, and Huntington Creek. The studies were conducted by measuring the flow rate and collecting a water quality sample at selected points along the stream segment and at points of major tributary inflow. Data from that study are presented in Volume A-1, Hydrology, page 62.

Significant changes occur in the Main Fork of Eccles Creek when it crosses the Star Point Sandstone. These changes are

especially noticeable at the O'Connor Fault, which crosses the stream at a point about one mile downstream from the confluence of the Main and South Forks. This fault apparently acts as a conveyance structure in the fractured Star Point, discharging water into Eccles Creek.

Another significant change in the characteristics of Eccles Creek occurs near the mouth of the canyon at the Pleasant Valley Fault. This probable flow barrier appears to be bringing water to the surface which had previously been flowing in the rock beneath the stream channel.

Changes in conditions along the South Fork of Eccles Creek can be largely accounted for by surface phenomena (hillside springs, tributary inflow, etc.). The Connelville Fault zone has little apparent effect on the recharge-discharge characteristics of the stream. This confirms the previous conclusion that faults in the Blackhawk do not act as conduits to the surface, but rather, seal to prevent vertical water movement.

Downstream changes in the characteristics of Huntington Creek can also be largely accounted for by tributary inflows, hillside springs, etc. The flow losses which do occur in the lower portions of the stream (immediately upstream from Electric Lake) can presumably be attributed to recharge of the alluvium. This recharge water is suspected to travel below the surface of the shale-alluvium interface towards Electric Lake.

2.3.4 Aquifer Characteristics

Measurements at a network of observation wells installed in the project study area indicate that ground water flows in a west to southwest direction, generally following the dip of the strata. Flow gradients average approximately 250 feet per mile over most of the project area although a gradient averaging 700 feet per mile was encountered in the southern portion of the lease area. This anomaly is probably associated with the Valentine Fault

zone, which passes through one of the observation well sites. The fracture has apparently connected the sandstone lenses of the Blackhawk Formation with the underlying Star Point Sandstone, thereby significantly increasing the water yield characteristics of the rock at this point and influencing the piezometric head in the area.

The differences between the elevation of water in the observation wells and that of surrounding springs indicates that two ground water systems occur in the Skyline project area. A shallow system, very local in extent and discontinuous, provides water to numerous seeps and springs through thin sandstone layers in the Blackhawk Formation. A deep ground water system is present in the saturated rocks surrounding and below the coal. This deep system has little apparent effect on the surface hydrologic regime of the permit area since the water is located well below the perennial streams of the permit area. The system continues to dip to the west and southwest beyond the permit area and remains below the Sanpete Valley floor. It is not known to outcrop down dip. A fence diagram depicting the relationship of the wells with their location and with the geology may be found in Drawing 2.3.4-1.

Springs in the Blackhawk Formation are fed from perched water in shallow sandstone lenses underlain with shale well above the regional ground water level.

Useable quantities of water from wells in either the Storrs Sandstone or the lower tongues of the Star Point Sandstone are unlikely unless a fracture zone is encountered. Drawdown and recovery tests, which were conducted at two different depths in an open test well located in the proposed portal area, indicated that the transmissivity of the Blackhawk Formation is approximately 18 gallons per day per foot (Volume A-1, Hydrology, page 84). No significant difference in transmissivity exists between the coal zone and the Aberdeen Sandstone. The low transmissivities and discharge rates (approximately 5 gallons per minute) indicate that the Blackhawk Formation is, at best, a poor aquifer.

Potentiometric surfaces are below the ground surface, even in the canyon bottoms, with the deeper holes under the Blackhawk showing a generally higher potentiometric surface than the shallower holes. East of the permit area, where the Star Point Sandstone is exposed, the potentiometric surface intersects the ground surface in the canyons, thereby producing springs along the bottoms of the canyons. Water table conditions exist primarily in shallow alluvial deposits along larger perennial streams. Potentiometric surfaces, as currently understood, are shown on Plates 11 and 12 of the Hydrology report - Appendix Volume A-1.

2.3.4.1 Waste Rock Disposal Site

There is little information available concerning the ground water system at the waste rock disposal site. No test wells are available in the area and there are no seeps or springs to provide water quality data. The site is an isolated system, located above the water table and has little inflow and no outflow. There is no known hydrological connection between the site and Pleasant Valley Creek.

The waste material placed in the site has tested negatively for toxicity. A discussion of these tests may be found in Section 4.4.5.

The groundwater situation is complicated by the present of underground workings of the old Union Pacific Mine. The present condition of these workings is unknown and unobtainable due to an underground smoldering fire.

2.3.5 Uses of Water in the Aquifers

2.3.5.1 Surface Water Rights

The water rights on and adjacent to the Skyline property which were on record with the Utah Division of Water Rights as of December, 1986 are listed in Volume 4. The locations of these water rights can be found on Plate 2.3.5.1-1.

In addition to those existing water rights identified in Volume 4, the Forest Service has water rights claims pending action in District Court for the Seventh Judicial District in and for Emery and Carbon Counties. The claim for upper Huntington Creek was filed on August 19, 1983. The claim for Eccles Creek and the South Fork of Eccles Creek was filed May 18, 1987.

Surface water rights in the area are primarily for stockwatering and irrigation. Stockwatering rights are almost entirely directly on the stream. Irrigation rights are centered around the town of Scofield and in Flat Canyon, southwest of the center of the property. Irrigated lands consist almost entirely of pasture. Only stockwatering rights are present on the lease area.

2.3.5.2 Ground Water Rights

Ground water rights on and adjacent to the Skyline Property, on record with the Utah Division of Water Rights as of December, 1986, are listed in Volume 4 and presented on Plate 2.3.5.2-1. Again, rights are primarily for stockwatering and irrigation (mainly lawns and gardens). Only one spring on the lease area

has a filed water right. Only a limited number of wells are located in the area.

Also shown on Plate 2.3.5.2-1 are exchanges of Scofield Reservoir water for ground water in Pleasant Valley Creek Basin. These are also listed in Volume 4. All exchanges are wells, with the exception of 91-940. Most of the exchanges serve the industrial and domestic needs for mining companies in the area.

2.3.6 Ground Water Quality

The high cost associated with properly constructing and developing the observation wells drilled in the formations found in the area precluded the collection of reliable water quality data from the wells.

Several core holes, however, have been used to obtain limited ground water information. As these wells are being drilled, static water levels were measured above the coal zone, in the coal zone, and below the coal zone in the Star Point Sandstone. The wells were finally cased down to the Star Point and the bottom 20 feet of the casings were perforated. Measuring the static water levels at different stages of drilling showed that deeper ground water had a higher piezometric head than the shallow ground water. Because of this, four shallow wells were drilled adjacent to four of these deep wells, and casings with perforations in the bottom 20 feet were installed. Piezometric heads were measured in shallow and deep holes showing the vertical piezometric gradient associated with the ground water. Data obtained from these wells are shown in graphic form in Volume 4.

The instability of the Blackhawk Formation made it difficult to keep uncased holes open for several hours. Reliable water quality samples could therefore not be obtained from the core holes. Several holes were more than 1,000 feet deep and one was more than 2,000 feet deep.

Two wells have been drilled in Eccles Canyon to determine aquifer characteristics of the Star Point Sandstone. The locations of these wells, W13-1 and W17-1, are shown on Plate 2.3.6-1. Well W13-1 extends through the Blackhawk Formation into the Star Point Sandstone and is now cased. During the draw down and recovery tests, the casing had not yet been installed.

The water quality analyses were measured from samples collected after periods of pumping from the well. Well W17-1 is located

adjacent to Eccles Creek in the canyon bottom and extends through alluvial materials before penetrating the Star Point Sandstone. The well had been pumped for a few hours when the water quality sample was collected. Well 13-1 was drilled near the portal area topsoil stockpile as a water supply source, but was abandoned because of insufficient flow. The data, however, are useful in showing groundwater quality. Results of the laboratory analysis of these samples are contained in the Hydrology section of Appendix Volume A-1.

A comparison of water quality data collected from the permit area springs, local mines, and a well indicated that the springs were of a quality similar to that of the deep ground water system of the area. Thus, inferences on ground water quality have been drawn principally from data collected almost entirely from springs.

Almost without exception, the ground water in the area is of a strong calcium bicarbonate type. Although the quality of the deeper ground water is expected to be more uniform, the data show that three distinctive qualities of spring water can be found in the project area. Springs issuing near the outcrop of the Castlegate Sandstone in the northwest corner of the project area have a very low dissolved solids content (normally less than 100 milligrams per liter). This results from the lack of shaley layers in the Castlegate. Local conditions have probably resulted in the slightly higher concentrations in the springs issuing in the headwaters of Eccles Canyon (dissolved solids concentrations between 300 and 350 milligrams per liter). Springs issuing over the remainder of the project area have dissolved solids content which generally varies from 180 to 260 milligrams per liter, averaging 220 milligrams per liter. (See Water Quality Data - Volume 4.)

Seasonal changes in ground water quality constituents show no consistent trends. Concentrations are generally lower in spring water than noted in surface water samples, although the

differences do not appear to be very significant. In many cases, trace metal concentrations were consistently below the detection limit of routine laboratory techniques.

The sample analysis reports located in the Hydrology Section of Appendix Volume 1-A, as submitted by Commercial Testing and Engineering Company, Denver, Colorado, are tendered to document that no potential acid-forming or toxic-forming material is to be found either above or below the coal seams. The equipotential figures do show some alkalinity producing tendencies occur.

The analysis reports are arranged by seam, i.e., McKinnon, Upper O'Connor, and Lower O'Connor A; and then by sample location, e.g., roof, floor.

The locations of the exploration holes at which these samples were taken are shown on Plate 2.3.6-1.

Obtaining ground water data from abandoned mines in the area has been investigated but found not practical. The only abandoned portal in the permit area is the old Eccles Canyon Mine. This portal was sealed and covered during construction of the Skyline portal area surface facilities and is no longer accessible.

There are several abandoned mines in the adjacent area, located in Winter Quarters, Pleasant Valley and Boarding House Canyons. A search of UDOH and EPA (Storet) records did not reveal any discharge data from these old portals. The private and protected nature of these lands precludes data gathering.

2.3.7 Groundwater Monitoring Program

The ground water monitoring program outlined in this section is a continuation of a program approved with the original Mining and Reclamation Permit Application. It incorporates practices designed to provide the baseline data necessary to validate the determination of the probable hydrologic consequences of proposed and existing mining and reclamation operations. The program also is designed to meet site specific requirements and incorporates the flexibility for change if necessary.

A monitoring program is being conducted at each of the ground water stations identified on Table 2.3.7-3 and depicted on Plate 3.2.6-1.

Water quality samples are collected from the 15 selected springs in the project area. The samples are comprehensively analyzed each summer for the parameters listed in Table 2.3.7-1.

Seasonally, Spring high flow and Fall low flow, these springs will be monitored for those constituents listed on Table 2.3.7-2. A listing identifying the station types is shown on Table 2.3.7-3.

In addition to the collection of the outlined water quality data, water level data will be collected from each of the nine wells as scheduled on Tables 2.3.7-1, 2.3.7-2 and 2.3.7-3, and noted on Plate 2.3.6-1. Summary information on these observation wells is found on Table 2.3.7-4.

The amount of water discharged from each mine on each monitoring occasion will also be monitored at the mine mouth through the use of a totalizing flow meter or similar device. Totals will be recorded and submitted with the quarterly monitoring reports. Significant changes in the source of water in the mine will be noted during the period of operation. Underground water pumped

from each mine will be monitored for water quality. Mine #1 discharge is sampled at Station CS-14. Mine #3 discharge is sampled at Station CS-12. Should the concentrations result in a sedimentation pond discharge which exceeds the NPDES discharge permit limitations or indicates potential disturbance to the hydrologic balance, an attempt will be made to isolate the contributing source and an evaluation made of possible appropriate remedial action. The best alternative remedial action will be implemented as soon as practicable to ensure protection of Eccles Creek water quality.

As required, ground water quality data collected from the property area will be submitted to the Utah Division of Oil, Gas, and Mining. Such reports will be submitted within 90 days after completion of the quarterly monitoring program. An annual report which will includ a summary of water quality data and water well level data for the previous year will be submitted within 90 days of the end of each year.

Table 2.3.7-1

COMPREHENSIVE WATER QUALITY ANALYTICAL SCHEDULE
(SURFACE AND GROUNDWATER STATIONS)
-LOW SUMMER FLOW-
(AUGUST - SEPTEMBER)

ANNUAL - WATER QUALITY STATIONS CS-1, CS-2, CS-3, CS-4, CS-6, CS-7, CS-8, CS-9, CS-10, CS-11, CS-12, CS-13, CS-14, UPL-10, VC-6, VC-9, VC-10, S10-1, S12-1, S13-2, S13-7, S14-4, S15-3, S17-2, S22-5, S22-11, S23-4, S24-12, S26-13, S34-12, S35-8, S36-12, WRDS #1, WRDS #2, WRDS #3 and WRDS #4.

FIELD MEASUREMENTS	LABORATORY MEASUREMENTS	
Flow	Acidity	Lead, Total & Dis
Dissolved Oxygen	Alkalinity	Magnesium
pH	Ammonia	Manganese, Total & Dis
Specific Conductance	Barium, Total & Dis	Nitrate
Temperature, Air	Bicarbonate	Phosphate
Temperature, Water	Boron, Total & Dis	Potassium
Turbidity	Calcium	Sodium
	Chloride	Sulfate
Note: Station VC-9 will use calculated flow from Station CS-6 and CS-13.	Copper, Total & Dis	Suspended Solids
	Fluoride	Total Dissolved Solids
	Iron, Total & Dis	

ADDITIONS TO THE COMPREHENSIVE SCHEDULE FOR
ECCLES CANYON STREAM STATIONS
AND WASTE ROCK DISPOSAL SITE

Includes stations CS-1, CS-2, CS-3, CS-4, CS-6, CS-9, CS-11, CS-12, CS-13, CS-14, VC-6, VC-9, VC-10, WRDS #1, WRDS #2, WRDS #3 and WRDS #4.

Cyanide	Phenols
Oil & Grease	Total Organic Carbon

WELLS - WATER LEVEL ONLY

Well locations: W79-10-1A, W79-10-1B, W79-14-2A, W79-14-2B, W79-22-2-1, W79-22-2-2, W79-26-1, W79-35-1A, W79-35-1B.

TABLE 2.3.7-2

ABBREVIATED WATER QUALITY ANALYTICAL SCHEDULE
(SURFACE AND GROUNDWATER STATIONS)
-HIGH SPRING (APRIL - JUNE) AND
LATE FALL (OCTOBER - NOVEMBER) FLOWS-

SEASONAL - WATER QUALITY STATIONS CS-1, CS-2, CS-3, CS-4, CS-6, CS-7, CS-8, CS-9, CS-10, CS-11, CS-12, CS-13, CS-14, UPL-10, VC-6, VC-9, VC-10, S10-1, S12-1, S13-2, S13-7, S14-4, S15-3, S17-2, S22-5, S22-11, S23-4, S24-12, S26-13, S34-12, S35-8, S36-12, WRDS #1, WRDS #2, WRDS #3 and WRDS #4.

FIELD MEASUREMENT	LABORATORY MEASUREMENTS	
Flow	Ammonia	Nitrate
pH	Bicarbonate	Phosphate
Specific Conductance	Calcium	Potassium
Temperature, Air	Chloride	Sodium
Temperature, Water	Iron, Total	Sulfate
Turbidity	Magnesium	Suspended Solids
	Manganese, Total	Total Dissolved Solids

NOTE: Station VC-9 will use calculated flow data from Stations CS-6 and CS-13.

- Dissolved oxygen will be measured at Stations CS-2, CS-6, VC-6 and VC-9.

SEASONAL ADDITIONS TO THE ABBREVIATED SCHEDULE
FOR ECCLES CANYON STREAM STATIONS
AND WASTE ROCK DISPOSAL SITE STATIONS

Includes stations CS-1, CS-2, CS-3, CS-4, CS-6, CS-9, CS-11, CS-12, CS-13, CS-14, VC-6, VC-9, VC-10, WRDS #1, WRDS #2, WRDS #3 and WRDS #4.

Phenols
Oil & Grease

WELLS - WATER LEVEL ONLY

Well locations: W79-10-1A, W79-10-1B, W79-14-2A, W79-14-2B, W79-22-2-1, W79-22-2-2, W79-26-1, W79-35-1A, W79-35-1B.

In addition to the high spring and late fall monitorings taken at all stations, winter season monitoring (Dec. - Feb.) for the above abbreviated schedule, including seasonal additions, will be taken at the following stations as accessibility permits: CS-2, CS-3, CS-6, CS-9, CS-11, CS-12, CS-13, CS-14, VC-6, VC-9 and VC-10. Station CS-15 will be monitored for flow only each Spring, Summer and Fall beginning Fall 1988.

! REPLACES	!! TEXT !
! Table 2.3.7-2 Page 2-35	!!Table 2.3.7-2 Page 2-35 Date 09/01/89 !

TABLE 2.3.7-3

MONITORING STATION IDENTIFICATION

ECCLES CANYON

STREAM STATIONS - 11 Stations

CS-1	CS-2	CS-3	CS-4	CS-6	CS-9
CS-11	CS-15	VC-6	VC-9	VC-10	

MINE DISCHARGE STATIONS - 2 Stations

CS-12 (Mine #3) CS-14 (Mine #1)

FRENCH DRAIN STATIONS - 1 Station

CS-13

HUNTINGTON CANYON

STREAM STATIONS - 5 Stations

CS-7	CS-8	CS-10	UPL-3*	UPL-10

WASTEROCK DISPOSAL SITE

STREAM STATIONS - 4 Stations

WRDS #1	WRDS #2	WRDS #3	WRDS #4

GROUNDWATER STATIONS

SPRINGS - 15 Stations

S10-1	S12-1	S13-2	S13-7	S14-4
S15-3	S17-2	S22-5	S22-11	S23-4
S24-12	S26-13	S34-12	S35-8	S36-12

WELLS (MONITORING) - 9 Well Stations

W79-10-1A	W79-10-1B	W79-14-2A	W79-14-2B	W79-22-2-1
W79-22-2-2	W79-26-1	W79-35-1A	W79-35-1B.	

WELLS, CULINARY -Referenced but not monitored

W13-1	W13-2	W17-1	W17-3	W24-1

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES)

001 Portal Area 002 Loadout Area

*Discontinued spring 1989

TABLE 2.3.7-4

SUMMARY INFORMATION ON GROUNDWATER OBSERVATION WELLS

OBSERVATION WELL NO.	COLLAR ELEVATION (GROUND)	TOTAL DEPTH DRILLED (FT)	TOTAL DEPTH CASED (FT)	TOP OF CASING-FT ABOVE COLLAR	PERFORATIONS	TOP OF COAL SEAM	COORDINATES	FORMATION MONITORED	COMMENTS
79-10-1A	9379.4	2190	2190	2.8	Bottom 20'	7402.8	N 498,739.290 E 2,073,496.481	Starpoint	
79-10-1B	9382.8	1110	1110	2.8	Bottom 20'	7402.8	N 498,783.026 E 2,073,448.969	Blackhawk	
79-14-2A	9051.7	122	122	3.0	Bottom 20'	8356.2	N 492,097.621 E 2,080,520.351	Blackhawk	
79-14-2B	9047.0	965	965	3.0	Bottom 20'	8356.2	N 492,100.107 E 2,080,487.589	Starpoint	Casing failed Approx. 6/89
79-22-2-1	9040.0	585	585	2.5	Bottom 20'	9044.3	N 292,837.390 E 2,074,072.647	Blackhawk	
79-22-2-2	9041.8	1395	1395	2.5	Bottom 20'	9044.3	N 491,792.440 E 2,074,097.687	Starpoint	Casing failed Approx. 9/85
79-26-1	9012.0	200	200	2.8	Bottom 20'	8414.0	N 483,357.8 E 2,079,916.0	Blackhawk	
79-35-1A	8726.4	1000	1000	2.5	Bottom 20'	8162.2	N 480,546.932 E 2,076,684.501	Starpoint	
79-35-1B	8724.4	150	150	2.5	Bottom 20'	8162.2	N 480,524.290 E 2,076,686.489	Blackhawk	

2.4 SURFACE WATER HYDROLOGY

As previously discussed, the Skyline permit area is located in the headwaters of the Price and San Rafael River Basins. Snowmelt is the primary source of water for the perennial streams in the two basins, with only a small amount of the total flow in the region being derived from rainfall. As a result, flow volumes per unit area are high in the headwaters and low near the mouths of the two basins.

The quality of surface water in the headwaters region is excellent, with total dissolved solids (TDS) concentration normally varying between 100 and 400 milligrams per liter. However, this quality deteriorates rapidly as the streams cross the saline Mancos Shale downstream and receive irrigation return flows from Mancos-derived soils. TDS concentrations in the Price and San Rafael Rivers, near their confluence with the Green River, generally vary between 1,500 and 4,000 milligrams per liter. Sediment yields in the two basins experience similar geographic variations, with the bulk of the sediment yielded at the mouths of the two major rivers coming from those areas which are underlain by the highly erodable Mancos Shale. Data summaries presented in this section are taken from the Skyline water quality monitoring program, Mundorff (1972) and Southeastern Association of Governments (1979). Information presented in this section summarizes and updates the original consultant's reports found in Appendix Volume A-1.

2.4.1 Drainage Basin Characteristics

Portions of four perennial watersheds drain the Skyline project area and include the Eccles Canyon, Green Canyon, Winter Quarters Canyon (all tributaries of Pleasant Valley Creek in the Price River Basin) and upper Huntington Creek (a tributary of the San Rafael River). Channels draining the permit area form dendritic patterns, with stream channels of the area flowing in all four major directions. All surface streams have been classified by

the Utah Division of Health as follows:

- 1C - protected for domestic use with prior treatment process,
- 3A - protected for cold water aquatic life, and
- 4 - protected for agricultural uses including stockwatering.

Electric Lake has been classified as 3A and 4 while Scofield Reservoir has been classified as 1C, 3A, 4, and well as 2B, protected for recreational uses, excluding swimming.

Slopes on the permit area are steep, averaging approximately 31 percent. Dominant drainage aspects are to the west in the Huntington Creek Basin and to the east in the Price River Basin. The landscape varies greatly, with most of the permit area being covered with conifer and aspen vegetative communities.

Because of the climatological conditions of the area (high precipitation and low evapotranspiration resulting in excess water), there are numerous water sources in the Skyline project area. Most of these are undeveloped springs, seeps and streams. The one notably developed water body located partially in the project area is Electric Lake, a 31,200 acre-foot reservoir whose upstream tip covers a small portion of the southwest corner of the project area in the Huntington Creek Basin. This reservoir is owned and operated by Utah Power and Light Company as a storage facility for water used at coal-fired power plants.

The thick vegetative cover on the project area has resulted in a well-maintained soil of high organic matter content, thus developing a more open soil structure with high infiltration rates. As a result, the potential for runoff from a rainfall event on the project area is low. Thus, snowmelt produces most of the runoff from the area during periods when soils are frozen and/or saturated.

2.4.2 Flow Characteristics

The seasonal distribution of flows in the perennial streams draining the project area is typical of western high elevation, snowmelt streams, where the majority of the flow occurs within a relatively short period of time in late spring and early summer (April, May and June). Flows in Huntington Creek above Electric Lake can be expected to vary from 1 to 100 cubic feet per second while those of Eccles Creek above Pleasant Valley Creek normally vary between 1 and 50 cubic feet per second.

The watersheds draining the project area yield an average of approximately 13.5 inches of water annually to the Price River Basin. However, because the relatively impermeable Blackhawk Formation underlies all of the Huntington Creek Basin above the southern boundary of the project area (either on the surface or directly beneath the surface member), the yield to the San Rafael River Basin is slightly higher (averaging approximately 16 inches per year).

A significant surface water quality sampling program has been conducted in Eccles Creek and Huntington Creek as well as in a representative sampling of seeps and springs in the Skyline permit area. The following briefly describes the major water quality characteristics of the permit area.

Surface water in the Skyline project area is of a calcium bicarbonate type. Total dissolved solids concentrations in the area are generally lowest during the months of April through June when flows are highest and affected by the diluting effect of direct snowmelt. As flows decrease and the majority of the flow is derived from seepage of local groundwater systems, the dilution effect becomes less pronounced and concentrations tend to increase. As a result, the dissolved solids content of surface water in the area varies from less than 100 milligrams

TABLE 2.4-1 DELETED

UPDATED DATA MAY BE FOUND IN VOLUME 4

REPLACES	TEXT
Table 2.4.1 Page 2-39	Deletion Notice Page 2-39 Date 5/9/89

TABLE 2.4-2 DELETED

UPDATED DATA MAY BE FOUND IN VOLUME 4

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Table 2.4.2 Page 2-40	Deletion Notice Page 2-40 Date 5/9/89

per liter (headwaters of Huntington Creek during the high flow season) to slightly greater than 500 milligrams per liter (Eccles Creek during low flow conditions).

Suspended solids concentrations in the area tend to vary proportionately with flow rate. During the snowmelt runoff season, concentrations are also naturally higher in Eccles Canyon than in the Huntington Creek drainage basin. Channel erosion, although relatively low throughout the area, appears to be more extensive in the steeper Eccles Canyon than in the Huntington Creek Basin and is probably the source of most of the increased sediment concentrations. Mud slides, when present, add considerably to the suspended solids concentration.

Hydrogen ion activity (pH) tends to be rather constant in the surface waters on and adjacent to the Skyline project area, varying normally between 7.3 and 8.2. The basic condition of the water with low acidity and high alkalinity indicates that acid drainage problems do not develop as a result of mining in the permit area.

Total and dissolved iron measurement values vary widely throughout the area, with the potential source being the iron contained in Blackhawk Formation cementing agents. Total iron, which varied in measurements from less than 0.01 to over 36 milligrams per liter during the observation period, tends to be somewhat directly related to the flow rate, and is associated with sediment loading. In contrast, dissolved iron tends to be much more constant.

Total manganese concentrations in the area were low, varying normally between 0.02 and .125 milligrams per liter. No distinct seasonal variations were noted.

Baseline concentrations of various constituents were normally well within the State of Utah standards for waters of the Skyline project area.

A summary documenting the water quality data in the mine area may be found in Volume 4.

2.4.3 Sediment Yield

The Skyline project area has a sediment yield which averages approximately 0.44 acre-feet per square mile per year, based on methods developed by the Pacific Southwest Inter-Agency Committee (1968) (Volume A-1, Hydrology, page 49). This converts to a total annual yield of 1.25 acre-feet of sediment to the Price River Basin and 3.07 acre-feet of sediment to the San Rafael River Basin. The majority of this sediment is yielded as suspended sediment, with only a small fraction occurring as bedload.

2.4.4 Monitoring Program

The surface water monitoring program outlined in this section is a continuation of a program approved with the original Mining and Reclamation Plan application. It incorporates practices designed to provide the baseline data necessary to validate the determination of the probable hydrologic consequences of proposed and existing mining and reclamation operations. The program also is designed to meet site specific requirements and have the flexibility for change if necessary. Surface water monitoring programs are conducted at each of the appropriate stations identified in Table 2.3.7-3 and shown on Plate 2.3.6-1. Surface water stations in Eccles Canyon were sampled more frequently than those on Huntington Creek during the initial phases of mining.

Eccles Canyon stream stations as shown on Table 2.3.7-3 and are analyzed for those constituents identified in Table 2.3.7-2 with an annual monitoring as per Table 2.3.7-1. South Fork tributary station CS-15 will be monitored for flow only beginning fall 1988. The purpose of this station is to check for subsidence effects from longwall mining.

Samples are collected annually from all surface water stations and analyzed as outlined in Table 2.3.7-1. These samples are collected during summer low flow in the month of August or September each year.

As mining has progressed towards Huntington Creek, seasonal samples from the five Huntington Creek stations are being collected when access permits and analyzed as outlined in Tables 2.3.7-1 and 2.3.7-2.

Sampling will continue at all surface water stations throughout the post-mining period and until the reclamation effort is determined successful by the regulatory authority. Samples will also continue to be analyzed for the parameters outlined in Tables 2.3.7-1 and 2.3.7-2 throughout the post-mining period, unless deletions in the list of parameters is determined to be appropriate.

In addition to the above outlined monitoring program, NPDES discharge permits have been acquired as necessary. Monitoring and operation of all surface water discharges are conducted in accordance with conditions of this permit. A copy of this permit (NPDES No UT-0023540) is appended to Volume A-1, Hydrology Section. The monitoring locations are shown on Map 2.3.6-1.

As required, water quality data collected from the surface water monitoring stations will be submitted to the Utah Division of Oil, Gas, and Mining. Such reports will normally be submitted within 90 days of the end of each quarter. An annual report, which will include a summary of the water quality data for the previous year, will be submitted within 90 days of the end of each year.

The Permittee conducted a search for seeps or springs in the downslope area west of the rock disposal site in the spring of 1984 and found no seeps or springs. Should surface flow occur,

surface water monitoring will be carried out, though the exceedingly ephemeral nature of the water flows in the area will necessarily affect the frequency of sampling. The Permittee commits to the following surface water monitoring program when surface flow is present.

1. Four monitoring stations will be established: two stations on the drainage from the east and two sites on the drainage from the south. Stations will be located both above and below the rock waste disposal site in each of the drainages. (See Drawing 2.3.6-1.)

2. When flow is present, these stations will be monitored, when accessible, at the same frequency and for the same constituents as the stations in Eccles Creek. The data will be tabulated and reported in the same manner as the Skyline water quality data.

3. The data from these stations will be evaluated for non-point source contribution from ground water aquifers. This procedure offers the best potential for detection of ground water contamination.

The Upper O'Connor seam required a breakout to improve ventilation. The breakout is on a south facing slope in a side canyon of the South Fork of Eccles Creek (see map no. 3.2.11-1). A new road was built across this canyon to gain access to the breakout area. The canyon flows water in all but the driest of years. During construction, the creek was sampled above and below the site on a daily basis. The samples were tested for total suspended solids and settleable solids as an aid in regulating construction activities and in implementing control measures. Construction related solids fluctuations were encountered throughout this phase of the project.

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2.5 HYDROLOGICAL IMPACTS OF MINING ACTIVITIES

Presented in the following subsections are summaries of the hydrological impacts of the mining activities of the Skyline project. The details backing the conclusions stated in this section and supplemental discussion can be found in the Hydrology Section of Appendix Volume A-1. Details of the consultant's flow calculations may be found in the flood plan calculations also in Appendix Volume A-1.

The potential hydrologic impacts discussed herein represent the latest information available and, generally, correspond to the consultant's original report. (See General Hydrologic Consideration Related to Coal Development and Subsequent Impacts, Vaughn Hansen Associates, February 1981, found in Appendix Volume A-1.

2.5.1 Potentially Affected Water Rights

Surface and groundwater rights in the general project area are primarily for stockwatering and irrigation. Stockwatering rights are located almost entirely and directly on the streams. The nearest irrigation rights are centered around the two areas of Scofield and in Flat Canyon, southwest of the permit area. Irrigated lands consist primarily of pasture. Only stockwatering rights are present in the Skyline permit area. Only one spring in the permit area has a filed water right. A limited number of wells are located in the general area, none of which are located directly on the property.

2.5.2 Mining Impact on Water Quantity

Due to the high shale content of the Blackhawk Formation, recharge to the deep ground water system through the Blackhawk Formation is slow. Fractures in the formation seal readily due to swelling of the bentonitic shale when wet. As a result, the impact of mining (including subsidence) on the quantity of water

in the permit area will be minimal. (A discussion of the mining impacts on the aquatic resources may be found in Section 2.8.) When subsidence occurs, the subsidence cracks should seal rapidly, preventing the deep percolation and subsequent loss of water previously destined for springs and other water sources. The location of a spring may change by a few feet, but no significant loss of water is anticipated. The sealing of potential cracks will be accelerated where subsidence occurs under stream bodies, due to the natural deposition of silt in the stream channel along with the swelling of the shale.

Although the Blackhawk Formation is saturated above the proposed mine workings, a rather small quantity of water is being encountered in the mine due to the impermeable nature of the formation, which limits the recharge rate and the ability of the rock to readily yield water. The inflow to the mine has been about 10-15 gallons per minute per active face, with mine entries generally dry approximately 100 to 200 feet up-dip from the face. Some roof bolt holes, however, continue to flow up to 2 GPM for an extended period of time.

Water encountered in the mine is either utilized underground as processed water or is pumped from the mine. (Procedures for handling of mine water are discussed in detail in Section 3.2.

Indigenous water associated with the coal will be removed from the area. This, however, will represent only a small fraction compared to the water flowing from the Wasatch Plateau. The water pumped from the mine is added to the flow of Eccles Creek and has a positive and stabilizing effect on the aquatic systems.

The construction of surface facilities utilized in conjunction with the Skyline Mines (yard areas, roads, conveyor lines, etc.) resulted in temporary increases in the suspended sediment concentration of the adjacent stream. However, because of the regulatory requirement that sediment control measures be provided for all areas of surface disturbance, concentrations of suspended material were significantly reduced. Minimization efforts, however, met with varying degrees of success.

Over long periods of time, groundwater in the Wasatch Plateau can be expected to flow towards the lowlands if not removed, passing through saline shales and emerging to augment streamflow with a dissolved solids content that significantly exceeds the concentrations found in the headwaters area. Because the Skyline Mines will act as interceptor drains, the groundwater that is brought to the surface from the mines has a much lower dissolved solids content than would have existed if the water was to continue its downward movement through shaley layers. Thus, the mines will have some beneficial impact on the chemical quality of water in the region. The increased flow, particularly during the summer low flow period, appears to benefit the Eccles Creek fishery by creating flow and temperature stabilization. Although suspended sediment and oil and grease may increase at the mine mouth, these constitutents are removed during the treatment processes described in Section 3.2.

Because of the high alkalinity and low acidity concentrations in the area (differing normally by two orders of magnitude), acid drainage problems do not occur as a result of mining. This is supported by the fact that coal in the area has a low sulphur content.

2.5.3 Alternative Water Supply

OSM Regulation 30 CFR 783.17 requires that alternative sources of water supply be identified if mining impacts will result in the contamination, diminution, or interruption of existing sources. Because no significant adverse hydrologic impacts are expected as a result of mining in the Skyline permit area, no individual or collective source of alternative water supply has been identified.

However, the Permittee presently owns 248 acre-feet of water rights in the Scofield Reservoir. Of these water rights, water sufficient for the Permittee's needs has been exchanged for rights from wells located near the mine site and at the mouth of Eccles Canyon for use in culinary and dust suppression water systems. Of this 248 acre-feet, a 148 acre-foot exchange has already been approved by the State Engineer of Utah.

The Permittee will replace the water supply of any land owner if such a water supply proves to be contaminated, diminished or interrupted as a result of the Skyline mining operations.

2.6 CLIMATE

The climate of the Skyline Mines area is typical of subalpine areas in the central region of Utah. In general, the summer season is short with maximum temperature readings (F°) in the 80's and minimum readings in the 40's. Fall and spring seasons are erratic in nature with snow precipitation occurring as early as September and as late as June. Winters are often severe, with recorded temperatures of -30°F or below. Snow frequently remains on the ground from November until June. Pre-construction meteorological studies performed for the permittee show that the prevailing wind direction within the general area of the Skyline Mines site is south-southwest. Winds are generally parallel to the canyons except during storm periods. Seasonal wind direction variance is minimal.

At the minesite, a U.S. Weather Bureau station has been established and average monthly temperatures range from 15°F in January to 60°F in July. Extreme temperatures are about -40° and 80°F. Average annual precipitation is 25 to 30 inches, including 8 inches of rainfall from May to September. Potential evapotranspiration is less than 18 inches per year. Snowfalls generally occur during the months of October through May. During this period, snow accumulation averages 4.5 feet. Maximum snow depth to be expected is 9 feet. Although no site specific weather data is collected at the railroad loadout area and the waste rock disposal area, observations indicate that they receive less moisture than the minesite and therefore are assumed to receive less than 25 inches of moisture each year for bonding purposes.

2.6.1 Climatological and Air Quality Monitoring Program

To provide climatological and air quality information specific to the Skyline Mines site area, the Permittee contracted with Radian Corporation of Austin, Texas, to conduct an air monitoring program for a one-year period beginning January, 1979.

The monitoring program, designed to generate site specific data of the air quality and meteorological conditions of the Skyline area,involves three separate monitoring phases - preoperational, construction, and operational (life of the mines). The preoperational monitoring program included continuous meteorological monitoring of the Skyline site area for a 12 month

period and 24-hour total suspended particulate (TSP) monitoring every third day for a period of six months (beginning May, 1979). Two locations, Boardinghouse Peak and Eccles Canyon, were selected as monitor station sites for the preoperational phase monitoring program.

On July 1, 1984, an approved NOAA weather station was placed in operation at the portal area. Operators were trained by the National Weather Service and are continuing to record temperature and precipitation data. These data are adding to the available baseline started by Radian Corporation. All climatological data obtained, including that taken at the mine, are published monthly by the National Climatic Data Center, Ashville, North Carolina. The climatological summaries presented in this document are taken from the NOAA reports of 1981 through March, 1986. A summary of these data is included in Volume 4. The complete Radian Corporation report may be found in the Air Quality Section of Appendix Volume A-1.

All equipment utilized by Radian in the performance of air quality and meteorological sampling was approved by the EPA for use in similar applications. Following are detailed discussions of the preoperational monitoring programs conducted at each site.

Boardinghouse Peak Monitoring Program

The lack of electrical power at the Skyline Mines site during the monitoring program required the selection of Boardinghouse Peak as the location of the continuous monitoring system. Boardinghouse Peak is 2 miles to the south of the Skyline portal site. On Boardinghouse Peak, an existing shelter with sufficient electrical power was adapted to house the data acquisition systems. At the Boardinghouse Peak site, the monitoring program included:

- Continuous meteorological monitoring of wind speed, wind direction, and temperature at a ten meter level.

- Solar radiation and rainfall/snowfall are recorded continuously at ground level.

- A battery-powered mechanical weather station for redundancy and assuring data gathering in the event of power failure.

- Twenty-four hour high volume particulate samples collection every third day (beginning on or about May 1, 1979) with monitoring to continue for a six month period.

- Noise monitoring, performed twice, once in the spring and again in the fall of 1979. Each field sampling involved a three to four day sampling period.

- Upper air studies of wind speed, wind direction, temperature and air pressure performed once each month using a Radiosonde-type system.

Eccles Canyon Monitoring Program

To obtain data at the location of the Skyline portal site, Radian Corporation positioned a battery-powered mechanical weather station within the boundaries of this site. The mechanical weather station monitors wind speed, wind direction and temperature. The monitoring program in Eccles Canyon was designed to coincide with the monitoring periods of the Boardinghouse Peak program.

Radian Corporation also monitored TSP at various locations in Eccles Canyon to provide site specific data for the Skyline portals. Monitoring at the portal site location, which lacked continuous electrical power, required portable electrical generation and supervision for each 24-hour sample period. Ten samples were taken coinciding with sampling days at the Boardinghouse Peak facility. TSP samples were also collected on a three day basis at the mouth of Eccles Canyon, near Clear Creek, Utah, which is the location of the train load-out facilities for the Skyline facilities for the Skyline Mines.

2.6.2 Synopsis of Data

A summary discussion of the Radian Corporation report follows.

The results of the meteorological and air quality studies indicate that the air quality of the Skyline project area is very good to excellent. Air in Eccles Canyon during 1979 was of poorer quality due to an unpaved dirt road leading from the mouth of the canyon up past the proposed portal site. The Permittee, in conjunction with the State of Utah, through the Utah Resource Development Act, paved this road in 1982 to accommodate traffic, which resulted in a reduction of particulate emissions from road traffic.

Presented below is a summary of the monitoring program results from January 1, 1979 through December 31, 1979.

Boardinghouse Peak - Monthly averages

	Low	High	Average
Wind Speed (MPH)	11.7	17.1	14.7
Temperature (^{o}F)	18.4	57.6	37.3
Pyranometer (Langleys)	151.2	678.5	413.5
Net Radiometer (Langleys)	31.5	294.1	150.2
Total Suspended Particulates (ug/cu.m)	23.0	49.5	30.3

Eccles Canyon - Monthly Averages

	Low	High	Average
Wind Speed (MPH)	1.5	3.5	2.5
Temperature (^{o}F)	-1.4	63.2	35.5

Clear Creek

The TSP sampled at the Clear Creek monitoring station averaged 61.7 ug/cu.m.

Upper-Level Atmospheric Studies

During the upper-level atmospheric studies several different weather conditions occurred. The studies determined the relationship of the topographical features and temperature and wind flow effects. The findings were:

- Deep surface-based temperature inversions were detected in Eccles Canyon during several morning pilot balloon runs. These inversion layers ranged in depth from about 100 meters to 500 meters.

- During the July sampling period, solar radiation was found to result in large increases in temperatures near the surface of Eccles Canyon, while at the Boardinghouse Peak site, the daytime increase in temperature was relatively small.

- Most of the Eccles Canyon afternoon soundings during the July sampling period showed that, even at heights well above the tops of the canyon walls, temperatures were notably warmer than during the morning at the same levels, indicating that heating of the canyon floor on sunny days influenced temperatures at considerable heights above the canyon floor.

- Daytime up-valley winds in Eccles Canyon, which were typically east-northeasterly, were found to be quite shallow (generally less than 100 meters). With increasing height above the canyon floor, wind directions quickly turned toward the direction of flow at levels above the canyon. While many of the soundings were conducted when daytime up-valley flows were occurring, only one sounding was conducted early enough in the morning for the nocturnal down-valley flows (generally westerly) to still be present. However, the sounding data showed that the down-valley flow was quite shallow, probably less than 100 meters.

- The daytime up-valley flows tended to be overridden by the large scale flow over the region and by channeling effects during cloudy conditions and/or when the large scale flow was relatively strong.

- Wind speeds generally increased with height above the floor of Eccles Canyon.

2.7 VEGETATION

2.7.1 General Description

Complete vegetative baseline data are in Appendix Volume A-2 and entitled, "Report of Vegetation, Plant, Community Analysis, Threatened and Endangered Plant Species, Soils and Reclamation Plans".

The Skyline project area and adjacent areas occur within an aspen-spruce-fir phase of the boreal forest biome, with representatives of cool desert shrub, riparian, and, to a lesser extent, the mountain brush community types present as significant, though minor, components.

The spruce-fir community, a type mainly on north-facing slopes, is dominated by Engelman spruce and subalpine fir, with variants supporting admixtures of aspen and wet meadow subtypes characterized by species of sedges and grasses. The wet meadow sub-types constitute approximately six percent of the project area, but when added to the spruce, fir, aspen community composes approximately 40 percent of the entire area. The forest floor is frequently subjected to dense shade.

The aspen community is a forb type with Populus tremuloides as the principal tree species. Only nine percent of the project area is dominated singularly by aspen. South-facing slopes and ridges are the main localities of this community. It is transitional, however, to the aspen, grass, forb, elderberry community which occupies approximately 33 percent of the lease area. The aspen, grass, forb, elderberry communities combined occupy 42 percent of the project area.

Species diversity in the aspen community is great. The main ground layer species are the same as those in the aspen, grass, forb, elderberry community with which the aspen community is transitional. More than 80 species of plants are present in the aspen community.

Eccles Canyon is vegetated by similar plant communities as described for the rest of the project.

Plate 2.7.1-1 shows the locations of the various plant communities. Plate 2.7.1-2 shows the location of the various vegetative reference areas. The reference areas are marked at each corner with a steel fence post which is painted orange. The limits of the surface disturbance is shown on Plates 3.2.1-1, 3.2.1-3, 3.2.3-3 and 4.16.1-1B. A species list by plant community with a discussion of the methods used in the community analysis are presented in the Appendix Volume A-2.

2.7.2 Community Analysis - Results and Discussion

Greatest diversity of species was observed in the reference area transects occupied by aspen, and by the grass-forb-elderberry with which it is intergraded. Those two types includes from 23 to 32 plant species in transects and in the productivity plots. Spruce-fir transects yielded from 17 to 26 species of plants and the riparian communities 15 to 26 species. The community type with least diversity in the reference areas was the sagebrush community, ranging from 10 to 14 species.

Sites in the reference areas differed in the production of herbage which can be eaten by livestock. Aspen and grass-forb-elderberry communities vary from 451.8 to 835.5 pounds per acre. Sagebrush exceeded that productivity with approximately 917.1 pounds per acre. Spruce-fir is assumed to be non-productive because of shading and poor representation of species in the forest floor. The riparian habitats measured in the reference areas yielded only 180.5 and 286 pounds.

The importance of the aspen and grass-forb-elderberry communities, which occupy approximately 42 percent of the permit area, is seen in the comparison of area occupied by that community and that occupied by other types.

The sagebrush-snowberry, sagebrush, and fringed sagebrush occupy only 13 percent of the project area. They occur mainly on shallow soils. Collectively they are diverse, with approximately 90 species of vascular plants. Fringed sagebrush occurs on only one percent of the area and is confined to ridge crests at high elevations. Only 16 species were noted in this type area.

The riparian community type consists of continuous strips of vegetation along the major drainages, as in the valley bottoms of Huntington Creek, Eccles Creek, and other minor tributaries. The community also occupies spring lines, seeps, and perennial channels down slope from minor springs, as in the valley of Huntington Creek. Dominant species on the wet lands are red top, silver sagebrush, sedge species, grasses, and numerous forbs.

Despite the importance of spruce-fir and spruce-fir-aspen community in the total vegetative cover of the permit area, these types are of little value in forage production. They are of value, however, in the protection of both wildlife and livestock. The dense shade provides cool bedgrounds and wildlife cover, while main grazing areas are in adjacent aspen and grass-forb-elderberry communities.

Wood production of aspen is equalled by spruce and fir species. All types produced an annual growth increment averaging 4.2 mm per year. Aspen occurs in a density of only one-third the number of trees per acre when compared to spruce and fir. Spruce and fir production is most significant as a timber source, and historically has contributed substantially to lumber production in the permit area and in Eccles Canyon, where scars of drag roads provide evidence of lumbering operations.

Sagebrush and snowberry-sagebrush communities are productive (917.1 pounds per acre) and extensive, representing approximately 13 percent of the permit area. Despite the relatively small area occupied, the type is of much importance to grazing and browsing animals.

Relative vitality of tree stands indicates that aspen sites are composed of different size classes: young, moderate, and old. This seems to assure the continuity of the aspen community. Where aspen grows in an admixture with spruce and fir, it appears that the woodland is successional with trends towards dominance by the coniferous species. In more xeric sites, the stand of aspen is composed of trees of all age and size classes. In that site, there is a substantial understory of chokeberry which is subordinate to the aspen overstory.

The composition of the spruce-fir community at the portal-yard area indicates a climax forest dominated by spruce, with young, intermediate, and old trees being represented. Fir trees are represented by a large number of seedlings, but the lack of trees of intermediate and older ages suggests that fir is not successful in dominating the forest type.

Total productivity of the areas to be disturbed is 519 animal unit days. This area will be lost to production during the active period of mine operation. Assuming a grazing period of three months (July, August and September), the reduction is then equivalent to the loss of thirteen cow-calf unit months.

2.7.3 Threatened and Endangered Plant Species

Passage of the Endangered Species Act of 1973 provided the legal basis for establishment of lists of endangered and threatened plant species. Such lists were prepared under direction of the Smithsonian Institution, and were published subsequently in the Federal Register (40:27824-27924. 1975; and 41:24524-24572. 1976). Work on endangered and threatened plants of Utah has been reviewed by Welsh, Atwood, and Reveal (1975), and reevaluated by Welsh (1978). The region under investigation was included in a

report on threatened and endangered species of the Central Coal Lands of Utah (Welsh, 1976).

A survey of the literature has failed to indicate the presence of any of the proposed endangered or threatened plant species in the area. This lack of critical or unique species is supported by the field surveys of the lease areas during initial investigation.

The region was searched on a quarter section by quarter section basis, with each community type within each quarter section being traversed. All community types were systematically searched by study teams walking parallel transects through the larger communities, and by individual search in the smaller vegetative types. No threatened or endangered species were encountered in either the permit area or surrounding areas.

2.7.4 Potential for Reestablishing Vegetation

Disturbed areas were present in the original proposed permit area, due to a small underground mine in Eccles Canyon which was abandoned long ago. The area had been slightly treated to reclamation procedures.

Crested wheatgrass, intermediate wheatgrass, smooth brome, orchard grass, tall oatgrass, bulbous wheatgrass, and bluegrass are introduced species which are now naturalized in the area. Numerous examples of natural re-establishment exist in the portal area and along Mountain Fuel Company pipeline corridor which transverses the ridge dividing Huntington Creek and Clear Creek drainage. Native species noted in the disturbed areas include yarrow, Artemisia species, aster, sedge, rabbitbrush, thistle, penstemon, bluegrass, cinquefoil, western coneflower, red elderberry and horsebrush.

Sparingly-vegetated sandstone ledges occupy approximately one percent of the project area. Species present on the ledges include serviceberry, aster, sedge, ferns, and others which are uncommon in the more densely-vegetated communities.

Revegetation efforts on slopes over 60 percent have been disappointing. On these steep slopes at the mine site several different techniques have been used on different occasions with very little success. These techniques have included burlap netting, hydromulching, hand seeding and transplanting of shrubs and seedlings. Revegetation on these slopes may have to be postponed until final reclamation when the slope angle will be altered making successful revegetation much more probable.

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2.8 AQUATIC WILDLIFE RESOURCES

Introduction

Both Huntington Creek and Eccles Creek flow through the project area and both provide habitat for reproducing resident populations of cutthroat trout. Cutthroat trout from Electric Lake use upper Huntington Creek for spawning and nursery activities. Scofield Reservoir, although stocked with rainbow trout exclusively, has numerous cutthroat trout which have been produced in Eccles Creek and other tributary streams such as Winter Quarters, Woods Creek, Lost Creek, Fish Creek, Pondtown Creek, Pleasant Valley Creek and possibly Boardinghouse Creek.

Eccles Creek

Eccles Creek is a small mountain stream draining west to east into Pleasant Valley Creek which flows north approximately 3 miles where it empties into Scofield Reservoir. Discharges in Eccles Creek are frequently as low as 2 cfs during late summer, fall and winter months; and high flows seldom exceed 50 cfs, even at the creek mouth. Water temperatures of streams such as Eccles Creek fluctuate because of turbulence from the rough channels. During November to March, water temperatures remain between 0-2°C. In the summer, water temperatures often fluctuate from 12-15°C daily although high temperatures seldom exceed 20°C.

Through natural erosion of mudstone, sandstone and shale deposits, Eccles Creek has periods of high total suspended solids (sedimentation). This occurs, however, during periods of high runoff when the stream waters have sufficient energy (velocity) to carry the fine sediments out of the canyon rather than depositing them on the coarser substrate materials. During normal runoff years, there are numerous clean trout spawning gravel beds in Eccles Creek. Maintenance of this resource is dependent upon a continuation of flow, adequate substrate, food base and water quality conditions.

The existing aquatic species of Eccles Creek, fish and macroinvertebrates, have adapted to tolerate natural temperature fluctuations and sediment loads. The macroinvertebrate communities of Eccles Creek have a high diversity of species representing all major trophic groups. There are species found only in high quality water streams indicating the high water quality of Eccles Creek. There are also environmentally resistant taxa present. This high diversity represents a resiliency to environmental change, especially short term changes.

Upper Eccles Creek above the Valley Camp Mine Road (at sampling stations ECO3, ECO2, UPMF, UPSF, Figure 2.8-A), have numerous taxa of macroinvertebrates found only in high quality waters and stable habitats. Lower Eccles Creek (Stations ECO4 and ECO5) has a more tolerant macroinvertebrate community with taxa tolerant to sedimentation dominating the community.

Cutthroat trout maintain naturally reproducing populations in Eccles Creek from the National Forest boundary downstream to the creek mouth. The fish have upstream migration access to a point just above Whiskey Gulch where a series of beaver dams frequently block upstream movement. There are no fish in the upper forks of Eccles Creek.

Construction activities caused sufficient sediment loading into Eccles Creek resulting in a significant reduction in fish populations. Cooperative efforts with DWR, however, resulted in habitat improvement by 1986 sufficient for near recovery of these populations. (See DWR report, "Recovery of the Cutthroat Trout (Salmo Clarki) Fishery in Eccles Creek, Utah From Coal Mining Impacts", Donaldson & Dalton, Volume A-3, under Aquatic Wildlife.)

Huntington Creek

Huntington Creek above Electric Lake is a small mountain stream draining north to south into Electric Lake. Discharges are frequently as low as 1.5 cfs, with spring high flows sometimes reaching 100 cfs. Water temperatures fluctuate during summer months, although daily highs seldom exceed 20°C. During winter months water temperatures seldom exceed 2°C and the stream is nearly completely iced over.

Through natural erosion of existing stream channel geological formations and adjoining hillsides, Huntington Creek waters have high loads of fine sediments during runoff periods. This occurs

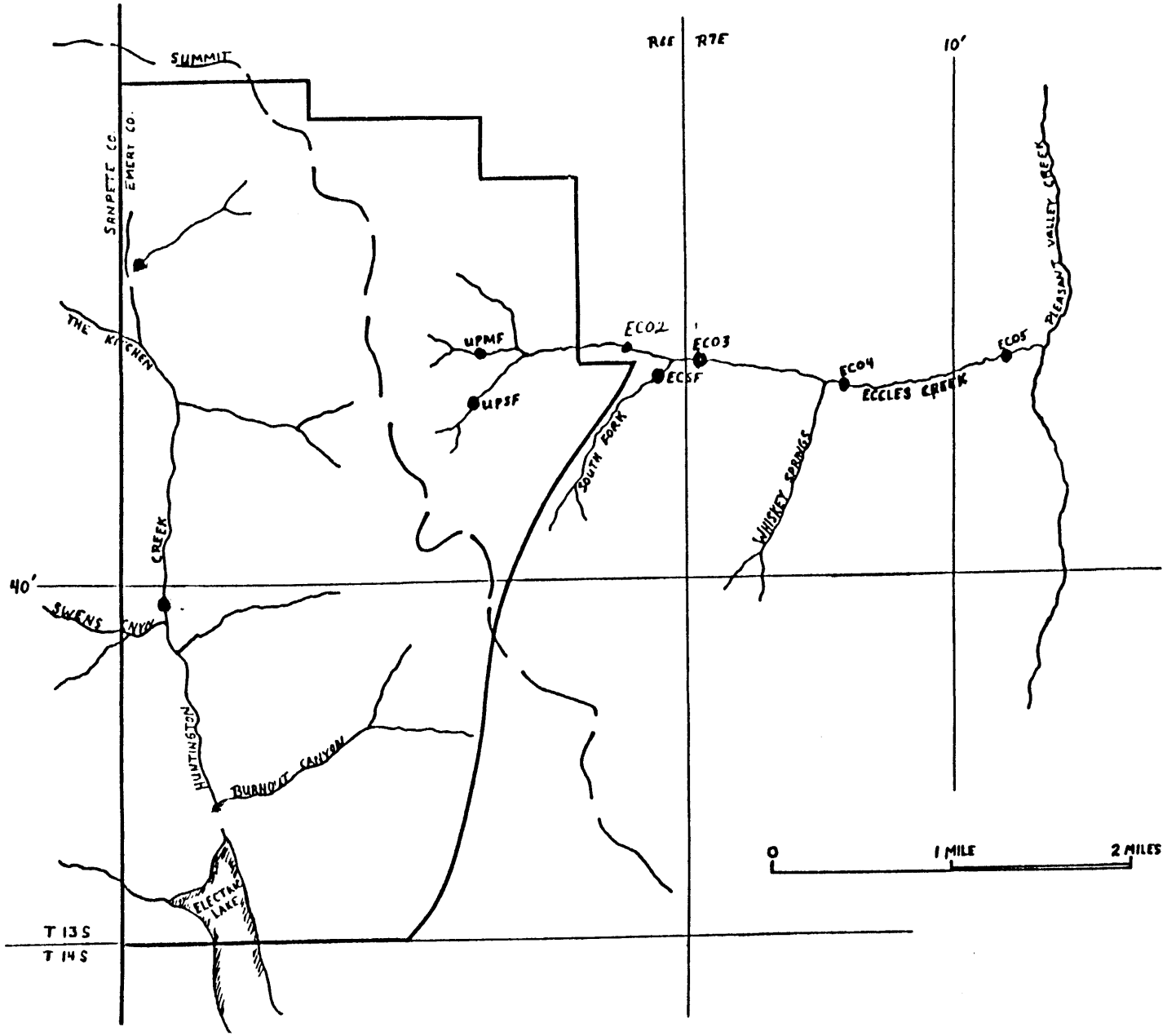


Figure 2.8-A. Eccles Creek and Huntington Creek, Carbon and Emery Counties, Utah, shown in relation to the Skyline Project, Coastal States Energy Company. Study stations are shown with the station codes used in the report.

when runoff is high and these sediments are carried into Electric Lake rather than being deposited on spawning gravels or other coarse substrate materials. Huntington Creek has numerous clean trout spawning gravel beds and the amount of fine sediments is not high enough to hinder spawning.

Huntington Creek has a diverse aquatic community with macroinvertebrate taxa representing all trophic levels. The successful cutthroat trout spawning and high number of resident trout evidence the high quality waters and habitat of Huntington Creek plus the ability of the macroinvertebrate community to support quality fisheries. Cutthroat trout, according to Utah Division of Wildlife Resources (UDWR) surveys, are increasing in numbers in Huntington Creek above Electric Lake. Trout produced in Huntington Creek provide an important part of the total number of fish in Electric Lake.

Project Impacts on Fisheries Resources

The surface facility disturbances in the portal area encroached on sections of all three upper Eccles Creek forks. In order to reduce sedimentation of these stream segments and the main stream, the tributaries and a section of Eccles Creek proper immediately below the tributary confluences were diverted into closed culverts. This modified approximately 4,200 feet of total stream habitat but did not reduce available fish habitat since fish were not found above the U.S. Forest boundary, prior to the diversion. Downstream drift of macroinvertebrates from the upper reaches of these forks still occurs as before.

At the coal loadout facilities near the mouth of the canyon (Station ECO5), approximately 600 feet of stream was moved to the north into a new channel. The new channel is 100 feet shorter but has nearly the same gradient (3 feet additional vertical drop/1,000 feet horizontal channel).

Degredation of Eccles Creek between the National Forest boundary

and the coal loadout facilities should continue to be minimal since road and conveyor plans were developed and are being implemented to minimize effects on the stream.

Water being discharged from the mine is augmenting the Eccles Creek stream flow. This increased stream flow is especially beneficial during summer months when normal stream flows are low. Water temperatures are also moderated by this increased flow.

There should be little impact on Huntington Creek above Electric Lake. Impacts to date have been associated only with the construction of a new UDOT highway. Sediment control measures minimized the impact during the construction activity.

2.8.1 Aquatic Monitoring Program

An aquatic monitoring program has been conducted to meet the intent of the requirements of UMC 783.20. The main purpose of the monitoring program is to gain sufficient knowledge to prevent and/or minimize impacts through wise project planning. Monitoring has: (1) described existing resources; (2) detected existing perturbations; and (3) provided the basis for wise project planning, operation and resource restoration.

The biological (macroinvertebrate and fish) and habitat (sediment and channel surveys) monitoring stations on Eccles Creek are shown in Figure 2.8-A. Sampling dates are limited by weather, but June and late October samplings are usually possible. Two seasonal sampling dates per year are required to differentiate natural seasonal intrastand variance from impact induced changes. Samples were taken annually through the project planning and early development. The biological sampling has been performed in conjunction with normal stream water monitoring so that comparative analysis is possible.

Seven stations on Eccles Creek were selected in relation to impact areas, UDWR fish sampling stations, existing macroinvertebrate and sediment stations, and water quality monitoring stations. At each station on the scheduled sample date (Table 2.8-1), four macroinvertebrate samples were taken from selected optimal substrates with a modified Surber Sampler. Three sediment samples were taken from potential spawning grounds. Replicate samples were taken to enable an analysis of variance between samples.

Habitat surveys, following methodologies used by USBLM and USDFS fisheries habitat specialists, were made annually throughout construction at critical Eccles Creek stations (Table 2.8.1). Measurements included: stream bank stability, channel substrate composition; stream gradient; riparian vegetation (type, relative cover); water width, depth and velocity at various discharges (Q) and channel width and tortuosity.

Fish surveys are conducted by UDWR personnel out of the Price office. Fish surveys are usually made in August so year class I fish will be large enough to sample and young-of-year fish are large enough to observe. Fish are measured as to total length and weight, counted and then released. These data are compared with earlier UDWR collection records, thus illustrating present fish population conditions compared with years past.

Table 2.8-2 summarizes the stream monitoring data. A summary of the sediment composition data, taken in accordance with the schedule on Table 2.8-1, is shown on Table 2.8-3. The UDWR reports have been added to the Aquatic Wildlife section of Volume A-3.

Future aquatic monitoring is planned only on an as needed basis. Need will be established in conjunction with UDWR personnel and will be required only in case of a major perturbation in fish

populations or other anomalous conditions. The Permittee will cooperate with UDWR in the investigation of any such condition. This approach to future monitoring is consistent with the requirements recommended by the UDWR, Price office.

TABLE 2.8-1

STREAM RESOURCE MONITORING SCHEDULE FOR ECCLES CREEK

	STATION		
Survey	June	August	October
Macroinvertebrates	Eccles Creek UPSF, UPMF, ECO2, ECO3, ECSF, ECO4, ECO5	None	Same as June
Fish	None	Eccles Creek ECSF, ECO3, ECO4, ECO5	None
Sediments	Eccles Creek ECO2, ECO3, ECO4, ECO5	None	Eccles Creek ECO2, ECO3, ECO4, ECO5
Habitat	Eccles Creek ECO2, ECO3, ECO4, ECO5	None	None

Aquatic Monitoring Summary

Aquatic monitoring data have been accumulated for a period of six years. Summaries of these data are presented in Tables 2.8.2 and 2.8.3. Backup data for these summaries, including the consultants original report and subsequent summary reports, may be found in Appendix Volume A-2.

TABLE 2.8-2

DESCRIPTORS OF THE BENTHIC COMMUNITIES AT SEVEN STATIONS ON ECCLES CREEK AND ITS MAJOR TRIBUTARIES, CARBON COUNTY, UTAH

Date	CTQa	CTQd	# taxa	H	#/m2	Standard Deviation	gm/m2
UPSF - Upper South Fork Eccles Creek above mine portal and culvert							
Jun 79	69	72	30	3.800	10,176	9,072	--
Jun 80	74	77	22	3.715	7,728	2,470	1.39
Aug 80	62	64	33	3.453	2,892	868	0.81
Nov 80	71	71	31	3.855	14,834	6,898	4.45
Jun 81	67	69	23	3.619	10,545	4,437	1.31
Sep 81	64	63	32	3.453	31,185	20,570	3.19
Nov 81	66	66	32	3.197	36,788	2,358	6.67
Jun 82	68	70	29	3.850	4,608	1,961	1.58
Aug 82	68	71	33	3.406	24,457	9,715	8.87
Oct 82	70	70	33	2.634	34,868	21,970	2.50
Oct 83	66	66	34	3.788	29,477	13,557	3.70
Jun 84	67	67	35	3.399	13,821	4,543	2.70
Sep 84	71	72	31	2.908	24,842	14,305	6.80
Oct 84	68	66	33	2.523	42,666	23,968	3.90
Jun 85	66	69	32	3.173	28,778	6,224	4.30
Jul 85	64	65	28	3.573	13,378	7,997	5.30
Oct 85	55	55	28	2.873	27,438	2,180	1.70
UPMF - Upper Middle Fork Eccles Creek above mine portal and culvert							
Jun 79	67	68	30	3.150	8,449	2,650	--
Jun 80	72	74	26	3.884	4,019	2,029	0.62
Aug 80	63	63	33	3.114	17,090	14,450	1.59
Nov 80	70	64	38	3.844	44,127	25,316	1.44
Jun 81	65	68	35	3.301	41,684	9,427	4.15
Sep 81	70	70	34	3.542	50,134	47,174	4.79
Nov 81	61	64	32	3.148	65,792	13,774	3.66
Jun 82	68	69	30	3.862	8,113	3,814	1.87
Aug 82	65	65	33	3.199	33,332	11,605	12.60
Oct 82	59	59	38	3.427	55,457	10,794	10.78
Oct 83	61	64	27	1.852	46,497	10,006	6.10
Jun 84	66	68	24	1.848	13,316	2,325	1.00
Sep 84	59	63	33	2.959	26,338	13,028	5.10
Oct 84	59	60	28	2.118	54,411	12,092	10.20
Jun 85	62	66	29	3.043	13,991	4,100	3.30
Jul 85	57	58	29	3.391	11,858	6,664	3.90
Oct 85	56	53	29	2.467	41,512	4,204	5.20

Table 2.8-2 (Continued)

Date	CTQa	CTQd	# taxa	H	#/m2	Standard Deviation	gm/m2
EC-02 - Eccles Creek immediately below mine portal and mouth of culvert							
May 79	66	66	36	3.510	12,339	5,138	--
Aug 79	65	65	42	1.964	73,181	22,640	3.26
Oct 79	64	66	32	2.534	17,761	11,601	2.61
Jun 80	64	63	27	3.389	4,350	1,874	1.57
Aug 80	68	69	31	3.468	5,232	1,253	0.44
Nov 80	66	69	30	3.020	9,745	2,414	0.54
Jun 81	64	63	21	2.173	11,274	4,645	2.20
Sep 81	71	73	30	2.554	19,077	19,191	1.09
Nov 81	80	84	24	3.970	2,370	1,418	0.51
Jun 82	72	71	30	2.411	6,053	4,898	1.18
Aug 82	64	69	26	2.514	7,798	4,659	1.75
Oct 82	70	72	30	1.838	28,718	16,615	6.37
Oct 83	70	74	23	3.746	2,556	917	3.30
Jun 84	67	71	21	1.040	14,843	6,779	2.80
Sep 84	70	73	29	2.923	4,070	719	1.70
Oct 84	66	69	28	2.142	11,190	2,263	3.80
Jun 85	71	74	22	2.849	5,544	1,845	1.70
Jul 85	65	67	24	2.770	13,758	5,891	3.90
Oct 85	65	69	23	2.037	13,391	1,040	1.60
EC-SF - South Fork Eccles Creek below EC-02 and above EC-03							
May 79	59	60	36	3.510	9,321	7,243	--
Aug 79	64	66	35	3.322	17,773	10,151	1.53
Oct 79	68	65	37	3.289	10,453	4,180	1.51
Aug 80	69	68	38	3.134	6,994	4,681	1.87
Oct 80	61	69	33	2.634	17,243	17,178	0.73
May 81	66	69	29	3.408	3,532	1,539	0.47
Sep 81	62	65	40	2.681	39,070	26,699	7.68
Jun 82	64	62	24	2.939	6,136	2,394	2.58
Aug 82	61	63	29	2.811	20,460	8,987	6.59
Oct 82	63	64	33	2.572	38,228	15,785	11.83
Oct 83	64	64	36	2.607	14,276	15,120	3.70
Jun 84	62	61	29	2.483	13,278	5,901	2.10
Sep 84	59	59	38	2.808	27,739	9,145	11.20
Oct 84	58	59	32	1.900	71,992	35,479	10.50
Jun 85	66	65	35	2.699	15,852	3,160	5.30
Jul 85	58	57	30	2.942	17,567	11,776	10.80
Oct 85	52	53	29	2.445	34,540	3,327	5.10

Table 2.8-2 (Continued)

Date	CTQa	CTQd	# taxa	H	#/m2	Standard Deviation	gm/m2
EC-03 - Eccles Creek below South Fork and above Whiskey Springs							
May 79	65	62	27	2.450	18,093	8,455	--
Aug 79	55	44	30	2.743	23,247	10,395	3.07
Oct 79	63	61	34	2.892	15,871	11,841	1.40
Apr 80	70	65	23	2.407	26,251	5,119	2.03
Aug 80	70	64	23	2.472	6,873	4,914	0.73
Oct 80	57	57	34	1.904	58,069	31,108	3.95
May 81	73	74	23	3.201	3,882	3,136	0.58
Sep 81	75	79	24	1.383	13,585	4,717	1.01
Jun 82	80	81	15	2.688	619	384	0.18
Aug 82	71	73	26	2.424	11,193	4,389	7.56
Oct 82	69	72	29	2.107	16,008	16,189	2.62
Oct 83	68	65	28	3.567	4,931	1,120	2.90
Jun 84	66	69	29	2.106	15,790	9,154	1.60
Sep 84	63	63	25	3.086	2,749	911	2.10
Oct 84	57	61	25	2.228	10,615	5,188	1.50
Jun 85	59	60	21	2.155	7,231	2,697	3.50
Jul 85	59	60	26	1.869	16,789	7,024	2.20
Oct 85	60	62	22	1.619	25,781	1,655	0.80
EC-04 - Eccles Creek below Whiskey Springs and Belina Road							
May 79	63	62	35	2.450	11,634	7,222	--
Aug 79	61	62	37	3.060	25,273	10,619	2.29
Oct 79	60	62	39	2.227	34,233	22,843	2.16
Apr 80	61	61	28	2.301	13,420	11,040	2.25
Aug 80	70	67	29	2.676	5,130	2,319	1.32
Oct 80	62	65	37	0.973	46,338	15,816	1.20
May 81	74	74	23	0.973	6,607	2,162	1.76
Sep 81	72	75	29	1.291	31,347	12,003	1.87
Jun 82	83	86	14	2.292	683	436	0.62
Aug 82	67	71	21	1.927	13,520	5,937	2.40
Oct 82	66	71	26	1.678	11,207	5,382	1.37
Oct 83	60	63	28	1.645	18,908	10,402	4.30
Jun 84	67	72	18	0.579	13,969	4,259	1.80
Sep 84	59	69	27	3.002	5,159	1,104	4.80
Oct 84	56	57	30	2.689	11,621	1,828	5.60
Jun 85	74	74	23	2.008	4,939	715	5.00
Jul 85	69	69	25	2.366	5,204	1,505	4.20
Oct 85	57	61	27	2.037	4,288	572	0.50

Table 2.8-2 (Continued)

Date	CTQa	CTQd	# taxa	H	#/m2	Standard Deviation	gm/m2
EC-05 - Eccles Creek at mouth of canyon (quantitative habitat study site)							
May 79	59	59	28	2.280	18,661	12,773	--
Aug 79	74	75	21	2.590	2,526	1,066	0.55
Oct 79	65	70	32	2.155	14,308	6,806	3.49
Apr 80	73	76	28	2.319	12,560	3,907	3.70
Aug 80	64	71	24	2.057	6,085	1,851	1.76
Oct 80	59	61	33	1.865	34,303	16,125	1.42
May 81	58	64	26	1.441	9,870	2,460	2.44
Sep 81	59	65	27	2.544	15,909	6,457	3.91
Jun 82	79	84	14	1.863	1,216	332	0.49
Aug 82	70	76	16	1.363	17,609	7,710	3.11
Oct 82	70	73	24	0.990	22,631	5,258	6.12
Oct 83	75	79	19	2.160	6,047	2,547	0.80
Jun 84	75	81	16	1.042	5,431	2,730	0.90
Sep 84	71	72	23	0.828	41,232	5,591	2.60
Oct 84	67	67	21	0.615	51,680	19,698	4.20
Jun 85	70	73	20	1.256	11,419	2,383	5.50
Jul 85	67	74	17	1.661	19,691	12,370	3.10
Oct 85	53	64	22	1.511	18,001	1,437	1.30

TABLE 2.8-3

SEDIMENT COMPOSITION OF GRAVEL BEDS
AT FOUR STATIONS ON ECCLES CREEK
AS PERCENT OF TOTAL MEAN WEIGHT
FOR SEDIMENTS PASSING THROUGH SIX USGS
STANDARD SOIL SIEVE SIZES

Sieve Opening (in mm)	Aug 1979	Aug 1980	Oct 1980	May 1981	Oct 1982	Oct 1983
Station ECC-02						
12.7	44.5	51.0	---	59.8	59.8	55.7
4.75	26.7	34.2	---	39.5	48.8	36.8
2.00	17.9	25.7	---	28.5	32.6	27.2
2.00	17.9	25.7	---	28.5	32.6	27.2
0.85	13.6	21.3	---	20.0	26.6	21.8
0.50	12.2	18.4	---	15.3	22.4	17.6
0.074	0.2	1.8	---	1.9	2.6	0.3
Station ECC-03						
12.7	---	55.2	58.1	73.2	65.9	59.2
4.75	---	38.8	45.8	53.9	40.9	44.8
2.00	---	29.5	39.5	40.9	31.8	37.5
0.85	---	25.3	35.1	35.0	28.8	32.5
0.50	---	22.7	29.5	31.8	26.0	23.8
0.074	---	1.8	0.4	1.9	1.6	0.7
Station ECC-04						
12.7	45.2	48.3	48.1	32.1	49.5	79.7
4.75	26.2	30.5	29.4	18.9	26.6	57.2
2.00	17.5	22.8	20.6	10.4	17.6	43.6
0.85	13.5	18.9	17.2	7.1	13.5	33.5
0.50	12.2	15.5	14.5	4.4	11.2	23.5
0.074	0.2	1.8	0.2	0.9	2.1	0.8
Station ECC-05						
12.7	50.4	43.9	41.7	38.9	46.2	53.3
4.75	29.4	28.1	21.8	19.5	33.9	31.2
2.00	20.3	22.1	16.7	13.2	28.6	20.2
0.85	15.9	18.9	14.3	10.4	24.5	14.3
0.50	14.1	14.9	12.2	7.8	20.7	9.1
0.074	0.2	1.4	0.2	1.0	2.0	0.3

TABLE 2.8-3

SEDIMENT COMPOSITION OF GRAVEL BEDS
AT FOUR STATIONS ON ECCLES CREEK
AS PERCENT OF TOTAL MEAN WEIGHT
FOR SEDIMENTS PASSING THROUGH SIX USGS
STANDARD SOIL SIEVE SIZES

	Sieve Opening (in mm)	June 1984	Oct 1984	June 1985	Oct 1985
Station ECC-02					
	12.7	66.5	64.2	54.4	69.5
	4.75	41.6	40.8	31.8	50.6
	2.00	29.2	30.6	20.5	22.6
	0.85	23.0	25.8	15.0	14.4
	0.50	18.8	22.6	11.8	11.1
	0.074	0.8	3.4	0.5	0.9
Station ECC-03					
	12.7	67.2	58.1	75.7	74.0
	4.75	47.8	39.6	47.0	51.3
	2.00	41.7	29.6	33.2	28.5
	0.85	39.3	24.1	26.0	18.1
	0.50	36.9	20.4	21.1	13.3
	0.074	1.7	2.6	1.2	2.0
Station ECC-04					
	12.7	63.6	56.5	69.1	73.5
	4.75	39.7	34.0	37.5	55.5
	2.00	27.8	22.6	25.6	31.7
	0.85	20.4	17.0	21.1	19.3
	0.50	16.4	13.9	17.0	14.7
	0.074	1.1	1.1	1.1	1.2
Station ECC-05					
	12.7	57.4	55.6	62.1	62.5
	4.75	35.4	32.0	32.3	39.5
	2.00	25.5	22.7	21.6	32.9
	0.85	21.2	18.4	17.5	23.9
	0.50	18.8	15.1	14.4	19.6
	0.074	1.4	1.5	1.1	1.6

2.9 TERRESTRIAL WILDLIFE

INTRODUCTION

Prior to any disturbance of the environment it is required that each Permittee conduct a study of the wildlife and their habitats in the mine plan area (UMC 783.20). This section summarizes the results of that study. An unabridged copy of the consultants report can be found in Appendix Volume A-2.

Purpose of Study

Prior to the study and evaluation of the Skyline Project, the Utah Division of Oil, Gas and Mining in consultative deliberation with the Utah Division of Wildlife Resources and U. S. Forest Service determined the objectives were to: (1) determine habitation and use by moose and elk of the environs in and around the Skyline project, (2) estimate use by mule deer of the canyons to be traversed by the coal conveyor, (3) determine more accurately the presence of other species of mammals, amphibians and reptiles, (4) determine habitat affinities and time of utilization by mammals, amphibians and reptiles, and (5) ensure correct knowledge of the occurrence of any endangered or high-interest species on the area of the project.

Personnel

The study was done under the direction of Drs. Clyde L. Pritchett, Associate Professor in the Department of Zoology and Curator of Mammals at the Monte L. Bean Museum, and H. Duane Smith, Associate Professor and Coordinator of Wildlife and Range Resources in the Department of Zoology, at Brigham Young University, Provo, Utah.

2.9.1 Species Status Lists

Literature and field data were summarized for all terrestrial vertebrates of concern, and the species categorized to determine

habitat affinities and high-interest species status. These results are reported in tabular form (Tables 2.9-1 through 2.9-3). They are listed according to their various ecological classifications (Dalton et al. 1978; Durrant 1952; Hall and Kelson 1959; Hayward 1967; and Hayward et al 1958). All species whose ranges appear to overlap any or all of the potential area of impact are listed. Generally speaking, the proposed project area could potentially be inhabited by about 57 mammalian, 6 amphibian and 15 reptilian species. Some of these are considered high interest species for the habitats and local area of concern and 48 percent are protected species.

Tables 2.9-1 through 2.9-3 contain listings of the vertebrate species most likely to be impacted by the mining activity and is not a listing of all area inhabitants. A more complete listing, including small birds, may be found in the Dalton et al 1978 reference copied in its entirely and located in Appendix Volume A-2.

Terms used in Tables 2.9-1 through 2.9-3 are defined as follows:

1. Plant communities (discussed in detail in another portion of this report): (a) spruce-fir; (b) aspen; (c) sage brush; (d) mixed shrubs and grasses; and (e) riparian habitat.

2. Resident species: (R) Any species that inhabits the area during reproduction activities.

3. Casual or Rare: (Ca) Any species that is only observed occasionally over a period of several years but whose status has not been determined as "threatened" or endangered".

4. High-interest: (X) Any species that is endangered, threatened, game or of economic or recreation value.

TABLE 2.9-1

SPECIES LIST AND CLASSIFICATION OF MAMMALS
WHOSE PUBLISHED RANGES OVERLAP
THE SKYLINE COAL MINE SITE

A = Abundant
C = Common
U = Uncommon
Ca = Casual or Rare
R = Permanent Resident
S = Summer Only

	Spruce-fir	Aspen	Sagebrush	Mixed Shrub & Grasses	Riparian	Observed On-Site	High-Interest Species
Masked Shrew *Sorex cinereus*					CR	X	
Mirriam Shrew *Sorex mirriami*					CR	X	
Vagrant Shrew *Sorex vagrans*					UR		
Dusky Shrew *Sorex obscurus*					CR	X	
Water Shrew *Sorex palustris*					CS	X	
Little Brown Myotis *Myotis lucifugus*					CS		
Long-eared Myotis *Myotis evotis*					US		
Fringed Myotis *Myotis thysanodes*					US		
Long-legged Myotis *Myotis volans*					US		
California Myotis *Myotis californicus*					US		
Small-footed Myotis *Myotis leibii*					US		
Silver-haired Bat *Lasionycteris noctivagans*					CS		
Big Brown Bat *Eptesicus fuscus*					US		

Table 2.9-1 (continued)

	Spruce-fir	Aspen	Sagebrush	Mixed Shrub & Grasses	Riparian	Observed On Site	High-Interest Species
Red Bat *Lasiurus borealis*					US		
Hoary Bat *Lasiurus cinereus*					CS		
Townsend's Big-eared Bat *Plecotus townsendii*					CR		
Brazilian Free-tailed Bat *Tadaria brasiliensis*					CR		
Nuttall's Cottontail *Suylvilagus nuttallii*		CR			CR	X	X
Snowshoe Hare *Lepus americanus*	CR	CR			CR	X	X
Least Chipmunk *Eutamias minimus*	CR	CR	AR		AR	X	
Unita Chipmunk *Eutamias umbrinus*	CR	CR		CR	UR	X	
Yellow-bellied Marmot *Marmota flaviventris*		CR		CR		X	
Uinta Ground Spuirrel *Spermophilus armatus*				AS		X	
Rock Squirrel *Spermophilus variegatus*			CR	CR	CR	X	
Golden-mantled Ground Squirrel *Spermophilus lateralis*			CR	CR	CR	X	
Red Squirrel *Tamiasciurus hudsonicus*	CR					X	
Northern Flying Squirrel *Glaucomys sabrinus*	CR						
Northern Pocket Gopher *Thomomys talpodes*			CR			X	

Table 2.9-1 (continued)

	Spruce-fir	Aspen	Sagebrush	Mixed Shrub & Grasses	Riparian	Observed On-Site	High-Interest Species
Botta Pocket Gopher *Thomomys bottae*					CA		
Beaver *Castor canadensis*					UR	X	X
Western Harvest Mouse *Reithrodontomys megalotis*			UR	UR		X	
Deer Mouse *Peromyscus maniculatus*	AR	AR	AR	AR	AR	X	
Bushy-tailed Woodrat *Neotoma cinerea*				UR		X	
Meadow Vole *Microtus pennsylvanicus*				CR	CR		
Montane Vole *Microtus montanus*				CR	CR	X	
Long-tailed Vole *Microtus longicaudus*				CR	CR	X	
Water Vole *Arvicola richardsoni*					CR	X	
Muskrat *Ondatra zibethicus*					UR	X	X
Western Jumping Mouse *Zapus princeps*				AS	AS	X	
Porcupine *Erethizon dorsatum*	CR			CR	CR	X	
Red Fox *Vulpes fulva*	CaR	CaR	CaR	CaR	CaR		X
Coyote *Canis latrans*	UR	UR	UR	UR	UR	X	X
Gray Fox *Urocyon cinereoargenteus*				CaR	CaR		X

Table 2.9-1 (continued)

	Spruce-fir	Aspen	Sagebrush	Mixed Shrub & Grasses	Riparian	Observed On Site	High-Interest Species
Black Bear *Ursus americanus*	CaR	CaR		CaR	CaR		X
Ringtail *Bassariscus astutus*					CaR		
Raccoon *Procyon lotor*					CaR		
Marten *Martes americana*	CaR						X
Ermine *Mustela erminea*		UR	UR	UR	UR		X
Long-tailed Weasel *Mustela frenata*	CR	CRT	CR	CR	CR	X	X
Mink *Mustela vison*					CaR	X	X
Badger *Taxidea taxus*			UR	UR		X	
Striped Skunk *Mephitis mephitis*	CR	CR	CR	CR	CR	X	
Mountain Lion *Felis concolor*	CaR	CaR	CaR	CaR	CaR	X	X
Bobcat *Lynx rufus*	UR	UR	UR	UR	UR	X	X
Wapiti or Elk *Carvus elaphus*	CS	CS	CS	CS	CR	X	X
Mule Deer *Odocoileus hemionus*	CR	CR	CR	CR	CR	X	X
Moose *Alces alces*		UR		UR	UR	X	X

TABLE 2.9-2

SPECIES LIST AND CLASSIFICATION OF AMPHIBIANS
WHOSE PUBLISHED RANGES OVERLAP
THE SKYLINE COAL MINE SITE

	Spruce-fir	Aspen	Sagebrush	Mixed Shrub & Grasses	Riparian	Observed On Site	High-Interest Species
Tiger Salamander *Ambystoma tigrinum*					UR	X	
Great Basin Spadefoot Toad *Scaphiopus hammondi*					UR		
Boreal Toad *Bufo boreas*						CR	X
Woodhouse's Toad *Bufo woodhousei*					CR		
Boreal Cricket Frog *Pseudacris triseriata*					CR	X	
Western Leopard Frog *Rana pipiens*					UR		

TABLE 2.9-3

SPECIES LIST AND CLASSIFICATION OF REPTILES
WHOSE PUBLISHED RANGES OVERLAP
THE SKYLINE COAL MINE SITE

	Spruce-fir	Aspen	Sagebrush	Mixed Shrub & Grasses	Riparian	Observed On Site	High-Interest Species
Fence Lizard *Sceloporus undulatus*		US		US			
Sagebrush Lizard *Sceloporus graciosus*			US	US		X	
Tree Lizard *Urosaurus ornatus*		US					
Mountain Short-horned Lizard *Phrynosoma douglassi*			US	US	US	X	
Great Basin Skink *Eumeces skiltonianus*					US		
Rocky Mountain Rubber Boa *Charina bottae*	CaS						
Wandering Garter Snake *Thamnophis elegans*			CS		CS	X	
Red-sided Garter Snake *Thamnophis sirtalis*					US		
Western or Yellow-bellied Racer *Coluber constrictor*					CaS		
Striped Whipsnake *Masticophis taeniatus*			US	US			
Western Smooth Green Snake *Opheodrys vernalis*					CaS		
Gopher Snake *Pituophis melanoleucus*			CS	CS		X	
Milk Snake *Lampropeltis triangulum*	US	US			US		
Utah Mountain Ringsnake *Lampropeltis pyromelana*	US	US					
Rattlesnake *Crotalus viridus*			US	US	US	X	

2.9.2 Project Impact Analysis by High-Interest Species

There are many published systems for ranking the importance for and use of habitat by wildlife. The one utilized herein was developed by the Southeastern Region of Utah Division of Wildlife Resources. Their system parallels but is not identical to the one developed by the U. S. Fish and Wildlife Service to rank wildlife values on coal lease lands in the western states. The Utah system lists critical wildlife habitats and use areas as most important followed in respective importance by high-priority, substantial value, and limited value habitats and use areas. It must be noted that the use of the word "critical" in this system is not the same as the legal definition used for "critical" in the Endangered Species Act.

Critical wildlife use areas are sensitive use areas necessary to sustain the existence and perpetuation of one or more species during critical periods in their life cycles. These areas are considered limited and lie within high-priority wildlife use areas. Biological intricacies dictate that significant disturbances cannot be tolerated by the members of an ecological assemblage on critical sites. The opinion of the Utah Division of Wildlife Resources is that disturbance to critical use areas or habitats will result in irreversible changes in species composition and/or biological productivity of the area so classified.

High-priority wildlife use areas are considered to be "intensive use areas" for one or more species of wildlife. High-priority use areas are not limited and in conjunction with limited value use areas form the substantial value distribution for a wildlife species.

Substantial value wildlife use areas are "existence areas" for one or more species of wildlife. These areas represent the distribution of a given herd or population and are formed by the merging of high-priority and limited value wildlife use areas for a species.

Limited value wildlife use areas are "occasional use areas" for one or more species of wildlife. Such areas are not limited and although they constitute part of the substantial value wildlife use area for a species, they are not essential.

Another important term used by Utah Division of Wildlife Resources is "critical period." This refers to a time in the natural history of the species when disturbance will likely lead to serious decreases in the productivity and perpetuation of the species. Examples are the reproductive and over wintering periods. UDWR in recent years has modified the term "crucial-critical" in regard to relative biological value of wildlife habitats or use areas to just "critical". The term "crucial" now only relates to a time of animal use. The definition remains the same.

2.9.2.1 Mammals

The potential area of impact is inhabited by about 57 species of mammals (Table 2.9-1). Approximately 30 percent of these species are protected and considered of high-interest to the State of Utah Division of Wildlife Resources. As such, each was considered in relation to the potential perturbations, but only those likely to be negatively impacted are discussed.

Moose

The population of moose inhabiting the Wasatch Plateau is most numerous in and about the drainages of Scofield Reservoir and upper Huntington Canyon where the moose are dependent upon the riparian habitats that are all designated as critical habitat by Utah Division of Wildlife Resources. These riparian zones are utilized by some moose year long, whereas the higher elevation habitats adjacent to the riparian zones are only utilized during the summer and are considered as high-priority summer range. The entire Skyline Project lies within this high-priority summer range and is utilized by moose from May 16 to November 30. Unlike other ungulates, moose do not mass migrate large distances to other altitudinally lower areas for winter but concentrate into the riparian areas from December 1 to May 15. Both high elevation and riparian habitats are used by moose as calving areas between May 15 and July 15.

During the field-work portion of this study only one cow and a calf were observed in the environs of the mine lease site. This cow was easily identified by a blue collar previously put on the moose by personnel of Utah Division of Wildlife Resources. The cow and calf were sighted on the Huntington side of Eccles Canyon, not far from where the road is intersected by the pipeline road. These animals were observed by various people and according to personnel of Utah Division of Wildlife Resources, they spent most of the summer in the environs of the mining site. One other moose, a yearling female with an injured front leg, was observed in the vicinity of the general project area. She was seen on Highway 96 two miles from the Scofield turnoff from U. S. Highway 6/50.

Considerable fresh tracks and pellets were found around the beaver ponds in upper South Fork and along the ridge above South Fork, and many sets of tracks were also found near a small pond located across the ridge south of South Fork. Some of the willows along the beaver ponds in Eccles Canyon were browsed quite high, apparently by moose during the winter. Sheepherders in the general project area indicated they had seen no moose in 1979; however, one sheepherder said a bull and cow inhabited James Canyon during most of 1978.

Both Eccles Canyon and South Fork have sufficient stands of willows and beaver ponds to facilitate moose populations, and since these specific sites are the focal points of moose sign in the project area care should be taken to minimize disturbance to and preserve this critical riparian habitat.

Elk

Elk on the mine site are from the Manti herd unit and occupy the high-priority summer range from mid-May through October each year. The known summer range of this herd is more extensive than

the potentially impacted area but the entire area of the mine lease lies within this high-priority summer range. During the summer, calving and rearing of elk occurs within the summer range from mid-May to mid-July. Unlike moose, elk migrate altitudinally and from November 1 to May 15 occupy lower vegetation communities that are classified as high-priority, and critical winter ranges. These winter ranges are not within the potentially perturbed habitat but are on ranges to the east and southeast (Scott, 1977) (Figure 2.9.1-A).

During the field-work in 1979, elk sign (tracks and pellets) were commonly observed throughout the project area of concern, but actual sightings of elk were obviously less frequent, however, not unusual. In the early part of the summer, before traffic increased, elk were often sighted from the road in Eccles Canyon, but after human activity increased few animals were seen within the canyon. Animals were, however, still using the area because fresh sign was observed just above the portal site on and along the Eccles Canyon Road. It appears that the elk adjusted their daily behavior pattern to avoid disturbance from vehicles and man. They seem to seek refuge in South Fork and periodically utilize Eccles Canyon on a crepuscular or nocturnal basis.

Although elk were present throughout the project area, the environs of the South Fork drainage was occupied by the highest concentration. This drainage appears to be a calving ground, since many cow elk with very young calves were observed therein, however by the same criteria there are other calving areas in James, Coal and Burn Out Canyons. It is not known whether or not these canyons external to the Skyline Project Area are near saturation during calving or if they could absorb cows that might be displaced from the area of concern due to disturbance.

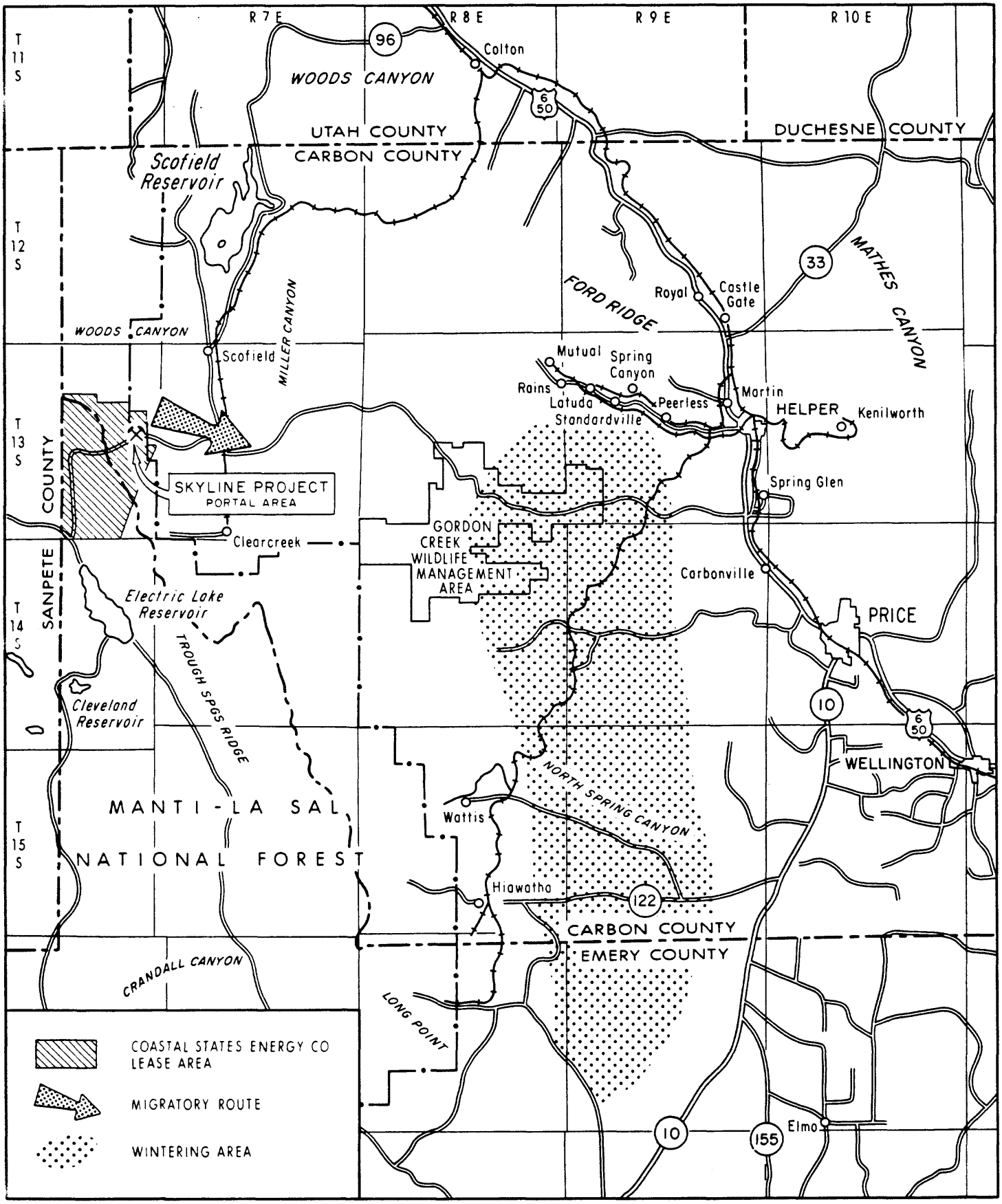


Fig. 2.9.1-A Winter range and migratory route of *elk* living in the environs of the Skyline lease area

The habitat in South Fork is conducive to elk habitation. The mountain is steep, has considerable cover and an abundance of good meadows that contain beaver ponds used for "elk wallows". The upper beaver ponds were used extensively as determined by the large number of tracks and bedding areas around them and elk traveled over the ridge from these ponds and less disturbed areas into Eccles Canyon.

The distribution of elk within and utilization of the Skyline Project Area has already been impacted by human activity as evidenced by the behavior pattern change in elk utilization of Eccles Canyon as human activity increases. The elk still utilize Eccles Canyon, but not for calving. It seems that they have sought more solitude for such activities in South Fork or other secluded places. Elk prefer large areas and it is known that 100 animals will do better on 500 acres than one elk on 5 or even 50 acres (Seton, 1927). Elk often traverse a 10-mile stretch during short periods of time, particularly when disturbed, in either summer or winter so disturbance sources and obstructions to movement should be minimized. Limits to elk populations will be determined by the extent man is willing to dedicate suitable range for this purpose (Rush, 1939). This range must include not only forage but sufficient security cover to allow the population to escape disturbance sources. This makes South Fork or the adjacent canyons important elk habit and they are significant to the stability of the elk herd in the potentially perturbed area. Both overpasses and underpasses should be provided so that elk can cross the conveyor that will otherwise function as a barrier to movement. This is essential to elk that occupy or traverse South Fork, between the proposed Belina and Skyline conveyors, Lack of passages may render this habitat useless for elk production and use.

Mule Deer

Mule deer on the mine site are considered part of herd units 32 and 34 by Utah Division of Wildlife Resources. They utilize the entire mine lease and adjacent areas which are high-priority summer range from May 16 to October 31. Fawning and rearing of young occur within this high-priority summer range from mid-May to mid-July. Unlike moose, deer migrate altitudinally and from early November to mid-May occupy lower vegetation communities that are classified as high-priority and critical winter ranges. Winter range for this population is not clearly defined but some deer likely move northeast in the environs of the Soldier Summit vicinity while others may migrate east to the Gordon Creek winter range. In either case, these winter ranges are not within the permit area (Figure 2.9.2-B).

Field work revealed that mule deer ranged over the entire project area, but were present in varying concentrations. In the mornings and evenings they were frequently sighted at the numerous salt licks in the area, especially South Fork. The ridge on the north of Pipe Spring Canyon had a good stand of manzanita and 25-35 deer were often observed in that area. There was also a herd at 20-30 deer in James Canyon. Deer frequented Eccles Canyon and were sighted from the mouth of the canyon to the top of the ridge. Fresh tracks were frequently observed on the road. Most draws coming into Eccles Canyon had deer trails in them, but the two just below the site of the proposed portal and one 1.6 miles from the top end of the conveyor, had heavily used trails.

No deer were observed with twin fawns in the environs of the proposed Skyline project but this is not surprising. According to Utah Division of Wildlife Resources records the deer population on this unit is below the carrying capacity of the excellent summer range and productivity is slightly below the state average. The amount of high-priority and critical winter

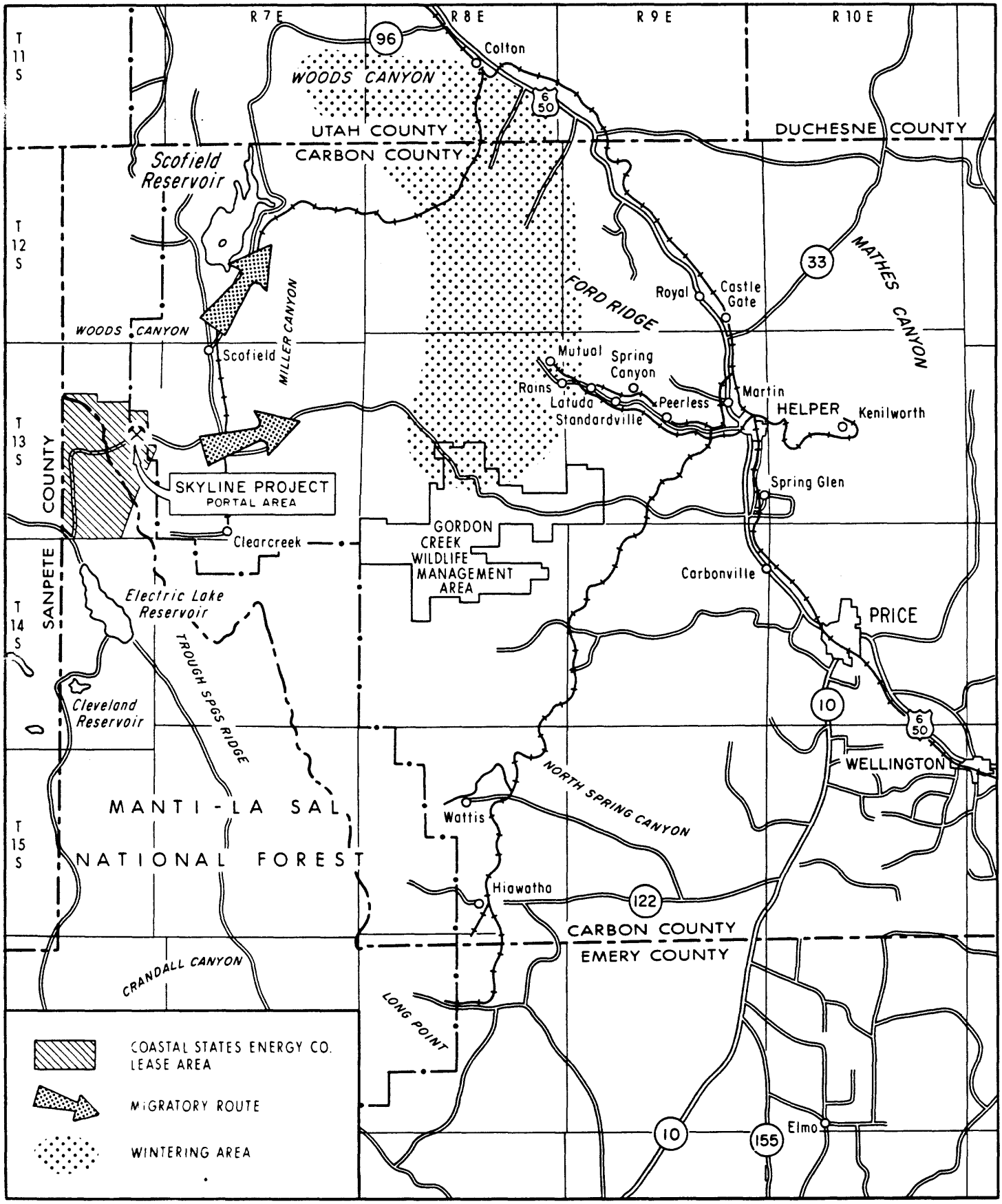


Fig. 2.9.2-B Winter range and migratory route of *mule deer* living in the environs of the Skyline lease area

range is the limiting factor for populations of deer in the potentially disturbed habitat. The Skyline project will not decrease the acreage of winter range that limits this population of mule deer, and, therefore, the impact will be less than if critical winter habitat were involved or if summer habitat were at carrying capacity.

Cougar

The entire Skyline project area provides substantial value, yearlong habitat for cougar which is a game species in Utah. The animals range throughout the area, but their movements are often dictated by migration patterns of mule deer and human disturbance. Although cougars are not overly abundant and are secretive, concern must be given them particularly when the females are accompanied by their young who are learning to hunt and survive. This is considered a critical period for cougars by Utah Division of Wildlife Resources. Crucial

Bobcat

The mine plan and adjacent areas provide substantial value habitats for bobcats who are reputed to occupy all terrestrial habitats on the entire Skyline project area. Although little is known about the bobcat habits, critical periods would be late February when parturition occurs and May and June when the young bobcats are not as secretive as cougar, and therefore, would be less likely to avoid the high human disturbance areas. They would therefore be vulnerable to open human harassment and illegal killing.

Black Bear

The entire potential area of concern provides substantial value, yearlong habitat for black bear. Although no black bear were observed the animals range throughout the entire lease area. They are not abundant nor are they active year round. The critical periods for black bear are February and March when the cubs are born and when they accompany their mother on initial foraging expeditions during early summer. Since parturition occurs within the winter den this critical period will be little impacted, but when the young are with the mother they will be susceptible to human activity, particularly harassment and illegal killing.

crucial

Cottontail Rabbit

The entire mine plan and adjacent areas provide substantial value, yearlong habitats for cottontail rabbits. The young are born between April and July which is considered critical period, but the activities associated with mining operation will in all probability not seriously alter the reproductive potential of the population. There will be increased hunting both legal and illegal, but this will likely benefit cottontail populations since hunted populations are more healthy and stable than non-hunted populations. Disturbed vegetation leading to succession also enhances reproductive potential.

Snowshoe Hare

The snowshoe hare is present in and dependent upon the spruce-fir vegetation type as a yearlong habitat use area. This habitat type is in abundance over the entire proposed project and adjacent areas, but the operation will do little to harm the total acreage of the habitat type and the hare populations dependent upon it. Although the critical period for reproduction

is from April 1 to August 15, the snowshoe hare will not be severely impacted through time nor will the actions lead to the demise of the population. Subsidence will not harm the above ground dweller and the lost habitat is sufficiently small that it will do little to snowshoe populations. Hunting pressure, legal and illegal, will be the most detrimental action and it will be up to law enforcement and hunting regulations to control this impact.

Furbearers

Portions of the proposed mine lease and adjacent areas provide substantial value habitats for some furbearing species: beaver, marten, ermine, long-tailed weasel, mink, badger and the striped skunk. The muskrat, classified as a non-furbearing animal by Utah Division of Wildlife Resources because of its "pest" status, must also be considered. The breeding and rearing activities of all of these non-migratory species occurs within the area of concern and their dens and lodges are of critical value to maintenance of their populations. It is doubtful if the proposed actions will seriously impact them. These species, with the exception of the marten, are widespread and highly adaptable to the activities of man. In fact, both beaver and muskrats are often controlled as pests. In the acres of actual habitat that is destroyed the faunal species will be lost, but this small acreage loss will be minimal compared to the total habitat available and the total impact on faunal populations will be little noticed.

2.9.2.2 Herpetofauna

Increasing elevation rapidly reduces the number and kind of reptiles and amphibians. Furthermore, in Utah the effects of the more northern latitude reduces numbers of herptiles in much the same way as does the increase in elevation.

These geographical and associated climatic factors have eliminated most desert species, leaving species that are adapted either to mountain habitats or montane type habitats developed in the more northern areas. Thus, the reptiles and amphibians of Utah, and particularly those inhabiting the areas under consideration, have arrived in Utah by means of dispersal lanes coming from the northeast and the southeast. With few exceptions the species listed have wide distributions and are versatile in their adaptive abilities.

Literature pertaining to the amphibians and reptiles is extensive; but much of it refers to species occurring in the desert areas and has only limited reference to forms inhabiting Utah mountains. Most of the publications dealing with species lists for the states are old. (V. Tanner, Amphibians, 1931; Woodbury, Reptiles, 1931; and Pack, Snakes, 1930). Perhaps the most up-to-date listings for the area under consideration are a checklist of Utah amphibians and reptiles (Tanner, 1975), and Utah Division publication No. 78-16 (Dalton, 1978).

Other recent literature pertinent to this report are: Schmidt (1953); Stebbins (1954 and 1966); W. Tanner (1953, 1957a and b, 1966-with Banta, 1969-with Morris, and 1972-with Fisher and Willis); and Woodbury (1952).

The area of concern in this report is located in the upper edges of sagebrush (Artemisia) and into the Aspen-Spruce-Fir plant communities.

Amphibians

Based on the extensive literature review and limited field work it was determined that probably four and potentially six species of amphibians (Table 2.9-3) inhabit the area of concern that provides substantial value habitat for all species listed. All

amphibians are protected, but since the species listed are all widespread throughout the mountains of Utah, none are treated as high-interest species, and, therefore, are not individually discussed. It is doubtful if the development action would seriously impact populations but rather localized individuals in the areas of total habitat destruction. An exception to this would result if subsidence interrupted underground aquifers and caused drying of present wet or riparian habitats essential to reproduction.

Reptiles

Based on the literature search and limited field work it was determined that probably 10 and potentially 15 species of reptiles (Table 2.9.3) occupy the mine land area that is considered as substantial value habitat for all 15 species. All reptiles are protected, but since the species listed are all widespread throughout montane habitats in Utah, none are treated as high-interest species and therefore, are not individually discussed. It is doubtful if the development action would seriously impact populations but it will destroy the habitat for individuals living in the areas of total habitat destruction surrounding the mine portal, conveyor, storage facilities and access roads.

2.9.3 Endangered and Threatened Species

According to National Wildlife Federation (1977), Dalton (1978) and the Federal Register (1979), there are no endangered or threatened species of amphibians or reptiles, or any threatened mammals that inhabit the south-eastern region of Utah. Dalton (1978), however, indicates that one endangered species, the black-footed ferret, might be found in the Wasatch Plateau east of the Skyline Drive. Durrant (1952) reports that he knows "...of no occurrence of the black-footed ferret north of the Colorado River in Utah...". There are unconfirmed reports of

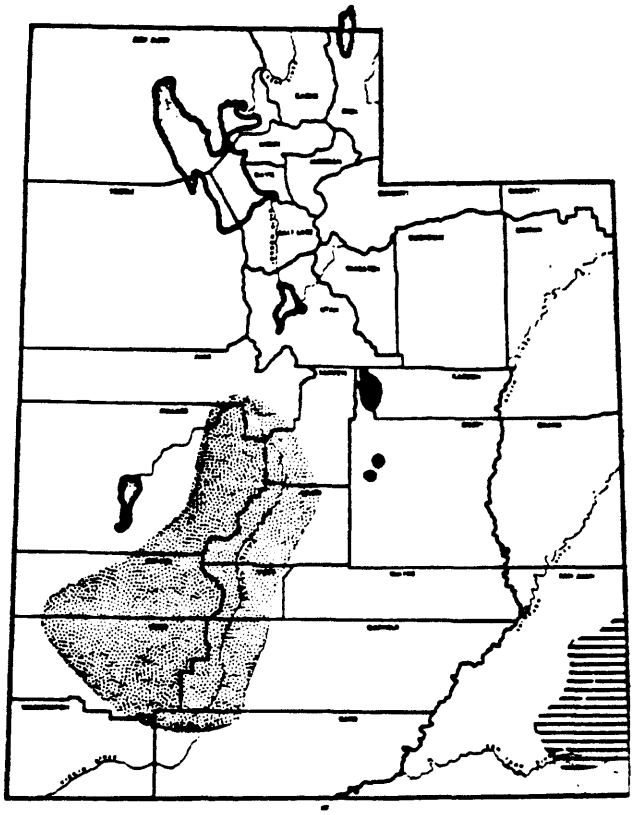
black-footed ferrett sightings east of Castle Dale and Ferron in Emery County, Utah. Many hours have been spent trying to verify the presence of these animals. Up to now these efforts have been unsuccessful. Observations on all of the Skyline lease and immediate surrounding areas show no signs of prairie dog colonies nor sufficient ground squirrel populations to support ferret populations (Fig. 2.9.3-A).

2.9.4 Impact Analysis and Protection of Wildlife

Numerous precautions were taken during construction of Skyline Mine to protect the wildlife resources. While the disturbances during the operational phase are greatly reduced, the following concerns have been and are still being considered: (1) surface disturbance, (2) loss of habitat, (3) noise, (4) human activity and (5) air pollution. Any one, all or a combination of the above perturbations can impact terrestrial vertebrates.

Surface Disturbance

Surface disturbance during construction was a major concern. Development radically modified 37.26 acres (Portal Area, South Fork breakout and water tank pad) of National Forest and 21.56 acres of private surface. This 58.82 acres of surface contour was leveled, filled or cut to construct roads, conveyors, waste disposal site and portal and loadout facilities necessary to the project. These cut and fill operations altered land forms and surface areas to conform to needs and modify natural surface drainage patterns. In addition, much of 6,290 acres are to be undermined via underground techniques with portions being subsided. (Final EIS on Development of Coal Resources in Central Utah, 1979).



Skyline Lease Area

Utah Prairie Dog

Black-Footed Ferret

Unconfirmed Ferret Sightings

Figure 2.9.3-A. Distribution map of endangered mammalian species in Utah in relation to the skyline lease area. Modified from Durrant 1952.

REPLACES	TEXT
Figure 2.9.3-A Page 2-98	Figure 2.9.3-A Page 2-99 Date 07/12/89

Habitat Loss

The immediate area of the mine portal, access routes, coal conveyor corridor and loadout facilities have been lost as habitat for wildlife, but the total acreage loss is small compared to that available. Minimal critical habitat was disturbed. Revegetation of road cuts and fill areas was initiated as soon as was practical with concern given to revegetation with plant species that not only benefit, but promote wildlife.

Subsidence

Surface disturbance associated with certain mining operations and techniques can be extremely detrimental to terrestrial and aquatic vertebrates, but the mining technique proposed for use in the Skyline Project minimizes much of the impact. Since no over burden is removed with underground mining, the only potential problem is surface subsidence. The 6,290 acres that will be in part undermined will be subject to subsidence up to 70 percent of the thickness of the mined coal, however, similarly mined areas in comparable habitats in New Mexico have experienced less than 12 percent subsidence with little or no visible surface disturbance. This was substantiated on a personal inspection tour by Dr. Smith. It is probable that the integrity of the above ground terrestrial communities will generally remain status quo, with occurrence of occasional fractures and minor slippages that will not be detrimental to vegetation or wildlife. Since subsidence will occur systematically and in small areas at a given time as panels are mined, the impact will be lessened. Only localized populations will be impacted and only for a short while. Existing reproductive potential coupled with dispersal will facilitate almost immediate recovery and negate the temporary population reduction.

Overland Coal Conveyor

One of the major surface disturbance impacts of concern to terrestrial wildlife is the construction of an overland coal conveyor that will of necessity act as a partial barrier to normal wildlife movement patterns in, along and across Eccles Canyon.

The overland coal conveyor is to extend 2.5 miles down Eccles Canyon from the portal to the storage facilities at the railroad loading area, and may represent a barrier to normal big game movements in the area. The potential impact of the conveyor as a barrier is now well understood by wildlife specialists. A detailed design of the conveyor system showing the big game crossings has not yet been started. This information will be provided to the Division for their approval at least 120 days prior to start of construction. To assure that state-of-the-art knowledge concerning big game passage is implemented, the applicant will coordinate the detailed design with UDWR personnel If UDWR feels that passage success studies are necessary, these studies will be cooperatively developed at the time of final design.

Loss of Habitat

Although approximately 6,290 acres of habitat will undergo disturbance, only 58.82 acres will actually be lost for habitation and production by mammal, amphibian and reptile species. This total acreage is small compared to that available and most of it is not of critical importance to the stability of the wildlife populations of concern. Minimal detrimental impact is expected to occur while still allowing such a project to proceed.

Once the mining operation is completed and the structures dismantled, the area will be revegetated to enhance the habitat for wildlife.

Noise

Noise created from construction and operation of the mine and its facilities was initially of consequence, but for most species will become inconsequential. With the possible exception of cougar and elk, there are no wildlife species of concern that will be permanently impacted. Wildlife will be initially disturbed and reproductive success possibly impaired but habituation will occur thus allowing a return to normal.

Cougars do not readily habituate to noise, but they are usually in sufficiently low population numbers and have such extensive ranges that they avoid the source of disturbance. This has likely occurred already in the project area due to the high level of noise and activity already in Eccles Canyon. Elk and noise are still an enigma. It is generally thought that elk will habituate to noise and observations by Dr. Smith, during blasting for seismic studies on the Big Horn Ranch, Utah, substantiate this. The observations to date, however, have been on elk in wide open areas where they did not have to be in close contact with the noise. A concern is whether elk will habituate sufficiently to the noise of the overland conveyor to use the underpasses. The proposed big game-conveyor system monitoring program should provide additional information.

Human Activity

Increased human activity can possibly cause the greatest impact. More people are actively using and traversing the area on a work-day basis plus many are also utilizing the area for recreation. More road kills of wildlife could occur and many of those people traversing and utilizing the area may carry firearms in their vehicles and use them for target shooting of small mammals, carnivores and even game species whether legal or not. Such action could seriously impact the stability of many of our non-protected species but trophically the impact will not cause a "domino effect." Removal of the herbivores will not cause radical declines in populations of higher trophic level species,

since the carnivores and raptors will also experience declines. Game and protected species could also be impacted but hopefully the laws of protection will sufficiently deter such actions to minimize this impact.

crucial

Recreational use of the environs other than hunting will undoubtedly impact the wildlife of concern, and will occur in all seasons of the year. It is especially important that wildlife not be harassed during critical periods in their life history. During winter, wildlife are often in a delicate energy state. Unnecessary disturbance by man causes them to use up critical and limited energy reserves that often results in mortality. In less severe cases, the fetus being carried by gestating mammals may be aborted or absorbed thus reducing reproductive success and productivity of the population. Impact, however, is reduced by the small number of species wintering in the project area.

During breeding seasons, disturbance by man can negatively affect reproductive success by disrupting territorial selection or defense, interrupting courtship displays and disturbing mating animals. This could result in reduced reproductive success and ultimately in reduced population levels.

During parturition, lactation and early in the rearing process, the increased potential for disturbance of young animals could be determined. It is during this time that young animals gain the strength and ability to elude predators and man. Undisturbed habitats allow the young animals to develop in relatively unstressed situations and to utilize habitats that are secure from predators. Disturbance by man can compromise this situation and result in abandonment of the young by the female, increased accidents that result in mortality or increased natural predation.

Efforts are being made to educate employees associated with the mine operation in the Skyline project area to the intricate values of the wildlife resources associated with the mine plan area. Employees are advised not to unnecessarily harass or take wildlife. The Permittee has extended an invitation to UDWR personnel to participate in these training sessions as appropriate.

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2.10 RAPTORS

The raptor study was conducted by Dr. Clayton White of the faculty of Brigham Young University. This section summarizes Dr. White's report. A complete copy of the report may be found in Appendix Volume A-2.

The Skyline Mines project area was studied at two different periods, a two-day early spring period and four-day breeding season period. Of prime consideration in this study was the determination of the presence or absence of two threatened or endangered species, the peregrine falcon (Falco peregrinus) and bald eagle (Haliaeetus leucocephalus). Additionally, all other raptors seen were recorded. Because of the elevation of the mines and the nature of the habitat, the numbers of individuals and numbers of species (diversity) of raptors is not great as compared to lower elevations where the habitat is less uniform. Several species may pass through the area in migration, but their numbers are not known nor has their length of stay been documented. Species likely to pass through the area are the marsh hawk (Circus cyaneus), Swainson's hawk (Buteo swainsoni) and rough-legged hawk (Buteo lagopus). In addition to field observations, the federal and state resource managers in the area were contacted to obtain information on raptors presence. Don Ward, U. S. Forest Service Biologist and Larry Dalton, Utah Division of Wildlife Resources Biologists, had only general and limited information on the area. However, as an indication of the species that might be expected to occur in the Skyline Mines area, data from Jones (1979) are given in Table 2.10.1. These data come from the area between Huntington and Ferron Canyons to the south of Skyline Mines. The frequency or density of raptors studied by Jones was also highest at elevations lower than the equivalent to the Skylines Mine area.

The Winter Period - 7-8 April

Larry Dalton, Utah Division of Wildlife Resources, indicated that bald eagles arrive at Scofield Lake approximately 15 November and leave at variable times in early winter corresponding to the "freeze up" of the lake. This is normally before January. Bald eagles do not utilize Electric Lake at the south edge of the study area. Food supplies there may be insufficient.

TABLE 2.10-1

RAPTOR SPECIES SEEN AND HABITAT SUITABILITY IN MANTI DIVISION, MANTI-LASAL NATIONAL FOREST

Areas surveyed	Species observed and expected[1]									Habitat[3]			
	Goshawk	Sharp-shined	Cooper's	Red-tailed	Golden Eagle	Eagle Nest	Prairie Falcon	Kestrel	Owl Cavity[2]	Cliff	Riparian	Prey	Roosting[4]
1. Huntington C.	+	–	P	P	–	–	–	+	–	L,I	I	I	–
2. Rilda C.	P	P	–	–	–	–	–	–	–	I	I	I	–
3. Mill Fork C.	P	P	–	P	+	P	–	–	–	I,H	I	I	–
4. Tie Fork C.	P	P	–	P	–	–	–	–	–	I	I	I	–
5. Crandall C.	+	+	+	–	–	–	–	–	–	L	H	I	–
6. Grimes Wash, Danish Basin	–	–	–	–	+	P	–	P	–	L,I	–	H	–
7. Cottonwood C.	P	P	–	P	+	+	–	+	+	I,H	I,H	I,H	–
8. Straight C.	+	–	+	–	+	+	–	+	+	I,H	I,H	I	–
9. Lower Joes Valley, Lowry C.	–	+	–	+	+	+	+	+	+	I,H	I,H	H	H
10. Upper Joes Valley	P	–	–	P	+	P	–	P	–	–	I	H	–
11. North Horn Mtn.	–	–	–	–	+	–	–	+	–	–	–	H	–
12. Upper Rock C.	–	–	–	–	+	+	–	P	–	I,H	–	L,I	–
13. Lower Rock C., East Rim	–	–	–	–	+	–	–	–	+	L,I	–	L,I	–
14. Ferron C., Bull Hollow	–	–	P	–	+	P	–	+	–	L,I	I,H	I,H	H
15. Ferron C., Flag-staff Peak	P	–	–	+	–	–	–	P	+	L,I	–	I	–
16. Muddy Creek C.	–	–	+	–	–	–	–	P	–	L,I	I	I	–

1. Species and structures: + = observed, – = not observed, P = probable occurrence.
2. Cavities assumed used by Great-horned Owls.
3. Habitat suitability: L = low, I = intermediate, H = high.
4. Roosting habitat suitability judged with respect to wintering Bald Eagles.

Although bald eagle roosting site locations are unknown, it is unlikely that the birds utilize any of the study area regularly.

Only a goshawk (Accipiter gentilis), a red-tailed hawk (Buteo jamaicensis) and a golden eagle (Aquila chrysactos) were seen in the Skyline area. Snow cover is generally too deep to provide open areas for prey species. Reports of golden eagles were received from several other persons who visited the general area during the winter. Raptor species that might occur there probably move to lower elevations during the winter. The great-horned owl (Bubo virginianus) might also winter in the immediate area of the mines, but none was seen.

The Breeding Season Survey (-26-29 July)

The mine portal site and twelve drill hole sites were visited and the immediate area searched for nesting raptors. No nests were located and only a few species were observed in flight.

The individual raptors observed were recorded on Raptor Count Sheets and sites visited and raptors seen are plotted on a map.

Those species seen were: eight sightings of red-tailed hawk and one kestrel (Falco sparverius); one golden eagle and one great-horned owl.

It is highly likely that all of the species given on Table 2.10-1 occur in the Skyline Mine region, but since they probably occur in low numbers only extensive survey work would reveal their presence.

2.10.1 Conclusion

Raptor species, normally found in conifer forests, occur in small numbers on the Skyline Mine area. Nesting habitat for tree nesting species provides the only readily available habitat there. Bald eagles pass through the area and stop over in adjacent regions during that migration. They, however, move on as winter sets in. Peregrine falcons may also pass over the area in migration, but any number that would do so is certainly small. No nesting sites of either species are known nor suspected in the Skyline area. The nearest known sites are in excess of 20 miles from the Skyline area.

The overall elevation of the mining region is high enough and the habitat such as to restrict the density and diversity of raptors.

It is concluded that development of the Skyline Mine area will not have an adverse effect on critical raptor species, and any species that may be affected are common enough that the impact will be minimal on the populations.

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2.11 SOILS

At each vegetation reference site a soil pit was excavated to the parent material layer. The exposed soil profile allowed for determination of information for classification of the soils into taxonomic units. The portal-yard and bypass access road areas were also sampled. Soils collected at the portal-yard sites were taken as a composite of the top six inches of the profile.

In addition to depth information obtained from the soil pit descriptions, there were 100 depth measurements along the transect areas and in the validation sites. Those readings were obtained by observing the depth of penetration of a sharpened steel rod.

Soils were classified to family unit according to the system utilized for classification of soils by the Soil Conservation Service (Johnson, 1975). Use of this method will allow correlation of permit area soils at the series level when the Soil Conservation Service completes the mapping effort of adjacent areas.

The data compiled on soils suggest that a cryic temperature regime is a proper designation for this area. Cryic is typically conifer-aspen related, with some high meadows included. These areas are too cold for cultivation of crop plants by ordinary means. Frigid designation is given to soils typical of aspen-sagebrush types, and some crops can be grown. Most of the soils are in the udic (moisture arriving in summer) regime.

Maps of soil/plant associations including cadastral locations are presented in the Vegetation and Soils Report submitted in the original application and are in Volume A-2. All soils have textures ranging from sandy loams to clay loams, and are considered neither unusual for the area in general nor for the vegetation types those soils support. The soils are not of a textural class that would be considered a problem either

in disturbance or in reclamation activities. A comparison of spruce-fir and aspen soils, which as broad categories make up more than 80 percent of the permit area soils, shows that the pH and salinity measurements are probably normal for this climatic regime with the pH range from somewhat acidic to neutral for spruce-fir and aspen soils. There is a slight difference in soil reaction between spruce-fir (pH 5.0) and aspen (pH 6.0) soils, but this is also considered to be characteristic (i.e., evergreen conifer types more acidic than the deciduous forest of aspen.)

Saline soil measured in the permit area, at reference site 2 - (Plate 2.7.1-1), aspen with an EC x 10^3 value of 1.88, is considered extremely low when compared to agricultural soils. A slight difference between soils is noted when depths are compared. The solum of aspen extends to an average depth of 20 inches from nine locations and to 18 inches at seven locations of the spruce-fir. This corresponds to the average depths of penetrometer readings in aspen of 19.9 inches and of 18.1 inches in spruce-fir soils.

It is also apparent that soils in aspen communities are more fertile in the commonly applied fertilizers, N, P, and K, and also in most micro-nutrients. The levels of Fe, Mg, and Mn are considered to be adequate for growth of native vegetation, even though somewhat below amounts reported for average soils in the western United States (Shacklette, et. al., 1971). Moderate amount of Zn, Ca, and K indicate that adequate quantities of these minerals are present, except in sagebrush soils.

High amounts of Ca, especially in the B-horizon of spruce-fir soils, are not considered a problem in immobilization of P due to the acid pH for these soils. Concentrations of Ca in sagebrush and aspen soils could become a problem in P relations if soils are altered to become more basic. NO_3-nitrogen is low in quantity, as was expected for these soil types. Average amounts of NO_3-nitrogen are inadequate in all soils of the region and all horizons. All areas would respond to addition of nitrogen,

as indicated by the low total nitrogen content from all vegetation types.

In summary, the most important fertilizer to be applied in reclamation attempts is nitrogen. The addition of nitrogen should be timed with suitable moisture content in the soils (fall and spring). A soils map of the portal-yard area has been prepared and is available at the Skyline Mine office. The soils are classified by the vegetation type with which they are correlated, as recommended by the Soil Conservation Service. Information from other areas to be disturbed can be extrapolated from the vegetative map and from the soil nomenclature assigned on the portal-yard area map.

It is recommended that a minimum depth of six inches of topsoil be placed on areas to be seeded to the south slope mixture. A 12-inch minimum on spruce and fir plantings on the north slope and a 24-inch minimum on south slopes that will receive Aspen/Elderberry transplants is advised. The amount of top soil necessary to revegetate all 52.36 acres would require 84,054 cubic yards. See Table 2.11-1.

Since the minimum amount of topsoil necessary in revegetation is well below the expected stockpile amount of 131,742 cubic yards (See Table 2.11-2) it would be advisable to increase the south slope seed mixture area to 12 inches and the south slopes that will receive Aspen/Elderberry transplants to 30 inches. This would require 113,739 cubic yards and would still be within the expected stockpile amount. The south slope transplant areas are intermingled throughout the entire south slope area and will be field located during final reclamation.

Only soil from the "A and B" horizons were collected and put into the toposil stockpile and considered as "useable" for reclamation purposes. The soil from the "C" horizon was considered unsuitable and therefore not removed and not put into the topsoil stockpile.

TABLE 2.11-1

Seeded Vegetation	Acres	Planned Depth/in.	Yards^3
South Slope Seed Mixture	20.52	12	28,556
North Slope Seed Mixture	19.92	12	24,683
South Slope Transplant Area	17.00	30	60,500
Waste Rock Seed Area	1.67	12	2,097
TOTAL	59.11*		115,836

* Includes all disturbed areas for entire permit area.

TABLE 2.11-2
TOPSOIL VOLUMES

Area	Mapping Unit	Vegetation	Acreage	Good (Ave Depth/ft)	Poor (Ave Depth/ft)	Useable Soil, yd^3	Unsuitable Soil, yd^3
Load Out	1	Sagebrush/ Grass/forb	7.62	2.5	2.5	30,734	30,734
	2	Grass/forb	4.0	4.5	0.5	3,630	403
	3	Spruce/fir	1.4	1.7	3.3	3,839	7,453
	4	Sagebrush/ Grass/Snowberry	0.8	1.7	3.3	2,194	4,259
TOTAL			13.82			40,397	42,849
Portal Yard	2	Grass/forb	1.3	4.5	0.5	9,438	1,048
	5	Sagebrush/ Grass	2.5	0.5	0.5	2,016	2,016
	6	Aspen/ Snowberry	1.62	2.5	2.5	6,534	6,534
	11	Aspen	6.31	2.5	1.5	25,450	15,270
	12	Grass/forb Elderberry	6.0	2.5	—	24,200	—
	13	Spruce/fir	16.17	1.0	2.5	26,087	65,219
	14	Grass/forb	2.5	0.6	1.5	2,420	6,050
TOTAL			36.4			96,145	96,137

REPLACES TEXT
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TABLE 2.11-2 (continued)
TOPSOIL VOLUMES

Area	Mapping Unit	Vegetation	Acreage	Good (Ave Depth/ft)	Poor (Ave Depth/ft)	Useable Soil, yd^3	Unsuitable Soil, yd^3
Conveyor Route	2	Grass/Forb	0.8	4.5	0.5	5,808	645
	5	Sagebrush/ Grass	2.1	0.5	0.-	1,694	--
	6	Aspen/ Snowberry	0.1	2.5	2.5	403	403
	7	Sagebrush/ Grass	0.3	—	—	—	—
	8	Aspen	.3	2.0	3.0	968	1,452
	9	Rock Outcrops	0.3	—	—	—	—
	10	Aspen	0.5	2.5	1.0	2,017	807
	11	Aspen	0.8	2.5	1.5	3,227	1,936
	12	Grass/forb Elderberry	0.3	2.5	—	1,210	—
	13	Spruce/fir	0.5	1.0	2.5	806	2,016
Total - Conveyor			6.0			16,133	7,259
Waste Rock Disposal		Sagebrush/ Grass	1.67	0	0	0	0
Water Tank & Wells		Aspen	.26				
South Fork Breakout		Aspen	.3	4.5	4.4	2,242	2,133
		Spruce/Fir	.66	4.5	4.4	747	74
	GRAND TOTAL		59.11			156,664	148,452

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Table 2.11-2 Page 2-117 !! Table 2.11-2 Page 2-117 Date 03/01/90

Additional Study

In coordination with Soil Conservation Service (SCS) personnel, the Permittee designed and performed a soil survey at the reconnaissance level for the permit area and a high-intensity detailed soil survey for the surface disturbance areas. Nondistrurbed areas were surveyed at an Order 3 level. Survey results are located in Appendix Volume A-2.

Survey standards were based on those described in the National Soil Survey Handbook and the Revised Soil Survey Manual which are standards for the National Cooperative Soil Survey Standards.

Survey maps are of a scale greater than 1:12,000 for all areas. As the survey progressed mapping unit descriptions including potential productivity of existing soils were developed in compliance with the above standards and submitted with all survey results.

The soils and other strata of the portal area were sampled, mapped, and studied in detail.

Endangered Plant Studies, Inc. (EPS) and Dames & Moore (D&M) have reported results of studies performed in the Skyline permit area, including detailed study of the portal area. EPS excavated soil pits in the portal area and other parts of the permit area. Soils were described, classified, sampled and analyzed as outlined in the Vegetation and Soils Report. In addition, D&M sampled soils at frequent intervals and obtained continuous cores of bedrock at 26 locations in Eccles Canyon, including the portal area. These borehole descriptions are presented in Section 2.2, Geology and Geotechnical, of this plan. The EPS and D&M reports are in Appendix Volumes A-2 and A-3.

In order to characterize overburden in the portal area, it is necessary to relate the D&M study to the geologic characteristics present in the Skyline permit area (Described in Section 2.2, Geology Report). Soil types and distributions were mapped by EPS

(Map 2.11-1) and the numerous soil descriptions and analyses can be readily extrapolated using the EPS report. Consolidated rock strata of the Blackhawk Formation are more difficult to map, however, and make the extrapolation of core data more difficult.

In this Application, the Aberdeen Sandstone and the overlying upper coal-bearing unit of the Blackhawk Formation are described. In the portal area, the Aberdeen Sandstone lies from 0 to 4 feet below the lowest coal seam to be mined and is continuous and of uniform lithology. Therefore, the Aberdeen description as presented suffices to characterize the lowest unit of interest throughout the portal area, even though it is poorly exposed. In contrast to the Aberdeen, the overlying sedimentary rocks are variable in extent and lithology. Because of the highly variable nature of these poorly exposed rocks, detailed mapping of individual lithologic units in the subsurface is not feasible. However, certain generalizations can be made regarding the relative percentages of the rock types present. Recent interpretative geologic work has focused on modelling ancient depositional environments for the sedimentary rocks in the coal-bearing sequence immediately overlying the Aberdeen Sandstone. Based on concepts developed it is possible to make general statements about the frequency of occurrence of various rock types in any area of the property. These predictions based on depositional models are believed to be more reliable than simple extrapolation between boreholes.

Stratigraphic studies in the permit area are based primarily on subsurface geophysical logs. These logs are available at the Skyline Mine office. The sources used to interpret lithology include the natural gamma, the gamma-gamma (density), the single-point resistivity, and sometimes the spontaneous potential and caliper logs. Studies of the relative percentages of sandstone, siltstone, claystone, and coal in each borehole suggest that ancient stream channels present in a specified stratigraphic interval had preferred orientations, and tend to be stacked in echelon or otherwise concentrated along trends of high sandstone percentage.

Using these results, relative proportions of the several lithologies can be extrapolated to the portal area, even through individual channels may not be correlated between boreholes In the 200 feet of strata immediately overlying the Aberdeen Sandstone, paleochannels have a preferred east-west orientation in the portal area. Based on extrapolation along this trend, percentages of lithotypes have been estimated for the portal area. For the described 200-foot stratigraphic interval, and excluding coal seams, the major lithologies are: sandstone 40%, siltstone 30%, and claystone 30%.

These lithologies have been described in detail in Section 2.2 (Geology) and in Volume A-3. The percentages may vary considerably from percentages in many boreholes drilled by D&M in the portal area. However, on the average these percentages are more representative of the character of the non-coal strata than estimated for individual boreholes.

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2.12 LAND USE

INTRODUCTION

The Skyline property, located in the northern end of the Wasatch Plateau coal field, is the site of a system of underground coal mines developed by Coastal States Energy Company. The general area of the Skyline property lies within both Carbon and Emery counties in T13S and R6E, approximately seventy-eight air miles southeast of Salt Lake City, Utah and twenty-two air miles northwest of Price, Utah (refer to Figure 2.12-A). The leasehold includes approximately 6,290 acres of land, of which 6,220 acres are located within the Manti-LaSal National Forest. The remaining seventy acres are coal rights leased from Carbon County. The portal and yard area are located in Eccles Canyon just west of and within the National Forest boundary line. A Utah State highway (SR-264) runs past the portal yard area east down Eccles Canyon to a coal loadout facility located at the canyon mouth. A conveyor system will parallel the road from the mine to the loadout facility at the mouth of Eccles Canyon.

2.12.1 Existing Land Uses

Existing land uses of the Skyline property and adjacent area consist of grazing, recreation, natural gas transmission and forestry.

Grazing

Four National Forest Sheep allotments are contained partially within the lease area (refer to Map 2.12.1-1). The numbers of livestock and season of use data for each allotment are contained in Table 2.12.1-1.

Private lands east of the National Forest boundary are grazed by similar numbers of sheep both before and after 7/1 to 9/30 (U.S. Geological Survey, 1979).

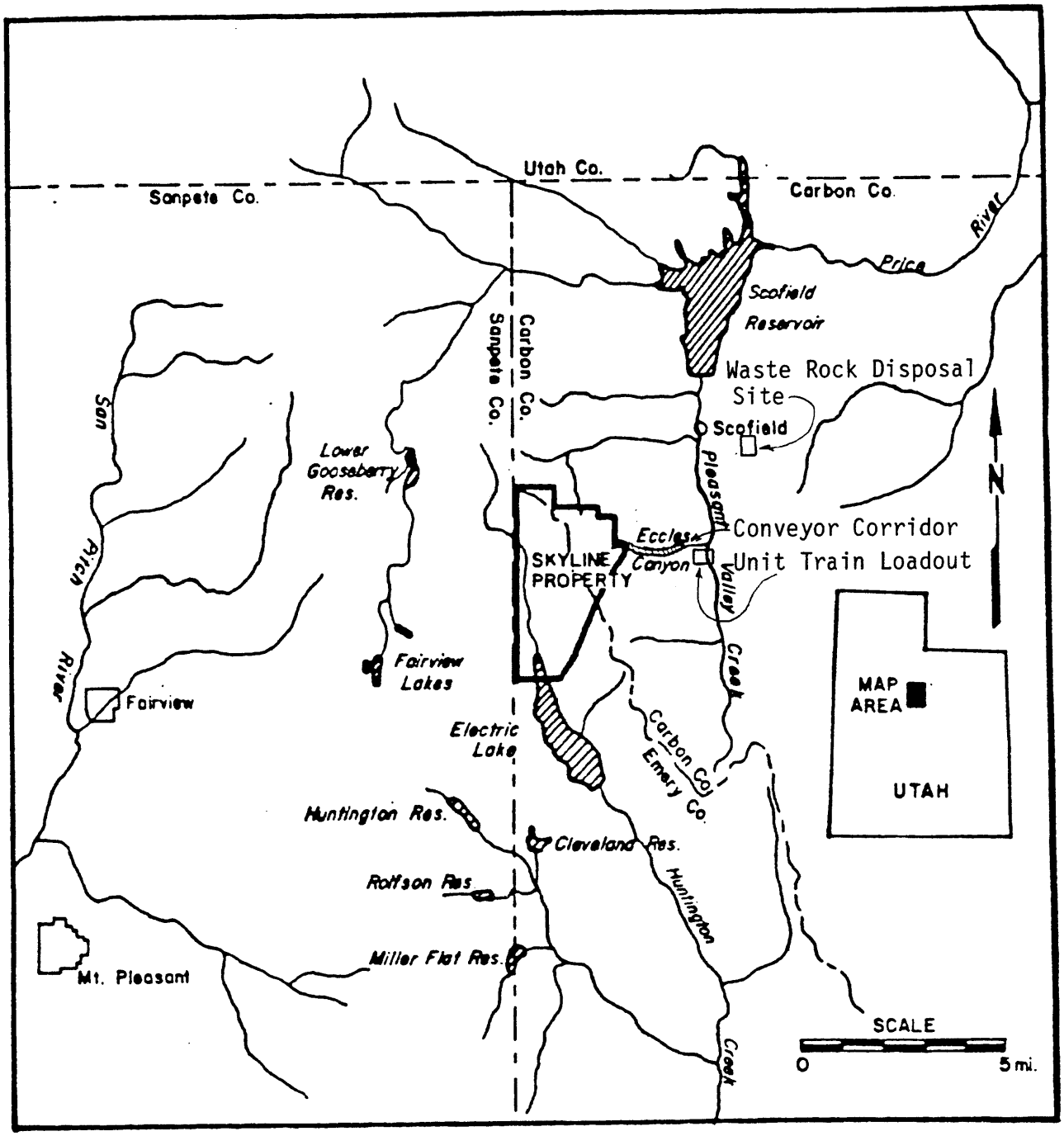

Figure 3.2.-A, Location of Skyline Project Area

REPLACES	TEXT
Figure 3.2-A Page 2-123	Figure 3.2-A Page 2-123 Date 07/07/89

TABLE 2.12.1-1

SHEEP ALLOTMENT DATA FOR THE FOUR ALLOTMENTS CONTAINED PARTIALLY WITHIN THE COAL LEASE AREA FOR THE PROPOSED SKYLINE MINE

Allotment	Sheep Numbers	Season of Use
Winter Quarters	459	7/1 - 9/30
Eccles Canyon	1000	7/21 - 9/15
Burnout	678	7/1 - 9/25
Coal Ridge	586	7/6 - 9/25

Recreation

Recreational use of the lease area affected by surface operations consists primarily of hunting big game, game birds, and small game species; fishing in Eccles Canyon below the portal area; from the south fork to the mouth of the canyon sightseeing, snowmobiling, and cross country skiing. Limited camping and picnicking also occurred in the mouth of Eccles Canyon (U.S. geological Survey, 1979).

Eccles Canyon Road provides the only direct access from Scofield Reservoir to Huntington Canyon and is used as an access route from the Scofield Reservoir recreation area to the recreational use areas at higher elevations in the northern end of the Wasatch Plateau (U.S. Geological Survey, 1979).

Natural Gas Transmission

A natural gas pipeline traverses the permit area from southeast to northwest. A gas tank associated with the transmission line is immediately southeast of the permit boundary. Additionally, an abandoned gas well is located in the Eccles Canyon portion of the permit area. A small building associated with Gas Well No. 8 is located in Eccles Canyon. The location of these features are all shown on Map 2.12.1-1.

Forestry

Forest uses are limited primarily to cutting firewood and fenceposts. Occasional timber sales from National Forest lands are made to salvage insect-killed spruce timber. One such sale, totalling 2.5 million board feet, was made in the Kitchen Creek drainage basin on the west side of the coal lease area in 1977.

2.12.2 Capability and Productivity of the Permit Area Affected by Surface Operations and Facilities

Portions of the permit area affected by surface operations and facilities of the underground Skyline Mines are capable of supporting limited forestry, grazing, and recreational uses. Farming in the area is prohibited by the steep and rocky terrain of Eccles Canyon.

FORESTRY AND GRAZING

Land Use Capability

Data concerning resource availability for forestry and grazing uses within the permit area affected by surface operations and facilities were collected and assimilated by Dr. Joseph R. Murdock, professor of Botany and Range Science at Brigham Young University, Provo, Utah (1979). Vegetative plot studies were made in the affected permit area within five general area classifications: the spruce-fir timber type, the aspen timber type, the sagebrush type, the riparian type and the unrecovered disturbed area type, composed of existing roads and the unrecovered site of an abandoned gas well and the abandoned Eccles Mine located on the proposed portal site. From these specific vegetative plot studies, the productivity and capability of supporting grazing and forestry uses were determined for each general area. The plot studies revealed that both the spruce-fir timber type and the unrecovered disturbed area type contained no significant herbage usable for grazing purposes.

The number of animal units and animal unit months that the other three areas are capable of supporting was determined by converting the available green plant species desirable by sheep to a dry weight basis and assuming that one 1,100 pound cow

having one calf, which constitutes an animal unit, consumes 27 pounds per day. The results of this analysis are presented in Table 2.12.2-1 for the yard area, the conveyor corridor and the bypass road.

The capability of the area affected by surface operations and facilities to support forestry uses was determined from the total land area in the spruce-fir and aspen timber types and the available timber volume per area as published by the U.S. Forest Service in the "Land and Resource Management Plan" for the Manti-LaSal National Forest, (1986). The spruce-fir timber type contained approximately 10,000 board-feet per acre and the aspen timber type contains 5,300 board-feet per acre. Therefore, within the affected area, there were approximately 201,000 board-feet of the spruce-fir timber and 93,800 board-feet of aspen timber.

TABLE 2.12.2-1

GRAZING POTENTIAL FOR THE AREA TO BE AFFECTED BY
MINING SURFACE OPERATIONS AND FACILITIES
(Does not include State Highway SR-264)

Surface Facilities Area	General Area Classification	Land Area (Acres)	Grazing Animal Units (AU)	Potential Animal Unit Month (AUM)
1. Portal Yard Area	Spruce-Fir	16.47	0	0
	Aspen	7.93	114	3.8
	Sagebrush	2.5	84	2.8
	Disturbed	8.5	0	0
	Riparian	1.0	38	1.3
Subtotal		36.4	236	7.9
2. Conveyor Corridor	Aspen	2.2	32	1.1
	Sagebrush	3.8	107	3.6
Subtotal		6.0	139	4.7
3. Railroad Loadout Area	Grass-Forb	10.32	126	4.2
	Spruce-Fir	3.5	0	0.0
Subtotal		13.82	126	4.2
4. Waste Rock Disposal Area	Disturbed	1.67	0	0
Subtotal		1.67	0	0
5. Water Tank and Well Pads	Aspen	.26	18	1
South Fork Breakout	Spruce-Fir	.96	0	0
Subtotal		1.22	18	1
TOTAL		59.11	519	17.8

REPLACES	TEXT
Table 2.12.2-1 Page 2-127	Table 2.12.2-1 Page 2-127 Date 03/01/90

Productivity

Sheep currently graze the lease and permit areas in accordance with the sheep allotments as specified in Table 2.12.1-1.

Recreation

Recreational use of the area affected by mine surface operations and facilities is limited primarily to sight seeing, fishing, hunting, snowmobiling and cross country skiing.

Eccles Canyon presently supports and is capable of supporting a self-reproducing population of cutthroat trout from South Fork to the mouth of the canyon. The only time a fishery potential exists above South Fork near the mine portal area is in the springtime when runoff volumes are highest (Winget, 1979).

The newly built highway (SR-264) through Eccles Canyon provides the only access route between recreational facilities in the north end of the Wasatch Plateau and the Scofield Reservoir recreation area. The U.S. Forest Service states that Electric Lake has added a considerable amount of recreational traffic to Eccles Canyon and that 1977 vehicle counts from June to the middle of October were approximately 22,000, which averages 160 vehicles per day. This number is increasing with the completion of the new highway. A stated management requirement of the Forest Service resulting from this vehicle count is to "provide new access connecting the Scofield area with Huntington Canyon" (U.S Forest Service, 1979).

Farming

Referring to agricultural lands within the lease and permit areas for the Skyline mine, T.B. Hutchins, State Soil Scientist for Utah, in a letter addressed to Keith Welch, Environmental Coordinator for the Permittee, made the following written statement, "Field evaluation of the area outlined on your map in Eccles Canyon shows no prime farmland in the area".

Farming in the lease and permit areas would be impractical due to the steep terrain (50 - 80 percent slopes).

PREVIOUSLY MINED AREAS

Underground Mined Areas

The abandoned Eccles Canyon coal mine, located in the southwest quarter of the southwest quarter of section 13 of T13S and R6E, is the only mine located in the proposed mine plan area. The Eccles Canyon mine, operated intermittently from 1899 to 1952, mined the Lower O-Connor "A" seam using the room and pillar method. The mine covered an area of approximately 500 feet south of the portal and 700 feet west of the National Forest boundary (Doelling, 1972 and Heath, 1979). Doelling (1972) states, "Little is known about the Eccles Canyon mine....Production figures are incomplete but estimated to be small." The Eccles Canyon Mine portals have been covered and sealed by SR-264 and the Skyline Mine benches.

No other known minerals of value have been mined within the lease and permit area. There are two producing and two abandoned gas wells located in Eccles Canyon. These gas wells are not classified as "mining". Therefore, no other minerals have been mined within the Skyline coal lease area.

Surface Mined Areas

There have been no previous surface mines located within the mining plan area or adjacent areas. The waste rock disposal area was an abandoned strip mine.

LOCAL LAND USE CLASSIFICATIONS

Both the county zoning ordinances and the "Land and Resource Management Plan" for the Manti-LaSal National Forest, prepared by

the U.S. Forest Service (1986), classify local land-use for the lease area of the Skyline Mine as recreation, forestry and mining.

County Zoning Ordinances

The Emery County zoning map dated 1970 and the Carbon County zoning ordinance amended February 15, 1977 with a revised zoning map dated 1974 have zoned the Skyline property for recreation, forestry, and mining (RF&M). Section 8-7-1 of the Carbon County zoning ordinance states:

> "Recreation, forestry, and mining zone has been established as a district in which the primary use of the land is for recreation, forestry, grazing, wildlife, and mining purposes. In general this zone....is characterized by...high grazing lands interspersed by ranches, recreational camps and resource outdoor recreational facilities and mines and facilities related thereto."

U.S. Forest Service Land Management Plan

All but approximately seventy acres of the lease area lie within the boundary of the National Forest, and are therefore subject to the "Land and Resource Management Plan" for the Manti-LaSal National Forest prepared by the U.S. Forest Service (1986). National Forest System lands within the permit area include the following management units (Management emphasis for each unit is described):

<u>RNG (Range) Management Unit</u> - Emphasis is on production of forage and cover for domestic livestock and wildlife.

<u>TBR (Timber) Management Unit</u> - Emphasis is on management for production and use of wood - fiber for a variety of wood products.

UC (Utility Corridor) Management Unit - Emphasis is on providing transportation corridors for major cross-country pipelines, electrical transmission lines and telephone lines. This unit currently contains a gas transmission pipeline constructed and operated under a Forest Service special-use permit issued to Questar Pipeline Company (main line 41).

RPN (Riparian) Management Unit - Emphasis is on management of riparian areas and all the component ecosystems. The units consist of a zone approximately 100 feet measured horizontally from the edge of all perennial streams and springs, and from the shores of lakes and other still water bodies.

MMA (Minerals Management Area) Management Unit - Emphasis is on making land surface available for existing and potential major mineral developments.

In the "Land and Resource Management Plan" the Forest Service lists specific objectives pertaining to management of resources and resource uses on National Forest System lands. The Forest Service portion of the disturbed area (portal area) is currently identified as a Minerals Management (MMA) Unit. After completion of coal mining activity, the area will revert to a Range (RNG) Management unit.

COMPATABILITY OF MINING OPERATION WITH FOREST SERVICE MANAGEMENT EMPHASIS AND OBJECTIVES

All mining activities related to the Forest Service "Land and Resource Management Plan" will be coordinated with the appropriate Forest Service personnel prior to implementation. While it is recognized that the fact that the mine located as it is on the Forest Service land boundary creats impacts, primarily visual and traffic pattern related, these effects are considered to be rather short term and will be essentially eliminated upon mine closure.

ARCHAEOLOGY AND PALEONTOLOGY IMPACTS

State and Federal laws require protection of certain cultural resources. The mining operation is considered compatible with the requirements of all agencies in this area, since to date, there are no known archaeological or paleontological sites within the proposed disturbed areas. Section 2.1.1 and Appendix Volume A-3 contain additional discussion and documentation on these cultural resources.

BUILDINGS, PUBLIC ROADS, AND OTHER MAN-MADE FACILITIES

There are few man-made features located within the Skyline Mine permit area. One abandoned gas well is located within the permit area in Eccles Canyon. The only building located within the permit area is a small structure associated with Gas Well No.8. A natural gas pipeline traverses the permit area and an associated gas tank is located east of the southeastern boundary of the lease area. The location of public roads, including SR-264, within and adjacent to the lease area are illustrated in Map 2.12.1-1. A USGS gauging station was located near the mouth of Eccles Canyon but was removed during the summer of 1985. (See also the reclamation discussion in Part 4.)

CEMETERIES, NATIONAL TRAILS AND WILD RIVERS

There are no cemeteries, national trails, or wild rivers located within or adjacent to the Skyline Mine lease and permit areas.

* N O T E *

MOST OF THE DETAILED DISCUSSION ON FOREST SERVICE OBJECTIVES FOUND ON PAGES 2-131 THROUGH 2-138 HAS BEEN REMOVED FROM THIS DOCUMENT AT THE REQUEST OF THE FOREST SERVICE.

Fire Management Objective

"Provide fire managment and other protective measures that will compliment ecologic and economic values."

Impacts

Approximately 14.76 acres (201,000 board-feet) of the spruce-fir timber type and 10.66 acres (93,000 board-feet) of the aspen timber type were removed to establish the surface operation facilities of the Skyline Mine. Timber affected by surface disturbances were harvested according to Forest Service requirements.

Because timber has been removed from the disturbed areas for the life of the mine, short-term impacts are in conflict with the management objective to harvest forest products on a sustained yield basis. However, long-term impacts of the Skyline Mine will support the objectives of the Forest Service. The revegetation effort includes replanting timber species which improve timber growth and yield.

Mining activities promote the improvement of access roads for timber harvesting and fire protection and allow removal of deadfall timber, thereby decreasing fire hazard.

RECREATION, SCENIC RESOURCES AND TRANSPORTATION

Recreation Management Objective

"Provide for a broad range of quality recreation opportunities in coordination with Federal, State, and local agencies. Manage off-road vehicle use to the extent needed to prevent environmental damage."

Scenic Resources Management Objective

"Plan resource activities to add variety and minimize adverse impacts on scenic resources."

Transportation Management Objective

"Manage and coordinate transportation systems compatible with various uses and activities to provide for feasible, safe movement of goods and services."

Impacts

The surface operation facilities of the Skyline mine imposes industrial modifications and intrusions, impairs the "near-natural" condition, and reduces the remote, unoccupied appeal of the South Fork of Eccles Canyon. (U.S. Geological Survey, 1979) The industrial modifications conflict with the scenic resources management objective of the Forest Service.

Traffic safety problems could be created from mining activities and increased recreational use of the new highway, due to the increased usage.

The Skyline Mine has provided the major impetus to improve the road in Eccles Canyon, increasing vehicle safety and reducing dust. This road, now on the State Highway system, reduces environmental damage through better drainage systems and paved roadways, improves access for recreation and movement of goods and services, and reduces need for off-road vehicle use in the Eccles and Huntington Creek areas.

Through revegetative measures after mining activities, the natural condition of Eccles Canyon will be restored and unreclaimed areas from previous activities, which constitute approximately twenty-five percent of the portal and yard area.

FISH AND WILDLIFE

Management Objective

"Protect and maintain wildlife and fish habitats consistent with other resource uses and activities and in cooperation with the Utah State Division of Wildlife Resources."

Impacts

Deer use would be affected on approximately 332 acres of land. A fifty percent reduction on deer use is expected within an area one tenth of a mile from the perimeter of mine facilities. (U.S. Geological Survey 1979). The conveyor corridor will temporarily affect deer use during construction, after which the deer will become habituated to the noise of the coal conveyor and other facilities.

The increased number of people in Eccles Canyon would be expected to have the greatest impact on wildlife in the area of the Skyline Mine. Elk would be expected to avoid using an area within approximately one half mile of mine facilities. (U.S. Geological Survey, 1979)

Through revegetative measures after the life of the mine, wildlife habitats will be restored to an improved condition over that of their existing condition.

Fish habitats were temporarily stressed from relocating Lower Eccles Creek into a new channel. The new channel has an equal or superior trout habitat to that of the previous channel. Currently, fish populations are returning to their pre-mine construction levels.

The streambed in the vicinity of the portal and yard area was placed in closed culvert to protect the fish habitat and stream from impacts of construction and mine operation activities (see Section 4.19). The placement of closed conduits does not affect the fish habitat. Following mine activities, the channel will be restored to an equal or better condition than previously existed.

Short-term effects on wildlife habitats are in conflict with the Forest Service objective to protect and maintain wildlife habitats. However, long-term impacts will be to improve the habitats and restore unreclaimed lands to usable wildlife habitats. The fish habitat in Eccles Canyon will be enhanced and improved during and after mining.

WILDERNESS ROADLESS AREAS

Management Objective

Determine the future status of inventoried roadless areas.

Impacts

There are no inventoried roadless areas within the lease area of the Skyline Mine.

MISCELLANEOUS

Buildings, Public Roads, and Other Man-Made Facilities

There are few man-made features located within the Skyline Mine permit area. One abandoned gas well is located within the permit area in Eccles Canyon. The only building located within the permit area is a small structure associated with Gas Well No.8. A natural gas pipeline traverses the permit area and an

associated gas tank is located east of the southeastern boundary of the lease area. The location of public roads, including SR-264, within and adjacent to the lease area are illustrated in Map 2.12.1-1. A USGS gauging station was located near the mouth of Eccles Canyon but was removed during the summer of 1985.

Cemeteries, National Trails and Wild Rivers

There are no cemeteries, national trails, or wild rivers located within or adjacent to the Skyline Mine lease and permit areas.

REFERENCES

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2.13 COMMUNITY INFRASTRUCTURE AND SOCIO-ECONOMICS

Numerous significant changes have occurred in the Skyline Mines community infrastructure and socio-economic service areas since the Permittee filed its Mining and Reclamation and permit application in 1979. These changes and their effects are reflected in the balance of this renewal update report.

This report clearly illustrates that the operation of the Permittee's Skyline Mines have had no negative socio-economic impacts on the community infrastructure of the service areas of Carbon, Emery, Sanpete, and Utah counties. In fact, the report illustrates that the development and operation of the Skyline Mines has been quite beneficial and has provided support to areas involved, and that planned future growth will have no adverse effects on the four county service area.

In general, dramatic changes have taken place in the number of coal mines in operation and the resultant work force reduction. Several changes in coal mine ownership have also occurred. One coal mining operation has had several mine fires, which significantly impacted the Skyline Mines' service areas. All of these changes have impacted the general economy of the 4 county area to different degrees, and this update report will address these items in further detail.

The original survey done by the Kaiser Engineers in August 1979 addressed the capability of the communities around the Coastal Permittee's Skyline Mines being able to accomodate the needs of Utah Fuel Company employees.

Our five year operational experience has shown that the communities of Carbon, Emery, Sanpete, and Utah counties have had and do have the abilities to provide the necessary infrastructure, i.e., community services such as water, sewage systems, housing, schools, recreation, medical care, land, and commercial facilities.

2.13.1 Service Area

The Skyline Mines have a rather large service area. Conceptually the service area can be viewed as two concentric circles. The inner circle is primary to the Skyline Mines; the outer is secondary.

The primary area contains those communities that lie within a 45 minute commute, and therefore are most likely to receive the largest influx of new residents seeking employment at Skyline. The secondary service area consists of those communities requiring over 45 minutes commute time to the mine. These communities are listed on the following page by service area category.

The newly constructed Eccles Canyon road (part of SR-264) was completed with final paving by the end of the 1986 construction period. The construction of this highway has facilitated employee travel to the work area and also has provided a safe and short, year-round connecting route between Carbon, Emery, and Sanpete counties.

PRIMARY SERVICE AREA

Pleasant Valley
Scofield (8 minutes)
Clear Creek (8 minutes)

Sanpete Valley
Fairview (30 minutes)
Mt. Pleasant (37 minutes)
Spring City (44 minutes)
Moroni (44 minutes)

Carbon County
Price (50 minutes)
Helper (44 minutes)

Earlier employment predictions indicated that some permanent residents from these secondary service area communities will commute to the Skyline mine for employment, but newcomers will not settle so far from the mine. Experience with other mines in the geographical area indicated that a 30 to 40 minute commute over 40 miles or less represents the maximum that miners can be expected to commute and still maintain a high degree of reliability. The Permittee's experience at Skyline has shown that with company bussing being provided, employees will travel

SECONDARY SERVICE AREA

Carbon County
Wellington
Sunnyside
East Carbon
Hiawatha

Emery County
Cleveland
Orangeville
Castle Dale
Ferron
Huntington

Sanpete County
Ephraim
Manti
Gunnison
Centerfield
Fountain Green
Milburn
Sterling
Wales

Juab County
Nephi

Utah County
Payson
Spanish Fork
Santaquin
Mapleton
Salem
Springville

greater distances and remain dependable, capable and safe workers.

Skyline employees are bussed daily from Carbon, Sanpete, and Utah counties. A few employees commute to work from Sevier and Salt Lake counties.

2.13.2 Growth Capability

Experience over the past five years has shown that the service area communities have had and do have more than adequate infrastructure to accomodate the relatively small growth now anticipated at the Skyline Mines. See Table 2.13-1, Growth Capability Summary.

Communities in Carbon, Emery, Sanpete and Utah counties have upgraded and are upgrading their infrastructure systems to better serve the needs of their residents. Because of anticipated growth in the late 70's and early 80's, all of the service area counties upgraded or replaced many of their outdated community infrastructure facilities. With the decline in energy demands and resultant reductions in the work force, many of the communities now find themselves with surplus service capability.

TABLE 2.13-1

GROWTH CAPABILITY SUMMARY

Services (Current Status) Community	Water	Sewer	Land For Expansion	Schools	Hospital	Housing	Commercial Facilities
Scofield	New System	New System	Yes	None	None	Small Surplus	Minimal
Fairview	Upgraded	Adequate	Yes	Unused Capacity	None	Surplus	Partial
Mt. Pleasant	Upgraded	Upgraded	Yes	Unused Capacity	Yes	Surplus	Full Convenience
Spring City	Upgraded	Adequate	Yes	Unused Capacity	None	Small Surplus	Partial
Price	Adequate	Adequate	Yes	Adequate	Yes	Significant Surplus	Full Convenience
Helper	Adequate	Adequate	Yes	Adequate	None	Significant Surplus	Partial
Moroni	Upgraded	Adequate	Yes	Unused Capacity	None	Surplus	Partial

REPLACES	TEXT
Table 2.13-1 Page 2-144	Table 2.13-1 Page 2-144 Date 07/07/89

2.13.3 Labor Force

At the time the Skyline Mines were being planned and initial construction started, there was a much greater demand for employees than there is at the present time.

Employment in the coal mining service areas has declined drastically. Sanpete, Carbon and Emery counties have a current combined unemployment of 9.5%. Utah county had extensive layoffs at the U.S. Steel Geneva plant. Since the Geneva plant has resumed full operation, unemployment levels in Utah County have improved slightly.

Table 2.13-2, 1988 Work Force - Unemployment Status, indicates for the above four county area a total of 6,180 unemployed workers, or 5.0% of the total work force, available for employment.

The current distribution of manpower, Table 2.13-3, shows the manpower distribution levels and percentage employed at the Permittee's Skyline Mines by county and respective communities for the year 1988.

Tables 2.13-4, 2.13-5, 2.13-6, 2.13-7 and 2.13-8 reflect similar manpower distribution levels for the past four years, 1982 through 1986.

These tables generally reflect the uneveness of the demand for coal over the past five years that has affected the Skyline Mines' development. Earlier predictions indicated rapid escalation of manpower levels, gradually reaching approximately 900 employees by 1991. Instead, manpower levels have increased only gradually, with intermittent reductions, primarily in the construction work force, to the current maximum of 232 employees as of December 30, 1988.

Table 2.13-9, showing projected manpower levels through the year 1991, indicates maximum employment figures to reach only 299 total employees during that five year period rather than the original projection of 900. Manpower figures probably will not increase beyond the 300 level, based on current production projections.

Table 2.13-8 also projects the percentage breakdown by county where Skyline employees will reside, based on past experience.

TABLE 2.13-2

1988 WORKFORCE - UNEMPLOYMENT STATUS

COUNTY	CURRENT WORKFORCE *	PERCENT UNEMPLOYED	NO. UNEMPLOYED
CARBON	8,280	8.5	700
EMERY	3,550	9.3	330
SANPETE	6,190	11.1	690
UTAH	104,940	4.3	4,460

Total Unemployed 6,180

* Current work force is comprised of employed workers and unemployed workers available for work as of December 30, 1988.

REPLACES	TEXT
Table 2.13-2 Page 2-147	Table 2.13-2 Page 2-147 Date 07/07/89

TABLE 2.13-3

MANPOWER DISTRIBUTION - 1988

UTAH COUNTY		PERCENT
Mapleton	2	0.86
Orem	5	2.16
Payson	7	3.02
Pleasant Grove	1	0.43
Provo	3	1.29
Salem	7	3.02
Santaquin	1	0.43
Spanish Fork	23	9.91
Springville	9	3.88
Benjamin	1	0.43
Elkridge	1	0.43
Lindon	1	0.43
Goshen	1	0.43
	62	26.72
CARBON COUNTY		
Helper	3	1.29
Price	22	9.48
Scofield	1	0.43
Kenilworth	1	0.43
Wellington	4	1.72
East Carbon	1	0.43
	32	13.79
EMERY COUNTY		
Ferron	1	0.43
Castle Dale	1	0.43
Emery	1	0.43
Huntington	1	0.43
	4	1.72

SANPETE COUNTY		PERCENT
Centerfield	4	1.72
Chester	1	0.43
Ephraim	8	3.45
Fairview	28	12.07
Fayette	1	0.43
Fountain Green	11	4.74
Gunnison	6	2.59
Manti	13	5.60
Mayfield	2	0.86
Moroni	10	4.31
Mt. Pleasant	30	12.93
Spring City	9	3.88
Sterling	1	0.43
Wales	2	0.86
Indianola	1	0.43
	127	54.74
SEVIER COUNTY		
Aurora	1	0.43
Glenwood	1	0.43
Richfield	1	0.43
Salina	1	0.43
	4	1.72
SALT LAKE COUNTY		
Sandy	2	0.86
West Jordon	1	0.43
	3	1.29

TOTAL MANPOWER = 232

REPLACES	TEXT
Table 2.13-3 Page 2-148	Table 2.13-3 Page 2-148 Date 07/07/89

TABLE 2.13-4

MANPOWER DISTRIBUTION - 1986

UTAH COUNTY		PERCENT
Mapleton	2	1.27
Orem	5	3.16
Payson	3	1.90
Pleasant Grove	1	0.63
Provo	3	1.90
Salem	2	1.27
Santaquin	2	1.27
Spanish Fork	15	9.49
Springville	8	5.06
	41	25.95
CARBON COUNTY		
Helper	1	0.63
Price	13	8.23
Scofield	1	0.63
	15	9.49
EMERY COUNTY		
Ferron	1	0.63
	1	0.63
SALT LAKE COUNTY		
Sandy	1	0.63
	1	0.63

SANPETE COUNTY		PERCENT
Centerfield	1	0.63
Chester	2	1.27
Ephraim	5	3.16
Fairview	22	13.92
Fayette	1	0.63
Fountain Green	6	3.80
Gunnison	7	4.43
Manti	10	6.33
Mayfield	1	0.63
Moroni	7	4.43
Mt. Pleasant	13	8.23
Spring City	7	4.43
Sterling	1	0.63
Wales	1	0.63
	84	53.16
SEVIER COUNTY *		
Aurora	4	2.53
Glenwood	2	1.27
Richfield	3	1.90
Salina	7	4.43
	16	10.13

TOTAL MANPOWER = 158

* Employees presently residing in Sevier County are recent transfers from Coastal States Energy Company's Southern Utah Fuel Company mine located in Sevier County, Utah, an it is assumed they will relocate in one or more of the counties closer to the Permittee's Skyline Mines.

ADDITION TO	TEXT
Table 2.13-3 Page 2-149	Table 2.13-4 Page 2-148A Date 07/07/89

TABLE 2.13-5

MANPOWER DISTRIBUTION - 1985

SANPETE COUNTY		PERCENT
Chester	2	1.80
Ephraim	4	3.60
Fairview	19	17.12
Fountain Green	4	3.60
Gunnison	1	0.90
Manti	6	5.41
Mayfield	1	0.90
Moroni	6	5.41
Mt. Pleasant	9	8.11
Spring City	5	4.50
Wales	2	1.80
	59	53.15

CARBON COUNTY		
Price	8	7.21
Helper	1	0.90
Scofield	1	0.90
	10	9.01

UTAH COUNTY		PERCENT
Mapleton	1	0.90
Orem	5	4.50
Payson	2	1.80
Pleasant Grove	1	0.90
Provo	3	2.70
Salem	2	1.80
Santaquin	2	1.80
Spanish Fork	16	14.41
Springville	7	6.31
	39	35.14

SEVIER COUNTY		
Salina	1	0.90
Aurora	1	0.90
	2	1.80

SALT LAKE COUNTY		
Sandy	1	0.90
	1	0.90

TOTAL MANPOWER = 111

REPLACES	TEXT
Table 2.13-4 Page 2-149	Table 2.13-5 Page 2-149 Date 07/17/89

TABLE 2.13-6

MANPOWER DISTRIBUTION - 1984

UTAH COUNTY		PERCENT
American Fork	1	1.03
Mapleton	1	1.03
Orem	3	3.09
Payson	2	2.06
Pleasant Grove	1	1.03
Provo	3	3.09
Salem	1	1.03
Santaquin	2	2.06
Spanish Fork	15	15.46
Springville	6	6.19
	35	36.08
CARBON COUNTY		
Price	6	6.19
Helper	1	1.03
Wellington	1	1.03
East Carbon	1	1.03
	9	9.28
SANPETE COUNTY		
Chester	2	2.06
Ephraim	3	3.09
Fairview	18	18.56
Fountain Green	4	4.12
Manti	5	5.15
Mayfield	1	1.03
Moroni	5	5.15
Mt. Pleasant	8	8.25
Spring City	5	5.15
Wales	2	2.06
	53	54.64

TOTAL MANPOWER = 97

REPLACES	TEXT
Table 2.13-5 Page 2-150	Table 2.13-6 Page 2-150 Date 07/07/89

TABLE 2.13-7

MANPOWER DISTRIBUTION - 1983

UTAH COUNTY		PERCENT
Mapleton	2	2.08
Orem	2	2.08
Payson	2	2.08
Pleasant Grove	2	2.08
Provo	3	3.13
Salem	1	1.04
Santaquin	1	1.04
Spanish Fork	12	12.50
Springville	7	7.29
	32	33.33
CARBON COUNTY		
Price	9	9.38
Helper	1	1.04
	10	10.42
SANPETE COUNTY		
Chester	2	2.08
Ephraim	3	3.13
Fairview	20	20.83
Fountain Green	3	3.13
Manti	6	6.25
Mayfield	1	1.04
Moroni	6	6.25
Mt. Pleasant	8	8.33
Spring City	5	5.21
	54	56.25

TOTAL MANPOWER = 96

REPLACES	TEXT
Table 2.13-6 Page 2-151	Table 2.13-7 Page 2-151 Date 07/07/89

TABLE 2.13-8

MANPOWER DISTRIBUTION - 1982

UTAH COUNTY		PERCENT	
Lehi	1	0.87	
Mapleton	2	1.74	
Orem	2	1.74	
Payson	2	1.74	
Pleasant Grove	3	2.61	
Provo	5	4.35	
Salem	1	0.87	
Santaquin	1	0.87	
Spanish Fork	15	13.04	
Springville	10	8.70	
	42	36.52	
CARBON COUNTY			
Price	9	7.83	
Helper	2	1.74	
East Carbon	1	0.87	
	12	10.43	
SANPETE COUNTY			
Chester	2	1.74	
Ephraim	3	2.61	
Fairview	25	21.74	
Fountain Green	3	2.61	
Manti	6	5.22	
Mayfield	1	0.87	
Moroni	6	5.22	
Mt. Pleasant	10	8.70	
Spring City	5	4.35	TOTAL MANPOWER
	61	53.04	= 115

REPLACES	TEXT
Table 2.13-7 Page 2-152	Table 2.13-8 Page 2-152 Date 07/07/89

TABLE 2.13-9

PROJECTED MANPOWER LEVELS

1989 THROUGH 1991

1989	1990	1991
253	299	337

PROJECTED MANPOWER RESIDENTIAL PATTERNS BY COUNTY *

COUNTIES	1989	1990	1991
	no.	no.	no.
Carbon	46	54	61
Utah	71	84	95
Sanpete	134	158	178
Other	3	3	3
TOTALS	253	299	337

* Projections based on previous employee history

Kaiser Engineers review of community infrastructure and socio-economic aspects final report on the Skyline Mines projected a manning table for Pleasant Valley mines that indicated a combined total of 1,420 employees for the Skyline Mines and the neighboring Valley Camp mining operation. Table 2.13-9 reflects the actual employment numbers and manpower projections to the year 1991 for these two mining operations in the Pleasant Valley area. Projections for the years 1987 through 1991 are based on actual known projected coal demands for both mining operations and reflect as near as possible actual manpower needs in the next 5 year period.

Table 2.13-10 also indicates Valley Camp of Utah, Inc's present manpower residence locations showing a significant difference from the projections reflected in the Kaiser Engineers report of 1979.

These changes in manpower residence locations indicate workers are coming from communities that are capable of providing more and better services, and thus are even further reducing community impacts.

Early projections of coal mine development in the Carbon/Emery area have proven to be incorrect and far in excess of actual existing conditions.

Table 2.13-11, which compares the projected mines to open on Federal land prior to 1985 to the current status, clearly illustrates that projections for a "booming" coal industry in the area were overly optimistic. Seven mines were projected to be operational with a combined annual production of 13.1 million tons, and total employment of 3,348 employees. Only three of the seven mines are in operation, producing only 3.70 MTPY and employing only 378 people of the projected 3,348, 2,970 less than projected.

It should also be noted that Table 2.13-10 did not contain the names of three other potential coal mine operations in the Pleasant Valley area. They were Blazon Mining Company, Aletha Mining Company, and UCO Mining Company. Blazon Mining Company did go into production for a brief period of time and then permanently closed their mine. Neither Aletha Mining Company nor UCO Mining Company went beyond the planning stages before reduced coal demand cancelled their project.

TABLE 2.13-10

MANNING TABLE FOR PLEASANT VALLEY MINES

Mine Year	82	83	84	85	86	87	88	89	90	91
Utah Fuel Company Employees	115	96	97	111	158	180	230	280	330	330
Valley Camp of Utah Inc Employees	245	216	181	165	165	165	165	165	165	165
TOTAL	360	312	278	276	323	345	395	445	495	495

The management at Valley Camp of Utah, Inc. reports that the present residence locations have changed from 1979 to the present as follows:

Communities	1979	1986
From Scofield	30%	13%
From Price/Helper	50%	37%
From Sanpete Valley	20%	28%
From Utah County		22%

REPLACES	TEXT
Table 2.13-9 Page 2-156	Table 2.13-10 Page 2-156 Date 07/07/89

TABLE 2.13-11

COMPARISON OF PROJECTED MINES TO OPEN ON FEDERAL LAND
PRIOR TO 1985
AND THE CURRENT STATUS

MINE NAME OPERATOR LOCATION T	PROJECTED M.T.P.Y (1990 est.)	CURRENT M.T.P.Y	PROJECTED EMPLOYMENT	CURRENT EMPLOYMEN
"B" CANYON U.S. STEEL Near Sunnyside	1.0	Undeveloped	280	0
FISH CREEK & DUGOUT CANYON P G and E Near Wellington	3.2	Undeveloped	896	0
DEADMAN'S MINE AMCA RESOURCE 10 miles east of Kenilworth	1.0	Operating .65	280	56
SKYLINE MINES COASTAL STATES Near Scofield	4.0	Operating 1.75	800	157
BELINA #2 & O'CONNOR VALLEY CAMP Near Scofield	2.4	Belina #2 on standby .75	672	165
MINE #1 MT. STATES RESOURCES 20 miles south of Emery	.5	Undeveloped	140	0
SKUMPAH CANYON ENERGY RESOURCES GROUP 20 miles east of Emery	1.0	Undeveloped	280	0
TOTALS	13.1	2.20	3,348	378*

* 2,970 fewer employees than predicted earlier

REPLACES	TEXT
Table 2.13-10 Page 2-157	Table 2.13-11 Page 2-157 Date 07/07/89

TABLE 2.13-12

MINING COMPANY MANPOWER NEEDS
COMPARISON 1981 - 1985

COMPANY	MANPOWER NUMBERS 1981	1982	1983	1984	1985	MINE STATUS
Aletha	1	1	0	0	0	Inactive
Beaver Creek	325	180	110	140	121	Operating
Blackhawk				30	30	Shut Down
Blazon	37	37	0	0	0	Shut Down
Canberra	15	15	0	0	0	Shut Down
Coastal States SUFCo	317	306	306	296	267	Operating
Utah Fuel Co. Skyline	126	86	86	98	101	Operating
Coop	50	50	40	33	33	Operating
Consolidation	231	17	17	17	111	Operational Shut down 82-84
Emery	1740	1010	1050	760	869	Operating
Genwall	1	1	1	24	24	Operating, but under Closure Order
Kaiser	265	0	0	96	312	Operating Shut down 82-83
Plateau	380	220	238	222	234	Operating
Price River (Castle Gate)	560	169	165	145	50	Shut down
Soldier Creek	140	88	90	76	76	Operating
Sunedco	2	1	1	1	1	Inactive
Tower (Andelex)	73	23	23	30	30	Operating
Train Mountain	60	25	25	37	29	Operating 85-86 Shut down 82-84
UCO/Std. Metals	7	7	0	0	0	Inactive
U S Fuel	375	400	285	291	228	Shut down
U S Steel	166	11	11	0	0	Shut down
Valley Camp of Utah	357	290	203	181	209	Operating
TOTALS	5228	2937	2651	2477	2725	

REPLACES	TEXT
Table 2.13-11 Page 2-158	Table 2.13-12 Page 2-158 Date 07/07/89

During the five year period from 1981-1985, 21 mining companies were classified as operating or potential operating mining companies. Of those 21 operating, eight are now shut down, two never become viable operations, three shut down during 1982-1983-1984, one is operating but facing a closure order, and UP&L's Wilberg (Emery) mine is closed due to a mine fire.

This summary clearly illustrates the instability and excess available work force of the Utah coal mining industry during the past five years, and further supports the premise that the Permittee's Skyline Mines' limited manpower needs have not negatively impacted, but perhaps have benefited, the service areas of Carbon, Enery, Sanpete and Utah Counties.

2.13-4 Suggested Action Items

Original recommended action items as identified in the study have been performed by the Permittee and Utah Fuel Company management personnel as follows:

<u>Scofield and the Pleasant Valley Area</u>

- Encourage the two (and possibly more) mining companies in Pleasant Valley to begin working on agreements to cooperate with each other and assist the local officials in solving existing problems.

- Hold an information exchange meeting with Scofield residents.

- Make a thorough investigation of the Utah Special Service District, which could provide many of the necessary community services to the mining companies and communities.

- Implement one of several housing assistance measures.

Response:

The Permittee and Valley Camp of Utah, Inc., being the owners of the two operating coal mines in the area, have cooperatively worked together and finalized agreements on land leases and land exchanges. Cooperative agreements have been formulated to jointly participate in the construction of the Eccles Canyon highway and also jointly share, under an agreement with each other and UDOT, snow removal maintenance costs on the highway. The road agreements have been especially beneficial to local residents in providing them with year round safe travel between SR96 and SR31. This well maintained highway (SR-264) provides year round access to local and state residents for summer and winter recreational and business activities.

Both the Permittee and Valley Camp of Utah officials have cooperatively worked closely during the past five years with Scofield-Pleasant Valley residents and elected officials in the following manner:

- Regularly attended Scofield Town Council meetings

- Are represented and regularly attend monthly meetings of the Pleasant Valley Committee (PVC). The PVC is composed of all representative users and city, county, state, and federal agencies in the Pleasant Valley area.

- Are or have finalized participating contracts with the Town of Scofield to participate in the newly proposed Scofield sewer project

- Have worked closely with the PVC and the Department of Wildlife resources in local stream improvements, by providing materials, labor, equipment, and technical expertise. Utah Fuel Company received a commendation from the <u>American Fisheries Society</u> for their extensive services rendered toward stream improvements resulting in significant fish migration and propagation.

The Permittee and Utah Fuel Company have participated in Scofield Town's Annual Pleasant Valley Days celebration with floats and other types of support.

Utah Fuel Company has assisted Scofield Town by grading and paving certain streets to eliminate dust, and also have constructed and installed permanent fence gates, enabling Scofield to control traffic to their sanitary land fill.

The Permittee has been actively involved throughout the entire planning stage of the Scofield sewer project, and actively assisted Scofield's representatives in receiving favorable consideration and grant approvals from the Utah State Community Impact Board.

There appears to be adequate housing available in the Pleasant Valley area, since there are several homes and property for sale, so there has been no reason to pursue the recommended housing assistance measure.

Until just recently, the Scofield Town Council has maintained a building moratorium on new home construction in the community.

The Sanpete Valley Communities

- Hold an information meeting in Fairview or Mt. Pleasant to inform local officials of the mining program and establish communication points.

- Monitor the housing situation in Fairview, Mt. Pleasant, and perhaps Spring City; and develop a dialogue with housing developers.

- Monitor school construction in North Sanpete School District. Provide updated employment information from time to time.

- Monitor hospital needs in the Sanpete Valley. Coordinate the mine manning schedule with local plans for a new hospital.

- Monitor water requirements, especially in Fairview.

- Request a copy of the tabulation of the Fariview resident survey.

Response:

Permittee's management officials have held several informational meetings with the local elected officials, including State Legislators, Mayors and County Commissioners of Sanpete county to keep them apprised of progress and plan changes occurring at the Skyline Mines. Contact with the identified community leaders has been on-going throughout the Skyline Mines' progress by the Permittee's Governmental Affairs Director.

As elected officials are replaced, contact is made after each election, where changes take place, to ensure good lines of communication are maintained.

Initial contacts were made with housing developers in the Fairview and Mt. Pleasant areas, but projected housing shortages in Sanpete county communities never materialized.

Several meetings were held with both North and South Sanpete School District Superintendents to keep them updated on the Permittee's development progress. New larger school buildings have been constructed for the elementary, middle and high school

grade levels; and educational facilities are more than adequate to meet educational needs for the foreseeable future.

As realistic manning schedules for the Permittee's Skyline Mines began to solidify, it became apparent that the mine's future hospital needs would not impact the Sanpete Valley Hospital in Mt. Pleasant. Hospital officials were apprised of the Applicant's manning schedules as construction and mine development progressed. A new hospital was constructed in Mt. Pleasant in May of 1984 with a 20 bed capacity, and is administered under the Intermountain Health Care directorship.

The Permittee discussed, with Sanpete County and community leaders in a community meeting, the status of their various water systems and community needs. Special attention was given to Fariview community's water situation.

Fairview, during Skyline mine development, has upgraded their water system significantly through funding from the State Community Impact Board. These community assistance grants and loans have enabled Fariview and other Sanpete communities to install new feeder and water distribution lines, and also enabled Fairview to drill a deep well to augment their canyon spring water supply. Fairview now has a state approved culinary water system.

A copy of the Fairview resident survey tabulation was procurred and evalutated by the Permittee.

Carbon/Emery Area

- Hold an information meeting in Price to inform local officials of progress and to establish communication points.

- Monitor essentials such as housing, water, sewage system, and capacity of new hospital.

Response:

Permittee held an informational meeting in the Price area in 1980 and 1981 with local, county, and state elected officials, who were updated as to the progress of the Skyline Mines construction and development phases.

Communication points were established as follows: Senator Omar Bunnell and Representative Mike Dmitrich from the State Legislature; James Simone, Chairman of the Carbon County Commission; and Mayors Walter Axelgard of Price and Charles Ghirardelli of Helper.

A similar informational meeting was held in Emery county, and local and county elected officials were updated on Skyline Mines' construction and development phases.

It was agreed that future contact people would be Mayor Drew Richards of Huntington City and the Emery County Commissioners: Gardell Snow, Chairman, of Ferron; Glen E. Jones, Huntington; and Rue P. Ware, Orangeville.

Permittee met at regular intervals with County Planning and Zoning officials and Price River Water Improvement District officials to apprise them of Skyline Mines' progress, and also to keep abreast of housing, water, and sewer developments.

Contacts were initially made with John Harris, Carbon Hospital Administrator, and also Don Larsen, Castle View Hospital Administrator. Mr. Larsen indicated that the new hospital has an 88 bed capacity - an increase of 18 beds over the old facility. The new hospital also has significant state-of-the-art technology and specialized medical services that were not offered in the old hospital.

TEXT ON

PAGE 2-165 DELETED

REPLACES	TEXT
Section 2.13-5 Page 2-165	Section 2.13-5 Page 2-165 Date 07/07/89

2.13.5 Comprehensive Study Program

The Permittee conducted a comprehensive study of the social, economic, and community impacts associated with the development of the Skyine Mines. W. Robert Richards, Housing and Community consultant, 2210 Arcadia Place, Masting, California 94553, was contracted to conduct the study to assess the current and future impacts on the four county service area communities.

Mr. Richards did an in-depth analysis of the construction and mining work force, the residential patterns, the community infrastructure associated with the identified work force, housing, transportation, and recreation impacts of the Skyline Mines. His conclusions were that in the stages of construction and early mine development there would be no significant impacts on the area's work force, housing, and recreation due to the limited numbers and wide dispersion of employees. Subsequent studies have, of course, reflected this same finding, since employee numbers at Skyline Mines have remained far below predicted manpower levels and community infrastructure facilities have been significantly improved.

The Permittee hand carried copies of the comprehensive study and reviewed same with the County Commissions from Carbon, Emery, Sanpete, and Utah Counties; the Mayors of the major municipalities in the effected counties; the Southeast Utah Association of Government officials; members of the State Legislature representing the four county service areas, and the regulatory authorities, DOGM and OSM. Recipients were encouraged to refer any questions to the Permittee and any comments to the regulatory agencies for appropriate follow-up.

Housing and company bussing were identified as possible mitigation measures, depending on projected growth scenarios for the service area.

Housing

Housing was felt to be adequate for the next two years (through 1983) if the current manpower demands remained constant and anticipated large power projects such as the Emery Gasification plant or Carbon-Emery power plants did not start construction.

None of these projected plants have materialized, and manpower demands have not remained constant; in fact they have declined significantly, (see Table 2.13-11, Manpower Needs Comparison - 1981-1985) creating a vast reservoir of unemployed workers to draw upon. In fact, Carbon, Emery, and Sanpete counties are classified as depressed areas.

The Intermountain Power Project (IPP) started initial construction on its number 1 & 2 plants in October of 1981, and announced in 1982 that proposed plants 3 & 4 were being cancelled. About that same time, Utah Power and Light cancelled its Number 4 Hunter plant. Fortunately for Carbon, Emery, Sanpete, and Utah counties, the IPP project did proceed with construction, since its coal contracts with the Permittee has enabled the Skyline Mines to continue development and increase operations.

The Intermountain Power Project is obtaining or will obtain coal from the following coal mines: Andelax (formerly Tower Resources), Plateau Mining Company, U.S. Fuel, the Skyline Mines, and Southern Utah Fuel Company. Without IPP as a customer, it is questionable whether all of the above mines would be viable operations, at least at the production levels now anticipated.

Bussing

The Permittee committed to providing free bus transportation service to the Skyline mine employees, and has, under its personal ownership, provided busses from Carbon, Sanpete, and Utah Counties.

Experience has shown that company bussing is very successful. Employee participation and satisfaction is high, averaging about 95% usage. It is a safe mode of worker transportation that provides convenient year round access from the multi-county service areas.

The Permittee has made and continues to make conscientious efforts to participate in organized, multi-municipal, county and regional efforts to keep such entities informed as to Skyline Mines' activities, and address community or county concerns relative to our Skyline mining operations. The Permittee has finalized a contract with the Scofield Town officials to assist the community by participating in their proposed Scofield-Pleasant Valley sewer project. Scofield Town has formed a Pleasant Valley Sewer Advisory Board and the Permittee has a representative on that Board to provide technical expertise and make recommendations to the Board and the Scofield Town Council regarding the sewer system operation.

2.14 PRIME FARMLAND INVESTIGATION

A pre-application investigation was conducted by the Permittee to determine if any prime farmland would be impacted within the area of the proposed surface facilities. Based on the criteria in 30 CFR 783.27 paragraph (b), items 1 and 5, the Eccles Canyon area cannot be classified as prime farmland. This opinion is substantiated by Dr. Therom B. Hutchings, State Soil Scientist for the Soil Conservation Service (See Exhibit A). Therefore, a negative determination for prime farmland classification of the Skyline project area is requested.

EXHIBIT A

United States Department of Agriculture
Soil Conservation Service
4012 Federal Building
125 South State Street
Salt Lake City, UT 84138

August 29, 1979

Keith W. Welch
Environmental Coordinator
Coastal States Energy Company
1354 East 3300 South, Suite 303
Salt Lake City, UT 84106

Dear Mr. Welch:

Field evaluation of the area outlined on your map in Eccles Canyon shows no prime farmland in that area.

Criteria for determination of prime rangeland have not been developed and agreed upon between agencies. We can not, therefore, evaluate prime rangeland.

I am returning your map.

Sincerely,

T. B. HUTCHINGS
State Soil Scientist

Enclosure

cc:
Ed Burton, AC, Orem
Gary Moreau, DC, Price

Plates 2.2.7-1 through 2.2.7-6 have been removed and placed in a CONFIDENTIAL folder.

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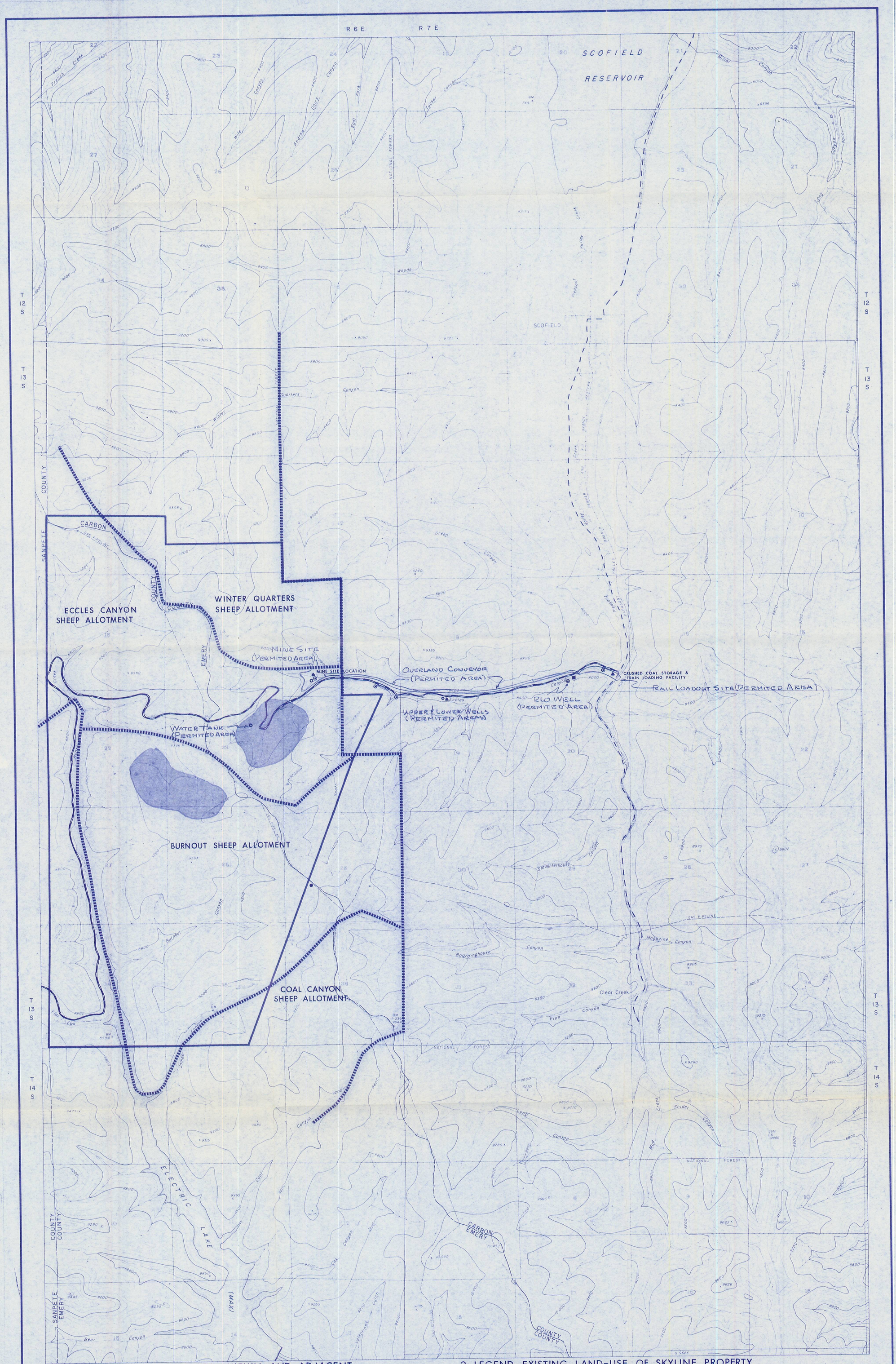


1. LEGEND: MAN MADE FEATURES WITHIN AND ADJACENT TO COAL LEASE AREA.

- PUBLIC ROAD
- PIPELINE
- UTAH FUEL WELLS
- GAS TANK
- ABANDONED GAS WELLS
- BUILDING
- USGS GAUGING STATION (ABANDONED)

2. LEGEND: EXISTING LAND-USE OF SKYLINE PROPERTY.

- SHEEP ALLOTMENT BOUNDRY LINES.
- TIMBER SALES

NO.	DATE:	REVISION	DRM	CHK	APP
2	9-79	Added Permit Boundaries (Approximate) 9-30-89	LWS	GF ZCH	
1	7/89	CHANGED WATER WELL TO ABANDONED GAS WELL			

DESIGNED BY: DATE
DRAWN BY: B. Guymon 6/27/89
CHECKED BY: ZCH 7/89
APPROVED BY:
APPROVED BY: W. Shinn 9-30-89
REFERENCE DWGS.

PROFESSIONAL SEAL

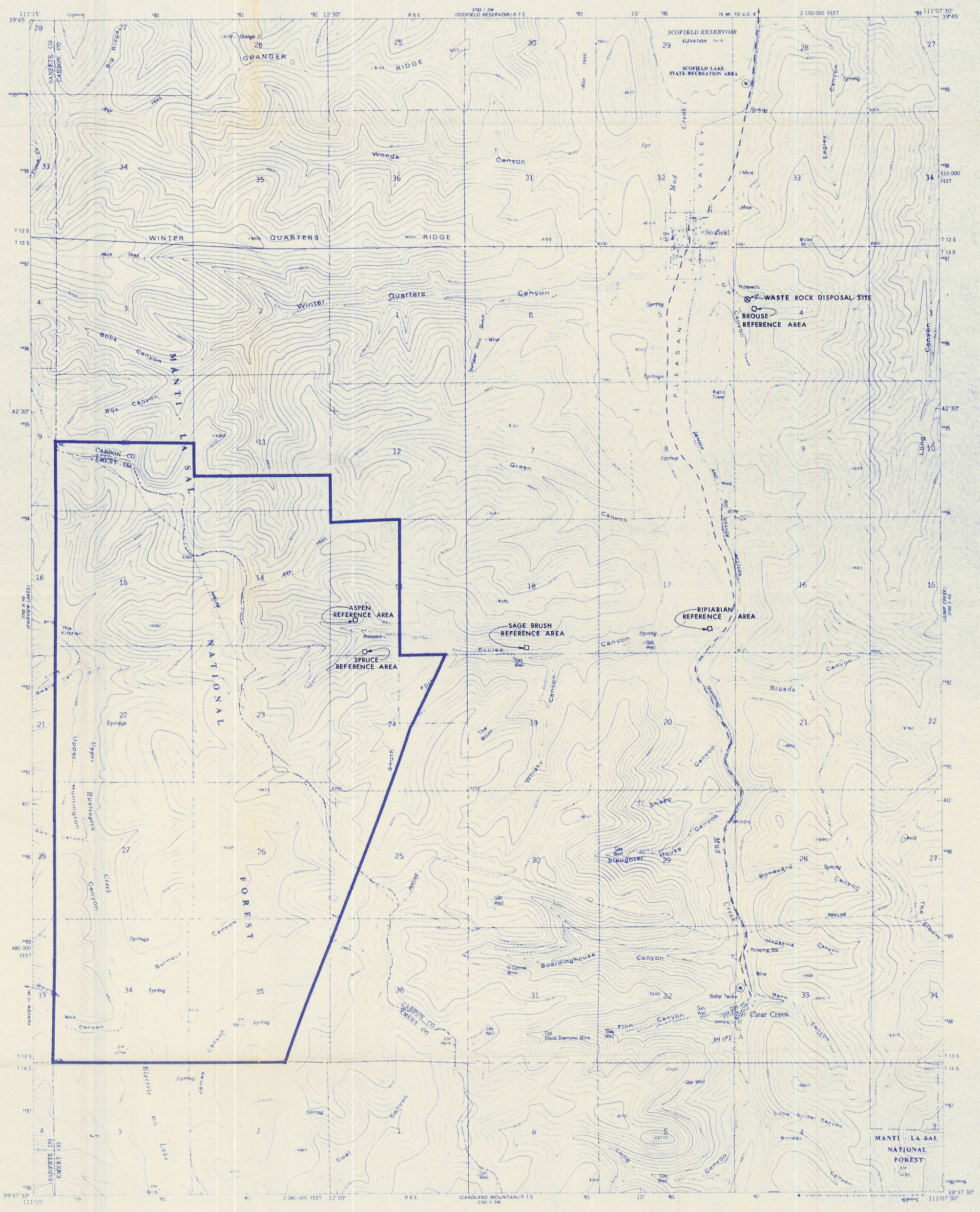
UTAH FUEL COMPANY
SKYLINE MINES

P.O. BOX 719
HELPER, UTAH.
84526

TITLE: MAN MADE FEATURES & EXISTING LAND-USES

Received 10.2.89

REV. NO. | LOCATION | SHEET 1 OF 1 | SCALE: 1" = 2,000' | MAP NO. LAND USE 2·12·1-1 | DWG. NO. | SCALE 1000 0 1000 2000 3000 FEET | CONTOUR INTERVAL 80 FEET



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OIL, GAS & MINING

NO.	DATE:	REVISION	DRN	CHK	APP

	DATE
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
APPROVED BY:	
REFERENCE DWGS.	

PROFESSIONAL SEAL

UTAH FUEL COMPANY
SKYLINE MINES

P.O. BOX 719
HELPER, UTAH
84526

TITLE

VEGETATIVE REFERENCE AREA

REV. NO.	LOCATION		MAP NO. 2.7.1-2
	SHEET	SCALE:	DWG. NO.

MAP A

PLANT COMMUNITIES

A	Aspen
AGFE	Aspen, grass, forb, elderberry
R	Riparian
SB	Sagebrush
SF	Spruce, fir
SFA	Spruce, fir, aspen
SL	Sandstone ledges
SS	Sagebrush, snowberry

PREPARED BY: S.L. Welsh and J.R. Murdock

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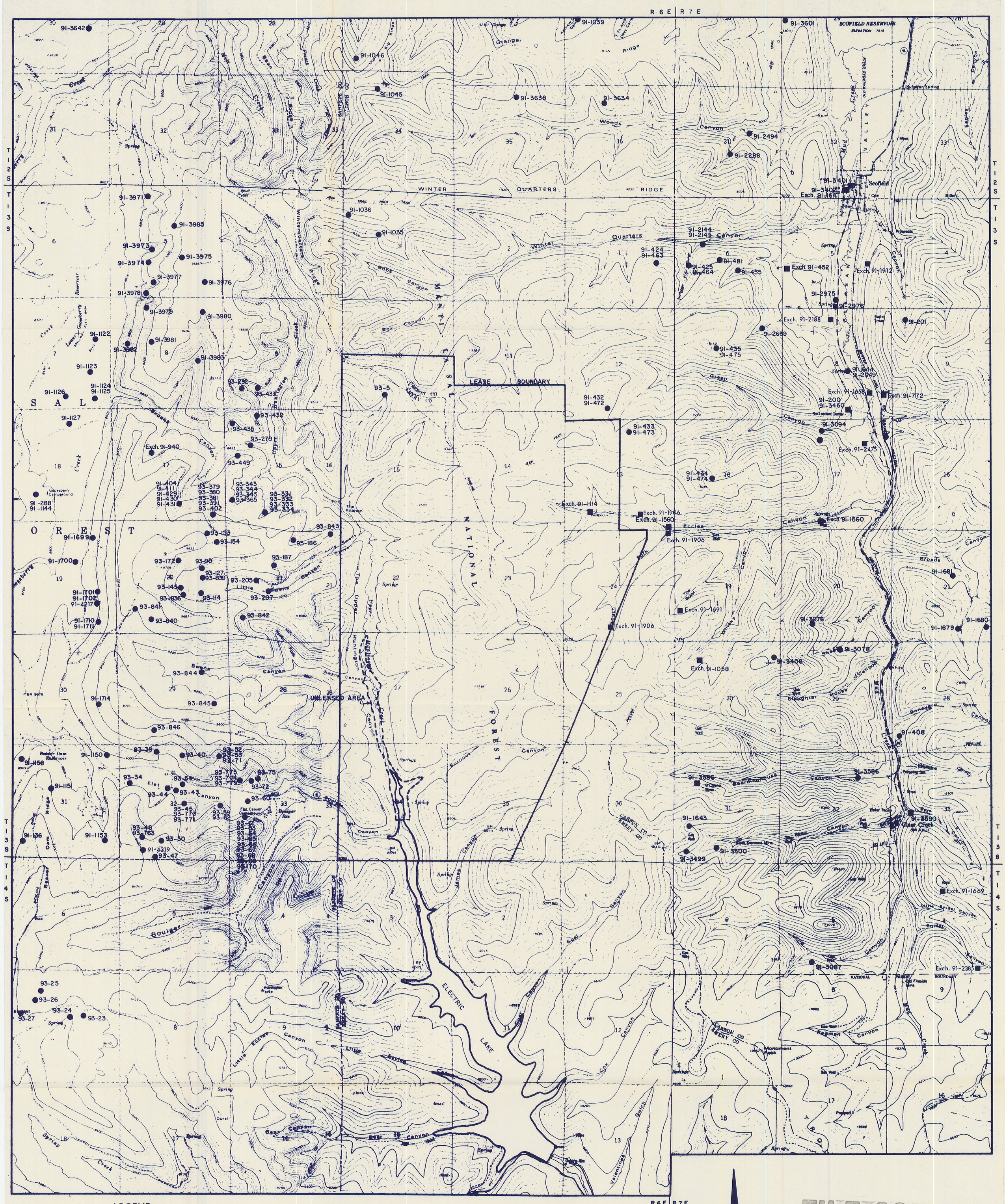
OIL, GAS & MINING

COASTAL STATES ENERGY COMPANY
SKYLINE PROJECT

VEGETATION MAP

JOB NO. ____ SCALE ____ DATE 1/86
DWG NO. ____ MAP OR FIGURE NO. 2.7.1-1
REVISION ____



LEGEND

93-75 WATER USE CLAIM NUMBER

■ WELL OR MINE WATER

● SPRING

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OIL, GAS & MINING

NO.	DATE	REVISION	DRW	CHK	APP.
1	1-27-87	Added Exch. & Springs			

		DATE
DESIGNED BY:		
DRAWN BY:	B. Guymon	6/86
CHECKED BY:		
APPROVED BY:		
APPROVED BY:		
REFERENCE DWGS.		

PROFESSIONAL SEAL

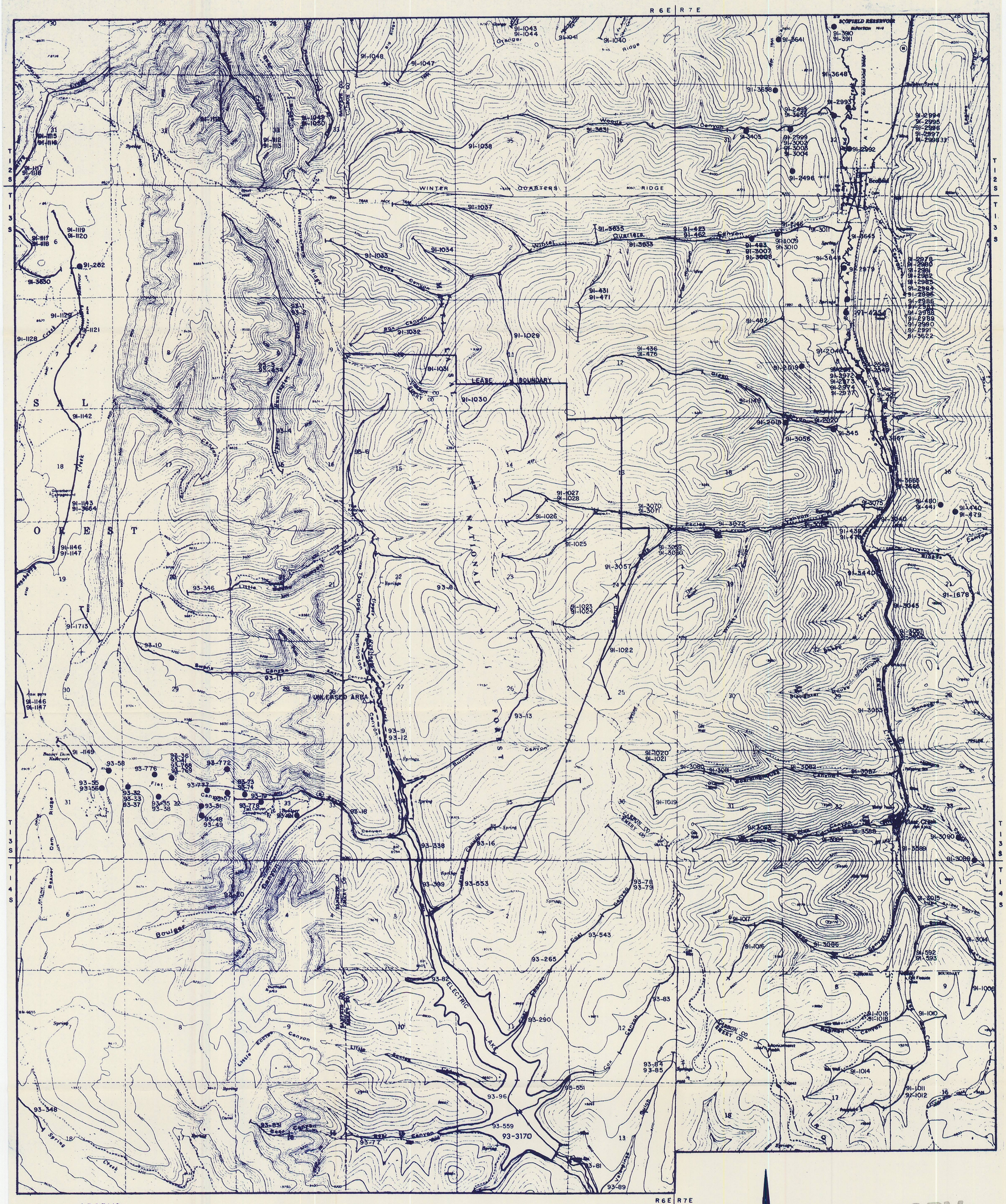
UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH. 84526

TITLE

GROUND WATER RIGHTS ON AND ADJACENT TO THE SKYLINE PROPERTY

REV. NO.	LOCATION	MAP NO. PLATE 2.3.5.2-1
1	SHEET 1 OF 1 / SCALE 1" = 2,000'	DWG. NO.

4 3 2 1



LEGEND

93-77 WATER USE CLAIM NUMBER

STREAM SEGMENT

● DIVERSION POINT, STOCK POND OR RESERVOIR USE.

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MAR 02 1987
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OIL, GAS & MINING

NO.	DATE	REVISION	DRW	CHK	APP.
1	1-27-87	UP&L (WATER RIGHT)			

	DATE
DESIGNED BY:	
DRAWN BY: B. Guymon	6/86
CHECKED BY:	
APPROVED BY:	
APPROVED BY:	
REFERENCE DWGS.	

PROFESSIONAL SEAL

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH. 84526

TITLE

SURFACE WATER RIGHTS ON AND ADJACENT TO THE SKYLINE PROPERTY.

REV. NO.	LOCATION		MAP NO. PLATE 2.3.5.1-1
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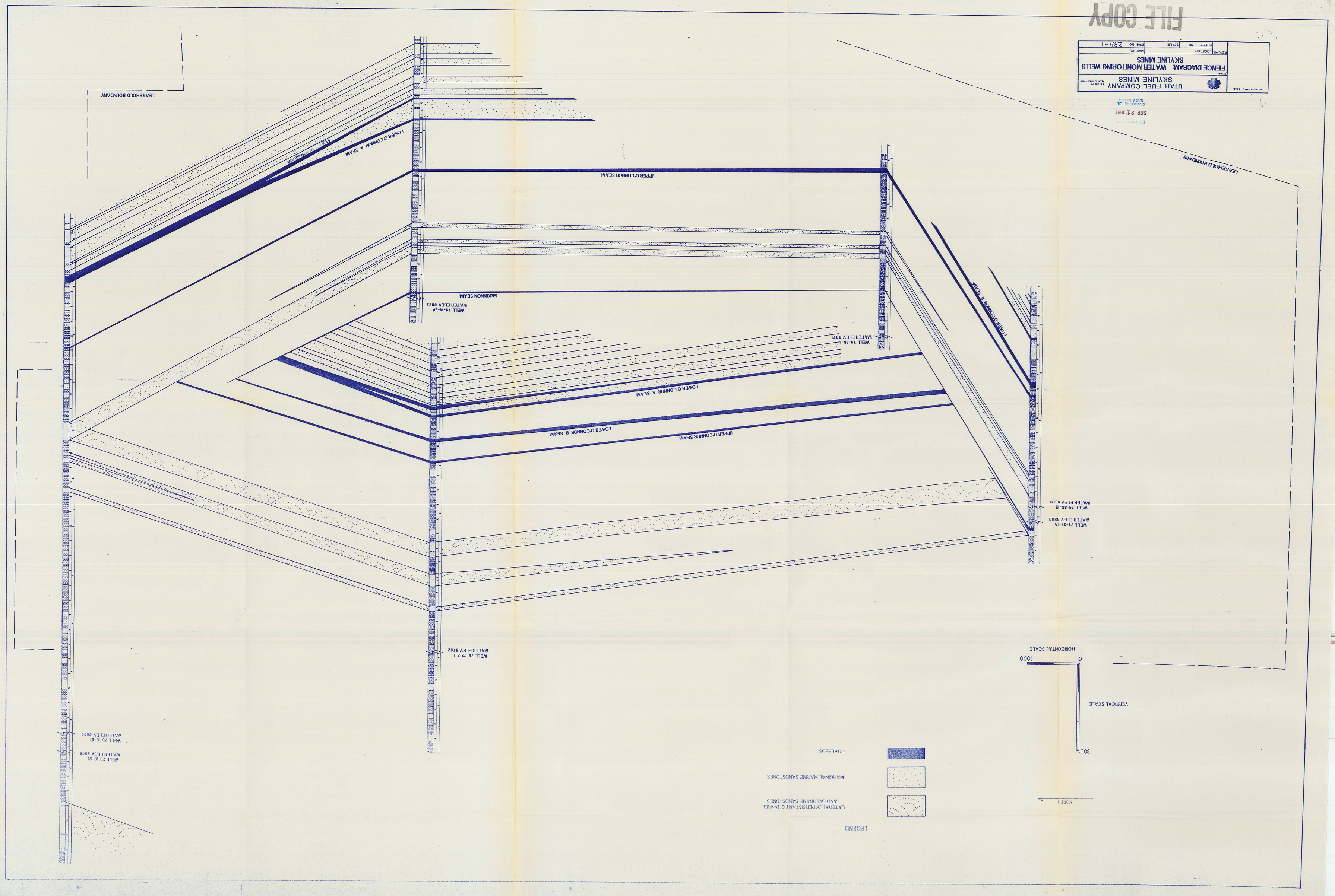
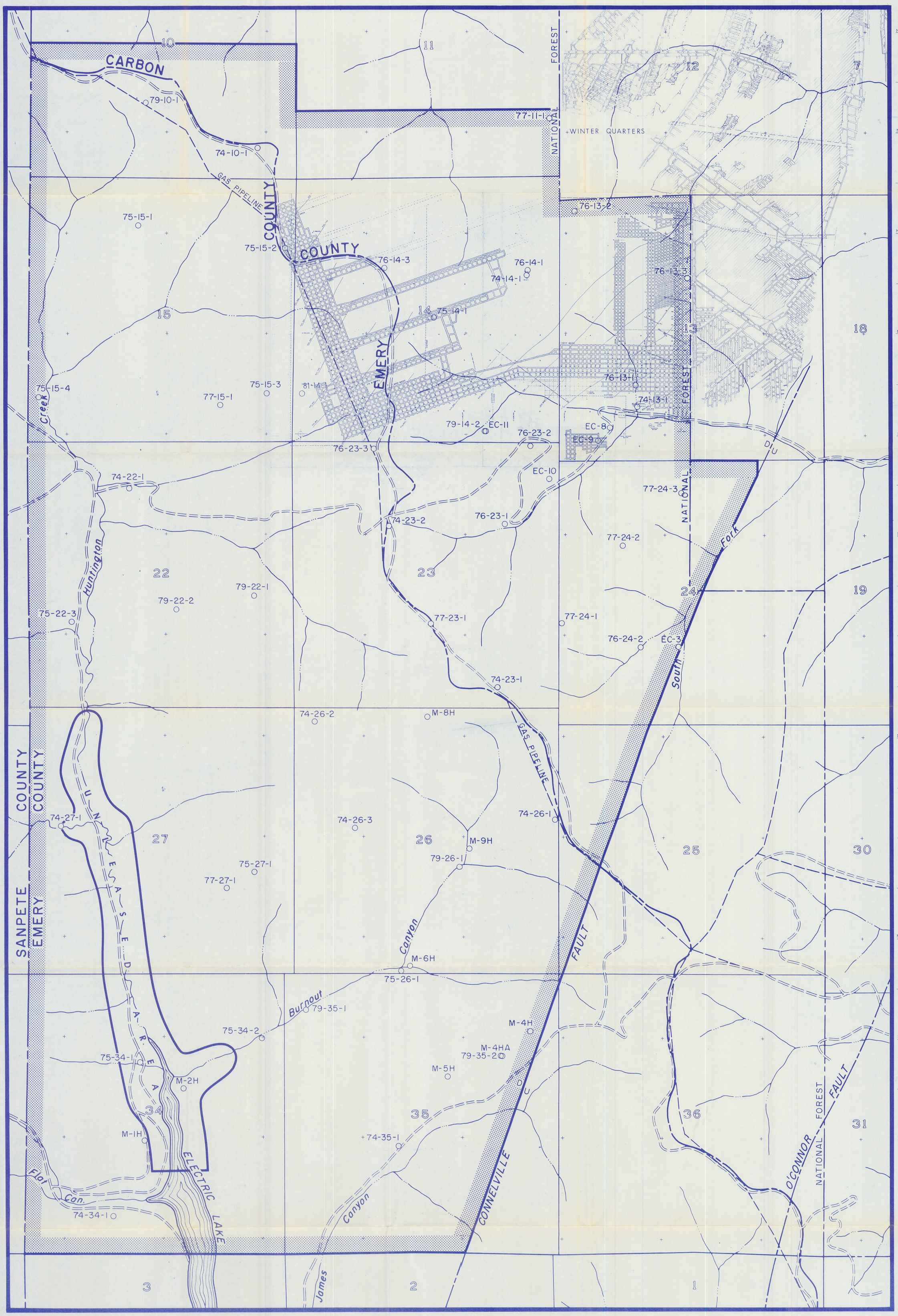
4 3 2 1


UTAH FUEL COMPANY
SKYLINE MINES
FENCE DIAGRAM: WATER MONITORING WELLS
SKYLINE MINES
LOCATION
MAP NO.
SHEET OF
SCALE
DWG. NO. 2.34-1
PROFESSIONAL SEAL
FILE COPY
SEP 21 1987
DIVISION OF OIL GAS & MINING
LEASEHOLD BOUNDARY
LEASEHOLD BOUNDARY
UPPER O'CONNOR SEAM
LOWER O'CONNOR A SEAM
MCKINNON SEAM
WELL 79-28-1
WATER ELEV 8921
WELL 79-34-2A
WATER ELEV 8972
LOWER O'CONNOR A SEAM
LOWER O'CONNOR B SEAM
UPPER O'CONNOR SEAM
LOWER O'CONNOR B SEAM
WELL 79-35-A
WATER ELEV 8580
WELL 79-35-B
WATER ELEV 8528
WELL 79-22-2-1
WATER ELEV 8702
WELL 79-30-A
WATER ELEV 9008
WELL 79-30-B
WATER ELEV 8934
LEGEND
LATERALLY PERSISTANT CHANNEL AND OVERBANK SANDSTONES
MARGINAL MARINE SANDSTONES
COALBEDS
NORTH
VERTICAL SCALE
300'
HORIZONTAL SCALE
0
1000'



BASE MAP FROM U.S. GEOL. SUR. TOPOGRAPHIC MAPS

SCALE IN FEET: 500' 250' 0' 500' 1000'

APPROVAL	DATE	SCALE: 1" = 500'	DATE	PROFESSIONAL SEAL
		DESIGNED BY		
		DRAWN BY		
		CHECKED BY		
		APPROVED BY		
		APPROVED BY		

COASTAL STATES ENERGY COMPANY
SKYLINE PROJECT

ABANDONED ADJACENT WORKING

JOB No.
DWG. No.
REVISION R-
MAP OR FIGURE NO. 2.2.7-7

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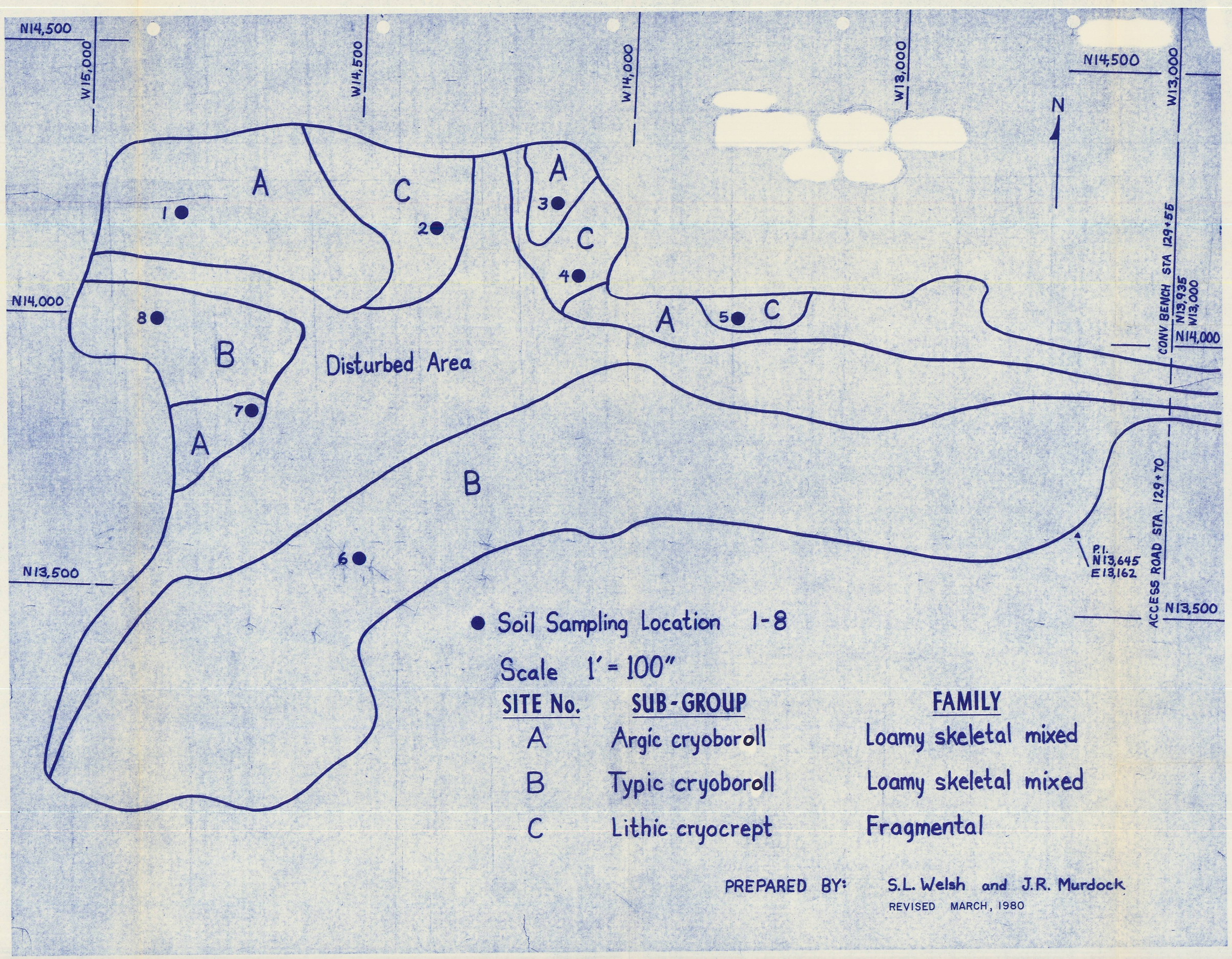

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NO.	DATE	REVISION	DRW	CHK	APP.
1	2-6-87	ZONE B-4 SPELLING			

		DATE
DESIGNED BY:		
DRAWN BY:	B. Guymon	6/86
CHECKED BY:		
APPROVED BY:		
APPROVED BY:		
REFERENCE DWGS.		

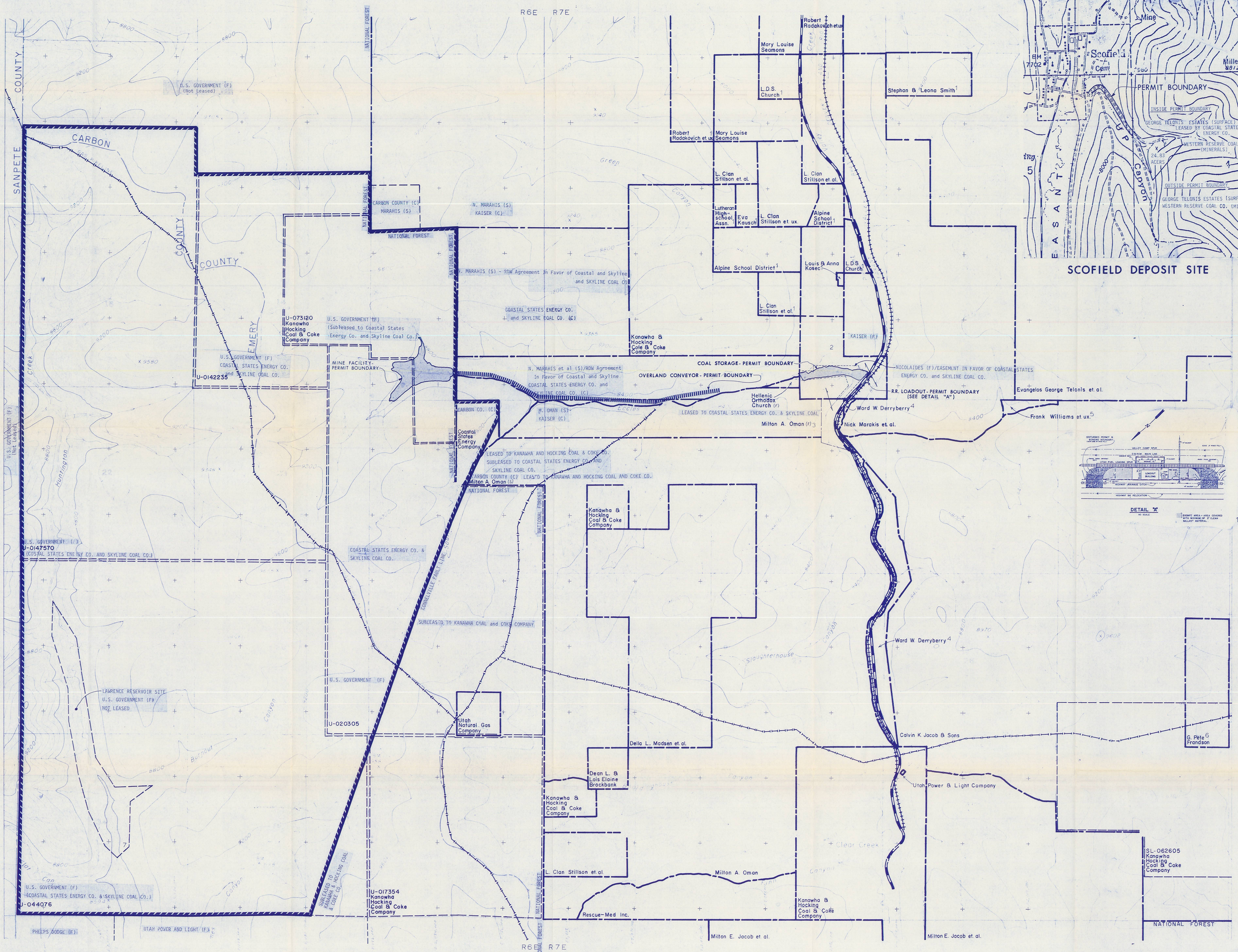
PROFESSIONAL SEAL

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 719
HELPER, UTAH. 84526

TITLE
PORTAL YARD AREA
SOIL MAP

REV. NO.	LOCATION		MAP NO. PLATE 2.11-1
1	SHEET 1 OF 1	SCALE 1"=100"	DWG. NO.

MONSEN ENGINEERING CO.
95074



LEGEND:

1. a. F = FEE
   b. S = SURFACE
   c. C = COAL
   d. U = FEDERAL COAL LEASE (NO.)
2. COASTAL STATES COAL LEASE AREA
3. PROPERTY BOUNDRY
4. FEDERAL LEASE BOUNDRY
5. EASEMENT
6. NATURAL GAS PIPELINE
7. DISTURBED PERMIT & BONDING BOUNDARY
8. OVERLAND CONVEYOR RIGHT-OF-WAY

SCALE 1:12000

0 1000 2000 3000 4000 FEET

N

NO	DATE	REVISION	APP

		DATE
DESIGNED BY:	KEVIN YOCUM	2/87
DRAWN BY:	B. GUTMOH	2/87
CHECKED BY:	KEITH ZOBELL	2/87
APPROVED BY:		11-30-89
APPROVED BY:		
REFERENCE DWGS.		

PROFESSIONAL SEAL

UTAH FUEL COMPANY
SKYLINE MINES
P.O. BOX 175
HELPER, UTAH 84526

TITLE
SKYLINE MINES -OWNERSHIP-
CARBON AND EMERY COUNTIES

REV. NO.	LOCATION	MAP NO.
	SHEET 1 OF 1 SCALE 1" = 1,000'	DWG. NO. 1.6-1

Received 10-1-90