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April 23, 1990

DIVISION OF  
OIL, GAS & MINING

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

Re: Des Bee Dove Mine Permit Renewal ACT/015/107

Dear Pam:

Transmitted herewith please find one (1) copy of the text and map revision to the Des Bee Dove Mine Permit. The revisions serve to update the PAP. Additional copies are being compiled and will be submitted to the Division within one week.

These changes, when approved by the Division and inserted into the current permit, will constitute the new permit document.

The following are the changes made to the Des Bee Dove PAP:

Introduction, Table of Contents, Certification

Replace Figure 1 following page 1 with Figure 1 (4/17/90).

Replace pages 2 through 5 (11/21/83), 6 (2/24/84), 7 (11/21/83), 8 & 9 (11/27/89), 10 (2/14/86) and Certification following page 4 with pages 2 thru 10 (4/16/90).

Part 1 - Legal, Financial, Compliance

Replace pages 1-1 thru 1-5 (6/29/88) with 1-1 thru 1-5.2 (4/16/90).

Replace pages 1-8 thru 1-19 (11/21/83) with 1-8 thru 1-19 (4/16/90).

Part 2 - Environmental Resources

Replace page 2-57 (11/21/83) with 2-57 (4/16/90).

Delete Figure 2-1 following page 2-57 and pages 2-58 thru 2-100.

Add pages 2-101.1 and 2-101.2 following Figure 2-9.

Replace pages 2-122 and 2-123 (11/21/83), 2-124 (1/27/84), 2-125 (11/21/83), 2-126 & 2-126A (3/15/85), three pages following 2-126A with 2-122 (4/16/90) thru 2-126.14.

Replace pages 2-128 and 2-129 (11/21/83) with 2-128 and 2-129 (4/16/90).

### Part 3 - Operation Plan

Replace Figure 1 following page 3-1 with Figure 1 updated 4/17/90.

Replace pages 3-2 thru 3-4 (11/21/83), four pages following 3-4, 3-5 thru 3-7 (11/21/83), 3-8 (11/21/83), one page following 3-8, 3-9 thru 3-11 (11/21/83), 3-12 thru 3-13A (10/1/84), 3-14 thru 3-25 (11/21/83), 3-26 (1/27/84), 3-27 (11/21/83), 3-27A thru 3-29 (1/16/85), 3-30 thru 3-32A (10/1/84), 3-33 thru 3-37 (11/21/83), 3-38 thru 3-41B (1/16/85), 3-42 and 3-43 (11/21/83), 3-44 (1/16/85), 3-45 thru 3-48 (11/21/83), 3-49 (1/16/85), 3-49A thru 3-51 (10/1/84), 3-52 and 3-53 (11/21/83), 3-53A and 3-53B (2/24/84), 3-53C (1/16/85), 3-54 (10/1/84), 3-55 (6/20/84), 3-56 thru 3-58 (10/1/84) with 3-2 thru 3-57 (4/16/90).

### Part 4 - Reclamation Plan

Replace 4-1 thru 4-4 (6/20/84), 4-4.1 (10/28/88), with 4-1 thru 4-4.53 (4/16/90).

Replace 4-5 (11/20/85), 4-5A and 4-5B (4/25/86), 4/6 (10/9/85), 4-7 (6/20/84), 4-7A (11/21/83), 4-7.3 (7/11/88), 4-11 and 4-12 (11/21/83), 4-12.1 thru 4-17 (7/11/88), 4-18 (11/21/84), 4-19 and 4-20 (1/27/84), 4-21 and 4-22 (7/11/88), 4-22.1, 4-23 and 4-24 (12/21/84), 4-25 (1/27/84), 4-26 and 4-26A (10/1/84), 4-27 and 4-28 (11/21/83) with 4-11 thru 4-28 (4/16/90).

Replace Reclamation Costs (6/20/84) preceding 4-20 with Reclamation Costs (4/16/90).

Replace pages 4-29 thru 4-33 (11/21/83) with 4-29 thru 4-33.4 (4/16/90).

Replace 4-35 and 4-35A (3/15/85), 4-36 (11/21/83) with 4-35 thru 4-36 (4/16/90).

### Appendices

Delete Appendices III and IV.

Replace Appendix V with Appendix V, June 6, 1989, including maps.

Map and Drawings

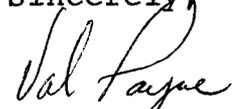
Replace Maps 1-1, 1-2, 2-14, 2-15, 2-17 and Nest Data insert, 3-7 sheet 2 of 3, 3-8 sheets 1 and 2, 5-2, 5-3, 5-6 with revised maps.

Add maps 5-3A and 5-3B.

Delete maps 2-1 thru 2-11 from Volume 4. These maps are now found in Volumes 8 and 9.

If you have any questions please call me at 687-9821.

Sincerely,



Val Payne  
Senior Environmental Engineer

VP/do  
Enclosure

## INTRODUCTION

Utah Power & Light Company owns and leases certain fee coal lands, together with assigned federal coal leases, and controls approximately 22,500 acres of contiguous minable property located in Emery County, Utah.

Geographically, the area is known as East Mountain, a large relatively flat plateau, containing two minable coal seams.

Coal is mined through three separate mines, Deer Creek, Wilberg and the Des-Bee-Dove Mines.

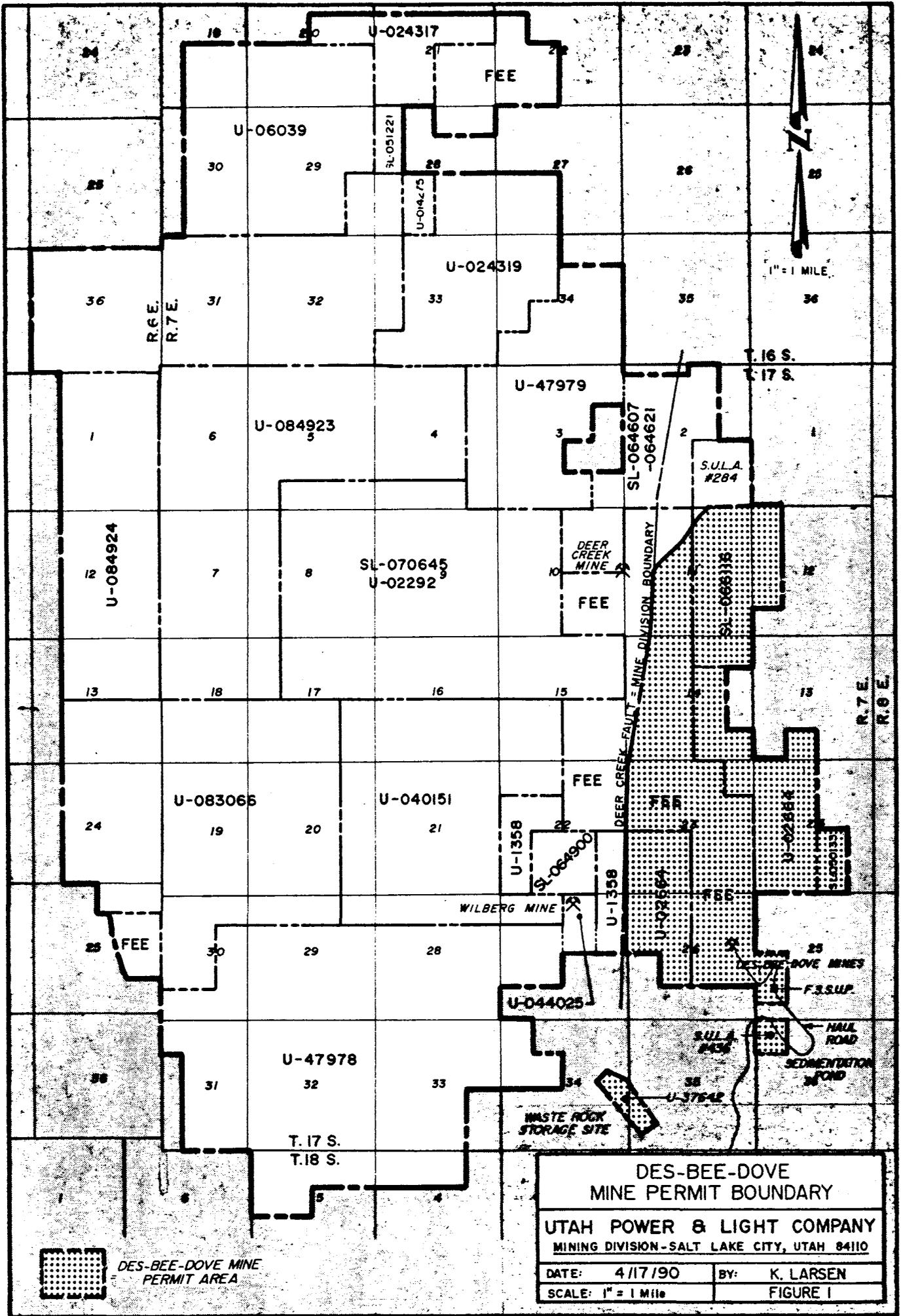
This report and related information addresses only the Des-Bee-Dove Mine complex and the lands above the coal planned for extraction through the Des-Bee-Dove portal facilities.

Figure 1 shows the Des-Bee-Dove Mine permit area which is bounded on the west side by the Deer Creek Fault and on the north, east and south by the lease boundaries.

Several of the environmental resource studies such as vegetation, soils and wildlife, apply to the applicant's total contiguous area and can be better evaluated as a whole as they refer not only to the specific mine but to the adjacent area.

All coal mined from Des-Bee-Dove will be utilized as fuel for Company-owned power plants.

Revised 11/21/83



DES-BEE-DOVE MINE PERMIT AREA

<b>DES-BEE-DOVE MINE PERMIT BOUNDARY</b>	
<b>UTAH POWER &amp; LIGHT COMPANY</b>	
MINING DIVISION-SALT LAKE CITY, UTAH 84110	
DATE: 4/17/90	BY: K. LARSEN
SCALE: 1" = 1 Mile	FIGURE I

Preparation of this application was completed by Company's Fuel Resources Department under the supervision of its Managing Director of Administration, Mr. D. W. Jense.

The department staffs sufficient professional and technical personnel to adequately address and narrate the majority of subject matter required for submission of this application.

Where environmental or ecological studies were required, Company engaged qualified consultants to perform work and they are identified on the title pages preceding their respective reports.

Construction drawings, for this project, with appropriate certifications are on file at Company's Mining Division Office located at 15 North Main, Huntington, Utah.

## ORGANIZATION OF MINING PERMIT APPLICATION

The following volumes contain Utah Power & Lights Company's Permit Application for underground coal mining operations at the Des-Bee-Dove Coal Mine.

The applicant has chosen to assemble this application in a format consistent with, and in sequence similar to the Division's permanent regulations, Sections UMC 771 through UMC 786.

The application is organized into a set of nine volumes as follows:

### Volume 1

Introduction  
Verification of Applicant  
Table of Contents  
Part 1 - Legal, Financial, Compliance Information  
Part 2 - Environmental Resources

### Volume 2

Part 2 - Environmental Resources (cont.)  
Part 3 - Mining Operation Plan  
Part 4 - Reclamation Plan

### Volume 3

Appendices

### Volume 4

Maps and Drawings

### Volume 5

Maps and Drawings

### Volume 6

Des-Bee-Dove to Wilberg Junction Road

### Volume 7

Sediment Pond Access Road

Volume 8

Mine Permit Geologic Section

Volume 9

Mine Permit Hydrologic Section

DES-BEE-DOVE COAL MINE

Owned by	Utah Power & Light Company
Operated by	Utah Power & Light Company
Located	7 Miles West of Huntington, Utah
Commence Mining	1938
Average Production	725,000 tons per year
Estimated Mine Life	5 1/2 Years
Type of Operation	Underground Coal Mine
Transportation System	Truck haulage to various power plants
Elevation	7,600 feet above sea level
Annual Precipitation	8-10 Inches
Aspect	South Facing
Vegetation Communities	Pinyon-Juniper - Salt Desert Shrub
Drainage	Grimes Wash/Cottonwood Creek
Area of Disturbance	20 Acres - Portal Facilities 4.5 Acres - Sediment Pond 50 Acres - Road

CERTIFICATION

STATE OF UTAH            )  
                              ): ss.  
County of Salt Lake )

Except as otherwise indicated thereon, all maps, plans, and cross sections submitted with this application have been prepared under the supervision of David Smaldone, a registered Professional Engineer of the State of Utah, who, to the best of his knowledge, hereby certifies to the correctness thereof.

  
\_\_\_\_\_  
David Smaldone, P.E.  
(Professional Engineer  
#0839209580)

The production for the sites above are based on an average year.

*George S. Cook*

George S. Cook  
Range Conservationist  
Price, Utah

Sam F. Chamberlain	Vice President Legal	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Orrin T. Colby, Jr.	Vice President Accounting	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Thomas W. Forsgren	Vice President External Affairs	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
J. Brett Harvey	Vice President Mining Division	Utah Power & Light Company P.O. Box 310 Huntington, Utah 84528
Craig O. Garritson	Acting Vice President Power Supply Services	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
J. Lynn Rasband	Assistant Vice President Planning & Engineering Operations	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Ernest E. Wessman	Engineering Assistant Vice President Power Supply	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Thomas A. Lockhart	Acting Vice President Power Systems	Pacific Power & Light Co. 920 SW 6th Ave. Portland, Oregon 97204
Dennis P. Steinberg	Assistant Vice President Hydro Resources Power Supply	Pacific Power & Light Co. 920 SW 6th Ave. Portland, Oregon 97204
Rodney M. Boucher	Vice President/ Chief Information Officer	Utah Power & Light Company 1407 West North Temple Salt Lake City, Utah 84140
Arnold Wagner	Controller	Utah Power & Light Company 1407 West North Temple Salt Lake City, Utah 84140

stock. There are a total of 123.2 million shares of Pacificorp  
Common Stock outstanding.

The permit applicant is:

Utah Power and Light Company  
1407 West North Temple  
Salt Lake City, Utah 84116  
(801) 535-2000

The operator is:

Utah Power and Light Company  
Mining Division  
PO Box 310  
Huntington, Utah 84528  
(801) 687-9821

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DES BEE DOVE  
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Rollins, Brown & Gunnell, Inc. - Slope  
Stability Report, Junction Road Cut Slope  
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UTAH POWER & LIGHT COMPANY  
DES-BEE-DOVE MINE  
APPLICATION FOR MINING PERMIT

This application for mining permit is submitted to the State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining, in accordance with the Utah Coal Mining and Reclamation Act, Title 40, Chapter 10, U.C.A., 1953 (as amended); the applicable rules and regulations adopted thereunder (Part UMC 771.1, et seq.); the Surface Mining Control & Reclamation Act of 1977 (P.L. 95-87), and applicable regulations adopted thereunder (30 CFR § 770, et seq.), the Cooperative Agreement between the State of Utah and the United States Secretary of Interior, and other applicable laws and regulations.

IDENTIFICATION OF INTERESTS (UMC 782.13)

On January 9, 1989 Utah Power and Light (UP&L) Company, a Utah Corporation and Pacificorp, A Maine Corporation, were merged with and into Pacificorp, an Oregon Corporation. At that time all outstanding shares of Capital Stock of Pacificorp Maine and UP&L were converted into shares of Capital Stock of Pacificorp Oregon. UP&L became a Division of Pacificorp Oregon. The UP&L Mining Division operates the following coal mines: The Deer Creek Mine, the Cottonwood/Wilberg Mine and the Des Bee Dove Mine (currently IDLED). The official corporation name is Pacificorp dba Utah Power and Light Company incorporated in Oregon.

No single shareholder holds in excess of 5% of the

BOARD OF DIRECTORS

DeeDee Corradini	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Michael O. Leavitt	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
John A. Lindquist, Sr.	Chairman of the Board	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Chase N. Peterson	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Rogers K. Rose	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Robert V. Thompson	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Richard L. Warner	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Don M. Wheeler	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Frank N. Davis	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Sidney G. Baucom	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Verl R. Thopham	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
David F. Bolender	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140
Richard C. Edgley	Director	Utah Power & Light Company 1407 West No. Temple Salt Lake City, Utah 84140

OFFICERS AND DIRECTORS OF  
PACIFICORP, AN OREGON CORPORATION

Charles M. Binkley  
Alaska Riverways, Inc.  
P.O. Box 80610 - College  
Fairbanks, Alaska 99708

F. Paul Carlson  
Honeywell, Inc.  
Honeywell Plaza  
MN12-5219  
Minneapolis, MN 55408

John C. Hampton  
Hampton Resources, Inc.  
Suite 400  
9400 SW Barnes Road  
Portland, OR 97225

Betty E. Hawthorne  
Dean Emeritus  
College of Home Economics  
Oregon State University  
Corvallis, OR 97331

William D. Hendry  
1126 Hillcrest Avenue  
Pasadena, CA 91105

Philip H. Knight  
NIKE, Inc.  
3900 SW Murraray Blvd.  
Beaverton, OR 97005

A. M. Gleason  
1600 Pacific First  
Federal Building  
851 SW Sixth Avenue  
Portland, OR 97204

Stanley K. Hathaway  
Hathaway, Speight, Kunz  
Trautwein & Barrett  
P.O. Box 1208  
Cheyenne, WY 81003-1208

Louis B. Perry  
Standard Insurance Company  
P.O. Box 711  
Portland, OR 97207

Robert A. Skotheim  
Office of Director  
The Huntington Library  
1151 Oxford Road  
San Marino, CA 91108

Roy A. Young  
Office for Natural Resources Policy  
Snell Hall - Room 534  
Oregon State University  
Corvallis, OR 97331

Richard C. Edgley  
Church of Jesus Christ of  
Latter-Day Saints  
50 East North Temple  
Salt Lake City, UT 84150

C. M. Bishop, Jr.  
Pendleton Woolen Mills  
P.O. Box 1691  
Portland, OR 97207

Don C. Frisbee  
1600 Pacific First  
Federal Building  
851 SW Sixth Avenue  
Portland, OR 97204

Eugene L. Shields  
Shields Bag & Printing Co.  
P.O. Box 9848  
Yakima, WA 98909

A. W. Sweet  
Western Bank  
P.O. Box 1720  
Coos Bay, OR 97420

Nancy Wilgenbusch  
President  
Marylhurst College  
Marylhurst, OR 97036

Michael O. Leavitt  
President  
The Leavitt Group  
1358 South Main  
Salt Lake City, UT 84115

John A. Lindquist, Sr.  
Chairman of the Board  
Lindquist & Sons  
3408 Washington Blvd.  
Odgen, UT 84401

Don M. Wheeler  
President  
Wheeler Machinery  
4901 West 2100 South  
Salt Lake City, UT 84120

Applicant has not operated underground or surface coal mines in the United States during the five years preceding the date of this application under any other name. However, in the past, applicant has employed an independent contractor to operate its mines, but as of April 27, 1986, Utah Power & Light Company resumed total operating control of the mines replacing Emery Mining Corporation as its operator.

The resident Agent who will accept Service of Process is David Smaldone, Utah Power & Light - Mining Division, PO Box 310, Huntington, Utah 84528, (801) 687-9821.

The following federal coal leases, upon which the applicant bases its right to perform coal mining in the permit area, have all been subleased or assigned to Utah Power & Light Company.

Lease No. U-02664  
 Issued to Corporation of the Presiding Bishop  
 of the LDS Church 1/1/57

Section 13           SE $\frac{1}{4}$ SW $\frac{1}{4}$   
 Section 23           NE $\frac{1}{4}$ NE $\frac{1}{4}$ , SW $\frac{1}{4}$   
 Section 24           W $\frac{1}{2}$   
 Section 26           NW $\frac{1}{4}$ , NE $\frac{1}{4}$ SW $\frac{1}{4}$   
 and  
 Section 14           SW $\frac{1}{4}$ NE $\frac{1}{4}$ , W $\frac{1}{2}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ SE $\frac{1}{4}$   
 Added by Modification 10/31/79

Township 17 South, Range 7 East, SLM  
 Utah, containing 920 acres

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

Section 24           W $\frac{1}{2}$ SE $\frac{1}{4}$

Township 17 South, Range 7 East, SLM  
 Utah, containing 80 acres

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

Section 11           E $\frac{1}{2}$   
 Section 14           N $\frac{1}{2}$ NE $\frac{1}{4}$   
 Section 12           W $\frac{1}{2}$ NW $\frac{1}{4}$ , NW $\frac{1}{4}$ SW $\frac{1}{4}$

Township 17 South, Range 7 East, SLM  
 Utah, containing 520 acres

OWNERS OF COAL TO BE MINED OTHER  
 THAN THE UNITED STATES

<u>Description of Land</u>		<u>Owner</u>
Section 11	SE $\frac{1}{4}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$	Utah Power & Light Company P. O. Box 899
Section 14	E $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$	Salt Lake City, Utah 84110
Section 23	NW $\frac{1}{4}$ , SE $\frac{1}{4}$ , NW $\frac{1}{4}$ NE $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$	

Revised 11-21-83

<u>Description of Land</u>	<u>Owner</u>
Section 26	NE $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$
Township 17 South, Range 7 East, SLM Utah, containing 1,000 acres	
Section 14	W $\frac{1}{2}$ NW $\frac{1}{4}$
Section 11	W $\frac{1}{2}$ SW $\frac{1}{4}$
The Estate of Malcolm McKinnon c/o Frank Armstrong 1300 Walker Bank Bldg. Salt Lake City, Utah 84111	
That part lying East of the Deer Creek Fault	

Township 17 South, Range 7 East, SLM Utah

SURFACE OWNERS OF RECORD WITHIN THE PERMIT AREA

<u>Description of Land</u>	<u>Owner</u>
Section 11	SE $\frac{1}{4}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$
Section 14	SW $\frac{1}{4}$
Section 23	NW $\frac{1}{4}$ , SE $\frac{1}{4}$ , NW $\frac{1}{4}$ NE $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$
Section 26	NE $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$
Township 17 South, Range 7 East, SLM Utah	
Utah Power & Light Company P. O. Box 899 Salt Lake City, Utah 84111	

The remaining surface is controlled by:

The United States of America  
Department of Agriculture  
U. S. Forest Service  
The Manti-LaSal National Forest  
350 East Main Street  
Price, Utah 84501

For coal ownership, see Drawing 1-1 in Drawings and  
Maps section.

For surface owners see Drawing 1-2.

The total acres of surface lands contained in the  
permit area is approximately 2,760.

Revised 11-21-83

OWNERS OF SURFACE LANDS CONTIGUOUS TO THE PERMIT AREA (782.13(E))

Brigham Young University  
Provo, Utah 84602

The Estate of Malcolm McKinnon  
c/o Frank Armstrong  
1300 Walker Bank Building  
Salt Lake City, Utah 84111

Cooperative Security Corporation  
115 East South Temple  
Salt Lake City, Utah 84111

State of Utah  
Division of State Lands  
231 East 400 South  
Salt Lake City, Utah 84111

Manti-LaSal National Forest  
United States of America  
Department of Agriculture  
US Forest Service  
350 East Main Street  
Price, Utah 84501

United States of America  
Department of the Interior  
Bureau of Land Management  
University Club Building  
Salt Lake City, Utah 84138

OWNERS OF SUBSURFACE RIGHTS CONTIGUOUS TO THE PERMIT AREA

United States of America  
Department of the Interior  
Bureau of Land Management  
University Club Building  
Salt Lake City, Utah 84138

State of Utah  
Division of State Lands  
231 East 400 South  
Salt Lake City, Utah 84111

Brigham Young University  
Provo, Utah 84602

The Estate of Malcolm McKinnon  
c/o Frank Armstrong  
1300 Walker Bank Building  
Salt Lake City, Utah 84111

Cooperative Security Corporation  
115 East South Temple  
Salt Lake City, Utah 84111

The applicant is the owner of fee surface and coal rights and the holder of leases related to the Deer Creek Coal Mine and the Wilberg Coal Mine which are contiguous to the permit area. These properties are detailed separately in the permit application for those mines.

The applicant has no option, bid, or other interest in any contiguous acreage other than as stated above.

There are no holders of record of any leasehold interest in areas to be affected by surface operations or facilities or coal to be mined other than oil and gas leases and grazing permits.

There are no purchasers of record under a real estate contract of areas to be affected by surface operations and facilities or coal to be mined.

The applicant has no option, bid, or other interest in any contiguous acreage other than as stated above.

MINING PERMITS (782.19)

Utah Power and Light Company was issued a mining permit (ACT/015/017) for the Des Bee Dove Mine, by the State of Utah, Division of Oil, Gas and Mining on August 29, 1985.

The MSHA identification numbers assigned to the Des Bee Dove Mine are:

Deseret 42-00988

Beehive 42-00082

Little Dove 42-01393

Utah Power & Light Company presently holds the following additional coal mining permits:

Deer Creek Mine

DOGM ACT/015/018 issued February 7, 1986

OSM UT-0016 issued October 28, 1985

MSHA ID NO. 42-00121

Cottonwood/Wilberg Mine

DOGM ACT/015/019 issued July 6, 1989

MSHA ID NO. 42-00080

The applicant has never had a federal or state mining permit suspended or revoked nor forfeited a mining bond or similar security deposited in lieu of bond.

NOTICE OF VIOLATION RECEIVED BY THE APPLICANT FROM THE DIVISION OF OIL, GAS AND MINING FOR COAL MINING ACTIVITIES (3 Year Period Prior to Application) (782.14c)

NOV 87-27-2-1 issued 10-7-87 at Deer Creek Mine,  
ACT/015/018

- (1) Failure to pass surface drainage through sediment  
pond

Assessment conference held - 12-18-87

Vacated - 12-30-87

NOV 88-30-5-1 issued 10-27-88 at Cottonwood/Wilberg  
Mine

- (1) Failure to maintain diversion
- (2) Failure to minimize erosion to the extent possible

Assessment conference held - 11-21-88

Final assessment paid - 3-10-89

NOV 89-30-2-1 issued 3-29-89 at Cottonwood/Wilberg Mine

- (1) Failure to maintain diversion to prevent  
additional suspended solids outside the permit  
area.

Assessment conference held - 6-28-89

Final assessment paid - 7-28-89

NOV 89-33-1-1 issued September 5, 1989 at  
Cottonwood/Wilberg Mine

Failure to take field water quality measurements.

Assessment conference held - 11-17-89

Vacated- 9-5-89

NOV 89-26-20-1-2 issued September 14, 1989 at Deer  
Creek Mine

(1) Failure to maintain berm and culverts.

(2) Failure to maintain silt fences.

Assessment conference held - 10-5-89

Final assessment paid - 12-18-89

NOV 89-20-1-1 issued October 11, 1989 at Deer Creek  
Mine

Failure to operate in accordance with approved plan.

Assessment conference held - December 19, 1989

Final assessment paid - None

NOV 90-32-1-1 issued February 20, 1990 at  
Cottonwood/Wilberg Mine

Non-Compliance of NPDES Permit.

Assessment conference held -

Final assessment paid -

RIGHT OF ENTRY (782.15)

By assignment dated 3/15/72, the LDS Church assigned  
its right to Federal Coal Lease U-02664 to Utah Power and Light  
Company, approved 7/1/72 by the BLM.

By special Warranty Deed dated 3/15/72, the LDS Church  
conveyed to Utah Power and Light Company its rights to the  
following fee land in Township 17 South, Range 7 East:

Section 14

SW1/4

Section 23                      NW1/4, W1/2NE1/4, SE1/4NE1/4, SE1/4

Section 26                      NE1/4, NW1/4SE1/4

By Warranty Deed dated 11/13/75, the LDS Church conveyed to Utah Power and Light Company its rights to the following fee lands in Township 17 South, Range 7 East:

Section 11                      SE1/4NW1/4, E1/2SW1/4

Section 14                      E1/2NW1/4

By Assignment dated 3/24/77, Peabody Coal Company assigned to Utah Power and Light Company its rights to Federal Coal Lease SL-066116, approved by the BLM 9/1/77.

By Assignment dated 7/1/76, S. McArthur and R. Moore assigned to Utah Power and Light Company their rights to Federal Coal Lease SL-050133.

None of these documents are subjects of pending litigation.

AREAS DESIGNATED UNSUITABLE FOR MINING (782.16)

In consultation with concerned federal land agencies and the Division of Oil, Gas and Mining, no lands within or adjacent to the permit area have been identified as qualifying under UMC-764 as areas unsuitable for surface effects of underground coal mining activities.

References:

Land Management Plan  
Ferron-Price Planning Unit  
Manti-LaSal National Forest

Mr. John Niebergall  
US Forest Service  
Manti-LaSal National Forest  
Ferron, Utah

Mr. Sam Rowley  
Bureau of Land Management  
Price, Utah

Mr. Ron Daniels  
Division of Oil, Gas and Mining  
Salt Lake City, Utah

No facilities or operations will be conducted within 300 feet of an occupied dwelling.

Applicant has demonstrated that a financial and legal commitment was made prior to January 4, 1977 (Peabody - UP&L contracts for coal delivery). In addition, an updated contact with the state and federal agencies responsible for administering the unsuitability criteria (US Forest Service, BLM and State of Utah) revealed no action or petition has been initiated.

There are no know restricted areas near the permit area of the Des Bee Dove Mine.

PERMIT TERM (UMC 782.17)

This application is for the five (5) year permit term, however, schedules for mining coal included in the mining plan narrative are tabulated for the life of the lease. In addition, mine maps submitted show areas to be mined on a year-by-year basis through the life of the lease.

PERSONAL INJURY AND PROPERTY DAMAGE INSURANCE (782.18)

The liability insurance coverage required by UMC 806.14 is provided by a policy issued to applicant. Applicant will insure that such insurance coverage is maintained in full force and effect during the life of the permit and through completion of reclamation, or will provide evidence that the self-insurance requirements of UMC 806.14 have been satisfied by it.

August 1988

**CERTIFICATE OF LIABILITY INSURANCE**

Issued To:  
State of Utah  
Department of Natural Resources  
Division of Oil, Gas and Mining  
--oOoOo--

**THIS IS TO CERTIFY THAT:**

Associated Electric & Gas Insurance services Limited  
(Name of Insurance Company)

ARGUS Insurance Building, 12 Wesley St. P.O. Box 8M 1064, Hamilton, Bermuda  
(Home Office Address of Insurance Company)

**HAS ISSUED TO:**

Utah Power & Light Company  
(Name of Permit Applicant)

Des/Bee/Dove  
(Mine Name)

ACT/015/017  
(Permit Number)

**CERTIFICATE OF INSURANCE:**

X0296A1A89  
(Policy Number)

12-24-89  
(Effective Date)

**UNDER THE FOLLOWING TERMS AND CONDITIONS:**

Per UMC/SNC Part 800.50 Terms and Conditions for Liability Insurance:

- A. The Division shall require the applicant to submit as part of its permit application a certificate issued by an insurance company authorized to do business in the state of Utah certifying that the applicant has a public liability insurance policy in force for the surface coal mining and reclamation operations, for which the permit is sought. Such policy shall provide for personal injury and property damage protection in an amount adequate to compensate any persons injured or property damaged as a result of the surface coal mining and reclamation operations, including the use of explosives and who are entitled to compensation under the applicable provisions of state law. Minimum insurance coverage for bodily injury and property damage shall be \$300,000 for each occurrence and \$500,000 aggregate.

August 1988  
CERTIFICATE OF LIABILITY INSURANCE

The undersigned affirms that the above information is true and complete to the best of his or her knowledge and belief, and that he or she is an authorized representative of the above-named insurance company. (An Affidavit of Qualification must be completed and attached to this form for each authorized agent or officer.)

1/12/90 Sandra A. Johnson  
(Date, Signature and Title of Authorized Agent of Insurance Company)  
Sandra A. Johnson (Assistant Vice President)

Signed and sworn before me by

this 12 day of January, 1990

[Signature]  
(Signature)

My Commission Expires:

7-29-96  
(Date)  
SANDRA JOHNSON  
Notary Public of New Jersey  
My Commission Expires July 29, 1990

SENT BY  
August 1988  
CERTIFICATE OF LIABILITY INSURANCE

- B. The policy shall be maintained in full force during the life of the permit or any renewal thereof, including the liability period necessary to complete all reclamation operations under this chapter.
- C. The policy shall include a rider requiring that the insurer notify the Division whenever substantive changes are made in the policy including any termination or failure to renew.

IN ACCORDANCE WITH THE ABOVE TERMS AND CONDITIONS, and the Utah Code Annotated 40-10-1 et seq., the Insurance Company hereby attests to the fact that coverage for said Permit Application is in accordance with the requirements of the State of Utah and agrees to notify the Division of Oil, Gas and Mining in writing of any substantive change, including cancellation, failure to renew, or other material change. No change shall be effective until at least thirty (30) days after such notice is received by the Division. Any change unauthorized by the Division is considered breach of the RECLAMATION AGREEMENT and the Division may pursue remedies thereunder.

UNDERWRITING AGENT:

Barbra A. Johnson  
(Agent's Name)

(202) 915-7216  
(Phone)

ARGIS Insurance Services, Inc.  
(Company Name)

Harborside Financial Center, 700 Plaza Two  
(Mailing Address)

Jersey City, New Jersey 07311-3994  
(City, State, Zip Code)

LICENSES, PERMITS AND APPROVALS OBTAINED BY APPLICANT TO CONDUCT  
MINING ACTIVITIES (782.19)

<u>NAME AND ADDRESS OF ISSUING AUTHORITY</u>	<u>LICENSE OR PERMIT</u>	<u>ID NO. &amp; DATE OF ISSUE</u>
US Geological Survey Conservation Division 2040 Administration Bldg. 1745 West 1700 South Salt Lake City, Utah 84104	Mining Permit	8/12/75
State of Utah Division of Oil, Gas & Mining 355 West North Temple Salt Lake City, Utah 84180	Mining Permit Hydrologic Monitoring Plan	ACT/015/017 8/29/85
State of Utah Division of Health 150 West North Temple Suite 426 PO Box 2500 Salt Lake City, Utah 84110	Construction Permit for Sedimentation Pond	2/6/79
State of Utah Dept. of Health PO Box 16690 Salt Lake City, Utah 84116	UPDES Discharge Permit Sedimentation Pond	UT-0023591 2/11/88
US Forest Service Manti-LaSal National Forest 350 East Main Street Price, Utah 84501	Special Use Permit, 100.41 acres for parking lot, warehouse, bathhouse, office, roads, miscellaneous facilities and spring developments.	2/10/77
	Weather station site	10/14/80
Bureau of Land Management 136 East South Temple Salt Lake City, Utah 84111	Microwave site Escapeway and breakout Waste Rock Disposal Site	U-28029 7/15/75 U-45337 5/28/80 U-37642 8/31/77
State of Utah Division of State Lands 231 East 400 South Salt Lake City, Utah 84111	Special Use Lease Agreement - 40 acres Sedimentation Pond	SULA-436 11/22/78

<u>Name and Address of Issuing Authority</u>	<u>License or Permit</u>	<u>I.D. No. &amp; Date of Issue</u>
U. S. Forest Service Manti-LaSal Nat'l. Forest 599 West Price River Drive Price, Utah 84501	Special Use Permit - 8.95 Acres Road R/W	9/24/82
Bureau of Land Management P. O. Drawer AB Price, Utah 84501	Road R/W 28.29 Acres	U-50148 9/13/82
State of Utah Division of State Lands and Forestry 3100 State Office Building Salt Lake City, Utah 84114	Road R/W 49.34 Acres	No. 2470 12/21/82

LOCATION OF PUBLIC OFFICE FOR FILING OF APPLICATION (782.20)

This application will be submitted to the Division of Oil, Gas and Mining and the applicant will file a copy of this application for public inspection at the office of the:

Emery County Recorder  
Emery County Courthouse  
Castle Dale, Utah 84513

NEWSPAPER ADVERTISEMENT AND PROOF OF PUBLICATION (782.21)

The following is a copy of the newspaper advertisement which will be published in a local newspaper of general circulation in the locality of the permit area at least once a week for four consecutive weeks. Proof of Publication will be filed with the Division within four weeks after the date of publication.

Notice

Utah Power & Light Company, PO Box 899, Salt Lake City, Utah 84110, hereby announces its intent to file an application for renewal of a Coal Mining Permit for the Des Bee Dove Mine with the Division of Oil, Gas and Mining under the laws of the State of Utah and the Office of Surface Mining.

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

Written comments on the application should be submitted to the State of Utah, Division of Oil, Gas and Mining, 4241 State Office Building, Salt Lake City, Utah 84114.

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

The approximately 2,760 acres contained in the permit area involve all or part of the following federal coal leases and fee lands:

The following federal coal leases, upon which the applicant bases its right to perform coal mining in the permit area, have all been subleased or assigned to Utah Power & Light Company.

Lease No. U-02664  
Issued to Corporation of the Presiding Bishop  
of the LDS Church 1/1/57

Section 13	SE $\frac{1}{2}$ SW $\frac{1}{2}$
Section 23	NE $\frac{1}{2}$ NE $\frac{1}{2}$ , SW $\frac{1}{2}$
Section 24	W $\frac{1}{2}$
Section 26	NW $\frac{1}{2}$ , NE $\frac{1}{2}$ SW $\frac{1}{2}$
and	
Section 14	SW $\frac{1}{2}$ NE $\frac{1}{2}$ , W $\frac{1}{2}$ SE $\frac{1}{2}$ , SE $\frac{1}{2}$ SE $\frac{1}{2}$

Added by Modification 10/31/79

Township 17 South, Range 7 East, SLM  
Utah, containing 920 acres

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

Section 24           W $\frac{1}{2}$ SE $\frac{1}{2}$

Township 17 South, Range 7 East, SLM  
Utah, containing 80 acres

Revised 11-21-83



The remaining surface is controlled by:

The United States of America  
Department of Agriculture  
U. S. Forest Service  
The Manti-LaSal National Forest  
350 East Main Street  
Price, Utah 84501

Additional Lands to be Affected by Mining

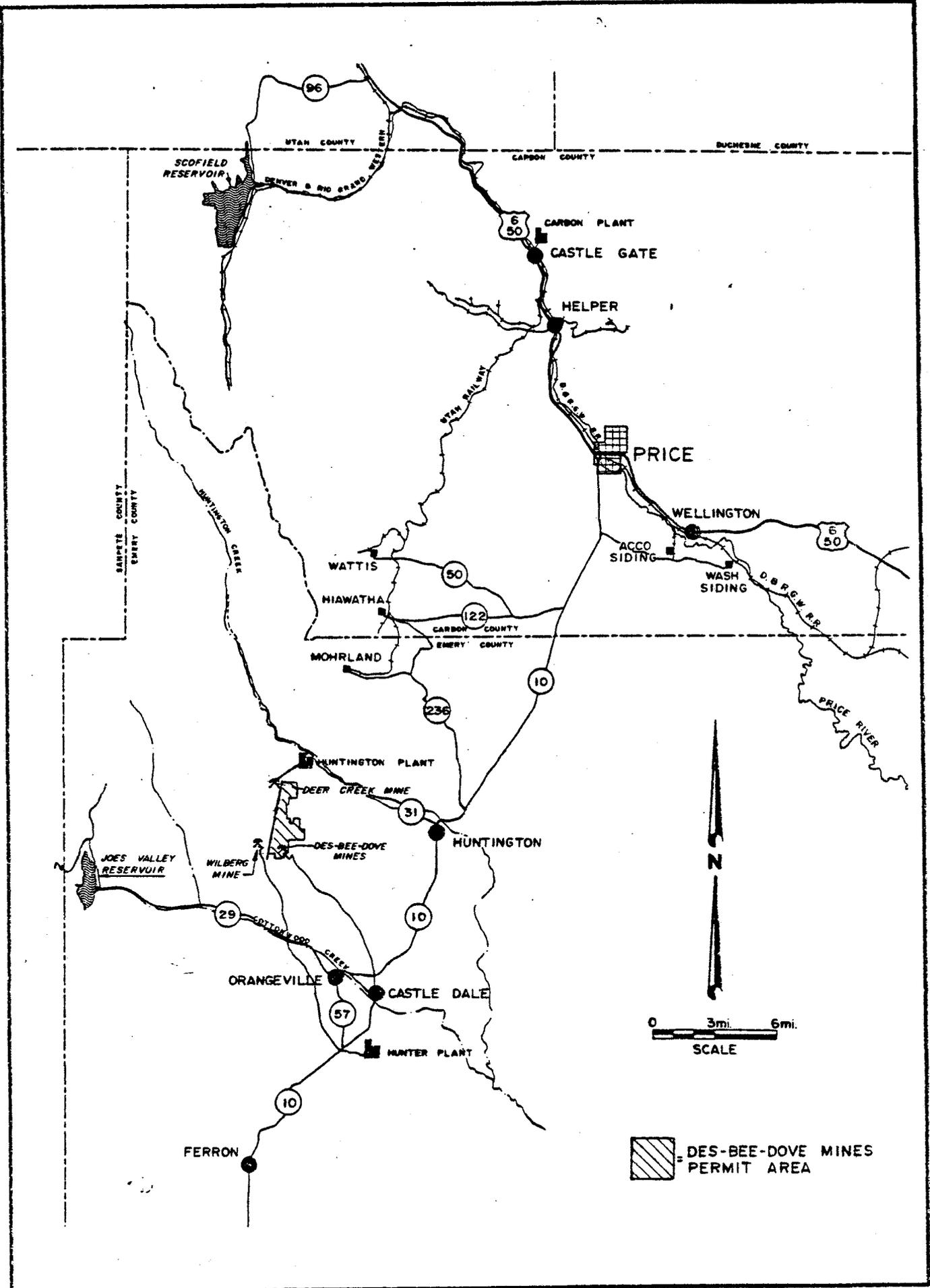
State of Utah Special Use Lease Agreement No. 436 utilized a sedimentation pond located in NW $\frac{1}{4}$ NW $\frac{1}{4}$ , Section 36, T17S, R7E, SLM.

BLM right-of-way grant U-37642 utilized for waste rock disposal. 48.62 acres located in the East Half of Section 34 and the Southwest Quarter of Section 35, T17S, R7E, SLM.

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

Revised 11-21-83

1-22



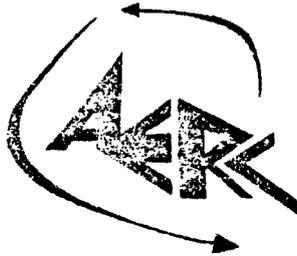
 DES-BEE-DOVE MINES PERMIT AREA

(783.12(b))

ARCHEOLOGICAL SAMPLE SURVEY  
AND  
CULTURAL RESOURCE EVALUATIONS  
OF THE  
EAST MOUNTAIN LOCALITY  
IN  
EMERY COUNTY, UTAH

Mine Plan Applicant:  
Utah Power and Light Company  
of Salt Lake City, Utah

F. R. Hauck, Principal Investigator



Report Prepared by:  
F. R. Hauck and D. G. Weder

ARCHEOLOGICAL-ENVIRONMENTAL  
RESEARCH CORPORATION

PAPER NO. 22

September, 1980

Salt Lake City, Utah

## ABSTRACT

In July and August, 1980, personnel of the Archeological-Environmental Research Corporation conducted a survey of 86 sample units totaling 2705 acres on East Mountain in Emery County, Utah. The purpose of the survey was to determine the cultural resource site density on the mountain and to assess the potential for the disruption of significant sites from future subsidence related to the underground mining being conducted within East Mountain.

Four prehistoric cultural resource sites and 11 isolated artifacts were recorded during the course of the survey. One site, 42Em1508, is considered to be significant and should be tested to determine its actual significance prior to nomination to the National Register of Historic Places. None of the four sites is considered susceptible to extensive destruction through subsidence because of their low profile, lack of architecture, and lack of rock art.

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## Chapter I - INTRODUCTION

### A. General Data on the Project

In July and August, 1980, the Archeological-Environmental Research Corporation (AERC) of Salt Lake City, Utah, conducted a sample survey cultural resource evaluation for Utah Power and Light Company (UPL) on East Mountain in Emery County, Utah (see Figure 1). Utah Power and Light Company, desirous of preparing a mine plan application for submission to federal and state authorities, requested that cultural resource evaluations be conducted within the potential subsidence zone which would comply with pertinent government legislation, i.e., Executive Order 11593 "Protection and Enhancement of Cultural Environment" (Federal Register, Vol. 36, No. 95, May 15, 1971), and "The Archeological and Historical Data Conservation Act of 1974," which is an amendment of "The Reservoir Salvage Act of 1960" (74 Stat. 220). For additional information on this Utah Power and Light Company development, please refer to the mine plan application.

AERC's field evaluations in this locality actually began in the summer of 1976 when, as a consultant to UPL AERC began evaluating proposed exploratory drill locations and access roads. AERC activities on East Mountain for UPL from 1976 through 1979, were documented in the following reports: UPL-76-6 (August 9 and 24, 1976), UPL-77-5 (May 26, 1977), UPL-77-9 (August 2, 1977), UPL-77-10 (August 26, 1977), UPL-77-12 (September 8, 1977), UPL-78-6 (July 6, 1978), UPL-78-10 (September 21, 1978), UPL-79-10 (June 27, 1979), UPL-79-14 (November 21, 1979) and UPL-79-14 (December 12, 1979).

5E

6E

7E



ARCHAEOLOGICAL ENVIRONMENTAL RESEARCH CORPORATION

Salt Lake City, Utah

9E

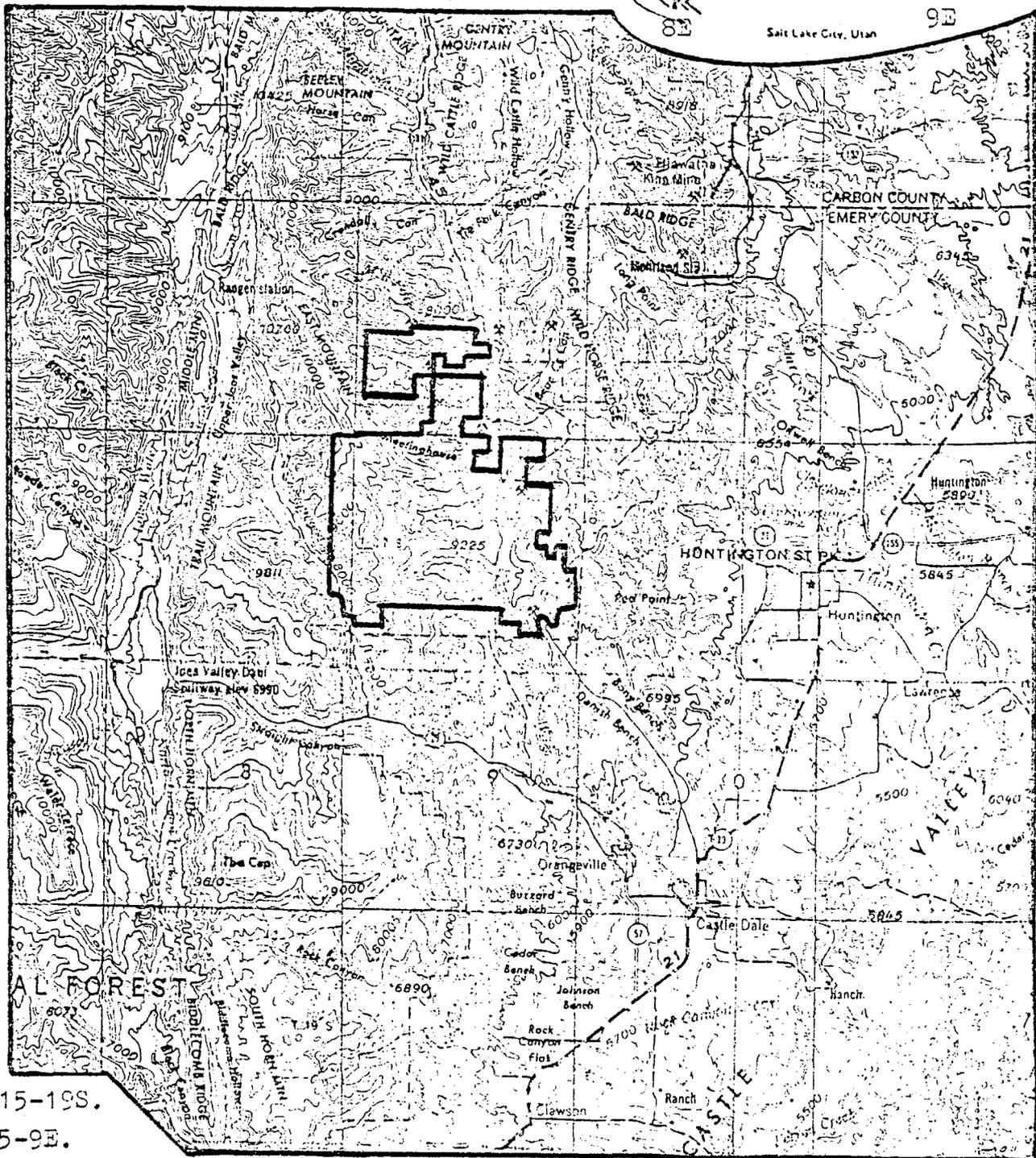
15S

16S

17S

18S

19S



T. 15-19S.

R. 5-9E.

Meridian: Salt Lake B. & N.

Quad:

Project: UPL-80-1

Series: Central Utah

Date: 9-26-80

Figure 1

General Project Area

on

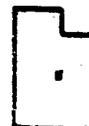
East Mountain

Price, Utah

1:250,000 Scale

Legend:

Sample Survey Zone



1" = 4 miles

Scale

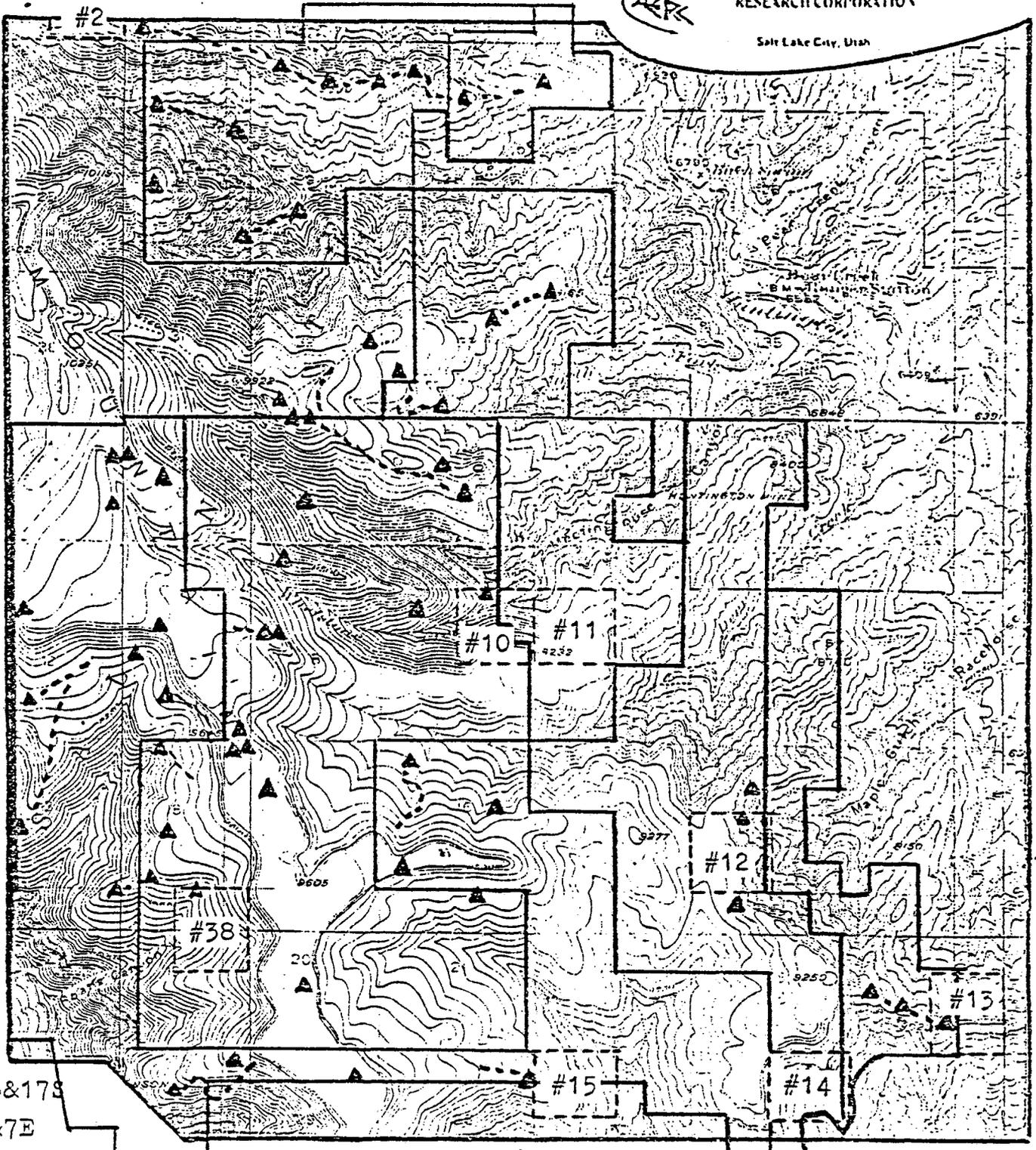
These evaluations were conducted under various U.S. Forest Service Region 4 blanket antiquities permits. During these surveys, some 62 proposed drilling locations were examined, at an average size of a quarter acre each, and about 13 miles of access route were evaluated for historic and prehistoric remains. No cultural resource sites were recorded although the observance of two isolated artifacts indicated the presence of limited prehistoric activity in the project area. The general location of these earlier surveys is demonstrated on Figure 2. The eight 160 acre sample units shown on Figure 2 are the locations intensively surveyed by AERC crews in 1976 during the Central Utah Coal Project (Hauck 1979a, Hauck et al. 1977). Three cultural resource sites were found and recorded during these earlier surveys.

The 1980 resource inventory (UPL-80-1) consisted of intensive examinations of 86 sample survey units generally composed of ten to 40 acre parcels. Some 43 of these sample units, totaling 1310 acres, were situated within National Forest lands administrated by the Manti-LaSal National Forest. The remaining 43 sample units were positioned upon privately owned surfaces within the permit area and comprised a total of 1395 acres which were evaluated by the AERC team. This total surveyed acreage, 2705 acres, comprises a 15% sampling of the approximately 18,000 acres situated in the potential subsidence zone of the mine plan permit application area. Future and past mining operations in the coal seams within East Mountain could result in surface subsidence. The purpose of this research, therefore, was to ascertain through non-random sample analysis, the probability for existence of historic and/or prehistoric cultural resource sites that would be highly susceptible to impact through subsidence. Figures 3 and 4 show the land ownership boundaries within the project area and demonstrate the position of the 86 sample units.

Some four prehistoric sites and 11 isolated artifacts were recorded during the course of the sample survey project.

All survey areas are situated within Township 16 South, Range 7 East and Township 17 South, Ranges 6 and 7 East. The

Salt Lake City, Utah



T. 16&17S

R. 6&7E

Meridian: Salt Lake B&M

Quad:

Hiawatha, Utah

15 Minute USGS

Project: UPL-80-1  
 Series: Central Utah  
 Date: 9-26-80

Figure 2  
 EARLIER SURVEY LOCALITIES  
 IN THE  
 PROJECT AREA

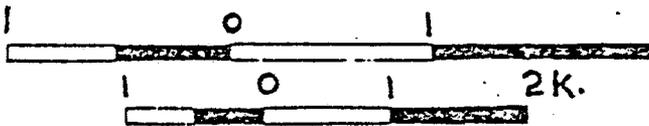
Legend:

Project & Mine Boundaries

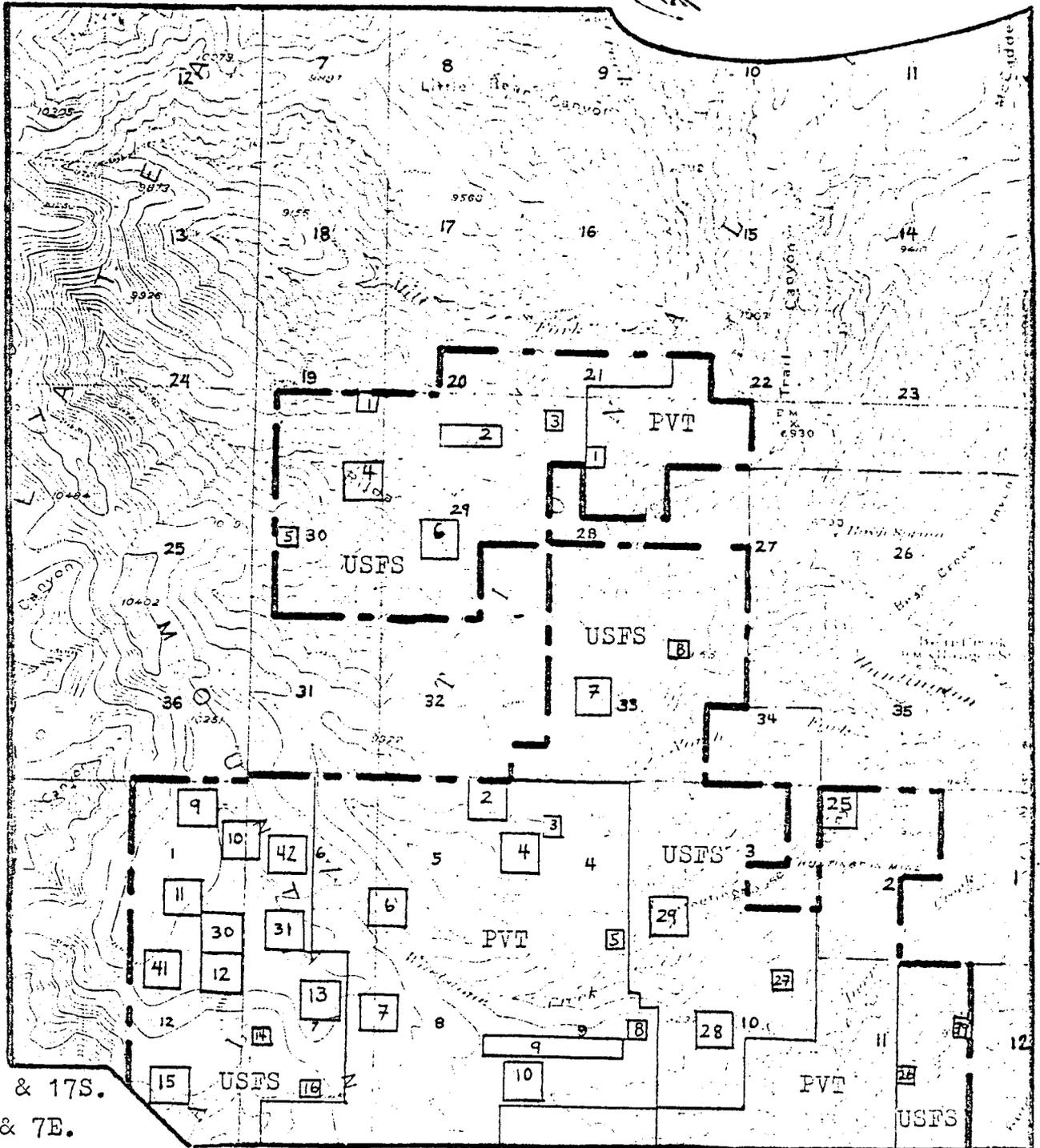
2M. Well Location

Access Road

Sample Unit



Scale



T. 16 & 17S.  
R. 6 & 7E.

Meridian: Salt Lake B. & M.

Quad:

Project: UPL-80-1  
Series: Eastern Utah  
Date: 9-26-80

Figure 3  
Land Ownership and  
Sample Unit Locations  
in the  
Northern Segment  
of the Project Area

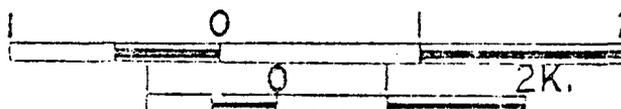
Hiawatha, Utah  
15 Minute USGS

Legend:

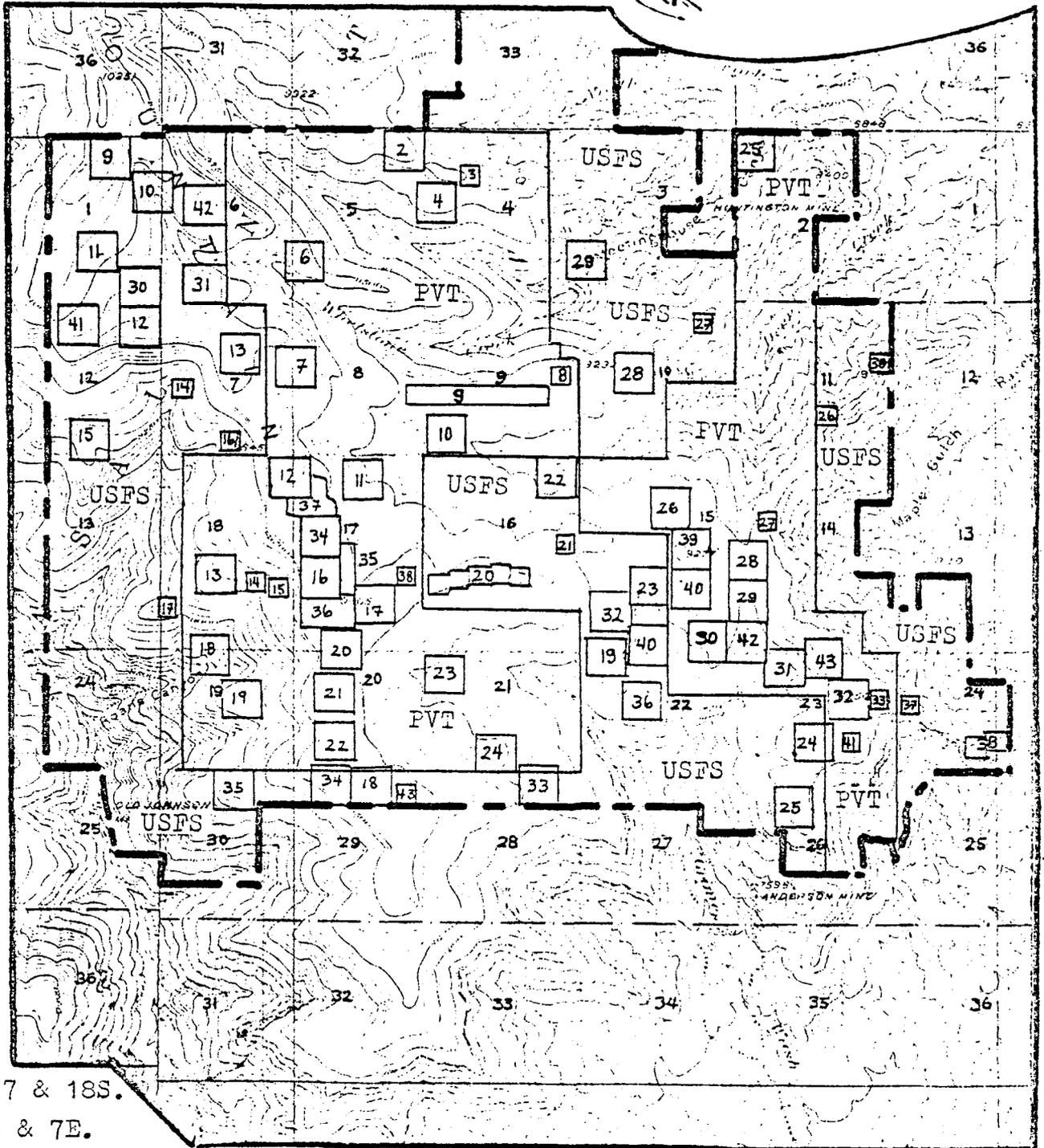
Project Boundary

2 M. Sample Survey  
Unit

40 acre  
 10 acre



Scale



T. 17 & 18S.

R. 6 & 7E.

Meridian: Salt Lake B. & M.

Quad:

Project: UPL-80-1  
Series: Central Utah  
Date: 9-26-80

Figure 4  
Land Ownership and  
Sample Unit Locations  
in the  
Southern Segment  
of the Project Area

Hiawatha, Utah  
15 Minute USGS

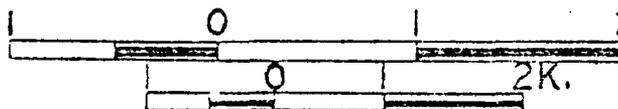
Legend:

Project Boundary

2 M. Sample Survey  
Unit

40 acre

10 acre



Scale

project area is actually located on the southern and eastern top and slopes of East Mountain and flanked to the east and west by Huntington Canyon and Cottonwood Canyon. The survey area is on the Hiawatha, Utah USGS 15 minute topographic quad.

All field notes and site data are filed at AERC headquarters in Bountiful, Utah. Site reports are being submitted to the Utah State Historic Preservation Office as well as to all relevant government agencies.

Attachment 2: INFORMATION CONCERNING SAMPLE  
UNIT SIZES AND LOCATION

In 1980, Utah Power and Light requested that AERC initiate a 15% sample survey of approximately 18,000 acre survey universe incorporated within their East Mountain Mine Plan Permit Area in Emery County, Utah. The Principal Investigator determined that about 1310 acres, totaling 15% of the National Forest lands and 1395 acres, totaling about 15% of the privately owned lands on East Mountain would result in a survey coverage of 2705 acres or 15% of the total 18,000 acres in the mine plan permit. The eight sample survey units of 160 acres each, evaluated on East Mountain in 1977, were not included in the sample design. This resulted in a reevaluation of 210 acres in 1980.

Previous archeological research on East Mountain had demonstrated the scarcity of cultural resources in this high altitude locality. Therefore, the determination was made to conduct a non-random sample survey and to bias all the sample units to those terrain features which could contain a good potential for prehistoric and historic activity. The areas chosen for this sampling approach included sparsely vegetated drainage and spring areas, saddles, open ridges, and south facing slopes. Because of the complexity of the terrain, a decision was made to create a variety of sample units based on ten acre units which could be combined to form 20, 30, 40, or 50 acre plots. The positioning of these units and their relative sizes were designed to meet the terrain characteristics within each area deemed to be suitable for testing. Thus, 40 acre units were positioned on broad ridge tops, 10 acre units on smaller terrain surfaces, and linear series of ten acre units established on the long, thin ridge lines to completely cover those flat areas where site remains could likely be found. This sampling design resulted in some 43 sample units on National Forest and 43 sample units on private land for a total of 86 sample units.

## B. Environment and Locality

The project locality is situated on the top and sides of East Mountain in Emery County, Utah. East Mountain is a high ridge which extends in a NW-SE direction from the Wasatch Plateau and overlooks Castle Valley. The top of East Mountain varies in elevation between about 9200 and 9600 feet in elevation and drops off steeply into Huntington Canyon (ca. 6500 feet elevation) to the northeast and into Cottonwood Canyon (ca. 7800 feet elevation) to the southwest. The East Mountain locality is drained by several canyons, such as Meeting House Canyon, Whetstone Creek and Deer Creek, which flow generally east or northeast into Huntington Creek, and by numerous small creeks which flow southwestward into Cottonwood Creek. Huntington Creek and Cottonwood Creek flow generally eastwards and join with Ferron Creek to form the San Rafael River. Even though both Cottonwood Creek and Huntington Creek are perennial streams, the drainages which flow into them from the East Mountain project locality are all seasonally intermittent. Considerable surface water is available on East Mountain, however, in the form of numerous small springs and seeps.

The high elevations of the Wasatch Plateau have a strong effect on the local climate. The annual precipitation in the project locality varies from 16 inches along the southern rim of East Mountain to 30 inches at the northern end. Summer precipitation varies from six inches to ten inches, respectively, indicating that two-thirds of the annual precipitation falls in the form of snow. For a similar reason, the freeze-free growing period is also highly variable in the project locality. The annual freeze-free period along Cottonwood Creek at the south end of East Mountain is 120 to 140 days, but decreases rapidly with elevation to as few as 20 days at the north end of the project locality.

Because of the deep entrenchment of both Huntington and Cottonwood Creeks, the surface geology is highly variable. In small areas at the highest elevations on East Mountain are erosion remnants of the Flagstaff Limestone, a freshwater deposit of Paleocene and Eocene age. The majority of the plateau surface on East Mountain is an exposure of the North Horn Formation, a deposit of fluvial sandstone and mudstone of Cretaceous or Tertiary age. Along the sides of Cottonwood and Huntington Canyons below the North Horn Formation, a series of Cretaceous age formations are exposed. The first is the Price River Group, consisting of fluvial and marine deposits of interbedded sandstone and mudstone. Below that is the Castlegate Sandstone, a cliff-forming deposit of deltaic origin. Underneath the Castlegate is the Black Hawk Group, a series of fluvial and marine deposits consisting of sandstone, mudstone, shale, and coal. Below that is the Star Point Sandstone, which consists of marine, deltaic, and beach deposits of interbedded shale and sandstone. Along the lower slopes immediately above Cottonwood and Huntington Creeks, the Masuk member of the Mancos Shale is exposed.

The high elevation of the project locality places the top of East Mountain within the Montane ecozone although the bottoms of both Huntington and Cottonwood Canyons are characterized by vegetation of the Pinyon-Juniper ecozone. The characteristic arboreal vegetation of the Montane ecozone in the project locality is shown below (after Johnson 1970):

#### Montane Arboreal Species

Bristlecone pine	<u>Pinus aristata</u>
Blue spruce	<u>Picea pungens</u>
Subalpine fir	<u>Abies lasiocarpa</u>
White fir	<u>Abies concolor</u>
Common juniper	<u>Juniperus communis</u>
Aspen	<u>Populus tremuloides</u>

The top of East Mountain is characterized by scattered communities of the above trees intermixed with open meadows of various grasses and sagebrush Artemisia tridentata.

At lower elevations along the canyon sides, several other plant species are typically present: Utah juniper Juniperus osteosperma, Rocky Mountain juniper Juniperus scopulorum, Gambel's oak Quercus gambelii, serviceberry Amelanchier utahensis, Amelanchier alnifolia, mountain mahogany Cercocarpus ledifolius and Douglas fir Pseudotsuga menziesii (Johnson 1970). In the canyon bottoms, the elevations are low enough to allow pinyon pine Pinus edulis to exist.

The project locality is situated in the Northern High Plateau Subcenter of the Middle Rocky Mountain Faunal area and is characterized by a wide variety of species. The following data summarize the mammal species known to exist in the general project area according to Durrant (1952):

#### Local Mammalian Species

##### Order Insectivora

Shrews

Sorex spp.

##### Order Lagomorpha

White-tailed jack rabbit

Lepus townsendii

Snowshoe rabbit

Lepus americanus

Black-tailed jack rabbit

Lepus californicus

Cottontail rabbit

Sylvilagus nuttallii

##### Order Chiroptera (Bats)

Myotis spp.

Silvery-haired bat

Lasionycteris spp.

Big brown bat

Eptesicus spp.

Red bat

Lasiurus spp.

Long-eared bat

Corynorhinus spp.

Big free-tailed bat

Tadarida spp.

Order Rodentia

Squirrels	<u>Citellus spp.</u>
Chipmunks	<u>Eutamias spp.</u>
Northern pocket gopher	<u>Thomomys talpoides</u>
Beaver	<u>Castor canadensis</u>
Western harvest mouse	<u>Reithrodontomys megalotis</u>
Mouse	<u>Peromyscus spp.</u>
Meadow mouse	<u>Microtus spp.</u>
Wood rat	<u>Neotoma cinerea</u>
Porcupine	<u>Erethizon dorsatum</u>
Marmot	<u>Marmota flaviventer</u>

Order Carnivora

Coyote	<u>Canis latrans</u>
Wolf (formerly in area)	<u>Canis lupus</u>
Red fox	<u>Vulpes fulva</u>
Gray fox	<u>Urocyon cinereoargenteus</u>
Grizzly bear (formerly in area)	<u>Ursus horribilis</u>
Black bear	<u>Ursus americanus</u>
Ring-tailed cat	<u>Bassaricus astutus</u>
Ermine	<u>Mustela erminea</u>
Long-tailed weasel	<u>Mustela frenata</u>
Marten	<u>Martes caurina</u>
Badger	<u>Taxidea taxus</u>
Striped skunk	<u>Mephitis mephitis</u>
Spotted skunk	<u>Spilogale gracilis</u>
Canada lynx	<u>Lynx canadensis</u>
Bobcat	<u>Lynx rufus</u>
Mountain lion	<u>Felis concolor</u>

Order Artiodactyla

Elk	<u>Cervus canadensis</u>
Mule deer	<u>Odocoileus hemionus</u>
Mountain sheep (formerly in area)	<u>Ovis canadensis</u>

The montane ecozone also supports a wide variety of avian species, some of which are summer migrants. These species are listed below according to Hayward et al. (1976). Those species which migrate into the area from out of the state are indicated as summer residents. The other species are present during the entire year but generally migrate to somewhat lower elevations during the winter months.

### Local Avian Species

#### Coniferous Niche

Red-breasted nuthatch	<u>Sitta canadensis</u> (summer)
Golden-crowned kinglet	<u>Regulus satrapa</u>
Ruby-crowned kinglet	<u>Regulus calendula</u>
Yellow-rumped warbler	<u>Dendroica coronata</u> (summer)
Western tanager	<u>Piranga ludoviciana</u> (summer)

#### Aspen Niche (Hole nesting)

Tree swallow	<u>Tachycineta bicolor</u>
Violet-green swallow	<u>Tachycineta thalassina</u> (summer)
House wren	<u>Troglodytes aedon</u> (summer)
Black-capped chickadee	<u>Parus atricapillus</u>
Yellow-bellied sapsucker	<u>Sphyrapicus varius</u>
Downy woodpecker	<u>Picoides pubescens</u>
Common flicker	<u>Colaptes auratus</u>
Chipping sparrow	<u>Spizella passerina</u> (summer)
Cassin's finch	<u>Carpodacus cassinii</u> (summer)
Black-headed grosbeak	<u>Pheucticus melanocephalus</u> (summer)
Western wood pewee	<u>Contopus sordidulus</u> (summer)
Mountain bluebird	<u>Sialia currucoides</u> (summer)
Hermit thrush	<u>Catharus gultatus</u>

#### Predators

Goshawk	<u>Accipiter gentilis</u>
Cooper's hawk	<u>Accipiter cooperii</u>
Red-tailed hawk	<u>Buteo jamaicensis</u>
Golden eagle	<u>Aquila chrysaetos</u>
Great horned owl	<u>Bubo virginianus</u>

## C. Prehistory and History of the Region

The variety of human cultures which have inhabited the project region can be examined from several perspectives. The temporal continuum extending over a range of 12,000 years involves such diverse groups as the early prehistoric big game hunters, the archaic hunter-gatherers, the semi-horticultural Fremont, the Shoshonean bands, the early historic explorers and fur trappers, the Mormon colonists, the coal and cattle barons, the final influx of farmers, small town settlers, and merchants. Man's social and technological variations mirror the complexity of his changing ecological system.

### The Prehistoric Period

The Prehistoric period within the project region can be subdivided into four main temporal phases: Paleo Indian, Archaic, Fremont, and Shoshonean.

#### PALEO INDIAN PHASE

The Paleo Indian phase began at approximately 12,000 B.P. (Before Present) and terminated by about 7000 B.P., and is generally divided into three subphases which are known as the Llano, Folsom, and Plano cultures (Jennings 1974:81).

The Llano culture was characterized by the hunting of mammoth during a time period between 12,000 B.P. and 10,000 B.P. Since the Llano culture has been defined primarily from the excavation of mammoth kill sites, very little is known about the overall subsistence activities of this culture.

Evidence of the Llano culture has been found over a widespread area in the Intermountain West and Southwest. The Clovis point, a large, lanceolate, fluted spear point is the only artifact which can be used confidently to infer the presence of the Llano hunters. Clovis points, in association with mammoth remains, have been found in New Mexico, Oklahoma, Colorado, Arizona, and Wyoming.

Based on these sites, which are characterized by mammoth-Clovis point association, the core area of the Llano culture is limited to eastern Colorado, most of New Mexico, and eastern Arizona. However, the Clovis point by itself has a much larger distribution. Clovis points, or very similar fluted points, have been found throughout the entire United States.

Within the project region of Utah, no characteristic Llano sites have been found, although several isolated Clovis points and one fluted point site have been reported. An isolated Clovis point was reported from Sevier County, Utah (Tripp 1966). Gunnerson (1956) performed a test excavation on a small rockshelter in Emery County (42Em8) from which a local collector had obtained a Clovis point. The test excavation did not, however, recover any additional Clovis points. An unusual fluted point very closely resembling the Cumberland fluted points commonly found east of the Mississippi River was found by an amateur collector in the San Rafael Swell and reported by Hauck (1979, see Figure 5-14c and d).

The Folsom culture (ca. 11,000 B.P. to 9000 B.P.) immediately followed the Llano culture, but several differences in subsistence and artifacts allow a clear distinction to be drawn. Although the primary evidence of the Folsom culture is also from kill sites, the fauna hunted and the projectile points used are different from the Llano culture. The Folsom point is a lanceolate, fluted, and usually eared projectile point generally smaller and thinner than the Clovis point. In addition, the Folsom point is associated at kill sites with the extinct Bison antiquus.

Folsom kill sites occur predominantly within the same region as the Llano core area but isolated Folsom points are not as widely distributed as Clovis points. Isolated Folsom points are almost entirely limited to the High Plains immediately east of the Rocky Mountains. A total of 11 Folsom points has been found in Utah but only one of these, found by an amateur

collector somewhere in the San Rafael Swell, is known from the project region (Tripp 1967).

The Plano subphase of the Paleo Indian phase extends from ca. 9000 B.P. to 7000 B.P. The Plano culture, like the Llano and Folsom cultures before it, was economically partially dependent on large game, bison, in particular. However, the Plano culture is characterized by a great diversity of projectile point types. Plano culture projectile points are typically lanceolate, precisely flaked, and non-fluted.

A new hunting technique also became widespread during the Plano subphase, the jump-kill. The jump-kill hunting technique entailed the driving of a herd of bison over the edge of a cliff or arroyo in order to injure or kill the bison.

Evidence of Plano culture inhabitation is predominantly limited to the High Plains east of the Rocky Mountains. The presence of Plano culture hunters in Utah is not widely acknowledged.

The presence of Paleo Indian cultures within Utah was minimal even during the Llano subphase, and tended to decrease with time. The slight Paleo Indian utilization of Utah can possibly be tied to the relative scarcity of the large game species in Utah compared to the Great Plains east of the Rocky Mountains. The widespread increase in aridity following the end of the Pleistocene was more acute west of the Rocky Mountains than on the eastern side, and as a result, the large herbivorous animals utilized by the Paleo Indian cultures were present on the Great Plains in considerably greater numbers.

#### ARCHAIC PHASE

Because of the relatively arid conditions of Utah and the Great Basin, large mammal hunting was not a viable subsistence technique in that area. The Great Basin and

adjacent Colorado Plateau of eastern Utah were occupied at an early date by Indian groups who were engaged in a subsistence pattern dependent on smaller game animals and the gathering of wild plant foods.

The utilization of caves and rockshelters by Archaic cultures in Utah has resulted in good temporal sequences for the entire Archaic phase. Radiocarbon dates from Danger Cave (Jennings 1957) verify human inhabitation of the Great Basin as early as 10,000 B.P., but the artifacts retrieved from the lowest levels of Danger Cave are not diagnostic of any recognized culture group.

In addition to Danger Cave, Hogup Cave (Aikens 1970) in the Great Basin, Sudden Shelter (Jennings, Schroedl, Holmer 1980) in the southern Wasatch Mountains, and Cowboy Cave (Jennings et al. 1980) in southeastern Utah, have all supplied important data pertinent to the development of a cultural sequence for the Archaic inhabitants of Utah. The Archaic has been divided into three phases based on changes in projectile point types.

The Early Archaic period begins at approximately 8500 B.P. and continues until about 6000 B.P. Subsistence during this period was based on generalized gathering and hunting techniques. A large variety of plant, animal, and insect resources was utilized. Hunting was primarily limited to deer and mountain sheep, although antelope and bison were also utilized. The trapping of rabbits and small rodents was also an important source of protein.

The prevalent utilization of caves and rockshelters as habitations in conjunction with the aridity of the area has resulted in conditions suited to the preservation of normally perishable materials. Due to the excellent preservation, it is known that the spear thrower (atlatl) was the implement used for hunting. The atlatl was used with a two- or three-component shaft and stone dart point throughout the Archaic phase. The

Early Archaic period was characterized by four types of dart points, the Pinto, Humboldt, Elko, and the Northern Side-notch (Holmer 1978). During this time period, the Elko point type had a limited areal extent confined primarily to the northeastern Great Basin and the northern Colorado Plateau. The Pinto and Humboldt points, generally found in close association in archeological contexts, had the same distribution as the Elko points, but are also found in sites in southern and central Idaho at this time period. The Northern Side-notch point had a very wide distribution during the Early Archaic period encompassing the northern Great Basin, Columbia Plateau, Northern Colorado Plateau, and Great Plains.

The Middle Archaic period began about 6000 B.P. and ended about 4500 B.P. Subsistence techniques and the utilization of caves were the same as during the Early Archaic but dart point styles changed and also diversified. Dart points such as the Rocker Side-notched, Sudden Side-notched, McKean Lanceolate, and San Rafael Side-notched were characteristic of this period (Holmer 1978). The Elko point continued to be used during this period in the same areas as it had been during the Early Archaic period. Although the Rocker Side-notched and Sudden Side-notched points were limited in their distribution to central Utah, the McKean Lanceolate and San Rafael Side-notched styles had wider distributions including the Great Plains at this time. Another point style made its appearance during the Middle Archaic, the Gypsum point (Holmer 1978). This point style was very common in the southern Great Basin and northern Colorado Plateau and continued to be utilized through the end of the Late Archaic period.

The Late Archaic period began about 4500 B.P. and ended at roughly 1700 B.P. Subsistence techniques were essentially unchanged from the earlier Archaic periods and the utilization of the Elko and Gypsum points styles was continued although the latter style is generally limited in its occurrence to the

southern half of Utah. At the end of the Late Archaic period, two new technological developments occurred which mark a significant change in prehistoric subsistence patterns: the introduction of corn and the bow and arrow.

Evidence of corn horticulture in the latter part of the Late Archaic period has been found at several locations: Cowboy Cave (Jennings et al. 1980), Cottonwood Cave in western Colorado (Hurst 1948), and Clyde's Cavern in central Utah (Winter 1973, Winter and Wylie 1974). At all three locations, corn caches were found which dated generally between 1600 B.P. and 2000 B.P. The very late portion of the Late Archaic period also witnessed the advent of the bow and arrow. At Cowboy Cave (Jennings et al. 1980), Rose Spring arrowheads were recovered from the uppermost level and were dated about 1700 B.P.

The entire Archaic phase is characterized by a gathering and hunting subsistence mode and a sequence of dart point styles which have been defined through the analysis of excavated cave and rock shelter sites. Transient habitation of these caves during the annual migratory round is the most widely accepted interpretation of the Archaic subsistence pattern.

The atlatl was the universal Archaic hunting implement until the very last centuries of the Late Archaic period. However, the advent of the bow and arrow around 1700 B.P. does not seem to have eliminated the utilization of the atlatl during the Late Archaic. Gypsum dart points continued to be manufactured even after the appearance of Rose Spring arrowheads at Cowboy Cave (Holmer in Jennings et al. 1980).

#### FREMONT PERIOD

The Fremont culture of Utah has traditionally been divided into five regional variants: Parowan, Sevier, Great Salt Lake, Uintah, and San Rafael. However, a recent

re-evaluation has resulted in a three-fold division. The Sevier culture now includes the Sevier, Great Salt Lake, and Parowan variants; the Uintah variant is replaced by an, as yet, unnamed northeastern Utah culture, and the San Rafael variant is designated as the Fremont culture. No cultural entity has been defined that can take into account the variation present between these three groups or areas. The differences are ascribed to separate origins (Madsen and Lindsay 1977).

All of these Utah cultures are characterized by the utilization of permanent dwelling, ceramics, and some degree of corn horticulture. According to Madsen, the Sevier culture (ca. 1300-650 B.P.) can be distinguished from the Fremont culture because of the former's primary dependence on wild foods collected from marshland environments west of the Wasatch Plateau. Madsen notes that Sevier villages are normally located near marshland or riverine biomes and consist of deep semi-subterranean dwellings which are frequently clay-lined. In addition, adobe surface storage structures are prevalent.

The Fremont culture is found east of the Wasatch Plateau and north of the Colorado River and dates from between 1500 to 700 B.P. The Fremont culture relied heavily on corn horticulture and is characterized by a settlement pattern which is also distinctly different from the Sevier culture (Madsen and Lindsay 1977). Fremont culture villages are relatively small and are located adjacent to permanent streams such as Ivie Creek, Muddy Creek, Ferron Creek, Cottonwood Creek, and Huntington Creek. Fremont culture architecture also differs from that of the Sevier; rock-lined, semi-subterranean dwellings and coursed masonry surface storage structures predominate. In addition, Anasazi tradewares are considerably more prevalent in the Fremont culture sites than in the Sevier culture sites.

The unnamed plains-derived culture of northern and northeastern Utah existed from about 1300 to 650 B.P. (Madsen and Lindsay 1977). This culture was dependent upon hunting of bison and the collecting of wild plants. The dwellings are normally shallow basin structures without any clear evidence of the type of superstructure utilized. Unlike the coiled pottery of the Sevier, Fremont, and Anasazi cultures, the unnamed culture produced pottery by the paddle and anvil techniques. It is important to note that there is a considerable spatial overlap of the unnamed culture and the Fremont culture traits in the northern portion of the latter's distribution. There is insufficient data at the present to determine whether the spatial trait overlap is due to alternate occupation, simultaneous occupation by the two cultures, or a combination of these two possibilities.

Hunting activities among the Sevier, Fremont, and unnamed cultures are evident from the many varieties of small arrowheads which have been recovered from excavations. Small, stemmed corner-notched (Rose Spring) arrowpoints are present in the earlier phases of all three cultures, but after about 1100 B.P., numerous regional variants developed. Side-notch arrowpoint styles (Bear River Side-notched and Uinta Side-notched) were common in the northern part of Utah while Parowan Basal-notched and Bull Creek arrowpoint styles were common in the southwestern and south-central portions of Utah respectively. The Bull Creek points are of particular interest because they are found in high frequencies at both Kayenta Anasazi sites in southern Utah and Fremont sites along the east side of the Wasatch Mountains (Coombs Village, Bull Creek sites, Snake Rock Village, Old Woman, and Poplar Knob) and probably indicate the reciprocal exchange of males for matrimonial purposes (Holmer and Weder 1980).

Dart points, the Elko series and Gypsum, in particular, are also found in association with Fremont sites. This association has been used by Schroedl (1976) to verify the indigenous development of the Fremont culture from Archaic antecedents. Dart points, during the Archaic, were used as both projectile points and knives (Weder in Jennings et al. 1980) but their function in the Fremont context has not yet been evaluated.

In reference to Utah, the Mesa Verde and Kayenta variants of the Anasazi culture are of particular importance. The San Juan Anasazi culture was centered around the Four Corners area where Colorado, New Mexico, Arizona, and Utah meet. The Kayenta Anasazi inhabited the extreme southern periphery of Utah from the San Juan River west to central Utah. As has already been noted, Kayenta influence is particularly evident in a narrow band of sites running from Coombs Village northwards past the Henry Mountains to the Snake Rock Village site adjacent to Interstate 70 on the east side of the Wasatch Plateau.

#### SHOSHONEAN PHASE

The Shoshonean populations, who were the sole inhabitants of Utah at the time of Euro-American contact, have been in the northeastern Great Basin region since approximately 650 B.P. Their origin has been the subject of considerable controversy, however. Several hypotheses have been expressed.

One hypothesis maintains that the Shoshoneans came from the southwest of the Great Basin at about the time of the dispersal of the Sevier, Fremont, and Anasazi agriculturalists (Madsen 1975b and Lamb 1958). Gunnerson's hypothesis (1962) states that the Fremont, Sevier, and Virgin cultures were Shoshonean peoples who had taken up

horticultural and ceramic techniques diffused from the Anasazi, but later reverted to an Archaic subsistence style after a climatic change which made agricultural subsistence techniques unproductive.

Regardless of which hypothesis is correct, Shoshonean groups (Ute, Paiute, Shoshone, and Bannock) were inhabiting the Great Basin into eastern Utah at ca. A.D. 1300, roughly coincident with the disappearance of the Fremont and Sevier cultures.

The Shoshonean subsistence pattern was quite similar to the Archaic adaptation. Small familial bands were engaged in a gathering and hunting subsistence utilizing a wide variety of non-domesticated plant, mammal, and insect species.

Very little archeological evidence is available for this time period. Two characteristic artifact types can generally be associated with the Shoshonean occupation of Utah. The bow and arrow was utilized for hunting and a type of arrowhead, the Desert Side-notch point, has been correlated with the Shoshonean occupation (Holmer and Weder 1980). The Shoshoneans also utilized ceramics to a small degree.

Shoshonean ceramics are easily distinguished from Sevier, Fremont, and Anasazi wares by the former's relative crudeness. Shoshonean ceramics are typically thick-walled, have large temper particles, are poorly smoothed, exhibit little decoration, and have been fired in an uncontrolled or oxidizing atmosphere.

#### The Protohistoric Period

The prehistoric Shoshonean occupation of the Intermountain West continued up to and through the period of Euro-American contact. The Indian groups inhabiting the area of eastern Utah within which the project locality is situated came to be called the Utes.

## PRECONTACT

The Utes are a group belonging to the Shoshonean (Uto-Aztecan) linguistic family of which there are three branches: Ute-Chemehuevi, Shoshoni, and Mono-Paviotso. The Ute-Chemehuevi branch includes those groups which came to be known as the Utes, Southern Paiutes, and Chemehuevi. Although there is little archeological evidence, the Utes probably were characterized by a social organization and subsistence mode quite similar to all of the other aboriginal groups in the Great Basin and Colorado Plateau. The Utes were pedestrian gatherers and hunters who utilized a relatively large area of western Colorado and eastern Utah (Steward 1974).

The Utes were grouped into loosely organized bands consisting of extended families. Leadership was present only for subsistence task groups. The Utes could be reliably distinguished from the other contemporary aboriginal groups only in terms of linguistic differences.

Group territoriality was developed only in a statistical sense. A particular Ute band might consider a certain area as a home, but the seasonal round of each band was highly variable from year to year. The area with which any band was most familiar was not exclusively utilized by that band. Inter-marriage among the various Ute bands tended to maintain linguistic unity but blur the definition of a territorial homeland for any particular band. Except for those Utes who were utilizing the aquatic resources around Utah Lake, local populations were small and mobile (Steward 1974).

## EARLY CONTACT

The presence of the Spanish colony at Santa Fe by 1598 resulted in the first contact between the Utes and Euro-American groups. The relationship which developed

between the Utes and the Spaniards was consistently friendly and resulted in the spread of the horse among the Ute bands. When the Utes obtained the horse, a change in their subsistence occurred. The equestrian Ute was able to travel more widely and more effectively and concentrate on bison hunting (O'Neill 1973).

The utility of the horse was strongly mitigated by environmental factors, however. The maintenance of an extensive horse herd required substantial supplies of grass which generally limited the advantage of the horse to those areas where grass was plentiful such as western Colorado, the Uintah Basin, and along the western slopes of the Wasatch Mountains. The supply of grass also determined the distribution of the bison. The horse was, therefore, not equally valuable to all of the Ute bands. The bands in Colorado were able to support their horses whereas those bands in Utah, eastern Utah, in particular, were unable to utilize the horse effectively and were more likely to eat a horse than to ride it.

Considerable trading activity with the Utes was occurring during the 17th and 18th Centuries. Of particular importance was slave trade (O'Neill 1973). The Utes were able to conduct slave raids on neighboring tribes (especially the Navajo) because of their equestrian status. They then exchanged their slaves for horses and other Spanish goods. Whether the slaves were exchanged with traders travelling into Ute territory, or were driven by the Utes to Spanish settlements, is unknown because of the lack of documented evidence. Until the 1770s, there was little official Spanish interest in the territory of the Utes. However, at that time, King Charles III of Spain decided that an exploration of the areas north of Santa Fe would be beneficial to Spanish control. His developing interest was a reaction to the growing influence and explorations by the British and French in the West.

Charles III felt that it was important to ensure control of trade by the Spaniards since he considered the British and French traders as a threat to Spanish rule (O'Neill 1973).

The first documented Spanish exploration of the area north of Santa Fe was the Dominguez-Escalante Expedition of 1776-1777. This expedition was also the first officially sponsored exploration, the purpose of which was to find a route between Santa Fe and the Spanish settlements in California. Although the expedition was unsuccessful in reaching its goal, it did extensively explore the territory occupied by the Utes who, in all recorded instances, welcomed the Spaniards.

A trail was eventually established between Santa Fe and California which came to be known as the Spanish Trail. The origins of the Spanish Trail are obscure; however, this trail was probably utilized in prehistoric times as evidenced by its association with archeological sites.

#### LATE CONTACT

Beginning in the early 1800s, the fur trade became active in Utah. The Arze-Garcia expedition traded for furs with the Utes at Utah Lake in 1813 and soon thereafter trappers began to actively exploit the area. Etienne Provost was a member of the Choteau-DeMun exploration of 1815 to 1817 and, subsequently, founded his own trapping company which operated primarily within Ute territory. He was subsequently killed by the Utes near the site of the city which now bears his name, Provo (O'Neill 1973).

During this time, more detailed information on the Shoshonean peoples of the area was recorded. In particular, specific Ute bands are mentioned with reference to their respective territories. Within the project region, the Weeminuche band conducted its yearly rounds (O'Neill 1973).

The Adams-Onis treaty of 1819, which gave Mexico its independence, resulted in an influx of Americans to Santa Fe. Most of the Americans came to engage in trapping. The newly arrived trappers caused a considerable increase in traffic along the Spanish Trail and an increase in competition for the available fur resources. This competition was not welcomed by the Utes, who were no longer consistently friendly with the Euro-Americans.

Although there were a large number of independent trappers operating in Utah, their activities have not been well documented. Antoine Robidoux was an important trapper, who by 1824, was operating primarily in the Uinta Mountains. William Ashley and Peter Skene Ogden were trapping in the northern Ute territory during the summer of 1824 and, about the same time, Jedediah Smith was exploring eastern Ute territories to evaluate their trapping potential (O'Neill 1973).

The growing traffic along the Spanish Trail had an important effect on the local Ute bands. Wakara, a Tumpanuwache leader, became quite powerful in the 1820s by conducting horse raids in southern California and returning to Utah by way of the Spanish Trail (Lyman and Denver 1970). He enhanced his power and wealth by exacting tribute from travelers along the trail and by the trading of stolen horses and Pahvant and Paiute slaves (O'Neill 1973). In addition, Wakara and his band actively engaged in fur trapping.

By the late 1830s, there was considerable competition for the fur resources of Utah and western Colorado. Robidoux established a permanent fort and trading center in 1837 near White Rocks in the Uinta Basin to capitalize on the beaver-laden streams of the Uinta Mountains.

The prosperity of the fur trade was not destined to last very long, however. The fierce competition over trapping areas led to widespread disruptive conflicts and, most importantly, the demand for furs used to make the beaver

skin hats which were fashionable in Europe and the eastern United States declined rapidly about 1840 as the fashions changed. Fort Robidoux was burned in 1844 by the Utes, who apparently blamed the trappers for the declining value of their furs (O'Neill 1973; Lyman and Denver 1970).

The decline of the fur trade had a serious impact on the Ute bands of Utah. The entire economic base of the Utes began to disintegrate after 1840. The trading activities with Santa Fe began to dwindle with the decline in the horse and slave trade. The termination of Mexican control of the area in 1846 and the subsequent loss of contact for slave trade into Mexico (Lyman and Denver 1970) was very disruptive to the relationships existing between Utah and Santa Fe.

During the declining years of the fur trade, the largest invasion of Ute territory occurred. Beginning in 1847, Mormon pioneers began to move into Utah and rapidly swelled their numbers through immigration. At first, there was little conflict with the Utes because the major Mormon settlement, Salt Lake City, was on the periphery of the Ute territory and the earliest Mormon expansion was to the north. In 1849, Fort Utah (later to become the town of Provo) was founded near Utah Lake on the traditional campsite of the Tumpanuwache band. Since the Tumpanuwache band, still under the leadership of Wakara, had been forced to revert to their earlier mode of subsistence due to the decline of the fur trade, their utilization of the resources around Utah Lake became of vital importance. The conflicting interests in the Utah Lake vicinity escalated into a series of raids and counterraids during the 1850s which became known as the Walker War. In the end, the Utes were forced to leave the valley and moved east across the Wasatch Mountains (O'Neill 1973).

The next few years were difficult for the Utes, who were being gradually forced to split up into small bands and resume a subsistence mode similar to the precontact period. Some of the bands, however, chose to raid Mormon settlements

and farms to obtain cattle so that they could avoid starvation. These raids became more prevalent during the 1860s. Raids were conducted on the Mormon settlers west of the Wasatch and the Utes returned to the unsettled areas east of the Wasatch with the stolen cattle (O'Neill 1973). Although several bands were responsible for these raids, one man, by the name of Black Hawk, became the focus of the blame for all the raiding.

The areas east of the Wasatch Mountains remained under Ute domination for several years. A Mormon attempt to colonize at Moab was undertaken in 1855, but the Mormon settlers were harassed by the Utes and forced to return to Salt Lake City. It was not until 1877, by which time the Utes had been removed to the Uintah Reservations, that Mormon colonists were able to safely settle east of the Wasatch Mountains (O'Neill 1973).

#### The Historic Period

The history of the east-central coal areas of Utah begins with the exploration and colonization efforts of the Spanish during the last quarter of the 18th Century. East-central Utah was first explored and mapped by the Dominguez-Escalante Expedition of the 1776-1777, in its efforts to establish a line of communication between the Spanish settlements of New Mexico and Monterey, California (Miller 1968).

Though the Dominguez-Escalante Expedition failed to achieve this end, subsequent attempts from the New Mexico settlements and the travelings of Spanish and American fur trappers, traders, and frontiersmen resulted in a connecting route known as the Old Spanish Trail (Miller 1968:Map 20). Along this route, which came up from Santa Fe through the San Juan country, across the Colorado River at Moab, over the Green River at the present site of Green River, across the San Rafael Desert into Castle Valley, then south through

Salina Canyon to southwestern Utah and southern California, passed thousands of horses and numerous trading, trapping, and Indian slave trade expeditions (Miller 1968).

By the 1830s, the trail was well established, portions of its route being followed in 1853 by explorer, John C. Fremont and government surveyor, John W. Gunnison, who reported several sets of well-worn tracks near Green River where Interstate 70 presently runs. Other sections of the trail still remain near the Big Hole Wash in Emery County. The primary route of the Old Spanish Trail, plus divergent trails to Utah Lake, Fort Robidoux, and Fort Kit Carson, brought the first extended contact into the project area (Miller 1968: Map 20).

Though forts and trading posts were scattered sparsely through southern and central Utah, the first attempts at organized settlement were undertaken by the Mormon Church. In 1855, the Elk Mountain Mission passed southward through Castle Valley to the area of Moab intending to establish a permanent settlement, but Indian hostility forced a quick retreat. The combination of hostile Indians, the desolate appearance of the region, the hardships involved in securing sufficient water for irrigation, and doubts about the quality of the soil caused further attempts at colonization of the eastern area of what was then Sanpete County to be dropped for over 20 years (McElprang et al. 1949:16).

At a priesthood meeting at Mt. Pleasant on September 22, 1877, encouragement was given to settle Castle Valley; soon after 75 men from Sanpete Stake were called with Christian G. Larsen as leader. Very few responded, however, because of the aforementioned reasons. Orange Seely was subsequently given the responsibility of superintending the founding of settlements and another call for colonizers was

issued by the Church in the fall of 1878. Some of the earliest settlers of the area who dwelt in dugouts in hills or washes until log houses could be erected were Elias and John Cox, Ben Jones, William Avery and Anthony Humbel. By the fall of 1878, the crops were sufficient and the situation stable enough for the families of these men to join them, a sure sign of an intent to remain (McElprang et al.1949).

Work progressed on the agricultural settlements of Castle Valley and roads were built through the Wasatch Mountains to the more stable areas of western Sanpete County. Additionally, in the fall of 1878, the "Star-Mail Route" was opened between Salina and Ouray, Colorado; it followed the paths of the Old Spanish Trail and the "Gunnison" Trail of years before (McElprang et al 1949:19-21). In just three years the towns of Castle Dale, Wilsonville, Ferron, Green-river (Blake), Huntington, Lawrence, Molen, and Orangeville had been established and the Legislative Assembly in February, 1880, created Emery Coutny, which embraced all of present-day Carbon, Emery, and Grand Counties (Lever 1898:593).

Though the project region was settled for its agricultural and grazing possibilities, it was the area that inspired active settlement and set the mining-dominated industrial base that central and eastern Utah retains to the present.

The first recorded discovery of coal in eastern Utah was by the Gunnison Expedition of 1853 (Powell 1976:13) when they located deposits of coal approximately three miles east of present-day Emery. The isolated location of the Gunnison find, coupled with the hope that the deposits already discovered at Coalville and Wales would prove sufficient for the territory's needs, caused Gunnison's discovery to be forgotten. The subsequent failure of the efforts at Wales to produce good coking coal, and the Union Pacific Railroad's monopolization and price-fixing on the deposits at Coalville, caused a re-evaluation of the potential coal producing areas east of the Sanpete settlements (Powell 1976:13).

As a result, the first effort to exploit the newly found eastern coal deposits was undertaken in 1875 at Connellsville in the upper reaches of Huntington Canyon. The Fairview Coal Mining and Coke Company was organized by men from New York, Salt Lake City, and Fairview. Eleven coke ovens were constructed and the coke was hauled by wagon into Springville. The expense involved with the hauling and the questionable quality of the coke produced caused the failure and abandonment of Connellsville by 1878 after only three years of operation (Powell 1976:13).

The next development of coal resources was begun in the Pleasant Valley area, also in 1875. The Pleasant Valley Coal Company, headed by Milan O. Packard, constructed a wagon road from Springville up Spanish Fork Canyon to Pleasant Valley coal lands in 1876; 1877 saw the opening of the Number 1 Mine in Winter Quarters Canyon (Powell 1976:14). A narrow gauge rail line was completed from Springville through Spanish Fork Canyon in October of 1879 by the Pleasant Valley Railroad Company as the haul to Springville by the wagon road occupied four days in good weather while in winter the road was impassable. This Pleasant Valley area proved to be extremely productive. The first three large scale mines in eastern Utah were established in this area when the Mud Creek Mine was reopened in 1882 followed by the 1884 opening of the Union Pacific Mine at Scofield just east of Winter Quarters (Powell 1976:15).

From the earliest times, the railroads sought to control the supply of coal in the territory, e.g., the Coalville resources and Union Pacific Railroad's control over that source. During the early 1880s, the Denver and Rio Grande Railroad was extending its lines from Colorado through Utah. Though originally graded through Castle Valley and Salina Canyon, the route of the railroad was altered, going through Price and Spanish Fork Canyon and thus taking in the rich coal areas of what was to become Carbon County (McElprang et al. 1949:22).

Further expressing its interest in eastern Utah coal, the Denver and Rio Grande Western (Denver and Rio Grande's Utah

holdings) purchased the independently owned Pleasant Valley Railroad Company and Pleasant Valley Coal Company in 1882. Shortly thereafter, Union Pacific Railroad Company (UPRR) penetrated the Pleasant Valley area in order to protect its threatened monopoly on Utah coal (Powell 1976:16). The UPRR formed the Utah Central Coal Company in 1882 and opened the Union Pacific Mine near Scofield in 1884. With the Denver and Rio Grande's Pleasant Valley Coal development (1882), the establishment of Utah Fuel Company in 1887 and the creation of Utah Central Coal of Union Pacific, the railroad companies almost totally dominated the ownership and production of the Utah mines until the early 1900s (Reynolds et al. 1948:195).

In 1888, a mine was opened at Castle Gate on the Price River near the mouth of Price Canyon. In about 1899, a new mine began operations at Sunnyside just 24 miles east of present-day Price at the base of the Book Cliffs. The Sunnyside Number 2 Mine also began its production in 1899 with the coal obtained there, and also at Castle Gate, being utilized for coking purposes (Powell 1976:17-18).

In 1906, the first of the coal operations which would remain free from railroad control began production at Kenilworth, three miles east of Helper. This enterprise was financially backed by James Wade and F. A. Sweet and was called the Independent Coal and Coke Company because of its unique ownership status. Sweet, one of Utah's most prominent coal authorities, also opened a mine on the middle fork of Miller Creek in 1908 and named the camp Hiawatha (Reynolds et al. 1948:213). This locality at the foot of Gentry Mountain, about 18 miles southeast of Price, was the scene of further coal mining development in 1911 when Black Hawk mine was opened by Brown and Eccles. Just a few miles to the south in northern Emery County, a small wagon mine was purchased by the Castle Valley Fuel Company and the town, Mohrland, named from the initials of the company's four major figures--Mays, Orem, Heiner

and Rice--was begun. Mr. W. H. Wattis undertook the last development in this area in 1916 at Wattis, several miles north of Hiawatha on the flank of Castle Valley Mountain.

The decade from 1911-1920 saw an increase in activity in the coal regions of east-central Utah with many new mines being opened in hitherto undeveloped areas within the Utah coal producing regions. In 1911, Frank Cameron prospected the region around Panther Canyon on the Price River, and in 1914, the first coal was shipped out by the Utah Fuel Company which had leased the properties to Cameron for development. Cameron also developed and opened a small camp at the base of Castle Rock, about five miles northwest of Helper. Located directly on the main line of the Denver and Rio Grande Western Railroad, the camp's name was changed many times as was its ownership. Originally known as Bear Canyon, it soon was called Cameron, for its developer, then Rolapp, and finally, Royal (Reynolds et al. 1948:244).

In 1912, Jesse Knight, one of the most prominent men in Utah mining history, bought 1600 acres of coal land west of Helper to provide coal for his smelting operations in the Tintic District. His mine, at what eventually became known as Spring Canyon, began production in 1913 and was the first of many mines in the Spring Canyon District, one of the most prolific coal producing areas in eastern Utah. Soon after the establishment of Storrs (Spring Canyon), F. A. Sweet opened another mine in Spring Canyon at Standardville, so called because it was considered to be the standard for the development of future mining camps. The year 1914 saw the opening of the Latuda Mine and camp by Liberty Fuel Company while mines were opened in 1916 at Peerless and Rains. The last mining development undertaken in the Spring Canyon District was Mutual Coal Company's Mutual and Little Standard operations, begun in 1921 and 1925, respectively.

The final major coal producing area to be opened in east-central Utah was the Gordon Creek District. This region had first been prospected in 1908, but was really brought to prominence in 1920 by A. E. Gibson, the superintendent of the Spring Canyon Mine. Mines were developed in this area up until 1925 by Consumers Mutual Coal Company, National Coal Company, and Sweet Coal Company. The operations of all three companies ceased by 1950 (Carr 1972:81).

After the development of the Gordon Creek area, further work on the coal regions was undertaken in areas that had been opened previously. In 1922, Columbia Steel Company opened a mine at Columbia near the location of Sunnyside in order to further exploit the excellent coking coal obtainable from that region. One very late development of the same coal veins that supported the Columbia operation was initiated in Horse Canyon in 1942 by the United States government to aid steel production at its Geneva plant (Reynolds et al. 1948:252). Both mine and steel plant were taken over by U.S. Steel after WWII and continue in operation to the present.

Most of the mines in east-central Utah continued production through the heavy demand years of WWI and the years of prosperity that followed but a combination of overdevelopment, the increased use of other natural fuels, rising costs associated with expensive underground haulage, and the Depression of the late 1920s and early 1930s caused several camps to be abandoned. Among the first mines to succumb were the long exploited Pleasant Valley mines. Winter Quarters, near Scofield, was closed down in 1928 while Scofield and Clearcreek experienced reductions of operations during the early 1920s and 1930s, respectively. Rains was also forced to cut back on operations in 1930. Despite these setbacks, as of

1929, there were 22 coal mines operating in Carbon, Emery, and Grand Counties, the production of these mines providing 98% of the state's output (Sutton 1949:852).

Economic and production difficulties continued to plague Utah's coal industry during the decade of the 1930s, forcing the closure of the Mutual and Mohrland mines in 1938. World War II brought a temporary respite to the general downward trend with many mines achieving their highest production levels during the war years and immediately thereafter.

The decade of the 1950s signalled the end for a great number of the eastern Utah coal mining operations as the adaptation of coal for new uses was insufficient to keep pace with this fuel's replacement in many of its traditional roles. The increasing use of natural gas for heating homes and heavy industry use and the railroad's switch to diesel power were among the developments which severely hurt the coal industry. This bleak picture has drastically changed with the advent of America's "energy shortage," and new technologies for coal use in the future have caused an upswing in coal production in east-central Utah. Mines which were closed, or kept running with skeleton crews, have begun to increase operations during the last decade and the possibility of a new sustained burst of coal mining activity definitely exists (Alexander 1963:244-247).