

DES-BEE-DOVE COAL MINE
PERMIT APPLICATION
UTAH POWER & LIGHT COMPANY

VOLUME I

USE THE BLACK BINDERS/GOLD LETTERS SUBMITTED
3/20/1981.

RETAIN ONLY THE INDEX TABS FROM THE ORIGINAL
MATERIAL.
DISCARD ALL OTHER TEXT.
INSERT THIS MATERIAL WITH INDEX TABS IN PROPER
LOCATIONS.

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

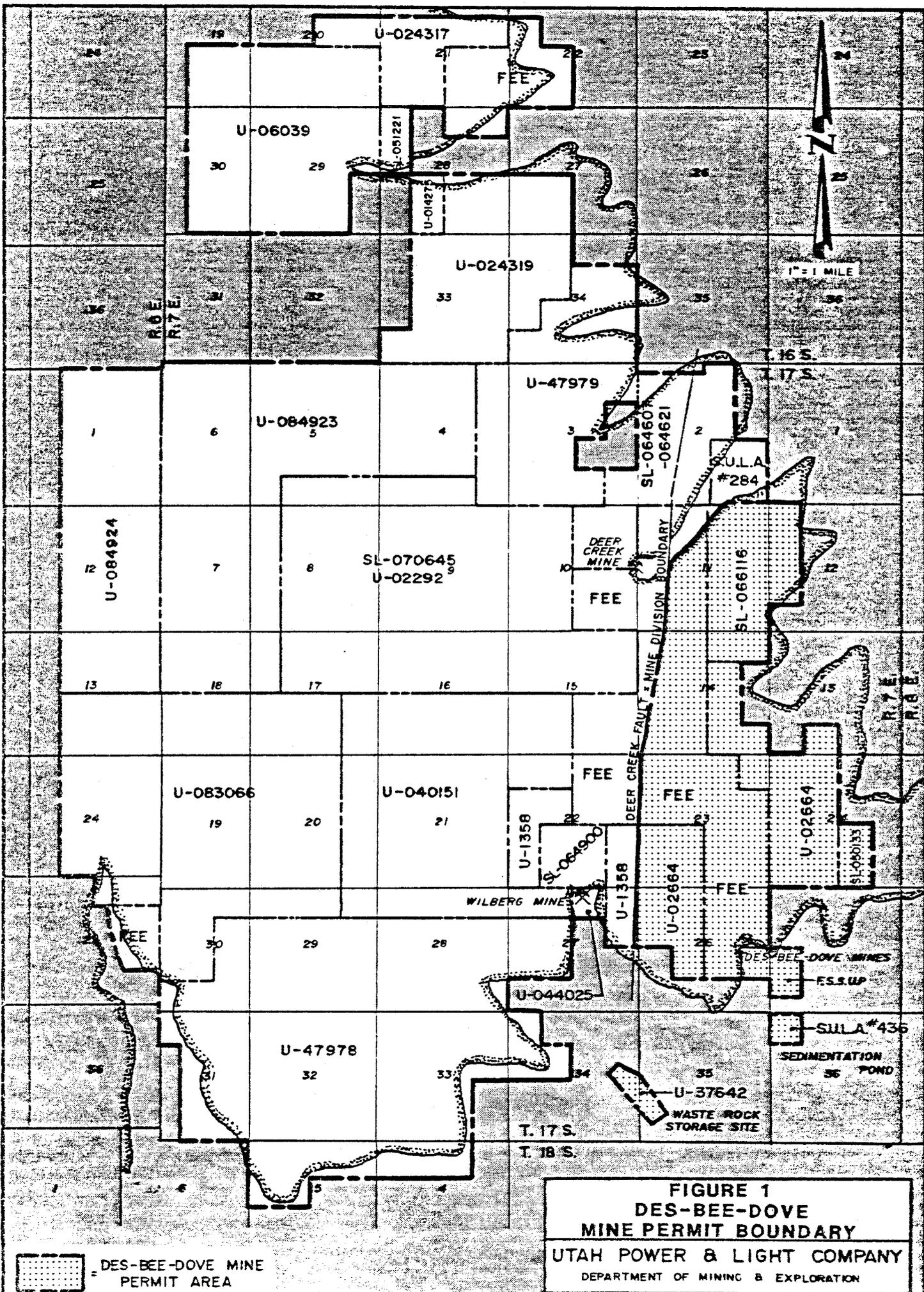


FIGURE 1
DES-BEE-DOVE
MINE PERMIT BOUNDARY
 UTAH POWER & LIGHT COMPANY
 DEPARTMENT OF MINING & EXPLORATION

DES-BEE-DOVE MINE PERMIT AREA

Preparation of this application was assigned to Company's Mining and Exploration Department under the supervision of its Manager, 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 office located at 41 North Redwood Road, Salt Lake City, Utah.

Mapping was done by Intermountain Aerial Surveys, a division of Engineering Enterprises, Inc., also located in Salt Lake City.

Other Company departments were used where their expertise coincided application requirements.

Revised 11/21/83

Organization of Mining Permit Application

The following volumes contain Utah Power & Light 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 five 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

Revised 11/21/83

DES-BEE-DOVE COAL MINE

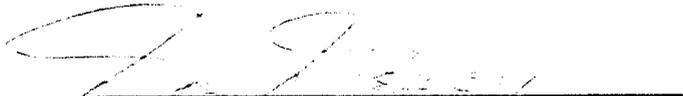
Owned by	Utah Power & Light Company
Operated by	Emery Mining Corporation
Located	7 Miles West of Huntington, Utah
Commence Mining	1938
Average Production	725,000 tons per year
Estimated Mine Life	13 Years
Type of Operation	Underground coal mine
Transportation System	Truck haulage to various power plants
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

Revised 11/21/83

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 Don A. Dewey, a registered Professional Engineer of the State of Colorado, who hereby certifies to the correctness thereof.



Don A. Dewey, P.E.
(Professional Engineer #6522)

TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Organization	3
Verification of Applicant	
Table of Contents	5
Part 1 - Legal, Financial, Compliance Information	
Identification of Interests	1-1
Corporate Statement	1-2
Listing of Leases	1-6
Surface Owners	1-7
Contiguous Owners	1-8
Mining Permits	1-10
Mining Violations	1-11
Right of Entry	1-14
Areas Designated Unsuitable for Mining	1-15
Insurance	1-17
Licenses, Permits & Approvals	1-18
Newspaper Advertisement	1-19
Part 2 - Environmental Resources	
Archeological Survey	2-1
Geology	2-57
Data Collection	2-57
Structure	2-58
Stratigraphy	2-60
Economic Coal Occurrences	2-63
Overburden	2-64

Revised 11/21/83

	<u>Page</u>
Hydrology	2-71
Groundwater	2-71
Surface Waters	2-78
Alternate Water Supply	2-97
Climatological Information	2-98
Vegetation	2-102
Soils Information	2-121
Fish and Wildlife Resources	2-133
Land Use Information	2-146
Prime Farm Land Investigation	2-149
Alluvial Valley Floors	2-150
 Part 3 - Mining Operation Plan	
Mine History	3-1
Mining Plan	3-2
Mining Method	3-7
Production	3-8
Equipment	3-8
Engineering Principles and Techniques	3-10
Facilities	3-12
Water Pollution Control Facilities	3-27
Transportation Facilities	3-30
Underground Development Waste	3-30
Offsite Support Facilities	3-34
Air Pollution Control Plan	3-35
Existing Structures	3-37

Revised 11/21/83

	<u>Page</u>
Part 4 - Reclamation Plan	
Structural Removal and Portal Seals	4-1
Backfilling and Grading	4-1
Revegetation and Interim Stabilization	4-8
Reclamation Costs	4-23
Protection of the Hydrologic Balance	4-25
Postmining Land Uses	4-26
Protection of Public Parks and Historic Places	4-28
Subsidence Control Plan	4-29
Fish and Wildlife Plan	4-34

Revised 11/21/83

Volume 3

Appendices

- I - Coal Lithologic Logs
 - a. Drill Hole EM-23C
 - b. Drill Hole EM-12C
 - c. Drill Hole D-25
 - d. Drill Hole B-124
- II - Field Data for the Vegetation Reference Areas
- III - Roof Control Plan
- IV - Ventilation System, and Methane, and Dust Control Plan
- V - Underground Development Waste Plan
- VI - Blasting Plan
- VII - Sedimentation Pond Criteria and Calculations
- VIII - Sedimentation Pond Construction Drawings - 01-52-1-015
01-52-1-016
- IX - Photographs of Existing Facilities
- X - Deseret Waste Dump Stability Analysis (Rollins)
- XI - Slope Stability Analysis - Bathhouse Fill (Rollins)
- XII - Hydrological Procedures and Calculations
- XIII - Subsidence Monitoring Plan

Revised 11/21/83

MAPS AND DRAWINGS

Legal, Financial, Compliance Information

Map #		
1-1	Coal Ownership Map	CM-10536-DS
1-2	Surface Ownership	CM-10537-DS
1-3	Mine Development as of 8/3/77 (Blind Canyon Seam)	CM-10368-BH
1-4	Mine Development as of 8/3/77 (Hiawatha Seam)	CM-10371-DS

Environmental Resources, Geology, Hydrology

2-1	Surface Exploration Drill Holes	CE-10424-EM
2-2	Hiawatha Structure Contour Map (Sheet 1)	CE-10469-EM
2-3	Blind Canyon Structure Contour Map (Sheet 1)	CE-10540-EM
2-4	Geologic Cross Sections	CE-10244-EM
2-5	Isopach Map - Hiawatha Seam (Sheet 1)	CE-10437-EM
2-6	Interburden Isopach Map Between the Hiawatha and Blind Canyon Seams (Sheet 1)	CE-10470-EM
2-7	Isopach Map-Blind Canyon Seam (Sheet 1)	CE-10434-EM
2-8	Hiawatha Overburden Contour Map (Sheet 1)	CE-10471-EM
2-9	Blind Canyon Overburden Contour Map (Sheet 1)	CE-10539-EM
2-10	Hydrologic Data Map	CM-10503-DS
2-11	Spring Map	CE-10404-EM

Vegetation and Soils

2-12	Vegetation Map	CE-10490-DS
2-13	Mine Plan Area Vegetation Map	CM-10487-DS
2-14	General Soils Map	CE-10502-DS
2-15	Mine Plan Area Soils Map	CM-10336-DS
2-16	Deseret Pond Soils Map	CM-10337-DS
2-17	Land Use Map	CE-10538-DS
2-18	Mule Deer Habitat	CM-10544-DS

Operation Plan

3-1	Mine Plan - Hiawatha Seam	CM-10474-DS
3-2	Mine Plan - Blind Canyon Seam	CM-10472-BH
3-3	5 Year Increments - Hiawatha Seam	CM-10531-DS
3-4	5 Year Increments - Blind Canyon Seam	CM-10530-BH
3-5	Wilberg Mine to Little Dove Mine Water Line	CM-10314-WB
3-6	Surface Facilities Location Map "A" (2 Sheets)	CM-10333-DS
3-7	Surface Facilities Location Map "B" (3 Sheets)	CM-10388-DS
3-8	Surface Drainage Map (2 Sheets)	CM-10421-DS
3-9	Road Plans	CH-R-001
	Road Cross Sections	CH-R-002
	Road Profile	CH-R-003
3-10	Existing Earth and Structures	CM-10392-DS

Revised 11/21/83

Reclamation

4-1	Final Reclamation Map (Sheet 1 & 2)	CM-10393-DS
4-2	Final Reclamation Map (Sheets 3 & 4)	CM-10393-DS
4-3	Disturbed Mine Plan Area Cross Sections	CM-10482-DS

Revised 11/21/83

UTAH POWER & LIGHT COMPANY
DEER CREEK COAL MINE
APPLICATION FOR MINING PERMIT

The application for mining permit is submitted to the State of Utah, Department of Natural Resources, Division of Oil, Gas & 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 C.F.R. § 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)

The permit applicant is:

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

The agent for service of process is:

D. W. Jense, Manager
Mining and Exploration
Utah Power & Light Company
P. O. Box 899
Salt Lake City, Utah 84110
(801) 535-4234

Revised 11-21-83

The mine operator is:

Emery Mining Corporation
31 North Main Street
P. O. Box 310
Huntington, Utah 84528
(801) 687-9821

The applicant is a corporation in good standing under the laws of the State of Utah. The names and address of every officer and director of applicant and operator are shown below. Applicant is a widely held public corporation and it has no principal shareholders.

OFFICERS

Harry Blundell	President & Chief Executive Officer	3191 Crestview Circle Bountiful, Utah
S. G. Baucom	Executive Vice President & General Counsel	2248 Logan Avenue Salt Lake City, Utah
Arvin S. Gibson	Executive Vice President	1412 Vineyard Drive Bountiful, Utah
Curtis L. Hoskins	Executive Vice President	535 South 1300 East Bountiful, Utah
Dean L. Bryner	Senior Vice President	2042 Lincoln Circle Salt Lake City, Utah
Frank N. Davis	Senior Vice President	1752 Siesta Drive Sandy, Utah
Karl J. Stott	Senior Vice President	1562 Stonemoor Circle Salt Lake City, Utah
James C. Taylor	Senior Vice President	2825 Carole Drive Salt Lake City, Utah
Robert Gordon	Vice President & Secretary	2380 Stringham Avenue Salt Lake City, Utah
Harry A. Haycock	Vice President	1403 North 400 East Centerville, Utah

Revised 11-21-83

Verl R. Topham	Vice President	4173 Cumberland Road Salt Lake City, Utah
Darcie H. White	Vice President	2817 Cherry Blossom Lane Salt Lake City, Utah
Orrin T. Colby, Jr.	Controller	255 Garden Avenue Salt Lake City, Utah
John E. Droubay	Treasurer	2021 Princeton Avenue Salt Lake City, Utah
Sam F. Chamberlain	Assistant Corporate Secretary	3670 S. Oakridge Drive Bountiful, Utah
Martin H. Craven	Assistant Treasurer	2491 Capricorn Way Salt Lake City, Utah
Albert R. Dunn	Assistant Vice President	762 Silver Shadows Drive Salt Lake City, Utah
Thomas W. Forsgren	Assistant Corporate Secretary	2868 Jennie Lane Salt Lake City, Utah

Revised 11-21-83

BOARD OF DIRECTORS

S. G. Baucom	2248 Logan Avenue Salt Lake City, Utah 84108
Ralph S. Blackham	Moroni, Utah 84646
Harry Blundell	3191 Crestview Circle Bountiful, Utah 84010
Deedee Corradini	200 East South Temple Salt Lake City, Utah 84111
J. P. Gibbons	1772 Country Side Drive Salt Lake City, Utah 84106
Gordon B. Hinkley	890 East Capitol Boulevard Salt Lake City, Utah 84103
E. A. Hunter	4234 Neptune Drive Salt Lake City, Utah 84117
Ted C. Jacobsen	714 - 16th Avenue Salt Lake City, Utah 84103
John A. Lindquist, Sr.	4140 Bevs Drive Ogden, Utah 84403
Fogers K. Rose	2805 East Morningside Idaho Falls, Idaho 83401
James C. Taylor	2825 Carole Drive Salt Lake City, Utah 84117
Robert V. Thompson	Lazy Cross 2 P. O. Box 220 Big Piney, Wyoming 83113

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, it has employed an independent contractor to operate all of its mines. The independent contractor so employed

Revised 11-21-83

during the past five years is Emery Mining Corporation of Huntington, Utah (formerly known as American Coal Company).

The officers, directors and principal shareholders of Emery Mining Corporation are:

Neal Savage	Chairman, President & Director	31 North Main Huntington, UT 84528
Kenneth C. Savage	Director	31 North Main Huntington, UT 84528
T. L. Savage	Director	31 North Main Huntington, UT 84528
Ray Christensen	Vice President & Director	31 North Main Huntington, UT 84528
William L. Zeller	Executive Vice President, Manager & Director	31 North Main Huntington, UT 84528
Jerry Lees	Secretary	31 North Main Huntington, UT 84528
R. D. Hartman	Director	31 North Main Huntington, UT 84528
Jim Hamlin	Director	31 North Main Huntington, UT 84528
Steve Adamson	Treasurer	31 North Main Huntington, UT 84528

Revised 11-21-83

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 $\frac{1}{2}$ NE $\frac{1}{2}$, 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 $\frac{1}{2}$, 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 $\frac{1}{4}$	The Estate of Malcolm McKinnon c/o Frank Armstrong 1300 Walker Bank Bldg. Salt Lake City, Utah 84111
Section 11 W $\frac{1}{2}$ SW $\frac{1}{4}$	
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 $\frac{1}{4}$	Utah Power & Light Company P. O. Box 899 Salt Lake City, Utah 84111
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	

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))

Shirl and Bessie McArthur
Huntington, Utah 84528

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
U. S. 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

Revised 11-21-83

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

Shirl and Bessie McArthur
Huntington, Utah 84528

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.

Revised 11-21-83

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)

The Des-Bee-Dove Mine is presently operating under an interim mining permit issued by the State of Utah, Division of Oil, Gas & Mining (Act/015/017) issued on May 11, 1978. An application for mining permit pursuant to 30 CFR 211 was submitted to the U.S.G.S. on April 17, 1977 along with the Deer Creek and Wilberg Coal Mines. Approval was never given for the Des-Bee-Dove Mine by the U.S.G.S. for reasons of administrative complications developed when the Office of Surface Mining assumed primacy. Inquiries to mine permitting status was determined that the mine was operating under prior approval dated August 12, 1975 (J. Moffitt).

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/015/018A issued May 11, 1978
U.S.G.S. issued January 20, 1978
MSHA ID No. 42-00121

Revised 11-21-83

Wilberg Mine

DOGM Act/015/018 issued May 11, 1978
U.S.G.S. issued January 23, 1978
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.

NOTICES 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 81-7-1-2 issued 9/14/81 at Wilberg Mine

- (1) Failure to maintain diversion abated
10/2/81.
- (2) Failure to manage non-coal wastes abated
10/19/81.

Assessment conference held 5/24/82.

Final assessment paid 7/15/82.

NOV 81-6-1-2 issued 9/4/81 at Des-Bee-Dove Mine

- (1) Failure to maintain sediment control
measures abated 10/6/81.
- (2) Failure to have records of blasting abated
10/6/81.

Finalized assessment paid 9/9/82.

Revised 11-21-83

NOV 81-4-7-2 issued 12/9/81 at Wilberg Mine

(1) Failure to maintain diversions abated
12/21/81 - Terminated 5/28/82.

(2) Snow removal - abated 12/21/81.

Finalized assessment paid 6/1/82.

NOV 81-4-8-2 issued 12/10/81 at Deer Creek Mine

(1) Failure to maintain surface drainage abated
12/21/81.

(2) Failure to minimize water pollution -
vacated.

Finalized assessment paid 3/18/82.

NOV 82-4-1-1 issued 1/22/82 for all mines

(1) Failure to report water monitoring data.
Submitted 1/27/82 - Terminated 1/27/82.

Violation vacated 11/26/82.

NOV 82-4-2-1 issued 1/27/82 at Wilberg Mine

(1) Failure to minimize water pollution and
erosion abated 2/23/82.

Finalized assessment paid 5/28/82.

NOV 82-1-1-1 issued 2/17/82 at Wilberg Mine

(1) Water discharge from Miller Canyon breakout
abated 2/22/82.

Assessment paid 1/14/83.

NOV 82-1-4-2 issued 3/23/82 at Wilberg Mine

(1) Coal waste in Miller Canyon.
(2) Failure to post signs and prevent access.

Assessment paid 9/9/82.

Revised 11-21-83

NOV 82-2-2-2 issued 3/25/82 at Wilberg Mine

(1) Failure to maintain sediment control at the
Cottonwood Portal.

(2) Failure to protect topsoil storage.

Assessment paid 2/25/83.

NOV 82-4-6-1 issued 6/22/82 at Wilberg Mine

(1) Failure to maintain sediment control at fan
portal road.

Assessment paid 3/18/83.

NOV 82-4-10-1 issued 9/20/82 at Des-Bee-Dove Mine

(1) Failure to maintain ditches and non-coal
wastes.

Assessment paid 3/18/83.

NOV 82-4-16-1 issued 12/9/82 at Wilberg Mine

(1) Discharge at sedimentation pond.

Terminated effective 12/16/82.

Assessment paid 4/28/83.

NOV 83-4-1-1 issued 1/13/83 at Deer Creek Mine

(1) Surface drainage on conveyor right-of-way.

Assessment paid 6/17/83.

NOV 83-4-4-1 issued 4/6/83 at Deer Creek Mine

(1) Failure to have approved waste disposal
site.

Vacated 6/2/83.

Revised 11-21-83

NOV 83-4-3-1 issued 4/6/83 at Wilberg Mine

- (1) Disposal of waste in undisturbed drainage area.

Terminated 5/18/83

Assessment paid 6/13/83.

NOV 83-7-7-1 issued 8/17/83 at Wilberg Mine

- (1) Refuse in waste rock site.

Assessment conference requested 9/22/83.

NOV 83-7-8-1 issued 10/14/83 at Wilberg Mine

- (1) Surface drainage

RIGHT OF ENTRY (782.15)

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

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

Section 14	SW $\frac{1}{4}$
Section 23	NW $\frac{1}{4}$, W $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$
Section 26	NE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$

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

Section 11	SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$
Section 14	E $\frac{1}{2}$ NW $\frac{1}{4}$

Revised 11-21-83

By Assignment dated 3/24/77, Peabody Coal Company assigned to Utah Power & 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 & 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
U. S. 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

Revised 11-21-83

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&LCO contracts for coal delivery). In addition, an updated contact with the state and federal agencies responsible for administering the unsuitability criteria (U. S. Forest Service, B.L.M. and State of Utah) revealed no action or petition has been initiated.

There are no known 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.

Revised 11-21-83

1-16

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's operator, Emery Mining Corporation. 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.

Revised 11-21-83

1-17

CCORD

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES LISTED BELOW.

NAME AND ADDRESS OF AGENCY
 Alexander & Alexander
 P. O. Box 13647
 Kansas City, Mo. 64199

COMPANIES AFFORDING COVERAGES

COMPANY LETTER	A	Commercial Union Insurance Co.
COMPANY LETTER	B	
COMPANY LETTER	C	
COMPANY LETTER	D	
COMPANY LETTER	E	

NAME AND ADDRESS OF INSURED
 Emery Mining Corporation
 P. O. Box 310
 Huntington, Utah 84528

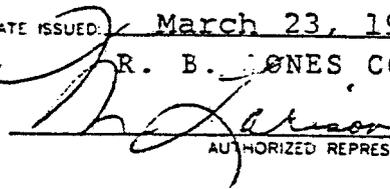
This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all terms, exclusions and conditions of such policies.

COMPANY LETTER	TYPE OF INSURANCE	POLICY NUMBER	POLICY EXPIRATION DATE	Limits of Liability in Thousands (000)		
					EACH OCCURRENCE	AGGREGATE
A	GENERAL LIABILITY <input checked="" type="checkbox"/> COMPREHENSIVE FORM <input checked="" type="checkbox"/> PREMISES—OPERATIONS <input checked="" type="checkbox"/> EXPLOSION AND COLLAPSE HAZARD <input checked="" type="checkbox"/> UNDERGROUND HAZARD <input checked="" type="checkbox"/> PRODUCTS/COMPLETED OPERATIONS HAZARD <input checked="" type="checkbox"/> CONTRACTUAL INSURANCE <input checked="" type="checkbox"/> BROAD FORM PROPERTY DAMAGE <input checked="" type="checkbox"/> INDEPENDENT CONTRACTORS <input checked="" type="checkbox"/> PERSONAL INJURY	CMLE 566399	6-1-83	BODILY INJURY	\$	\$
				PROPERTY DAMAGE	\$	\$
				BODILY INJURY AND PROPERTY DAMAGE COMBINED	\$ 500	\$ 500
				PERSONAL INJURY		\$ 500
	AUTOMOBILE LIABILITY <input type="checkbox"/> COMPREHENSIVE FORM <input type="checkbox"/> OWNED <input type="checkbox"/> HIRED <input type="checkbox"/> NON-OWNED			BODILY INJURY (EACH PERSON)	\$	
				BODILY INJURY (EACH ACCIDENT)	\$	
				PROPERTY DAMAGE	\$	
				BODILY INJURY AND PROPERTY DAMAGE COMBINED	\$	
	EXCESS LIABILITY <input type="checkbox"/> UMBRELLA FORM <input type="checkbox"/> OTHER THAN UMBRELLA FORM			BODILY INJURY AND PROPERTY DAMAGE COMBINED	\$	\$
	WORKERS' COMPENSATION and EMPLOYERS' LIABILITY			STATUTORY		
	OTHER				\$	(EACH ACCIDENT)

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES

Cancellation: Should any of the above described policies be cancelled before the expiration date thereof, the issuing company will endeavor to mail 10 days written notice to the below named certificate holder, but failure to mail such notice shall impose no obligation or liability of any kind upon the company, or on undersign

NAME AND ADDRESS OF CERTIFICATE HOLDER
 Utah Power & Light Company
 P. O. Box 899
 Salt Lake City, Utah 84110
 Attn: Bill McQuay
 Mining & Exploration Division

DATE ISSUED: March 23, 1983
 R. B. GONES CORPORATION

 AUTHORIZED REPRESENTATIVE

(COAL)

CERTIFICATE OF LIABILITY INSURANCE

Issued to: State of Utah
Department of Natural Resources
Division of Oil, Gas, and Mining

THIS IS TO CERTIFY, That the Federal Insurance Company
(Name of Insurance Company)
of 100 William Street, New York, New York 10038
(Home Office Address of Company)
has issued to Emery Mining Corporation of
(Name of Permit Applicant)
P.O.Box 310, Huntington, Utah 84528 Policy No. GLP(84)7302-83-35
(Address of Permit Applicant)

effective from June 1 19, 83 and continuing until cancelled,
nonrenewed, or changed, as provided herein, which policy provides personal
injury and property damage insurance covering the obligations imposed upon
such permit applicant with regard to Permit No. ACT/E/S/C/17 according
to provisions of the coal mining and reclamation program of Utah, (Utah Code
Annotated 40-10-1 et seq.), specifically Section UMC/SMC 806.14.

Underwriting Agent: E. Sanford Bell, CPCU, ARM

Company Name: Alexander & Alexander Phone: (816)391-1000

Address: P.O.Box 13647, Kansas City, Missouri 64199

The above-named insurance company agrees to notify the Division in writing
of any substantive change in the above coverage, 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.

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.

R. B. JONES CORPORATION

BY Vernon M. Jones

(Date, Signature, and Title of Authorized Representative of Insurance Company)

Signed and sworn to before me by Vernon M. Jones this the 16th
day of September, 19 83.

CELESTIA WELCH
Notary Public, State of Missouri
Commissioned in Jackson County
Commission Expires March 28, 1986

Celestia Welch
(Notary)

My Commission Expires: _____

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>I.D. No. & Date of Issue</u>
U. S. 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 1588 West North Temple Salt Lake City, Utah 84116	Mining Permit Hydrologic Monitoring Plan	ACT/015/017 5/11/78 10/10/79
State of Utah Division of Health 150 West North Temple Suite 426 P. O. Box 2500 Salt Lake City, Utah 84110	Construction Permit for Sedimentation Pond	2/6/79
U. S. E.P.A. Region VIII 1860 Lincoln Street Denver, Colorado 80203	NPDES Discharge Permit Sedimentation Pond	UT-0023591 8/12/80
U. S. 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, miscellan- eous 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

Revised 11-21-83

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, P. O. Box 899, Salt Lake City, Utah 84110, hereby announces its intent to file an application for 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.

Revised 11-21-83

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

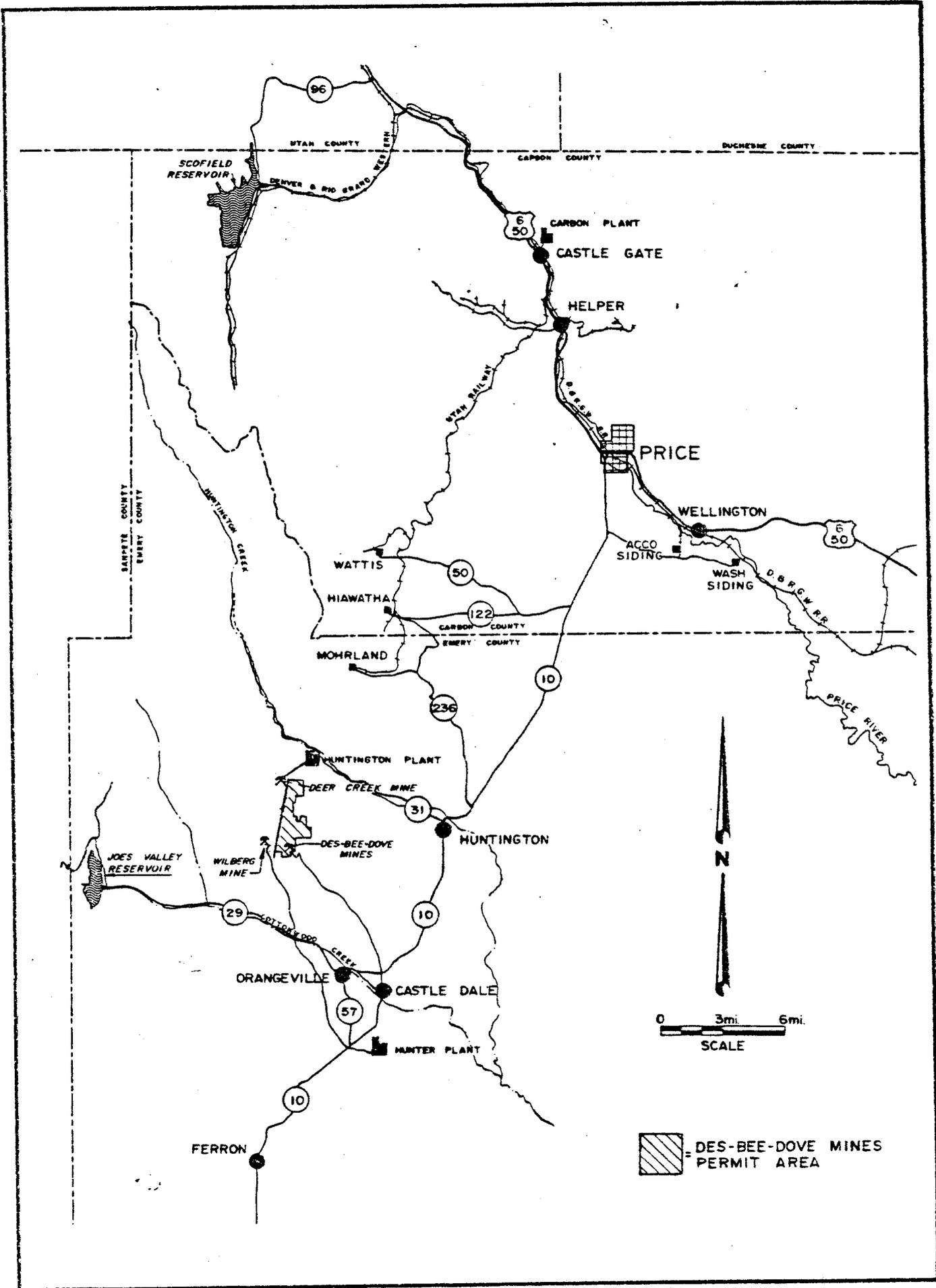
Additional Lands to be Affected by Mining

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



 = 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, 42Em1308, 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.

Table of Contents

	Page
Abstract.	ii
Table of Contents	iii
List of Figures	iv
List of Tables.	v
Chapter I - Introduction.	1
A. General Data.	1
B. Environment and Locality.	8
C. Prehistory and History of the Region.	13
D. Previous Investigations	36
E. Research Design	41
Chapter II - Methodology.	43
A. Field Research.	43
B. Laboratory Research	49
C. Artifact Inventory and Analyses	50
Chapter III - Cultural Resource Descriptions.	53
A. Site Analyses	53
B. Comparative Analyses.	57
Chapter IV - Evaluations and Recommendations.	59
A. Resource Significance Evaluations	59
B. National Register Criteria of Eligibility	62
C. Discussion of Impact Potential on Cultural Resource Sites	63
D. Recommendations	65
Bibliography.	67
Appendix.	77
Site Reports.	

List of Figures

	Page
1. Map of General Project Area.	2
2. Map of Earlier Survey Localities in Project Area.	4
3. Map of Land Ownership and Sample Unit Locations - Northern Segment.	5
4. Map of Land Ownership and Sample Unit Locations - Southern Segment.	6
5. Artifact Sketches.	52
6. Map of Cultural Resource Locations in Project Area.	56

List of Tables

	Page
1. Sample Unit Locations.	44
2. Cultural Resources in the Mine Plan Area	50
3. Cultural Resource Site Summary	54
4. Site Significance.	61
5. Cultural Resource Impact Potential	64

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

9E

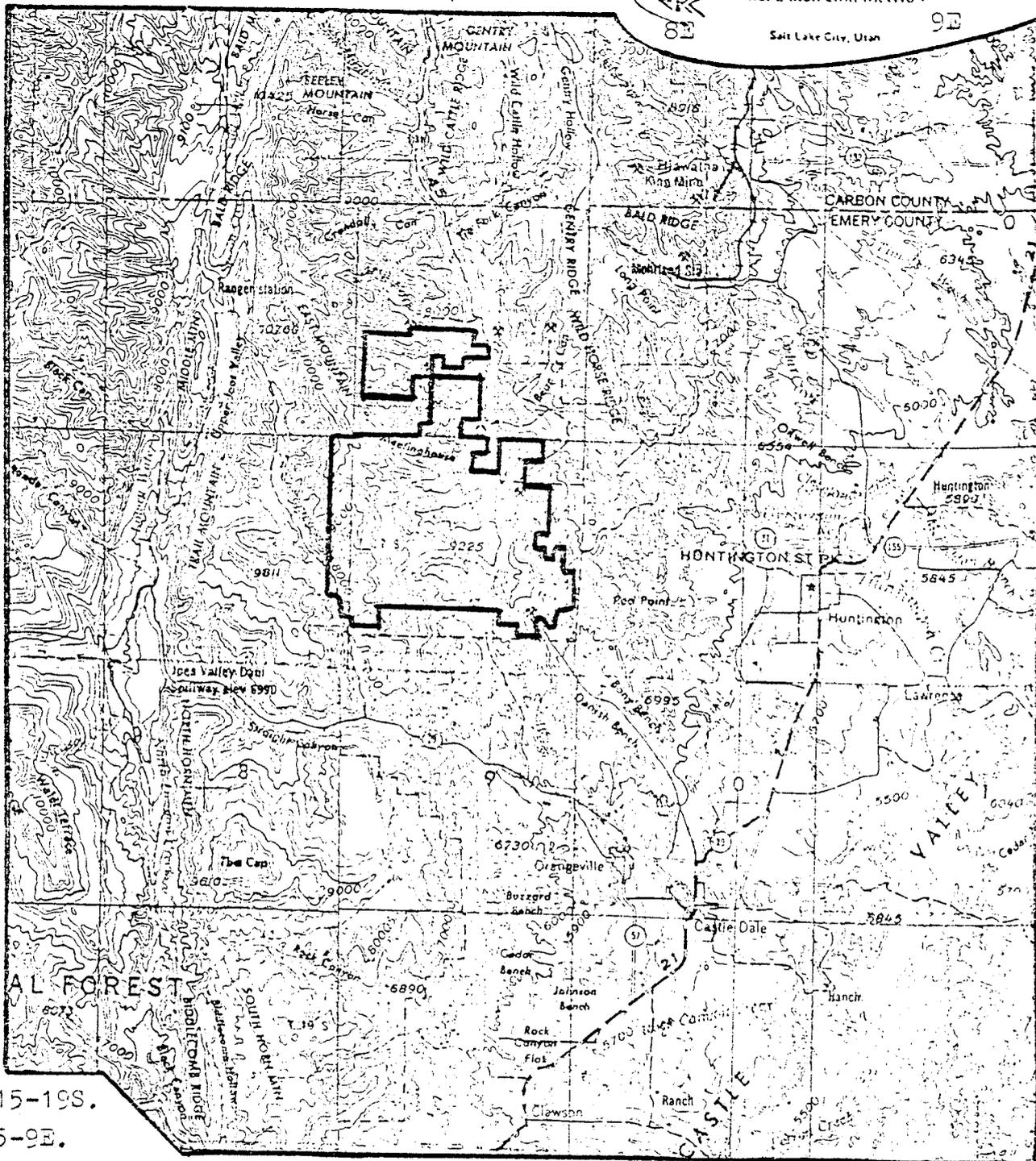
15S

16S

17S

18S

19S



I. 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

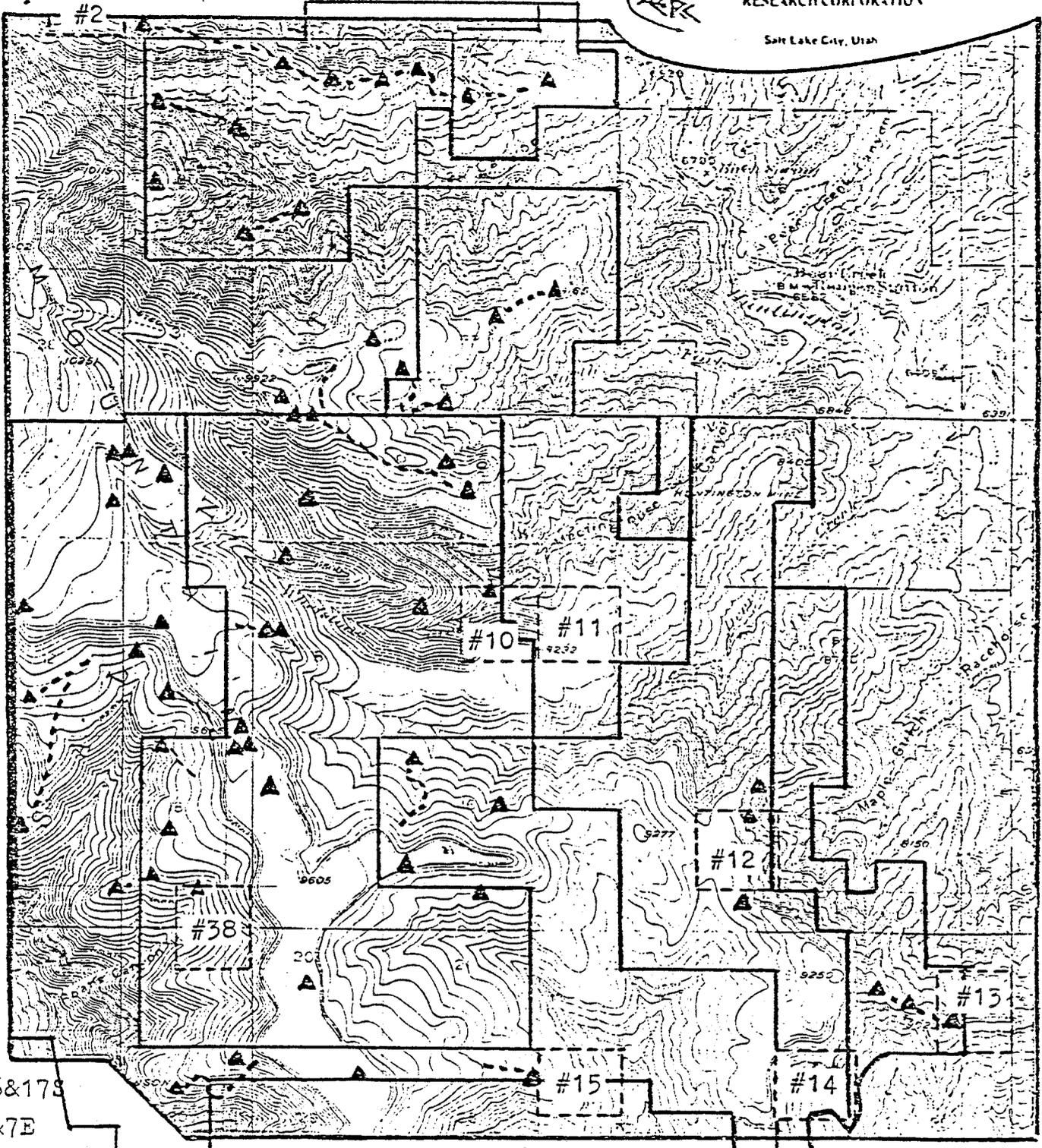
Scale

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



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

Meridian: Salt Lake B&M

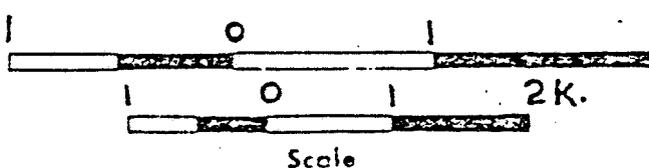
Quad:
Hiawatha, Utah
15 Minute USGS

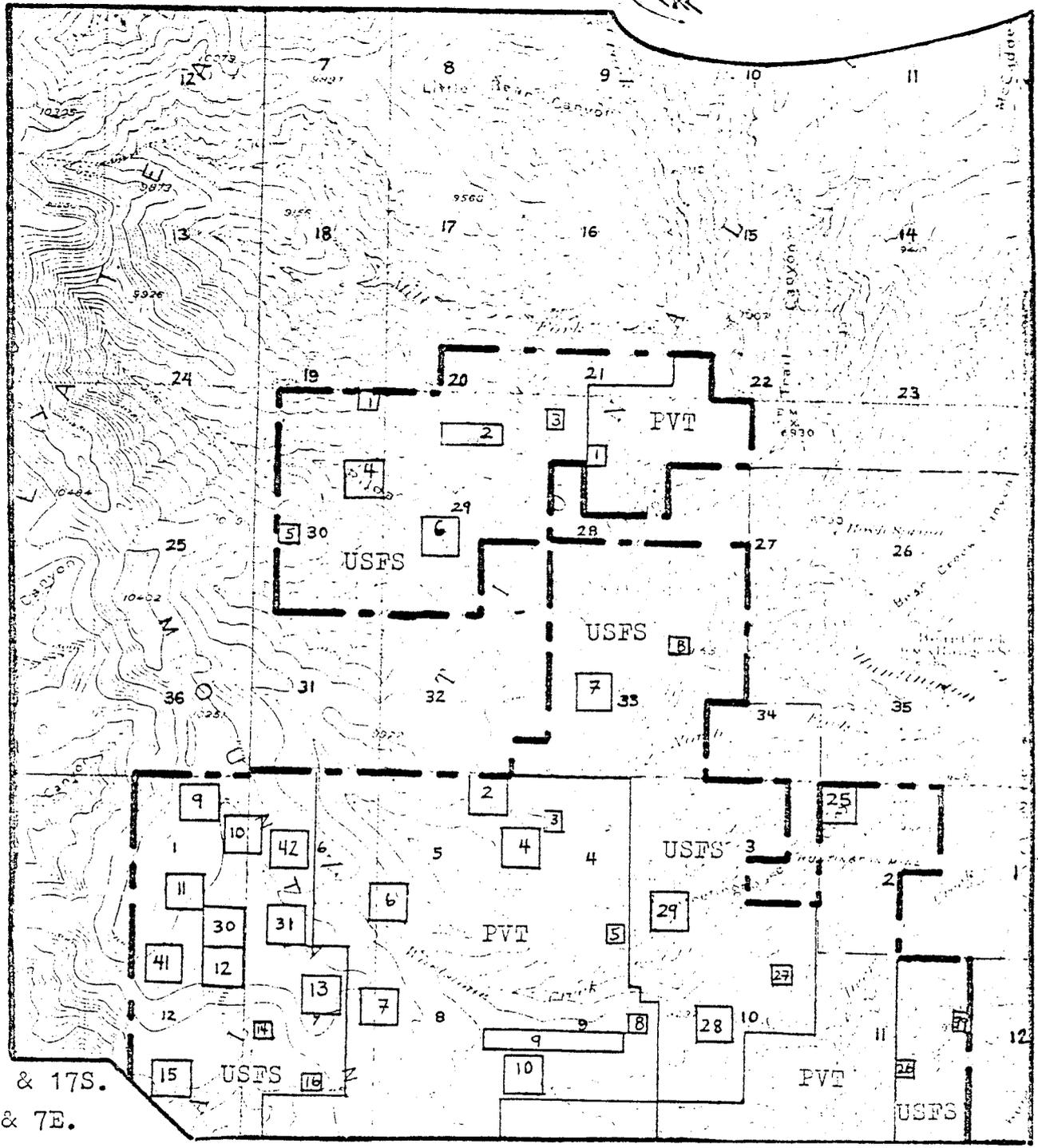
Project: UPL-80-1
Series: Central Utah
Date: 9-26-80

Figure 2
EARLIER SURVEY LOCALITIES
IN THE
PROJECT AREA

Legend:

- Project & Mine Boundaries
- 2M. Well Location
- Access Road
- Sample Unit





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

Meridian: Salt Lake B. & M.

Quad:

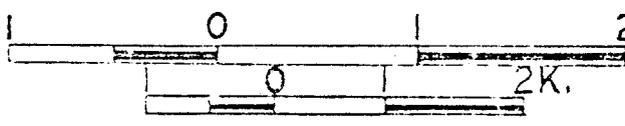
Project: UPL-80-1
Series: Eastern Utah
Date: 9-26-80

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

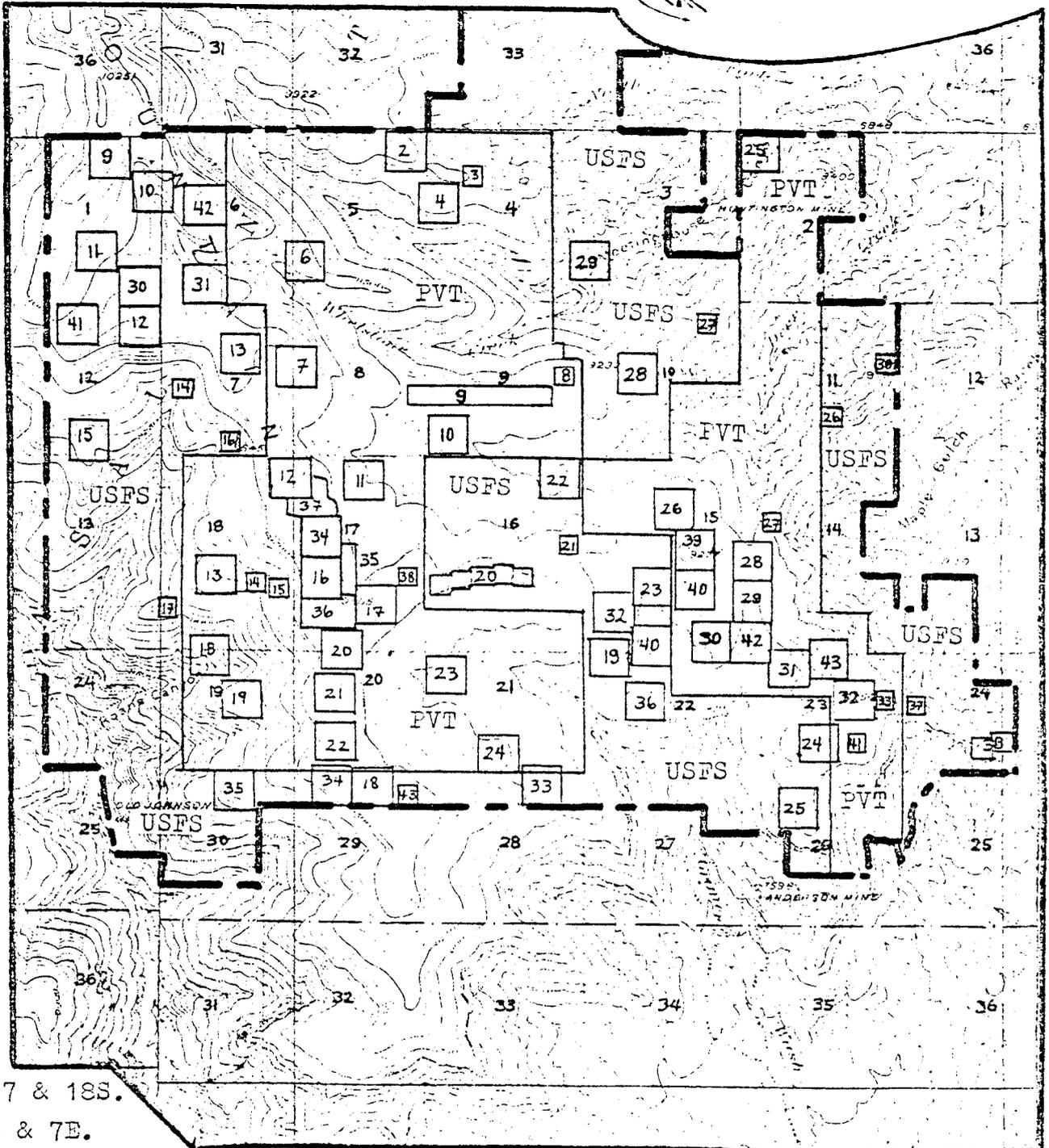
Hiawatha, Utah
15 Minute USGS

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:

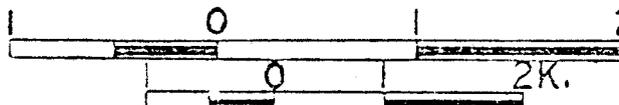
Project: UPL-80-1
Series: Central Utah
Date: 9-26-80

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

Hiawatha, Utah
15 Minute USGS

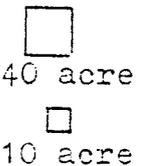
Legend:

Project Boundary



Scale

2 M. Sample Survey
Unit



40 acre
10 acre

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 50 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)

Silvery-haired bat

Myotis spp.

Big brown bat

Lasiurus spp.

Red bat

Eptesicus spp.

Long-eared bat

Lasiurus spp.

Big free-tailed bat

Corynorhinus spp.

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. Intermarriage 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 counterraidings 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 County, 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, Hainer

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).

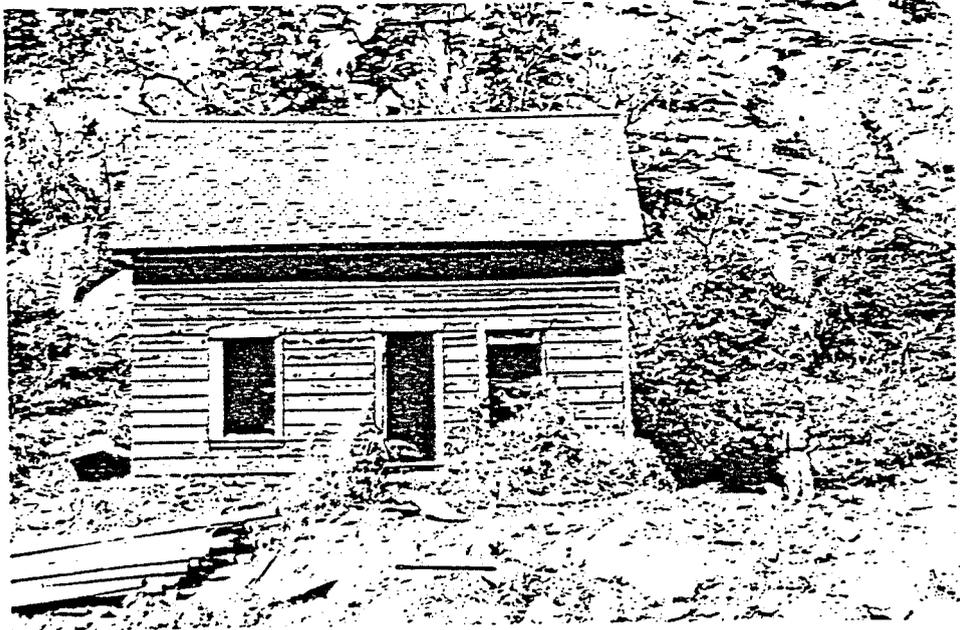
Economic and production difficulties continued to plague Utah's coal industry during the decade of the 1930s, forcing the closure of the Mutual and Mohrland mines in 1938. World War II brought a temporary respite to the general downward trend with many mines achieving their highest production levels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

Attachment 3: INFORMATION CONCERNING HISTORIC
MINES IN THE GENERAL PROJECT AREA

Three historic coal mines are situated in the general project area. These sites include the Huntington, Anderson, and Old Johnson Mines. The Huntington Mine is located in Meetinghouse Canyon, Section 3, Township 17 South, Range 7 East. It does not fall within the project boundaries nor will it be adversely affected by the Utah Power & Light mining operations. The Anderson Mine site is also located outside the project boundaries in Grimes Wash Canyon. It is situated in Section 26, Township 17 South, Range 7 East, on the southwest facing wall of the canyon. The Anderson Mine will not be adversely affected by the Utah Power & Light operations.

The third historic site consists of the Old Johnson Mines which are located on private land in Cottonwood Canyon, Section 25, Township 17 South, Range 6 East. This historic site which was actively mining coal from 1909 until 1948, is situated on the east wall of Cottonwood Canyon opposite the presently active Trail Mountain Coal Mine. The Old Johnson Mines including the Twin City, Shumway, and Cottonwood Portals are situated on the periphery of the Utah Power & Light Project western boundary and could be adversely affected by the mining operations. Such impact would be of an indirect nature related to subsidence or to further expansion of the Cottonwood Canyon road. The Old Johnson Mines site has been recorded as an historic resource and provided with the Smithsonian registration number 42Em1633. An analysis of the site by F. R. Hauck of AERC has resulted in a determination that this mine is of historic significance and has the potential for nomination to the National Register. A copy of the site report with accompanying photographs is presented in Attachment 6.



WEIGH HOUSE



WEIGH HOUSE

Old Johnson Mines Site



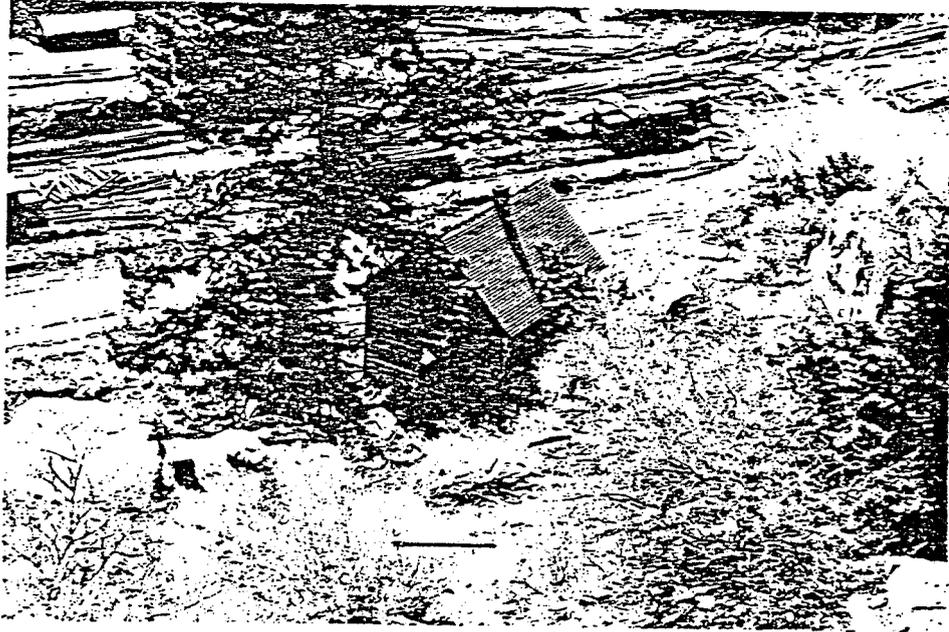
WEIGH HOUSE & ROOT CELLAR



WEIGH HOUSE



WEIGH
HOUSE
Front
Construction



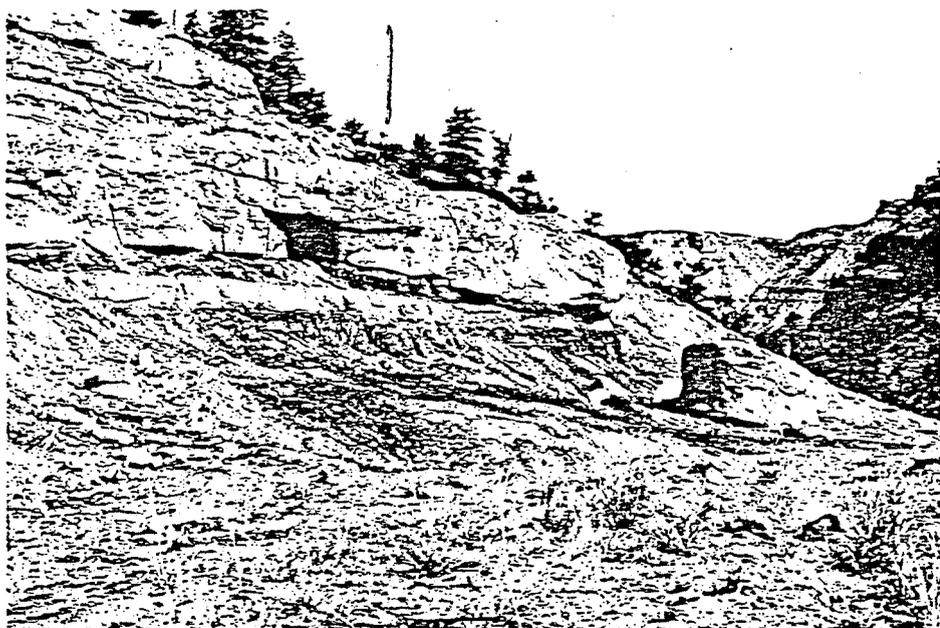
COTTONWOOD CANYON ROAD & WEIGH HOUSE

From the Portal Terrace

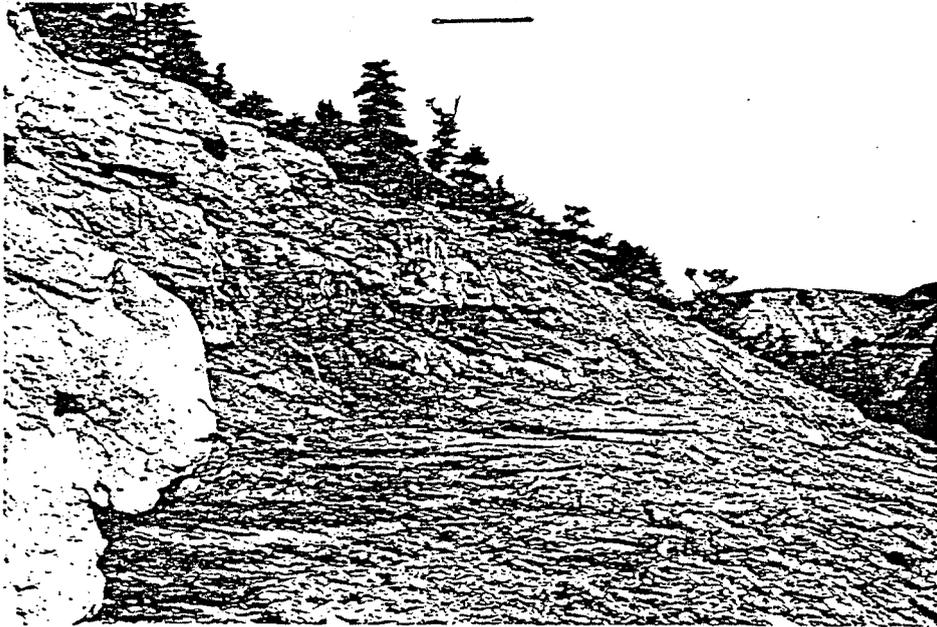




PORTAL TERRACE Looking North



PORTAL TERRACE Looking South



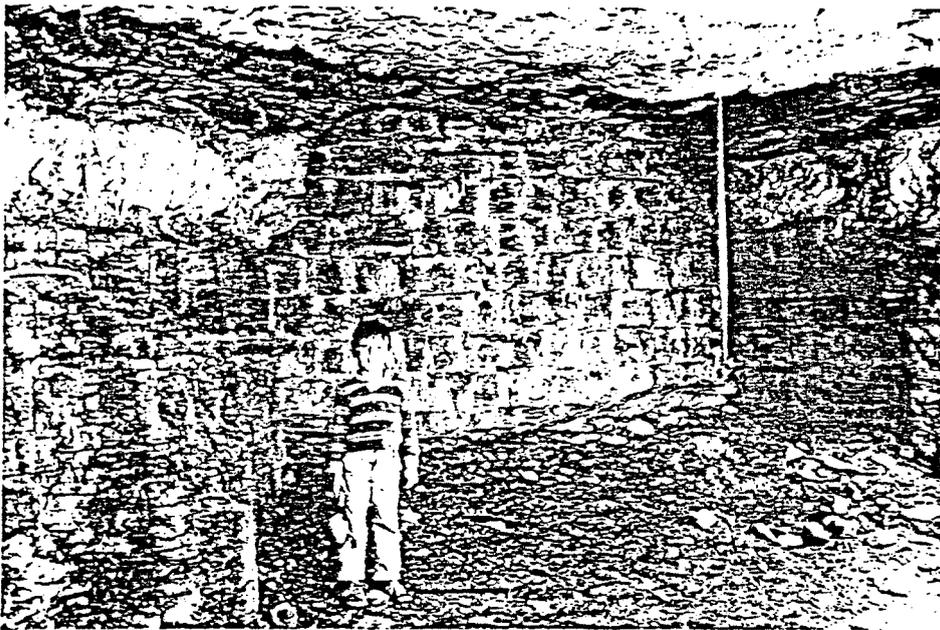
SOUTHERN END OF PORTAL TERRACE



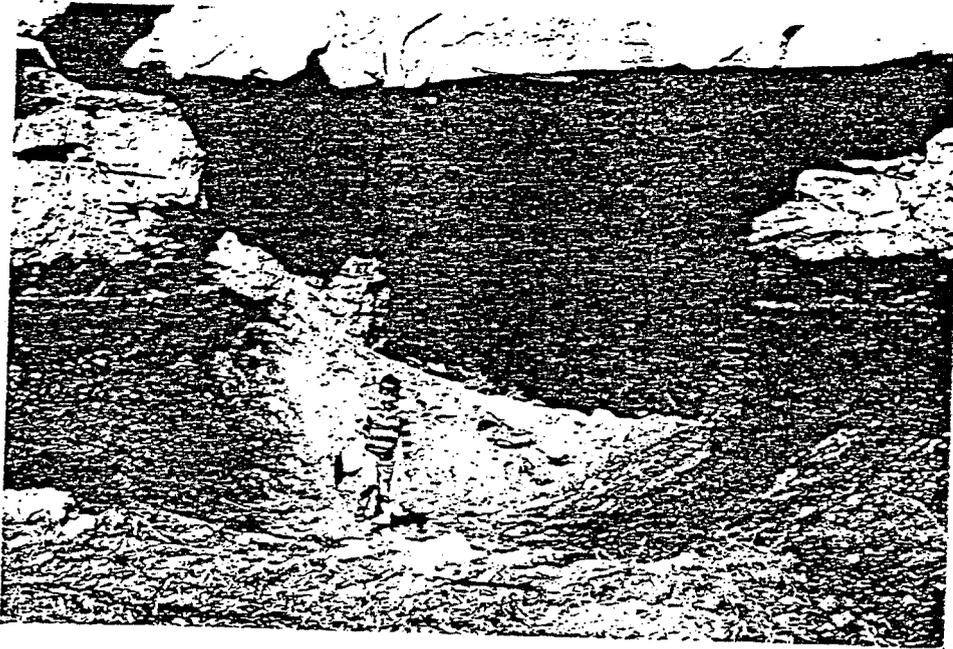
EXPOSED COAL SEAM ON PORTAL TERRACE



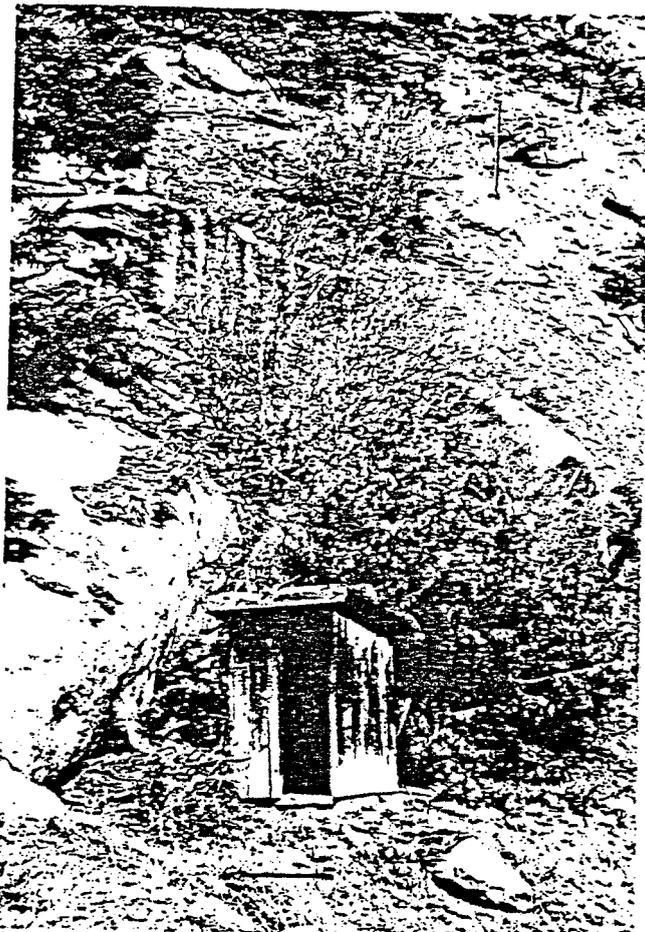
NORTH PORTAL ENTRANCE



NORTH PORTAL IN DETAIL

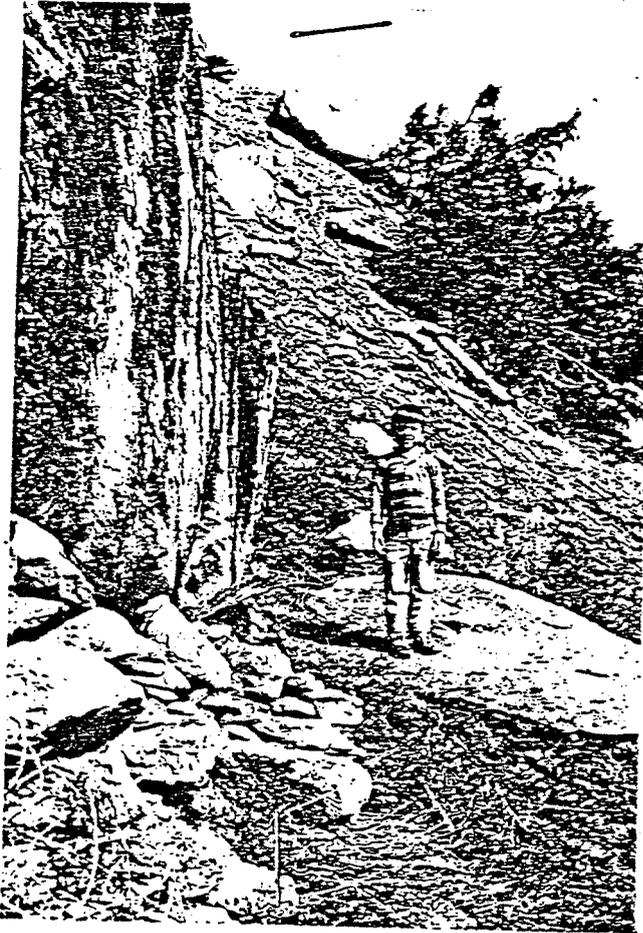


SOUTH PORTAL ENTRANCE



OUTHOUSE

Portal Terrace is
in the Background
at the top of the
Picture



WALL FRONTING BOULDER

Construction Creates
a Storage Area Under
the Rock

Slope Where Coal Shute
was Located is in the
Background



ROCK WALL DETAILED SHOWING CAVITY
UNDER THE BOULDER

D. Previous Investigations in the Region

Archeological research in the Castle Valley locality began with the Claflin Emerson Expedition. In 1929, Noel Morss and Henry Roberts conducted explorations and limited test excavations under the auspices of this expedition along the Fremont River and as far north as the Muddy River in Emery County. Morss' work resulted in the original definition of the Fremont cultural entity (Morss 1931, Gunnerson 1969). Morss' description of Fremont sites north of the Colorado River was an important contribution to the understanding of the prehistoric horticultural adaptation in the American Southwest.

With the exception of Reagan's description of the large petroglyph panel in Buckhorn Draw (Reagan 1935), there were no archeological investigations in the Castle Valley region for the next 15 years. Between 1952 and 1957, the University of Utah conducted a series of surveys in order to better define the nature of the Fremont occupation in Utah. A large number of Fremont sites was located along the east side of the Wasatch Plateau and several of the sites were subjected to limited test excavations, including 42Em5, the Emery Site (42Em47), and Snake Rock Village (42Sv5). Each of these three sites were Fremont habitations (Gunnerson 1957). In addition to these Fremont sites, Gunnerson also tested a shallow rock shelter on Silverhorn Wash (42Em8) as a result of a local collector's report that a fluted projectile point resembling the Clovis style had been found eroding from the shelter deposits. Little additional information was obtained by the excavation, however (Gunnerson 1956).

In the 1970s, there was a significant upsurge in archeological activity in the Castle Valley region. In 1970, three sites endangered by vandalism were excavated by the University of Utah. These sites, Windy Ridge Village (42Em73), Crescent Ridge (42Em74), and Power Pole Knoll (42Em75) all proved to be Fremont habitation sites (Madsen 1975a) dating between about 980 B.P. and 1260 B.P.

During the following year, the University of Utah conducted excavations at Clyde's Cavern (42Em177). Clyde's cavern was a locus of summer plant gathering activities during the Late Archaic period, but the majority of the cultural deposits were shown to be the result of summer maize cultivation and wild plant harvesting activities during the subsequent Fremont period (Wylie 1972, Winter and Wylie 1974).

The next site to be excavated in the study area was Joe's Valley Alcove (42Em693). During the summer of 1974, the United States Forest Service excavated this site which had cultural strata, dated by both radiocarbon and typological means, from the Early Archaic, Late Archaic and Fremont periods (E. DeBloois, personal communication). That same summer, a University of Utah field school excavated the Innocents Ridge site, which proved to be yet another Fremont habitation locus (Schroedl and Hogan 1975).

During the early fall of 1975, the Antiquities Section, Division of State History (Utah) conducted an excavation of a small rockshelter as a part of the cultural resource mitigation program for Consolidation Coal Company of Denver, Colorado. This site, known as Pint Size Shelter (42Em625), had two main cultural strata, one dated to the Late Archaic and the other dated to the early Fremont period. Both of these occupations were evidently the result of wild plant procurement activities (Lindsay and Lund 1976).

Other Fremont habitation sites, located farther to the south, have been excavated. These sites include Snake Rock Village (Aikens 1967), Old Woman and Poplar Knob (Taylor 1957), and the Old Road Site and Ivie Ridge Site (Wilson and Smith 1976). These five sites were all Fremont period habitations although Kayenta and Mesa Verde Anasazi ceramics were recovered at low frequencies indicating that there was contact with other cultural groups located farther south.

In addition to these Fremont sites, a deeply stratified rockshelter (Sudden Shelter, 42Sv6) was found to contain occupational strata spanning the entire Archaic period, ca. 8000 B.P. to 3000 B.P. (Jennings et al. 1980). The original site report indicated that Fremont diagnostics were present on the site when it was originally documented, but these artifacts were no longer present when the excavations were begun. The Sudden Shelter site is of particular importance to the local prehistory and the prehistory of the eastern Great Basin and northern Colorado Plateau because of its numerous well-defined occupational strata which has allowed a fine-grain correlation between certain diagnostic projectile point types and the temporal phases of the Archaic period.

A test excavation of two heavily vandalized rockshelter sites (42Em959 and 42Em960) in Cottonwood Canyon conducted by AERC in 1979 seem to mirror the results of the excavations at the nearby Joe's Valley Alcove. Radiocarbon analyses have not yet been completed, but projectile point correlations indicate that these two sites were occupied during the Early Archaic, Late Archaic, and, most heavily, during the Fremont period (Weder and Hauck, n.d.).

Since 1970, the level of survey intensity has increased drastically. The various cultural resource inventories conducted during the 1970s have generally been the result of natural resource development programs and are too numerous to summarize in the present context. Summaries of these inventories performed before 1978 can be found in Sargent (1977) and Hauck (1979a). The combined inventory results as of 1977 indicate that the majority of the culturally identifiable sites in the general area are Fremont although Archaic sites are also well represented. Protohistoric Numic sites are present but rare (Hauck 1979a:110).

A number of cultural resource inventories have been conducted in the general project locality. An inventory along Grimes Creek, about three and one-half miles east of Cottonwood Creek, reported four lithic scatters, a quarry, and a rockshelter (42Em763-768). Three of the lithic scatters had diagnostic artifacts indicative of both the Archaic and Fremont occupations. These sites are all between 6700 feet and 7000 feet in elevation and are located adjacent to, or near, Grimes Creek (Hauck 1977a).

In 1977, AERC field crews conducted intensive surveys of eight sample survey units all containing 160 acres and situated within, or adjacent to, the East Mountain mine plan permit area (see Hauck 1979a). These surveys involved the Forest Central Planning Area and included units 2, 10, 11, 12, 13, 14, 15 and 38 (see Figure 2). Three prehistoric cultural resource sites (05F/44, 45, and 46) were recorded during these surveys and were given permanent site numbers of 42Em853, 854 and 855. These sites were all sparse lithic scatters of low significance which were probably related to prehistoric hunting activities on East Mountain.

An intensive inventory of the Cottonwood Creek valley, conducted by AERC in 1979, revealed a similar situation. In addition to the earlier reported sites, 42Em959 and 960, five additional sites were recorded by AERC. Three of these sites are lithic scatters and one is a rock alignment, all of unknown cultural affiliation. The fifth site is a lithic and ceramic scatter with ceramics of the Fremont period (Smith and Hauck 1979b, Hauck 1979c).

AERC has conducted numerous drill hole and access road inventories on East Mountain within the mine plan permit application area, finding only three cultural resource sites (see Hauck 1976a, 1976b; 1977a, 1977b; Hauck, et al. 1977; Weder and Hauck 1977; Norman and Hauck 1977; Hauck 1978a, 1978b;

Smith and Hauck, 1979; and Hauck 1979a). These sites include 42Em853-855. A single isolated projectile point (see Figure 6H) and an isolated mano have been found on East Mountain during the earlier AERC surface surveys conducted for Utah Power and Light Company.

The National Register of Historic Places has been consulted and no registered sites are situated within the permit area on East Mountain.

E. Research Design

AERC's research design, which has been developed for the general central Utah region consists of the following:

1. The determination of presence or absence of a continual sequence of Paleo Indian, Archaic, Fremont, and Shoshonean utilization of the project area and the local manifestations of these cultural phases when present;
2. the determination of presence or absence of cultural materials which demonstrate the utilization patterns of the East Mountain locality;
3. the determination of which types of prehistoric cultural activity were conducted in the project area based upon patterns in artifact associations or predominance of particular types of sites;
4. the determination of presence or absence of early historic Euro-American habitation, trapping, trade, or travel within the project area; and,
5. the determination, on a regional level, of whether the sites in the project area contained any remains demonstrating local interaction between the Sevier and San Rafael variants of the Fremont culture.

Based upon the preceding research conducted in the general project area, which includes Huntington Canyon, Grimes Creek, and Cottonwood Canyon, AERC has hypothesized that the high density of cultural resources is confined to the sub-7500 foot elevations within the pinyon-juniper woodland ecozone and situated in the proximity of permanent water sources. Elevations above 8000 feet contain a low density of

limited activity cultural resources, primarily consisting of lithic scatters, small surface quarries, temporary campsites, and rockshelters. (The minimal definition of a limited activity site is an association of four or more flakes and/or lithic tools and/or ceramic sherds observed within the original context of deposition.)

Chapter II - METHODOLOGY

A. Field Research

During July and August, 1980, a cultural resource inventory of 86 sample units was conducted by AERC for Utah Power and Light Company in the East Mountain project area of Emery County, Utah.

Michael Sloan of AERC was in charge of the field crew with F. R. Hauck as Principal Investigator. Team members included Monika Williams, Bunny Melendez, Robert Stevenson, John Hayes and Mark Melendez.

The sample survey project area is between the 7250 and 10,200 foot elevations with the majority of sample units situated between 9000 and 10,000 foot contours. This is the area where future surface disturbance resulting from underground subsidence could occur. A 15% surface survey involving 2705 acres within a total of the 18,000 acre survey universe was conducted by performing intensive evaluations of a total of 86 units. These sample units were plotted within the subsidence zone to maximize coverage of those upland surfaces containing the greatest potential for historic and prehistoric sites (see Figures 3 and 4).

Locations of the sample units, their acreage, and cultural resource presence are shown on Table 1.

An analysis of the basic environments of the 86 sample units involving combinations of wooded or open, ridge top or slope, and presence or absence of drainage indicates that 58% of the sample unit acreage lay in open flats and sloping surfaces where grasses and low shrubs were the primary vegetation community. Some 21% of the sample unit acreage was situated in woodland-open area combinations involving both flat terrain on the mountain, narrow ridgelines, slopes, and drainages. Wooded slopes and wooded drainages contained

Table 1

<u>U.S. Forest Sample Unit</u>	<u>Acreage</u>	<u>Location</u>	<u>Cultural Resource</u>
1	10	T.16S., R.7E., Sec. 19	None
2	30	" " " 20	"
3	10	" " " 21	"
4	40	" " " 29	"
5	10	" " " 30	"
6	40	" " " 29	"
7	40	" " " 33	"
8	10	" " " 34	"
9	40	T.17S., R.6E., " 1	"
10	40	" " " 1	"
		and	
		" R.7E., " 6	"
11	40	" R.6E., " 1	"
12	40	" " " 12	"
13	40	T.17S., R.7E., " 7	"
14	10	" " " 7	"
15	40	T.17S., R.6E., " 12	
		and	443R/X8
		" 13	
16	10	T.17S., R.7E., " 7	None
17	10	" " " 18	
		and	"
		" 19	
18	40	" " " 20	
		and	443R/X4
		" 29	
19	40	" " " 22	None
20	50	" " " 16	"
21	10	" " " 16	"
22	40	" " " 16	"
23	40	" " " 15	"
24	40	" " " 23	"

Table 1 (cont'd.)

<u>U.S. Forest Sample Unit</u>	<u>Acreage</u>	<u>Location</u>	<u>Cultural Resource</u>
25	40	T.17S., R.7E., Sec. 26	None
26	10	" " " 11	"
27	10	" " " 10	"
28	40	" " " 10	"
29	40	" " " 3 and " 4	"
30	40	T.17S., R.6E., " 1	"
31	40	T.17S., R.7E., " 6	"
32	40	" " " 15 and " 22	443R/X9
33	40	" " " 21 and " 28	None
34	40	" " " 20 and " 29	"
35	40	" " " 30	"
36	40	" " " 22	443R/X10
37	10	" " " 24	None
38	20	" " " 24	"
39	10	" " " 11	"
40	40	" " " 22	"
41	40	T.17S., R.6E., " 1 and " 12	"
42	40	T.17S., R.7E., " 6	"
43	10	" " " 29	"

1310 acre total

Table 1 (cont'd.)

<u>Private Sample Unit</u>	<u>Acreage</u>	<u>Location</u>	<u>Cultural Resource</u>
1	10	T.16S., R.7E., Sec. 21	None
2	40	T.17S., R.7E., " 5	"
3	10	" " " 4	"
4	40	" " " 4 and " 5	"
5	10	" " " 4	"
6	40	" " " 5	"
7	40	" " " 8	"
8	10	" " " 9	"
9	70	" " " 8 and " 9	443R/3 (42Em1309)
10	40	" " " 9	"
11	40	" " " 17	"
12	40	" " " 17	"
13	40	" " " 18	"
14	10	" " " 18	"
15	10	" " " 17	"
16	40	" " " 17	443R/2 (42Em1308)
17	40	" " " 17 and " 20	None
18	40	" " " 19	"
19	40	" " " 19	443R/X1
20	40	" " " 20	None
21	40	" " " 20	443R/1 (42Em1307)
22	40	" " " 20	None
23	40	" " " 21	"
24	40	" " " 21	"
25	40	" " " 2	"

Table 1 (cont'd.)

<u>Private Sample Unit</u>	<u>Acreage</u>	<u>Location</u>	<u>Cultural Resource</u>
26	40	T.17S., R.7E., Sec. 15	None
27	10	" " " 14	"
28	40	" " " 14 and " 15	443R/4 (42Em1310)
29	40	" " " 14 and 15, 22, and 23	None
30	40	" " Sec. 22	443R/X3
31	40	" " " 23	None
32	40	" " " 23	"
33	10	" " " 23	"
34	40	" " " 17	443R/2 (42Em1308)
35	10	" " " 17	443R/2 (42Em1308)
36	40	" " " 17 and " 20	None
37	15	" " " 17	"
38	10	" " " 17	"
39	40	" " " 15	"
40	40	" " " 15	443R/X2
41	10	" " " 23	443R/X5 and X6
42	40	" " " 22 and " 23	
43	40	" " " 23	

1395 acre total

15% of the sample unit acreage with the final 6% being situated on wooded mountain flats, wooded ridgelines, and wooded slope-wooded flat combinations.

All inventoried sample survey units were examined by survey personnel walking parallel transects with individual spacing ranging from 10 to 20 meters (30 to 60 feet) apart. Shorter intervals and zigzag transects were utilized for intensive examination of specific areas judged to be of high site potential.

A total of four prehistoric resource sites was recorded following the survey. These sites include 42Em1307, 42Em1308, 42Em1309 and 42Em1310. Some 13 isolated artifacts were collected during the field evaluation. These isolates have been marked utilizing the project number (AERC 443R) and the isolate number (X1-11). The location of sites and isolates are all demonstrated on Figure 6. No historic sites were observed or recorded during the project.

Sites 42Em853, 854 and 855 are also shown on Figure 6. These three sites were recorded in the project area by AERC during the Central Utah Coal Survey project of 1977 (see Hauck 1979a). Isolate 43A/X1 was collected by AERC in 1977 while conducting an evaluation of a proposed drilling location for Utah Power and Light Company.

All cultural resource sites were recorded on Bureau of Land Management site forms, photographed, sketched, and their locations were marked on a Hiawatha, Utah 15 minute U.S.G.S. topographic map. Site reports for the four newly recorded sites will be forwarded to all relevant government agencies as an appendix to this report.

B. Laboratory Research

The analyses to be performed in the AERC laboratory for this project concerns the evaluation of projectile points and miscellaneous lithics.

Projectile point analyses include identification of manufacturing techniques, e.g., heat treatment, blank and preform preparation, edge grinding, edge reworking, and use wear analyses. Arrow and atlatl points were catalogued according to type.

The evaluation of miscellaneous lithics involves obsidian trace element analysis and the identification of various tool styles and manufacturing techniques.

C. Artifact Inventory and Analysis

Chronological evaluations of prehistoric sites were accomplished through artifact correlation with established types and varieties. The various projectile point types collected from the field were generally identifiable with similar Great Basin, Eastern Great Basin, Colorado Plateau, and Western Plains types.

Table 2 contains a list of sites and a description of artifacts collected from East Mountain by AERC personnel.

Table 2

<u>AERC No.</u>	<u>Permanent Site No.</u>	<u>Artifact</u>
03/44	42Em853	Not collected
03/45	42Em854	Not collected
03/46	42Em855	Not collected
443R/1	42Em1307	Not collected
443R/2	42Em1308	Seven projectile point fragments, three small scrapers
443R/3	42Em1309	Not collected
443R/4	42Em1310	Two projectile point fragments
43A/X1	Isolate	
443R/X1	"	Projectile point fragment
443R/X2	"	Secondary flake
443R/X3	"	Unfinished projectile point base fragment
443R/X4	"	Two secondary flakes and one biface blade base fragment
443R/X5	"	Projectile point fragment
443R/X6	"	" " "
443R/X7	"	" " "

Table 2 (cont'd.)

<u>AERC No.</u>	<u>Permanent Site No.</u>	<u>Artifact</u>
443R/X8	Isolate	Biface blade fragment
443R/X9	"	Projectile point fragment
443R/X10	"	Projectile point fragment
443R/X11	"	Biface blade fragment

Some 25 artifacts have been collected during various surveys AERC has conducted on East Mountain. All these artifacts were collected from surfaces within the mine plan permit area. All artifacts are of prehistoric origin. The diagnostic artifacts collected from the project area are shown on Figure 5.

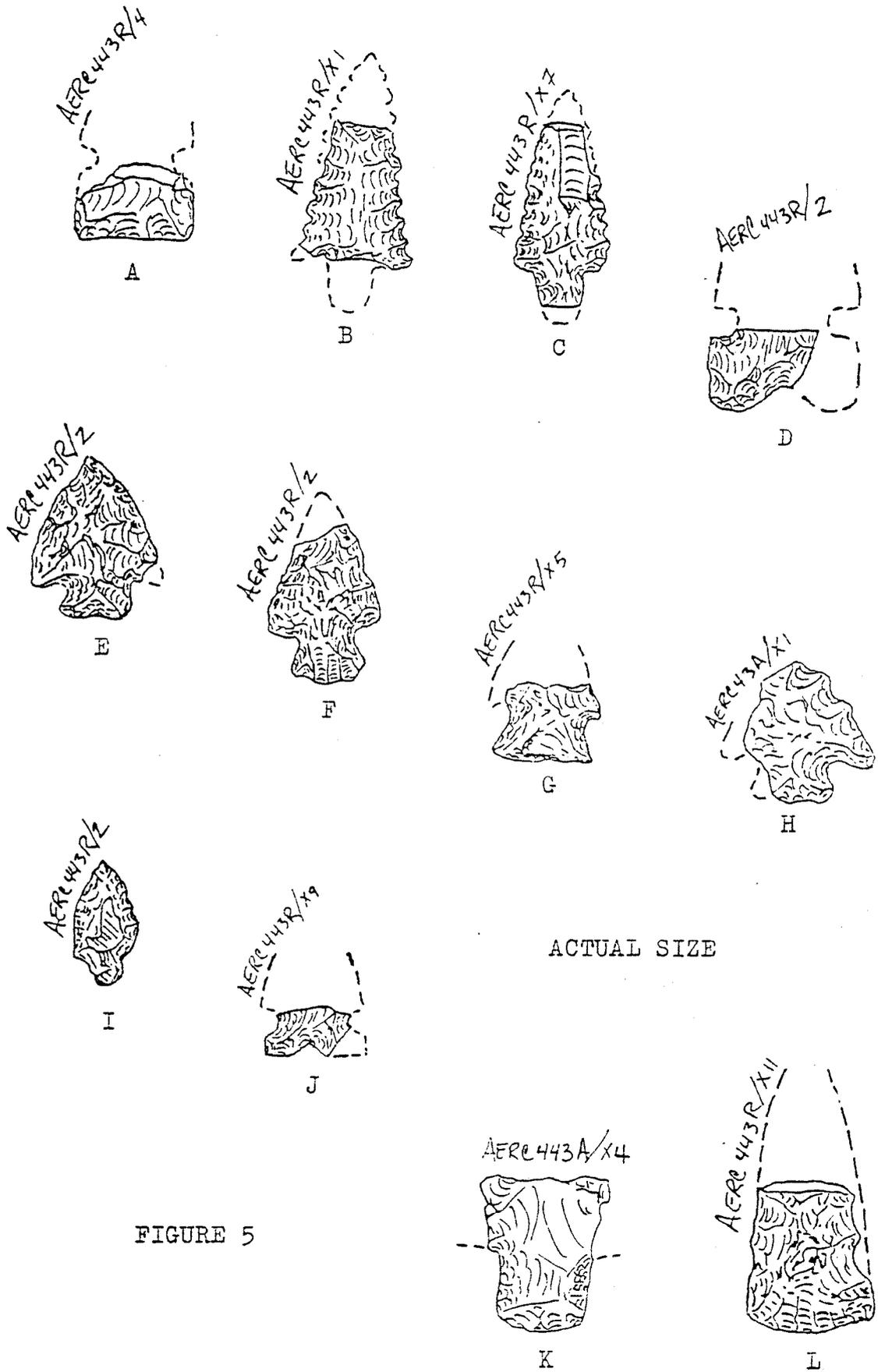


FIGURE 5

Chapter III - CULTURAL RESOURCE DESCRIPTIONS

A. Site Analyses

A total of four previously unrecorded cultural resource sites was located during the sample survey, three of which are located on upland slopes surrounding the upper drainages of Deer Creek. A summary of the pertinent site characteristics of all the known sites situated in the permit area is given on Table 3. All seven sites are lithic scatters with hunting and hide preparation activities suggested by the types of artifacts observed. Diagnostic projectile points show a definite predominating Archaic period presence on the mountain, with a minor post-Archaic, possibly Fremont and later Shoshonean, intrusion.

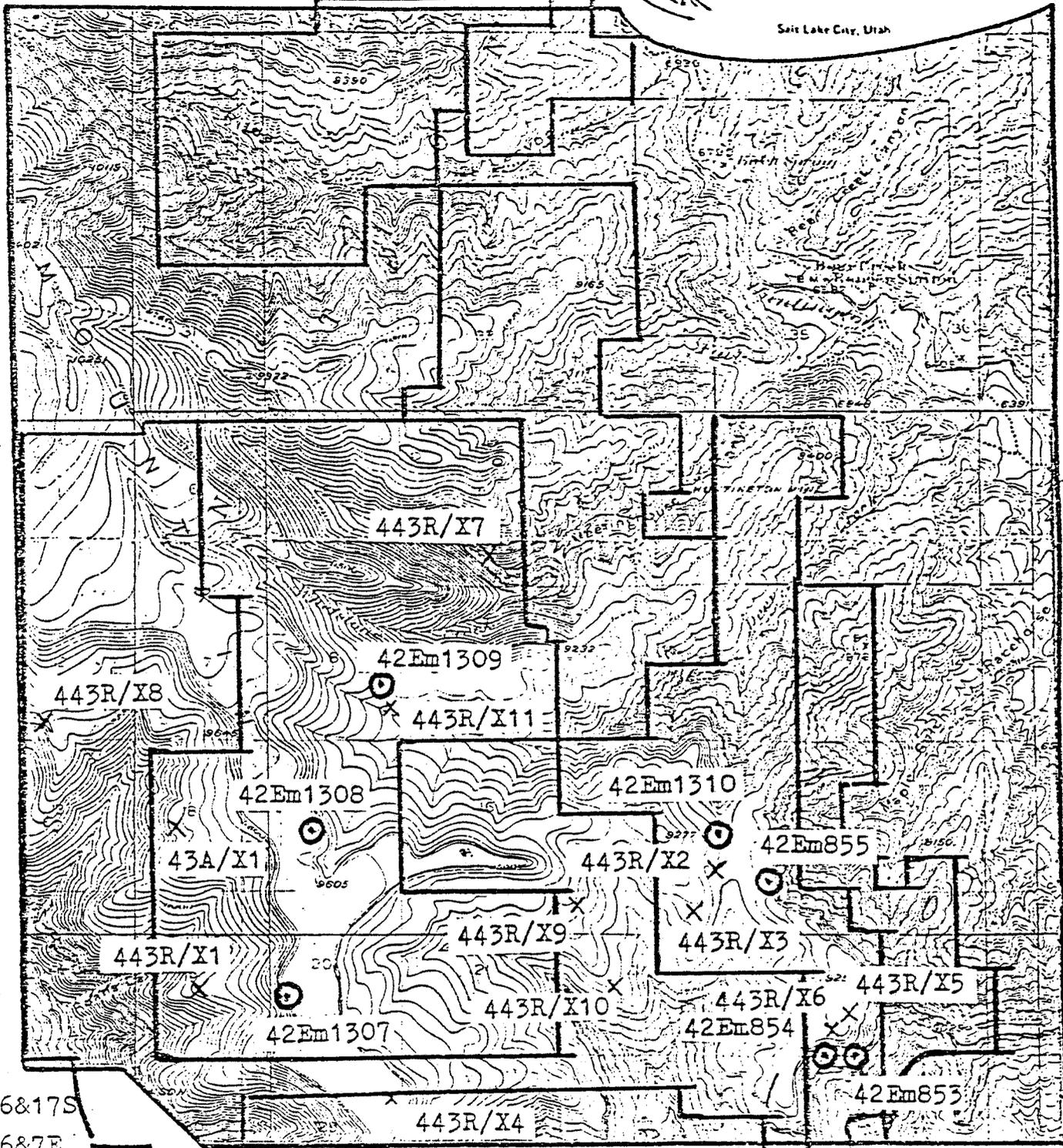
Based on the definitions of cultural resource significance (see Chapter IV), one of the seven cultural resource sites listed in Table 3 is considered eligible for nomination to the National Register of Historic Places (NRHP). Site 443R/2 (42Em1308) is a potential candidate for nomination to the Register because of its size, the presence of diagnostics, its environmental location, and its moderate depth (5 to 20 cm.) potential. This site has been given a CRRS:S-2 rating. Sites 443R/3 and 4 (42Em1309 and 1310) have been given CRRS:S-3 ratings and do have minimal scientific value based upon marginal depth (0 to 10 cm.) potential. The other four sites including AERC 443R/1 (42Em1307), AERC 03F/44 (42Em853), AERC 03F/45 (42Em854), and AERC 03F/46 (42Em855) have been given CRRS:S-4 status, i.e., having marginal scientific value. Should additional research on any of these sites provide information showing that any site has greater cultural value than presently assigned, the site rating will be adjusted accordingly.

Table 3

Cultural Resource Site Summary

<u>AERC</u> <u>Site No.</u>	<u>Permanent</u> <u>Site No.</u>	<u>Site Type</u>	<u>Culture</u>	<u>Land</u> <u>Ownership</u>
03F/44	42Em853	Lithic Scatter	Unknown	Private
03F/45	42Em854	Hunting Station- Lithic Scatter	Unknown	Private
03F/46	42Em855	Hunting Station- Lithic Scatter	Unknown	Private
443R/1	42Em1307	Lithic Scatter	Unknown	Private
443R/2	42Em1308	Lithic Scatter- Possible Temporary Campsite	Archaic and Post-Archaic	Private
443R/3	42Em1309	Lithic Scatter- Possible Temporary Campsite	Unknown	Private
443R/4	42Em1310	Hunting Station- Lithic Scatter	Archaic	Private

Site and isolated artifact locations are shown on Figure 6. This map gives the relationship of all seven sites and 12 isolate artifact locations within the subsidence zone and the mine plan permit area. Additional information on the sites is contained in the site reports which are being provided to all relevant government agencies as an appendix to this report.



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

Meridian: Salt Lake B&M

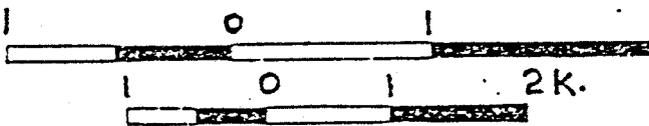
Quod: Hiawatha, Utah

Project: UPL-80-1
Series: Central Utah
Date: 9-16-80

Figure 6
CULTURAL RESOURCES
IN THE
PROJECT AREA

15 Minute USGS

- Legend:
- Project & Mine Boundaries
 - 2 M. Archeological Site
 - Isolated Artifact



Scale

B. Comparative Resource Analysis

All of the seven sites situated in the potential subsidence zone of the mine plan permit area are prehistoric. All of the sites are lithic scatters although two sites (42Em1308 and 42Em1309) may have been temporary campsites as suggested by their locations and by the grinding tool fragments observed on the sites (see Table 3). Three other sites, including 42Em854, 855 and 1310, were possibly hunting loci as indicated by the artifacts and their environmental locations. The two remaining sites, (42Em853 and 1307), are lithic scatters and presently permit no further use identification.

As Figure 6 demonstrates, the majority of cultural resources which have been located in the project area are primarily clustered along the eastern ridge with a secondary clustering of materials along the southern end of the mountain ridge. The density of cultural material declines along the ridge to the northwest. Isolated artifact and site locations, therefore, suggest that prehistoric activity was highest along those ridges and drainages which are associated with Deer Creek which may have been the primary prehistoric access route leading up to the mountain. The southeastern resource clustering also indicates the possibility of access routes extending up the cliffs in that locality, perhaps originating in Maple Gulch or in Grimes Wash.

The artifacts collected from the project area show a temporal range of ca. 6900 B.P. to possibly as late as 450 B.P. A possible Northern Side-notch fragment (see Figure 5A), recovered from site 445R/4 (42Em1310) which dates from 6900 B.P. to 6300 B.P., signals an Early Archaic presence. The Gypsum points shown in Figure 5B and C came from two isolated locations. These two points could range from Middle to Late Archaic since the Gypsum Series was utilized in central Utah from ca. 5000 to

after 1000 B.P. (Holmer 1978:70). The Sudden Side-notch point fragment shown in Figure 5D demonstrates a Middle Archaic period presence on East Mountain. This type of atlatl point was in use from 4600 to 3700 B.P. (Holmer 1978:69). The four Elko Corner-notched points shown in Figure 5E through H were collected from site 42Em1308 and from two isolated locations. Like the Gypsum points, the Elko series projectile points extend over a long period in the Eastern Great Basin, from the Early Archaic through to the Late Prehistoric period. Radiocarbon analyses of strata associated with Elko series points demonstrates that they were in use as early as 7600 B.P. and possibly persisted in use into the Historic period (Holmer 1978:62).

The Rose Spring arrowpoint shown in Figure 5I demonstrates a Post-Archaic presence upon the mountain which could have been of Fremont origin. The Rose Spring point type in central Utah occurred from 1650 to 1000 B.P. (Holmer and Weder 1980:67).

Isolate 443R/X9 (see Figure 5J) is possibly the fragmented base of a Shoshonean Desert Side-notch point. This fragment is the only evidence of Shoshonean peoples utilizing East Mountain. The temporal range for this point extends from ca. 600 to 100 B.P.

The biface blades shown in Figure 5K and L are not presently identifiable with any specific cultural phase or period.

Chapter IV - EVALUATIONS AND RECOMMENDATIONS

A. Resource Significance Evaluations

An outline of cultural resource significance for the seven known prehistoric sites situated in the subsidence zone of the East Mountain mine plan permit area is presented in Table 4. Here the site quality indicators are presented with a statement on site condition. The field assessment of significance utilizing the CRRS system is provided in the fourth column. The CRRS system is best explained by quoting from the BLM definition sheet:

Cultural Resource Rating System

The following criteria are established as guidelines. The Bureau recognizes that the assignment of a particular rating is a professional judgment; however, the rationale of these judgments will be explicitly documented as part of the evaluation process.

Assign an evaluation rating (S1, S2, S3, S4) to each site according to the following guidelines and record on the BLM form 6400-3:

S1. S1 sites are those sites which are worthy of preservation in situ. In general, they are sites in relatively good condition with integrity (both internal and external); and are unique or representative; and/or have associations with important events or personages; and /or have yielded, or have a clear potential for yielding, highly significant scientific or educational information.

S2. S2 sites are those sites which contain important scientific or educational data but yet are not worthy of preservation in situ. They are generally not particularly unique, representative, nor do they have important associations. Many contemporary sites may be S2 sites because, although they cannot be clearly and immediately assessed as such, they may become highly significant when evaluated from a future historical perspective.

S3. S3 sites are those sites whose main worth are their potential for contributing data in regards to solving larger problems, such as reconstruction of

paleo-environments and human use patterns. These kinds of sites generally show little concentration of artifacts, few features, no important associations, and little or no uniqueness or representativeness.

S4. S4 sites are those sites which have minimal information retrieval possibilities, or which have no integrity, uniqueness, representativeness, or no important associations."

No sites were accorded CRRS:S-1 status as being definite candidates for the National Register of Historic Places.

One site, 42Em1308 (AERC 443R/2), is rated as a CRRS:S-2 level having the potential for inclusion on the National Register. Two sites were accorded CRRS:S-3 ratings and the remaining four sites (see Table 4) are of CRRS:S-4 value. Should future research on any one of these seven sites provide data demonstrating a site has a greater cultural value than presently accorded, the CRRS rating will be appropriately upgraded.

Table 4

Site Significance

<u>Site</u>	<u>Quality*</u>	<u>Condition</u>	<u>CRRS</u> <u>Value Rating</u>
42Em853	d	Good	S-4
42Em854	d	Poor	S-4
42Em855	c, d	Good	S-4
42Em1307	d	Good	S-4
42Em1308	a, b, c, d, f, g	Good	S-2
42Em1309	c, d	Fair	S-3
42Em1310	d	Poor	S-3

*AERC Quality Indicators are:

- a) size or layout is unique;
- b) quantity and/or quality of artifacts is unique;
- c) indication of depth;
- d) environmental location is unique;
- e) existence of unique artifacts, architecture, art or structure;
- f) condition is excellent for preservation of materials or data;
- g) site contains specific cultural data relevant to temporal and spatial identifications;
- h) site is scene of an important event; and
- i) site is associated with an important person.

B. National Register Criteria of Eligibility

Application of the National Register Criteria of Eligibility, defined under 36 CFR 60.6, to each of the seven sites that are situated in the subsidence zone of the permit area provides the following information:

- a) None of the seven sites is associated with events that have had a significant contribution to the broad patterns of our history; or
- b) none of the seven sites is associated with the lives of persons significant in our past; or
- c) none of the seven sites embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction.
- d) one site of the seven evaluated in this report has provided important information on the prehistory of the region and has the potential for yielding additional data important to understanding past human activities in the high elevation areas of central Utah. This site, 42Em1308, which has been rated at a CRRS:S-2 level of significance, is considered as eligible for inclusion on the National Register of Historic Places (NRHP).

One CRRS:S-3 site, 42Em1309, and 42Em855 (CRRS:S-4) are categorized as unevaluated. These sites do not presently meet the criteria for eligibility and further testing is required before a determination of eligibility can be made.

Sites 42Em853, 854, 1307, and 1310 (see Table 4) are not eligible for inclusion on the National Register of Historic Places since they do not meet any of the four criteria established in 36 CFR 60.6.

C. Discussion of Impact Potential on Cultural Resource Sites

Direct impact potential of cultural resource sites is related to possible subsidence of surface areas on East Mountain within the project area that could result in the future from the removal of coal seams within the plateau.

Direct impact stemming from project development, e.g., bulldozing, portal development, etc., is not being considered in this report since direct impact to archeological sites due to these kinds of activities is being mitigated through avoidance procedures by AERC. Inasmuch as no historic or prehistoric site types which are susceptible to extensive disturbance from subsidence are known within the subsidence zone, the potential for direct impact of these types of sites is considered to be nil.

Indirect impact is a greater threat to the archeological sites. This, however, would result primarily from non-project related hunting and camping activity by casual visitors and not from mining operations. Site AERC 443R/2 (42Em1308) is most vulnerable to this type of destruction because of its extent and accessibility (see Table 5). This site has already been partially disturbed by disking and revegetation activities which were conducted within the past 20 years. Thus, future ranching activities on this privately owned land could cause further disruption to this valuable site.

Table 5

Cultural Resource Impact Potential

<u>Site</u>	<u>GRRS Status</u>	<u>Direct Impact*</u>	<u>Indirect Impact</u>	<u>Impact Agent</u>
42Em853	S-4	Low	Low	Casual visitors
42Em854	S-4	Low	Low	Casual visitors
42Em855	S-4	Low	Moderate	Vandalism
42Em1307	S-4	Low	Low	Casual visitors
42Em1308	S-2	Low	High	Vandalism
42Em1309	S-3	Low	Moderate	Casual visitors and erosion
42Em1310	S-3	Low	Low	Casual visitors and erosion

*Impact specifically limited to subsidence

D. Recommendations

There are three basic kinds of adverse impact which can occur to both known and unknown cultural resource sites in the mine plan permit area.

The first of these is direct, or project-related, disturbance resulting from development activities. Ongoing archeological consultation with Utah Power and Light Company can preclude direct impact of any known or unknown sites during any phase of project development. AERC, therefore, recommends that Utah Power and Light Company policy be continued involving archeological evaluations of surfaces prior to initiating exploration or developmental projects in the mine plan permit area.

The second aspect of adverse impact which may occur in the mine plan permit area relates to vandalism of sites. To curtail this activity, AERC suggests that the Utah Power and Light Company administrators acquaint all personnel with the federal antiquities laws concerning the preservation of cultural resource sites. AERC further recommends that all field personnel be made aware of the value of the resources and be watchful for visitors into the mine plan permit area who may be intent on destroying cultural resource sites. Site 42Em1508 (AERC 443R/2) has not been vandalized and its resource value has yet to be finalized. AERC recommends that basic subsurface testing of this site be conducted. This site is the largest known lithic scatter and possible temporary campsite at this elevation (9600 feet ASL) in central Utah and detailed subsurface testing could provide important information on the temporal-cultural utilization period and on prehistoric seasonal subsistence activities conducted in the high elevations.

The third type of adverse impact which can occur in the mine plan permit area is disruption through subsidence.

With the future removal of coal seams under East Mountain, the potential increases for future disturbance on the surface of the plateau. Extensive AERC surface evaluations conducted from 1976 through 1980 involving both sample survey, drill location evaluation, and access road evaluation have demonstrated that no architectural cultural resources which would be highly susceptible to subsidence exist in the mine plan permit area or, more specifically, within the subsidence zone. The limited activity sites which are the most common within the project area involve prehistoric lithic scatters and hunting and camping sites. Depth potential on these types of sites is generally low in this area, hence should subsidence occur in the future, only marginal or no disruption of these sites is anticipated. AERC, therefore, concludes that subsidence does not constitute a viable potential impact to any significant or susceptible cultural resource sites situated within the mine plan permit area. Should surface tension cracking occur in the future and pose a threat to any of the seven cultural resource sites reported in this document, Utah Power and Light Company should have a professional archeologist prepare a damage assessment and site mitigation planning statement for evaluation by relevant governmental authorities.

The mitigative and avoidance comments presented herein are considered sufficient to provide a high level of protection to the cultural resource sites which are situated within the permit area. AERC recommends that Utah Power and Light Company be granted a cultural resource clearance based upon these recommendations to facilitate their future mine development and exploration.

BIBLIOGRAPHY

Aikens, C. Melvin

- 1967 Excavations at Snake Rock Village and the Bear River No. 2 Site. University of Utah Anthropological Papers, No. 87, Salt Lake City.
1970 Hogup Cave. University of Utah Anthropological Papers, No. 93, Salt Lake City.

Alexander, Thomas G.

- 1963 From Dearth to Deluge: Utah's Coal Industry. Utah Historical Quarterly, Vol. 31, No. 3, Salt Lake City.

Ashcroft, Gaylen L. and E. Arlo Richardson

- Map of Freeze-Free Season, State of Utah. Utah Agricultural Experiment Station, Utah State University and Department of Commerce, ESSA, Environmental Data Services.

Beckwith, E. G.

- 1855 Report of Exploration for a Route for the Pacific Railroad by Captain J. W. Gunnison, Topographical Engineer, near the 38th and 39th Parallels of North Latitude. Reports of Explorations and Surveys, Vol. 2, Washington.

Berge, Dale L.

- 1973 "An Archeological Survey in the Castle Valley Area, Central Utah." Museum of Archaeology and Ethnology, Brigham Young University, Provo. (Manuscript on file)
1974 An Archeological Survey in the Castle Valley Area, Central Utah. Publications in Archaeology, Department of Anthropology and Archaeology, New Series No. 1, Brigham Young University Press, Provo.
1976 "Cultural Resource Evaluation of the Clear Creek Substation - Helper - Blackhawk 46 K.V. Transmission Line, Swisher Mine." Department of Anthropology and Archaeology, Brigham Young University, Provo. (Manuscript submitted to the Utah Power & Light Co.)
1977b "Cultural Resource Evaluation of the Emery Substation - Dog Valley Mine Distribution Line." Department of Anthropology and Archaeology, Brigham Young University, Provo. (Manuscript submitted to the Utah Power & Light Co.)

- Berge, Dale L. and Michael P. Benson
1977 "A Cultural Resource Evaluation of the Emery Plant to Emery City Transmission Line." Department of Anthropology and Archaeology, Brigham Young University, Provo. (Manuscript submitted to the Utah Power & Light Co.)
- Berry, Michael S.
1974 The Evans Mound: Cultural Adaptation in S.W. Utah.
1975 Archeological, Historical and Paleontological Survey for Consolidation Coal Company and Kemmerer Coal Company in Emery County, Utah. A Special Report, Division of State History, Salt Lake City.
- Carr, Stephen L.
1972 The Historical Guide to Utah Ghost Towns. Western Epics, Salt Lake City.
- DeBloois, Evan
n.d. Joe's Valley Alcove. (Unpublished manuscript)
- Doelling, H. H.
1972 Central Utah Coal Fields Monograph #3. Utah Geological and Minerological Survey, Salt Lake City.
- Durrant, Stephen
1952 Mammals of Utah. University of Kansas Publications, Museum of Natural History, No. 6, Lawrence.
- Dykman, James L. and Richard A. Thompson
1976 "The Dog Valley Strip Mine Survey." A Special Report by the Southern Utah State College, Cedar City.
- Earle, B. J.
1975 "An Archaeological Summary of the Wasatch Plateau, Central Utah." Museum of Archaeology, and Ethnology, Brigham Young University, Provo. (Manuscript of file)
- Gillin, John
1941 Archeological Investigations in Central Utah. Papers of the Peabody Museum of American Archaeology and Ethnology, Vol. 17, No. 2, Cambridge.
- Gillio, David A.
1975 "Archeological Survey of Trail Mountain Timber Sale." U. S. Forest Service, Richfield. (Manuscript on file)

Gunnerson, James H.

- 1956 A Fluted Point Site in Utah. American Antiquity, Vol. 21, No. 4, Salt Lake City.
- 1957 An Archeological Survey of the Fremont Area. University of Utah Anthropological Papers, No. 28, Salt Lake City.
- 1962a Unusual Artifacts from Castle Valley, Central Utah. Miscellaneous Collected Papers, University of Utah Anthropological Papers, No. 60, Salt Lake City.
- 1962b Plateau Shoshonean Prehistory: A Suggested Reconstruction. American Antiquity 28 (1):41-45, Salt Lake City.
- 1969 The Fremont Culture: A Study in Culture Dynamics on the Northern Anasazi Frontier. Papers of the Peabody Museum of Archaeology and Ethnology, Vol. 59, No. 2, Cambridge.

Hauck, F. R.

- 1976a "An Archeological Survey of Drill Stations and An Access Road in the East Mountain Locality of the Manti-LaSal National Forest in Emery County, Utah (UPL-76-6A)." Report prepared for Utah Power & Light Company by Archeological-Environmental Research Corporation, Salt Lake City.
- 1976b "An Amendment to the Archeological Reconnaissance Report of August 9, 1976, on Drill Stations in the East Mountain Locality of the Manti-LaSal National Forest in Emery County, Utah (UPL-76-6B)." Report prepared for Utah Power & Light Company by Archeological-Environmental Research Corporation, Salt Lake City.
- 1977a "An Archeological Survey of Proposed Access Roads and Drill Stations on East Mountain, Emery County, Utah (UPL-77-5)." Report prepared for Utah Power & Light Company by Archeological-Environmental Research Corporation, Salt Lake City.
- 1977b "An Archeological Survey of Proposed Access Roads and Drill Stations on East Mountain, Emery County, Utah (UPL-77-9)." Report prepared for Utah Power & Light Company by Archeological-Environmental Research Corporation, Salt Lake City.
- 1978a "Archeological Reconnaissance on East Mountain in Emery County, Utah (UPL-78-6)." Report prepared for Utah Power & Light Company by Archeological-Environmental Research Corporation, Salt Lake City.
- 1978b "Archeological Reconnaissance in the East Mountain Locality of Emery County, Utah (UPL-78-10)." Report prepared for Utah Power & Light Company by Archeological-Environmental Research Corporation, Salt Lake City.

- 1979a Cultural Resource Evaluation in Central Utah - 1977. Cultural Resource Series, No. 3, Bureau of Land Management, Utah.
- 1979b "Archeological Evaluation of a Proposed Portal Site in the Maple Gulch Locality of East Mountain, Emery County, Utah (UPL-79-14)." Report prepared for Utah Power & Light Company by Archeological-Environmental Research Corporation, Salt Lake City.
- 1979c "A Preliminary Report on the Cultural Resource Evaluation and Test Excavations in Cottonwood Canyon, Emery County, Utah (UPL-79-5A, B, C)." Report prepared for Utah Power & Light Company by Archeological-Environmental Research Corporation, Salt Lake City.
- Hauck, F. R. et al.
1977 "The Central Coal Project of Utah." Volumes I, II and III; Report prepared under contract 14-08-0001-16479 for the U.S. Geological Survey by the Archeological-Environmental Research Corporation of Salt Lake City.
- Hayward, C. Lynn, Clarence Cottam, Angus M. Woodbury and Herbert H. Frost
1976 Birds of Utah. Great Basin Naturalist Memoirs, No. 1. Brigham Young University Press, Provo.
- Helm, Claudia
1974 "Preliminary Report of an Archaeological Survey in Sevier, Emery and Garfield Counties." Department of Anthropology, University of Utah, Salt Lake City. (Manuscript submitted to the U. S. Forest Service and the Bureau of Land Management and to the National Science Foundation.)
- Holmer, Richard N.
1978 "A Mathematical Typology for Archaic Projectile Points of the Eastern Great Basin." Unpublished Ph.D. Dissertation, Department of Anthropology, University of Utah, Salt Lake City.
- Holmer, R. N. and D. G. Weder
1980 Common Post-Archaic Projectile Points of the Fremont Area. Antiquities Section Selected Papers, Volume VII, No. 16, D. B. Madsen, Editor, Salt Lake City.
- Hurst, C. T.
1948 The Cottonwood Expedition, 1947 - a Cave and a Pueblo Site. Southwestern Lore, Vol. 14, No. 1.
- Jennings, J. D.
1957 Danger Cave. University of Utah Anthropological Papers, No. 27, Salt Lake City.
1974 Prehistory of North America. Second edition, McGraw-Hill, Inc., New York.

- Jennings, Jesse D., Alan R. Schroedl and Richard N. Holmer
1980 Sudden Shelter. University of Utah Anthropological Papers, Salt Lake City.
- Jennings, Jesse D., et al.
1980 Cowboy Cave. University of Utah Anthropological Papers, Salt Lake City (Manuscript in preparation)
- Johnson, Carl M.
1970 Common Native Trees in Utah. Special Report 22, Agricultural Experiment Station, College of Natural Resources, Utah State University, Logan.
- Kennette, S. D. and F. R. Hauck
1978 "Archeological Reconnaissance in the Scofield Locality of Carbon and Emery Counties, Utah." Report prepared for the Coastal States Energy Company by the Archeological-Environmental Research Corporation, Salt Lake City (CSEC-78-1).
- Lamb, Sydney, M.
1958 Linguistic Prehistory in the Great Basin. International Journal of American Linguistics, Vol. 24.
- Leach, Larry L.
1966 The Archeology of Boundary Village. University of Utah Anthropological Papers, No. 83, Miscellaneous Paper, No. 13, Salt Lake City.
1967 "Archeological Investigations at Deluge Shelter." Department of Anthropology, University of Utah, Salt Lake City. (Manuscript on file)
- Lever, W. H.
1898 History of Sanpete and Emery Counties.
- Lindsay, LaMar
1974 "Report of a Preliminary Archeological Survey of Coal Lease Lands (U-073039, U-073040 and U-073041), Sevier and Emery Counties, Utah. A Special Report prepared for the Bureau of Land Management, Salt Lake City.
- Lindsay, LaMar W. and Christine K. Lund
1976 Pint Size Shelter. Antiquities Section Selected Papers, Vol. III, No. 10, Division of State History, Salt Lake City.
- Lister, Robert H., and Florence C. Lister
1961 The Coombs Site, Part III: Summary and Conclusions. University of Utah Anthropological Papers, No. 41, Glen Canyon Series, No. 8, Salt Lake City.

- Louthan, Bruce D. and Dale L. Berge
1975 "Archaeological Survey of the Huntington-Sigurd
Transmission Line on Bureau of Land Management Lands."
Department of Anthropology and Archaeology, Brigham
Young University. (Manuscript submitted to the Utah
Power & Light Co.)
- Lyman, June and Norma Denver
1970 Ute People, An Historical Study. Uintah School
District and the Western History Center, University
of Utah, Salt Lake City.
- Madsen, David B.
1975a Three Fremont Sites in Emery County, Utah.
Antiquities Section Selected Papers, Vol. I, No. 1,
Division of State History, Salt Lake City.
1975b Dating Paiute-Shoshoni Expansion in the Great
Basin. American Antiquity, Vol. 40, No. 1, Washington,
D. C.
- Madsen, David B. and LaMar W. Lindsay
1977 Backhoe Village. Antiquities Section Selected
Papers, Vol. IV, No. 12, Division of State History,
Salt Lake City.
- Madsen, Rex
1973 "Topography, Climate and Soil Types as Indicators
of Fremont Regional." Paper presented at the Great
Basin Anthropological Conference, University of Utah,
Salt Lake City.
1977 Prehistoric Ceramics of the Fremont. Museum of
Northern Arizona Ceramic Series, No. 6, Flagstaff.
- Marwitt, John P.
1968 Pharo Village. University of Utah Anthropological
Papers, No. 91, Salt Lake City.
1973 Median Village and Fremont Culture Regional Variation.
University of Utah Anthropological Papers, No. 95, Salt
Lake City.
- Matheny, Ray T.
1971 "Archaeological Survey of Huntington Canyon Salvage
Project, June 1971." Department of Anthropology and
Archaeology, Brigham Young University, Provo. (Manuscript
submitted to Utah Power & Light Co.)
- McDonald, A. J. and F. R. Hauck
1979 "Archeological Reconnaissance in the Vicinity of
Eccles Canyon, Carbon County, Utah." Report prepared for
the Coastal States Energy Company by the Archeological-
Environmental Research Corporation, Salt Lake City
(CSEC-78-1).

- McElprang, Stella, et al.
1949 Castle Valley. Daughters of the Utah Pioneers,
Emery County Chapter, Salt Lake City.
- Miller, David E., compiler
1968 Utah History Atlas, Second Edition. Smith Printing
Service, Salt Lake City.
- Morss, Noel
1931 The Ancient Culture of the Fremont River in Utah.
Papers of the Peabody Museum of American Archaeology
and Ethnology, Vol. 12, No. 3, Cambridge.
1954 Clay Figurines of the American Southwest. Papers
of the Peabody Museum of American Archaeology and
Ethnology, Vol. 49, No. 1, Cambridge.
- National Archives of the United States
1973 Advisory Council on Historic Preservation, Part
800 - Procedures for the Protection of Historic and
Cultural Properties. National Register, Vol. 39,
No. 18, Washington, D. C.
- Norman, V. G. and F. R. Hauck
1977 "An Archeological Survey of a Drill Site on
Whetstone Creek in the East Mountain Locality."
Report prepared for the Utah Power and Light Company
by Archeological-Environmental Research Corporation,
Salt Lake City (UPL-77-12).
1979 "Archeological Survey in the Eccles Canyon Locality
of Carbon County, Utah." Report prepared for the
Coastal States Energy Company by the Archeological-
Environmental Research Corporation, Salt Lake City
(CSEC-78-1).
1980 "Archeological Evaluation of a Proposed PCB
Transformer Structure Site at the Emery Deep Mine in
Emery County, Utah." Report prepared for Consolidation
Coal Company by the Archeological-Environmental Research
Corporation, Salt Lake City (CCC-80-2)
- O'Neill, Floyd A.
1973 "A History of the Ute Indians of Utah Until 1890."
Doctoral dissertation submitted to the University of
Utah, Salt Lake City.
- Powell, Allan Kent
1976 A History of Labor Union Activity in the Eastern
Utah Coal Fields: 1900-1934. University of Utah, Salt
Lake City.

Ranch, Rebecca

- 1980 "A Cultural Resource Evaluation of the Soldier Creek Coal Mine Property in Emery County, Utah." A report prepared for the Soldier Creek Coal Company by the Archeological Center at the University of Utah, Salt Lake City.

Reagan, Albert B.

- 1935a An Archaeological Trip to Buck Horn Draw - Indians Worshipping the Sun. Utah Academy of Sciences, Arts, and Letters, Vol. XII, Salt Lake City.
- 1935b Trip to Bull Hollow Wash, May 3-4, 1935. Utah Academy of Sciences, Arts, and Letters, Vol. XII, Salt Lake City.

Reynolds, Thursey, J., et al.

- 1948 Centennial Echoes from Carbon County. Daughters of the Utah Pioneers of Carbon County, Salt Lake City.

Sargent, Kay

- 1977 "Emery County: An Archeological Summary." Division of State History, Salt Lake City.

Schroedl, Alan R.

- 1976 "The Archaic of the Northern Colorado Plateau." Unpublished dissertation, Department of Anthropology, University of Utah, Salt Lake City.

Schroedl, Alan R. and Patrick F. Hogan

- 1975 Innocents Ridge and the San Rafael Fremont. Antiquities Section Selected Papers, Vol. I, No. 2, Division of State History, Salt Lake City.

Smith, T. M. and F. R. Hauck

- 1979a "An Intensive Inventory of Drill Sites and Access Roads in the East Mountain Locality of Emery County, Utah." Report prepared for the Utah Power and Light Company by the Archeological-Environmental Research Corporation, Salt Lake City (UPL-79-10).
- 1979b "An Intensive Inventory of the Proposed UPL Cottonwood Creek - Wilberg Mine Portal Area (UPL-79-5)." Report prepared for Utah Power and Light Company by the Archeological-Environmental Research Corporation, Salt Lake City.

Steward, Julian

- 1974 Ute Indians I. Aboriginal and Historical Groups of the Ute Indians of Utah. Garland Publishing Inc., New York and London.

- Sutton, Wain, ed.
1949 Utah Centennial History, Vol. II. Lewis Historical Publishing Company, New York.
- Taylor, Dee Calderwood
1957 Two Fremont Sites and Their Position in Southwestern Prehistory. University of Utah Anthropological Papers, No. 29, Salt Lake City.
- Tripp, George
1966 A Clovis Point From Central Utah. American Antiquity, Vol. 27, No. 3.
1967 Bill Mobely does it again! Utah Archeology, Vol. 13, No. 1.
- Utah Water and Power Board
Map of the Normal Annual Precipitation, 1931-1960, State of Utah.
- Vienneau, Azor
1973 The Bottle Collector. Petheric Press, Halifax, Nova Scotia.
- Walker, J. Terry
1977 "Archeological Investigations on Trough Springs Ridge and Near the Huntington Canyon-Electric Lake Dam." Department of Anthropology and Archaeology, Brigham Young University, Provo. (Manuscript on file)
- Weder, D. G. and F. R. Hauck
1977 "An Archeological Survey of Proposed Drill Stations on East Mountain, Emery County, Utah." Report prepared for the Utah Power & Light Company by the Archeological-Environmental Research Corporation, Salt Lake City (UPL-77-10).
n.d. "Test Excavation of Two Rock Shelters in Cottonwood Canyon, Emery County, Utah. AERC Manuscript in preparation.
- Wilson, Curtis J. and Howard L. Smith
1976 Interstate Highway I-70 Salvage Archeology, Antiquities Section Selected Papers, Vol. II, No. 7, Division of State History, Salt Lake City.
- Winter, Joseph C.
1973 The Distribution and Development of Fremont Maize Agriculture: Some Preliminary Interpretations. American Antiquity, Vol. 38, No. 4.

Winter, Joseph C. and Henry G. Wylie

1974 Paleoeecology and Diet at Clyde's Cavern. American Antiquity, Vol. 39(2):303-315, Washington, D. C.

Wormington, H. M.

1955 A reappraisal of the Fremont Culture. Proceedings of the Denver Museum of Natural History, No. 1, Denver.

1964 Ancient Man in North America. The Denver Museum of Natural History, Popular Series, No. 4, Denver.

Wylie, Henry G.

1972 "Report of Excavations at Clyde's Cavern (42Em177) Emery County, Utah." Department of Anthropology, University of Utah, Salt Lake City. (Manuscript on file)

APPENDIX

(Site Forms sent under separate
cover to relevant government agencies)

Attachment 4: INFORMATION CONCERNING SITE RECORDING

All survey units sampled in 1980 were identified by a four-person AERC team with survey personnel walking parallel transects. Individual spacing ranged from ten to 20 meters during these transect surveys. Shorter intervals between personnel and zig zag transects were utilized for a more intensive examination of specific areas where surface materials indicated site potential. At the completion of the surface survey, the Principal Investigator visited each site or possible site with the crew chief and conducted an evaluation of the resource, its function and significance. The site reports were prepared during this second visit to each site. Sites were photographed, sketched, and noted on the 15 minute USGS map for the area. Diagnostic artifacts, i.e., projectile points were collected during the survey as were any lithic tools useful in studying manufacture techniques, lithic type and source, and site utilization.

Attachment 5: SITE DESCRIPTIONS AND
ELIGIBILITY RECOMMENDATION

Site 42Em853 (AERC 03F/44)

This prehistoric lithic scatter is situated on private lands in the Ferron District of the Manti-LaSal National Forest on the south facing slope near the crest of the East Mountain plateau. The site measures 40 x 40 meters in size and is of sparse density measuring one flake per two square meters. The detritus consists of secondary and tertiary flakes. One nondiagnostic projectile point tip was observed on the site. No artifacts were collected.

National Register status: This site is not significant.

Site 42Em854 (AERC 03F/45)

This prehistoric hunting station is situated on private lands in the Ferron District of the Manti-LaSal National Forest on the south facing slope near the crest of the East Mountain plateau. The site was probably utilized by hunters waiting for game to travel an adjacent game trail. The site measures 15 x 15 meters in size and is of sparse density. The detritus consists of secondary and tertiary flakes. One nondiagnostic projectile point fragment and several blade fragments were observed. No artifacts were collected.

National Register status: This site is not significant.

Site 42Em855 (AERC 03F/46)

This prehistoric hunting station is situated on private lands in the Ferron District of the Manti-LaSal National Forest on the east facing slope near the crest of the East Mountain plateau. The site was probably utilized by hunters waiting for game to travel across the lower slope. The site measures 7 x 7 meters in size and is of sparse density. The artifacts observed on the site include one biface blade and a nondiagnostic projectile point fragment. No artifacts were collected.

National Register status: This site is not significant.

Site 42Em1307 (AERC 443R/1)

This prehistoric lithic scatter is situated on private lands in the Ferron District of the Manti-LaSal National Forest upon the top of the East Mountain plateau. The site measures 15 x 15 meters in size and is of sparse density containing primary flakes. No tools were observed, nor was the site collected.

National Register status: This site is not significant.

Site 42Em1308 (AERC 443R/2)

This prehistoric lithic scatter is situated on private lands in the Ferron District of the Manti-LaSal National Forest upon the top of the East Mountain plateau. The site may have been utilized as a campsite as suggested by its size, depth potential, and variety of artifacts present. The site measures 300 x 150 meters in size and has a range of detritus from primary flakes through pressure retouch flakes. Three diagnostic projectile points were collected along with four fragments of points and three small scrapers. Artifacts were of the Archaic and Post archaic periods.

National Register status: This site is significant and could provide future researchers with pertinent information on occupation in an high altitude environment.

Site 42Em1309 (AERC 443R/3)

This prehistoric butchering-hide preparation station is located on private lands in the Ferron District of the Manti-LaSal National Forest upon the top of the East Mountain plateau. Artifacts on the site suggest it is the locus of butchering and hide preparation activities. The site measures 30 x 30 meters in size and contains a sparse scatter of butchering tools and flakes. The site was not collected.

National Register status: This site is significant and could provide future researchers with pertinent information on game preparation techniques.

Site 42Em1310 (AERC 443R/4)

This prehistoric lithic scatter-hunting site is located on private lands in the Ferron District of the Manti-LaSal National Forest upon the edge of a north draining arroyo upon the top of the East Mountain plateau. The site measures 30 x 20 meters in size and is of sparse density containing primary and secondary chert flakes. One Northern Side-notch projectile point fragment recovered from the site indicates an Early Archaic activity locus. Two projectile point fragments were collected from this site.

National Register status: This site is marginally significant.

Site 42Em1633 (AERC 797R/1)

This site, the historic Old Johnson Mines, is located on private lands in the Ferron District of the Manti-LaSal National Forest upon the east slope of Cottonwood Canyon. The Old Johnson Mines were actively mining coal from 1909 until 1948. The site presently consists of two portals, a portal terrace, a coal shute area which has been dismantled, a walled boulder which may have been a storage/

powder house area, an outhouse, and the weighhouse structure.
The site has been greatly modified and impacted by the
expansion of the Cottonwood Canyon road.

National Register status: This site is significant.

ARCHEOLOGICAL - ENVIRONMENTAL
RESEARCH CORPORATION

Prehistoric and Historic
Archeological Site Inventory Sheet

1. Permanent Site No.: 42Em853
2. Date Issued: 8/5/77
3. AERC Site No.: 03F/44, Forest Central 14, USFS
4. Date of Survey: 7/19/77
5. Type of Site: Lithic scatter
6. Significance Rating: S-4
7. Project: CCP--77
8. Contract No.: 14-08-0001-16479
9. Contract Date: 5/13/77
10. Site Noted in Report: CCP Final Report — 1977
11. Site Name: None given
12. State: Utah
13. County: Emery
14. T & R Location: T.17S, R.7E, S.26,
15. Meridian: Salt Lake B & M
16. UTM Grid: NA
17. Map Reference: Hiawatha Quad. 15'
18. Aerial Photo Data: NA
19. Reported by: AERC
20. Recorded by: Michael Benson
21. Site Location Relative to Landmarks: The site is located on the edge of the rim of canyon NE of Peabody Mine. (Drill site 40 m. NW—#PB3)

Environmental Information

22. Soil Type: Sandy loam
23. Soil Origin: Residual
24. Site Elevation: 8900'
25. Predominant Vegetation: Sage, pinyon
26. General Ecosystem or Ecozone: 5 c 5
27. Topographic Location: On small, gentle saddle overlooking a large canyon
28. Aspect of Site: Open
29. Water Resources Type: Wash; stream
30. Water Resources Distance & Direction: Grimes Wash, 1.8 km. W
31. Presence of Game Trails: Yes
32. Misc.: Lithic density is 1 flake/2 sq. meters

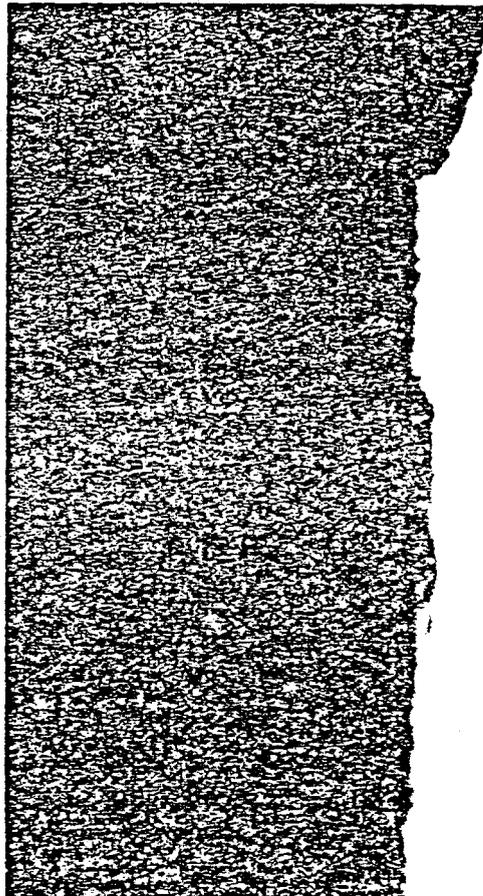
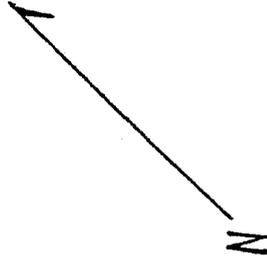
Archeological Information

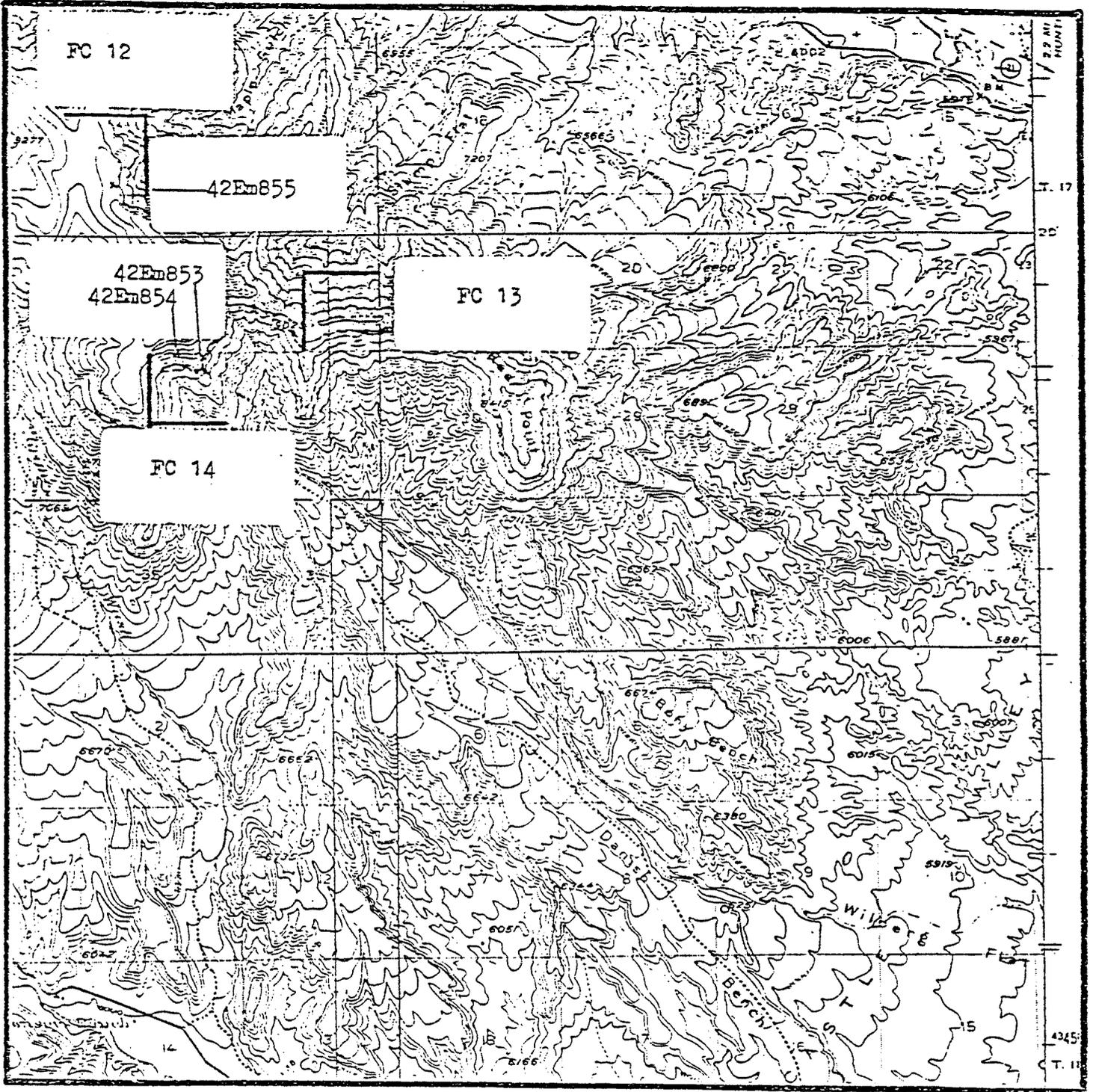
33. Cultural Classification: Unknown
34. Approximate Temporal Range Involved: Unknown
35. Size of Site: 40 m. X 40 m.
36. Number of Components and Location: -
None

Site No.: 42Em853

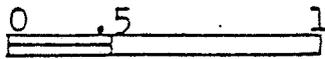
AERC 03F/44

37. Type of Architecture: NA
38. Measurements of Structure: NA
39. Kinds of Artifacts: Lithics
40. Lithic Artifact Types: Secondary and tertiary waste flakes and projectile point tip
41. Artifact Counts after Processing: None collected
42. Location of Collection: NA
43. Condition of Site: Good
44. Type of Impact Expected: NA
45. Mitigation Procedures Initiated: M-1
46. Mitigation Procedures Recommended: NA
47. Photographs: 03F-3(10)
48. Additional Information Attached: No





SCALE in miles



15 Minute Series

Hiawatha
Topographic Quad.
Utah



Environmental Information

22. Soil Type: Sandy loam
23. Soil Origin: Residual
24. Site Elevation: 9000'
25. Predominant Vegetation: Pinyon
26. General Ecosystem or Ecozone: 5J 3
27. Topographic Location: On rim of canyon overlooking Peabody mine in open area between two stands of pine.
28. Aspect of Site: NW, 2⁰ slope
29. Water Resources Type: Stream
30. Water Resources Distance & Direction: Grimes wash, 1.4 km. W
31. Presence of Game Trails: Yes
32. Misc.: Site density is sparse

Archeological Information

33. Cultural Classification: Unknown
34. Approximate Temporal Range Involved: Unknown
35. Size of Site: 15 m. X 15 m.
36. Number of Components and Location: None

ARCHEOLOGICAL - ENVIRONMENTAL
RESEARCH CORPORATION

Prehistoric and Historic
Archeological Site Inventory Sheet

1. Permanent Site No.: 42Em855
2. Date Issued: 8/5/77
3. AERC Site No.: 03F/46, Forest Central #12, Forest Service
4. Date of Survey: 7/20/77
5. Type of Site: Hunting station
6. Significance Rating: S 4
7. Project: CCP-77
8. Contract No.: 14-08-0001-16479
9. Contract Date: 5/13/77
10. Site Noted in Report: CCP Final Report - 1977
11. Site Name: None given
12. State: Utah
13. County: Emery
14. T & R Location: T.17S, R.7E, S.14, SW $\frac{1}{4}$, SE $\frac{1}{4}$, SW $\frac{1}{4}$
15. Meridian: Salt Lake B & M
16. UTM Grid: NA
17. Map Reference: Hiawatha Quad. 15'
18. Aerial Photo Data: NA
19. Reported by: AERC
20. Recorded by: Mike Benson
21. Site Location Relative to Landmarks: Located 70 m. E of dirt road to Red Point. On edge of canyon rim overlooking Maple Gulch.

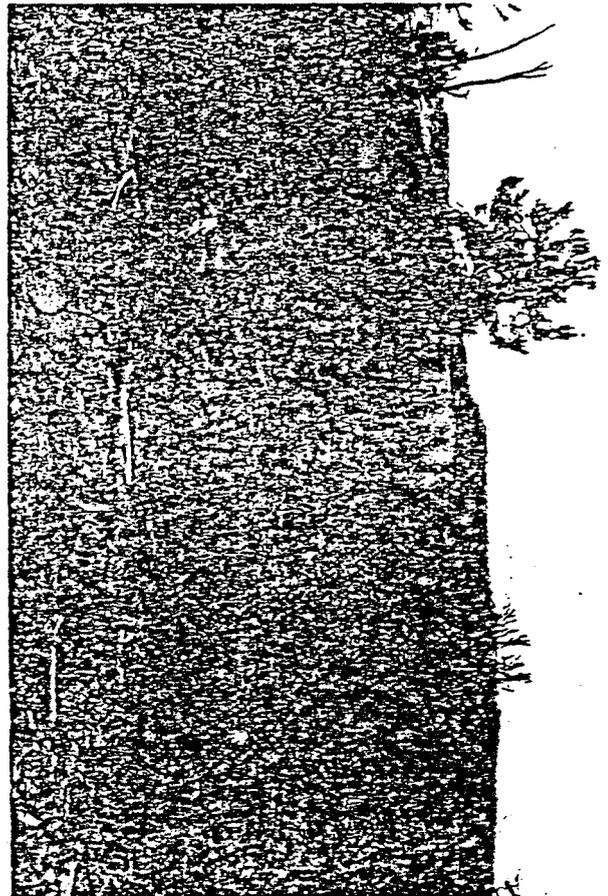
Environmental Information

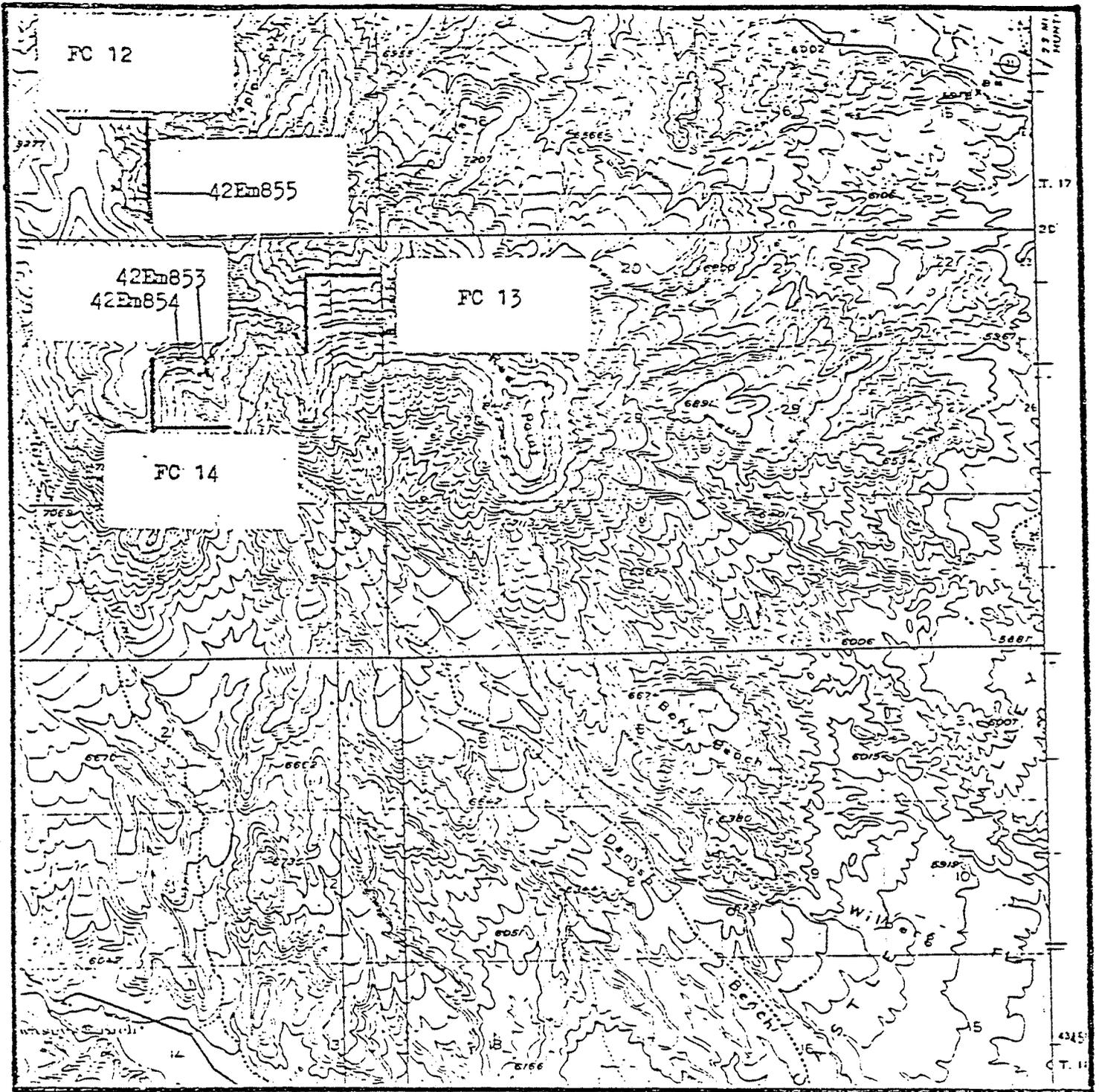
22. Soil Type: Sandy loam and gravel
23. Soil Origin: Residual
24. Site Elevation: 9050'
25. Predominant Vegetation: Pinyon, sage brush, common juniper, bristle cone pine?
wild flowers
26. General Ecosystem or Ecozone: Alpine
27. Topographic Location: On the edge of a canyon (rim) overlooking Maple Gulch.
Gentle slope to W.
28. Aspect of Site: W 3⁰ slope
29. Water Resources Type: Head of Deer Creek
30. Water Resources Distance & Direction: .8 km. NW
31. Presence of Game Trails: Yes
32. Misc.: Possible small hunting area due to the location and tools noticed. Not very dense.

Archeological Information

33. Cultural Classification: Unknown
34. Approximate Temporal Range Involved: Unknown
35. Size of Site: 7 m. X 7 m.
36. Number of Components and Location: None

37. Type of Architecture: NA
38. Measurements
of Structure: NA
39. Kinds of Artifacts: Lithics
40. Lithic
Artifact Types: Blade and projectile point
41. Artifact Counts
after Processing: None collected
42. Location
of Collection: NA
43. Condition of Site: Good
44. Type of
Impact Expected: NA
45. Mitigation Proce-
dures Initiated: M-1
46. Mitigation Proce-
dures Recommended: NA
47. Photographs: 03F-3 (11)
48. Additional Infor-
mation Attached: No





2. County Emery
 3. Temp. No. AFRC 443R/1

4. Class: X Prehistoric Historic Paleontologic
 5. Cultural Site Type (interpreted function): Lithic scatter
 6. Paleontological Site Type: Invertebrate; Vertebrate; Flora
 7. Elevation [I/11-15] 8500 ft. X. 3048 m.
 elevation source: contour
 8. UTM Grid: [I/16-30] zone 12; 480860 m E; 4353020 m N
 9. [II/1-16] NW of NE or SW of Section 20 T. 17S. R. 7E.
 10. Map Reference: Hiawatha Series: 15 Map Date: 1923
 11. Aerial Photo Data: NA
 12. Site Location: Site is situated 50 m. N of Snow Lake junction on East Mountain.

13. Land Owner [II/17-18]: Private
 BLM District/Forest [II/19]: NA
 14. Site Name/Previous Designations: NA
 15. Description of Site: Site is a limited activity area - sparse lithic scatter. CRRS:S-4

CLASS	QUANTITY	CLASS	TYPE	QUANTITY
Debitage [II/30]	<u>8</u>	Ceramics [III/10-21]		
Bifaces [III/1-9]		Proj Pnt [III/1-9]		
Scrappers [III/1-9]		Gnd Stn [III/22-29]		
Utilized Flakes		Glass [II/22-29]		
		Metal [II/22-29]		
		Nails [II/22-29]		
		Cans [II/22-29]		
		Wood [II/22-29]		
		Other [II/22-29]		

Description: Site contains scattered primary flakes of various chert types.

17. Non-Structural Features: (describe and locate on site map) [III/22-27]

<u>hearth/firepit (EE)</u>	<u>rubble mound (RM)</u>	<u>earthen mound (EM)</u>	<u>trail/road (TR)</u>
<u>hidden (HD)</u>	<u>stone circle (SC)</u>	<u>burial (BU)</u>	<u>EP grade (EG)</u>
<u>depression (DE)</u>	<u>rock alignment (RA)</u>	<u>pictograph (PI)</u>	<u>tram way/trad (TW)</u>
<u>water control (WC)</u>	<u>mine tailings (MT)</u>	<u>petroglyph (PE)</u>	<u>other (OT)</u>

Description: NA

CLASS	MATERIAL	QUANTITY	CLASS	MATERIAL	QUANTITY
Single m			Tower		
Multiple m			Cairn		
Granary			Corral		
Cist			Dugout		
Pit house			Kiln		
Kiva			Monument		
Well			Mine		

Description: NA

19. Cultural Affiliation [IV/7-14]: UNKNOWN
 How Determined? NA
20. Site Dimensions: 15 m x 12 m; Area [IV/17-21]: 225 sq m
21. Were surface artifacts collected? Yes; No; [IV/22] if yes, attach a continuation sheet describing sampling method used.
22. Estimated depth of fill [IV/23]: 0 m
 Subsurface test? Yes; X No (include location of test on site map)
23. Description:
 Site Condition [IV/20]: Excellent; Good; X Fair; Poor
 Agent of Impact:
24. Nat. Register Potential [IV/11]: Significant (C); X Non-Significant (D)
 Justification: Site has no depth potential, contains no features and has no diagnostics.

25. Research Potential: None
26. Recommended Mitigation: Avoidance
27. Direction/Distance to Permanent Water [V/5-10]: North / 1.8 m
 Type/Name of Water Source [V/11]: Spring
 Distance to nearest other Water Source [V/2-4]: 1.5 mile
 Type of other water source: Snow Lake
 Distance to Cultivable Soil [V/12-14]: 4 miles
28. Topographic Location (check one under each heading) [V/15-18]

PRIMARY LANDFORM	POSITION ON LANDFORM	DEPOSITIONAL ENVIRONMENT		SECONDARY POSITION
<input type="checkbox"/> mountain spine (A)	<input checked="" type="checkbox"/> top/crest/peak (A)	<input type="checkbox"/> fan (A)	<input type="checkbox"/> marsh (L)	<input checked="" type="checkbox"/> top/crest/ridge (A)
<input type="checkbox"/> hill/bump (B)	<input type="checkbox"/> edge (B)	<input type="checkbox"/> talus (B)	<input type="checkbox"/> landslide/slope (M)	<input type="checkbox"/> edge (B)
<input checked="" type="checkbox"/> tableland/mesa (C)	<input type="checkbox"/> slope (C)	<input type="checkbox"/> dune (C)	<input type="checkbox"/> delta (N)	<input type="checkbox"/> slope (C)
<input type="checkbox"/> ridge (D)	<input type="checkbox"/> toe/foot/bottom (D)	<input type="checkbox"/> stream terrace (D)	<input type="checkbox"/> island (O)	<input type="checkbox"/> toe/foot (D)
<input type="checkbox"/> valley (E)	<input type="checkbox"/> saddle/pass (E)	<input type="checkbox"/> playa (E)	<input checked="" type="checkbox"/> cliff (P)	<input type="checkbox"/> cutbank (E)
<input type="checkbox"/> plain (F)	<input type="checkbox"/> bench/ledge (F)	<input type="checkbox"/> shore feature	<input type="checkbox"/> outcrop (Q)	<input type="checkbox"/> detached conolith (F)
<input type="checkbox"/> canyon (G)	<input type="checkbox"/> pinnacle (G)	<input type="checkbox"/> extinct lake (F)	<input type="checkbox"/> stream bed (Z)	<input type="checkbox"/> interior (G)
	<input type="checkbox"/> interior (E)	<input type="checkbox"/> extant lake (G)		<input type="checkbox"/> step (E)
		<input type="checkbox"/> alluvial plain (E)		<input type="checkbox"/> riser (I)
		<input type="checkbox"/> coluvium (I)		<input type="checkbox"/> poly. geo. feature (J)
		<input type="checkbox"/> moraine (J)		<input type="checkbox"/> spring mound/bog (K)
		<input type="checkbox"/> flood plain (X)		<input type="checkbox"/> cave (L)
				<input type="checkbox"/> alluvial channel (M)
				<input type="checkbox"/> patterned ground (X)

Description: Site is on top of flats upon East Mtn

29. Degree/Aspect of slope [V/19-23]: 0°
30. Vegetation COMMUNITY and association [V/24-25]:

ALPINE GRASSLAND (AA)	YELLOW PINE-OAK (DE)	COLD DESERT SCRUB (FE)	SALT DESERT SCRUB (GE)	WARM DESERT SCRUB (HE)
<input type="checkbox"/> SPARSE YER (EX)	<input checked="" type="checkbox"/> Sponderosa pine (DA)	<input type="checkbox"/> sagebrush (FA)	<input type="checkbox"/> greasewood (GA)	<input type="checkbox"/> desert saltbush
<input type="checkbox"/> humboldt (MA)	<input type="checkbox"/> oakbrush (DE)	<input type="checkbox"/> small sagebrush (FB)	<input type="checkbox"/> greasewood-shadsal (GC)	<input type="checkbox"/> creosote bush (H)
<input type="checkbox"/> white fir spruce (BB)	<input type="checkbox"/> mountain brush (DC)	<input type="checkbox"/> little rabbitbrush (FC)	<input type="checkbox"/> seepweed (GG)	<input type="checkbox"/> creosote/burns
<input checked="" type="checkbox"/> ALPINE DOUGLAS YER (CE)	<input type="checkbox"/> maple (DD)	<input type="checkbox"/> shadsal (FD)	<input type="checkbox"/> pitflower/sagebrush (GD)	<input type="checkbox"/> Joshua tree (HD)
<input type="checkbox"/> limber pine (CA)	<input type="checkbox"/> streamside (DX)	<input type="checkbox"/> horsebrush (FE)	<input type="checkbox"/> saltgrass (GZ)	<input type="checkbox"/> YERSE COMMUNIT
<input type="checkbox"/> douglas fir (CB)		<input type="checkbox"/> vistar-fac (FF)	<input type="checkbox"/> alkali sacaton (GT)	
<input type="checkbox"/> lodgepole pine (CC)	<input type="checkbox"/> FLATS/PRAIRIE (EE)	<input type="checkbox"/> boy-sage/blkbrush (FG)	<input type="checkbox"/> rabbitbrush (GU)	<input type="checkbox"/> ALPINE FLATS/Y
<input type="checkbox"/> bristlecone pine (CD)	<input type="checkbox"/> grasslands (EA)	<input type="checkbox"/> bud sagebrush (FH)		<input type="checkbox"/> FLATS/DRY LAKE
<input checked="" type="checkbox"/> aspen (CE)	<input type="checkbox"/> piñon-juniper (EE)	<input type="checkbox"/> fat saltbrush (FI)		<input type="checkbox"/> WASTELAND (IE)
<input type="checkbox"/> streamside (CX)	<input type="checkbox"/> streamside (EZ)	<input type="checkbox"/> dry molly (FJ)		
<input type="checkbox"/> meadow grassland (CA)		<input type="checkbox"/> streamside (FX)		<input type="checkbox"/> CULTIVATED LAKE

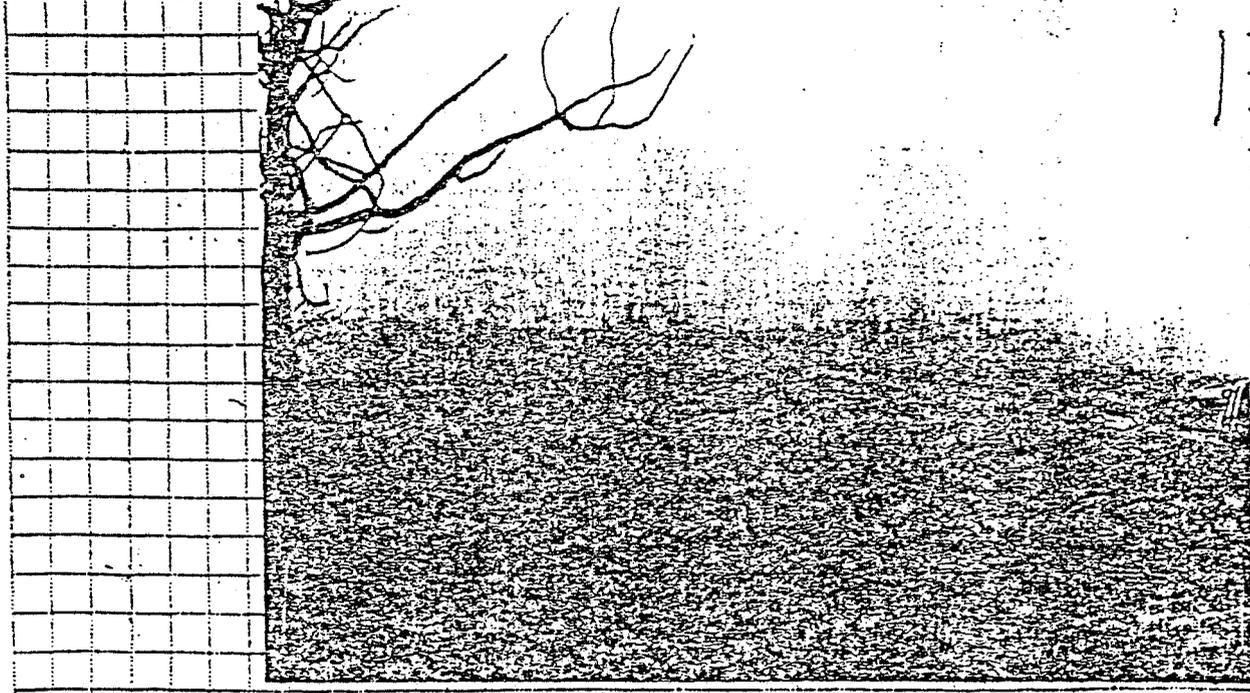
(Check COMMUNITY only if association cannot be determined)

Description: Interface between high altitude sage flats and a span in Montane ecozone.

31. Next nearest plant association/distance:
32. Photograph Numbers [V/26]: 443R-1 (1)
33. Recorded by: F. R. Hauck
 Survey Org. [V/27-28]: AERC Date: 9-9-80
 Assisting Crew Members: V. G. Norman, Michael Sloan

34. Sponsoring Agency: UPI-80-1 Contract No. NA

SITE NO. 42Em1307 443R/A



35. Encoding Form: (all entries are right justified)

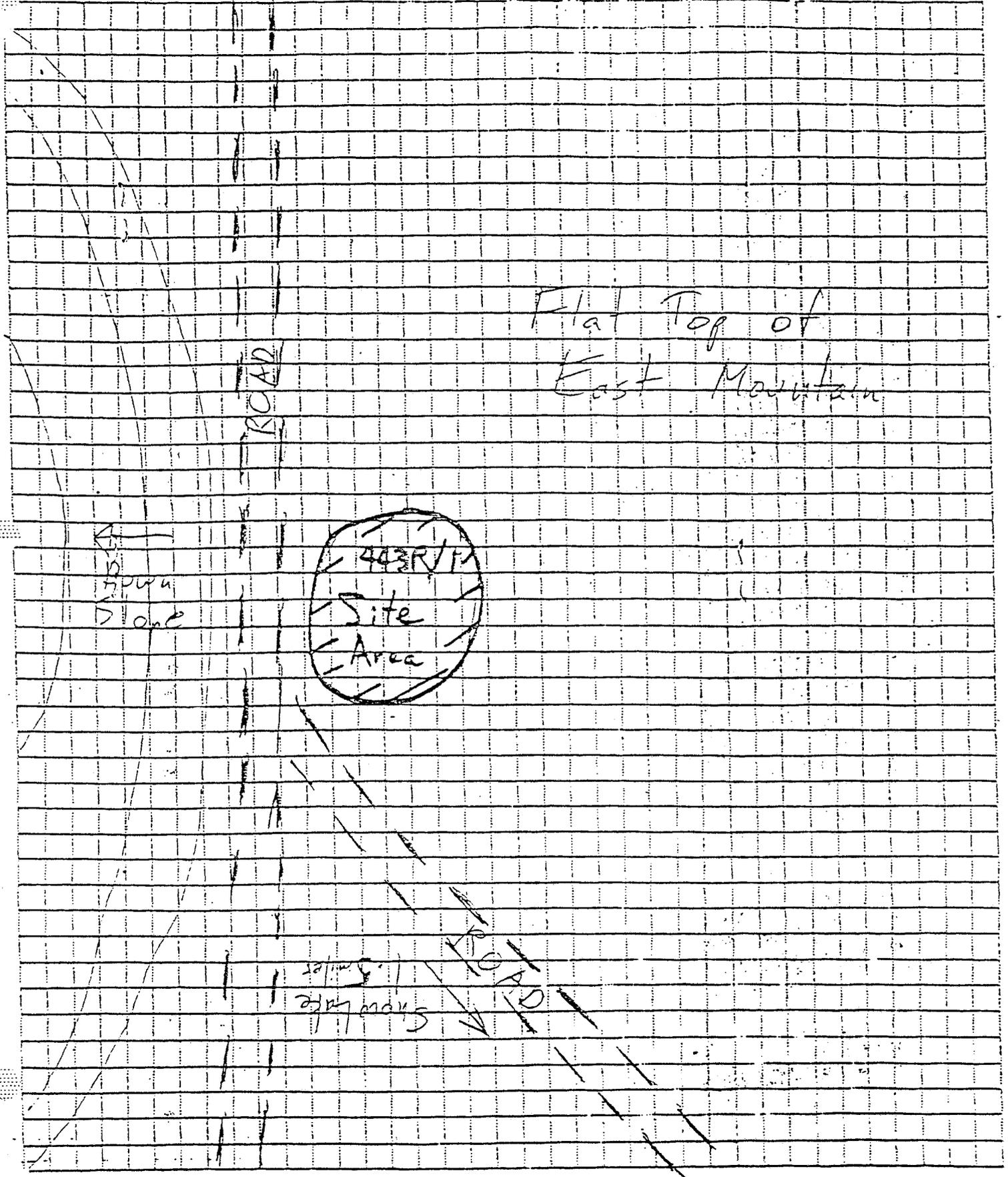
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
I	4	2	E	M	,	1	3	0	7	9	6	0	0	.	1	2	4	8	0	8	6	0		4	3	5	3	0	2	0					
II	N	W	N	E	S	W	2	0		7	S		7	E		P	R		L	S															
III	A	A										A	A	A																					
IV												2	2				A		2	2	5		A	B	C	C	M	1							
V	D										0	.	1	8	.	A	6	4	.	C	A	P	A	0		9	9	8		C	2		B	A	E
VI																																			

Form must be accompanied by a site map; photocopy of U.S.G.S. top map with T., R., scale, and quad name; photographs of the site; an artifact sketches (if applicable).

9-9-80

Aerc 443 R-1

UPL 80-1



2. County Emery
3. Temp. No. AERC 443B/2

4. Class: X Prehistoric Historic Paleontologic
5. Cultural Site Type (interpreted function): Lithic scatter
6. Paleontological Site Type: Invertebrate; Vertebrate; Flora
7. Elevation [II/11-15] 9606 ft. X.3048
Elevation source: Map contour
8. UTM Grid; [II/16-30] zone 12; 486140 m E; 4354600 m N
9. [II/1-16] NA of NE or SW or Section 17 T. 17S; R. 7E
10. Map Reference: Hirawatha, Utah Series: 15M Date: 1923
11. Aerial Photo Data: NA

12. Site Location: Site is situated on east side of flats upon East Mountain, ca. 100 m. north of Burnt Tree Spring

13. Land Owner [II/17-18]: Private
BLM District/Forest [II/19]: NA NA
14. Site Name/Previous Designations: NA

15. Description of Site: Site is a large lithic scatter which extends ca. 300 m. N-S by 150 m. E-W. Site consists primarily of scattered detritus although fragmented manos and complete points were also observed. Site has range from primary flakes to pressure retouch flakes. Obsidian also observed. CRRS:S-2

16. Artifacts:	Artifacts	CLASS	TYPE	QUANTITY
should be described/drawn on a continuation sheet and their locations plotted on the site map.		Ceramics [III/10-21]	various	2
		Proj Pnt [III/1-9]		
		Gnd Stn [II/22-29]		
		Glass [II/22-29]		
		Metal [II/22-29]		
		Nails [II/22-29]		
		Cans [II/22-29]		
		Wood [II/22-29]		
		Other [II/22-29]		
	CLASS QUANTITY			
Debitage [II/30]	<u>MUCH</u>			
Bifaces [III/1-9]	<u>many</u>			
Scrapers [III/1-9]	<u>2</u>			
Utilized Flakes	<u>many</u>			

Description: 1 Rose Spring (obsidian), 2 Elko corner notched, 2 mid-sections

17. Non-Structural Features: (describe and locate on site map) [III/22-27]

- | | | | |
|----------------------------|----------------------------|---------------------------|---------------------------|
| <u>hearth/firepit (HE)</u> | <u>rubble mound (RM)</u> | <u>earthen mound (EM)</u> | <u>trail/road (TR)</u> |
| <u>hidden (HD)</u> | <u>stone circle (SC)</u> | <u>burial (BU)</u> | <u>EE grade (EG)</u> |
| <u>depression (DE)</u> | <u>rock alignment (RA)</u> | <u>pictograph (PI)</u> | <u>spur way/road (TW)</u> |
| <u>water control (WC)</u> | <u>mine tailings (MT)</u> | <u>petroglyph (PR)</u> | <u>other (OT)</u> |

Description: None

18. Structural Features: (describe and locate on site map) [III/28-IV/6]

CLASS	MATERIAL	QUANTITY	CLASS	MATERIAL	QUANTITY
Single rm			Tower		
Multiple rm			Cairn		
Granary			Corral		
Cist			Dugout		
Pit house			Kiln		
Kiva			Monument		
Well			Mine		

Description: None

How Determined? Point Types

20. Site Dimensions : 250 m x 150 m; Area [IV/17-21] : 37500 sq m
 21. Were surface artifacts collected? X Yes; No; [IV/22] If yes, attach a continuation sheet describing sampling method used. Grab
 22. Estimated depth of fill [IV/23] : +0.5 cm
 Subsurface test? Yes; X No (Include location of test on site map)
 Description:
 23. Site Condition [IV/25] : X Excellent; Good; Fair; Poor
 Agent of Impact: Reclamation & revegetation of 20% site surface
 24. Nat. Register Potential [V/11] : X Significant (C); Non-Significant (D)
 Justification: Site has size, marginal depth potential and presence of diagnostic artifacts.

25. Research Potential: Excellent
 26. Recommended Mitigation: Avoidance
 27. Direction/Distance to Permanent Water [V/5-10] : NW / 1 mi.
 Type/Name of Water Source [V/11] : Spring
 Distance to nearest other Water Source [V/2-4] : 1.4 miles
 Type of other water source: Whetstone Creek
 Distance to Cultivable Soil [V/12-14] : 5 miles
 28. Topographic Location (check one under each heading) [V/15-18]

PRIMARY LANDFORM	POSITION ON LANDFORM	DEPOSITIONAL ENVIRONMENT	SECONDARY POSITION
<u> </u> mountain spine(A)	<u>X</u> top/crest/peak(A)	<u> </u> fan(A)	<u>X</u> top/crest/ridge(A)
<u> </u> hill/butte(B)	<u> </u> edge(B)	<u> </u> talus(B)	<u> </u> edge(B)
<u>X</u> tableland mesa(C)	<u> </u> slope(C)	<u> </u> dune(C)	<u> </u> slope(C)
<u> </u> ridge(D)	<u> </u> toe/foot/bottom(D)	<u> </u> stream terrace(D)	<u> </u> toe/foot(D)
<u> </u> valley(E)	<u> </u> saddle/pass(E)	<u> </u> plays(E)	<u> </u> cutbank(Z)
<u> </u> plain(F)	<u> </u> bench/ledge(F)	<u> </u> shore feature	<u> </u> attached noncliff
<u> </u> canyon(G)	<u> </u> rimrock(G)	<u> </u> extinct lake(F)	<u> </u> interior(C)
	<u> </u> interior(H)	<u> </u> extent lake(G)	<u> </u> step(E)
		<u> </u> alluvial plain(H)	<u> </u> riser(I)
		<u> </u> coluvium(I)	<u> </u> ppt-geo. feature
		<u> </u> moraine(J)	<u> </u> spring mound/bog
		<u> </u> flood plain(K)	<u> </u> tave(L)
			<u> </u> alcove/shelter(M)
			<u> </u> patterned ground

Description: Site is upon top of East Mountain.

29. Degree/Aspect of slope [V/19-23] : 0°
 30. Vegetation COMMUNITY and association [V/24-25]:

<u> </u> ALPINE GRASSLAND(AA)	<u> </u> YELLOW PINE-OAK(DZ)	<u> </u> COLD DESERT SHRUB(FE)	<u> </u> SALT DESERT SHRUB(GZ)	<u> </u> WARM DESERT
<u> </u> SPEDICE FIR(BZ)	<u> </u> ponderosa pine(DA)	<u> </u> sagebrush(FA)	<u> </u> yuccawood(GA)	<u> </u> desert salt
<u> </u> knobole(BA)	<u> </u> oakbrush(DE)	<u> </u> small sagebrush(FB)	<u> </u> junwood-shadscl(GZ)	<u> </u> creosote bu
<u> </u> white fir-spruce(BB)	<u> </u> mountain brush(DC)	<u> </u> little rabbitbrush(FC)	<u> </u> seepweed(GC)	<u> </u> creosote/bu
<u>X</u> ASPEN DOUGLAS FIR(CC)	<u> </u> maple(DD)	<u> </u> shadscale(FD)	<u> </u> pickleweed/samphire(GD)	<u> </u> joshua tree
<u> </u> limber pine(CA)	<u> </u> streamside(DE)	<u> </u> horsebrush(FE)	<u> </u> saltgrass(GZ)	<u> </u> MARSH COMMU
<u> </u> douglas fir(CB)		<u> </u> winter-fac(FE)	<u> </u> alkali sacaton(G7)	
<u> </u> lodgepole pine(CC)	<u> </u> FLAINS/PRAIRIE(EZ)	<u> </u> hop-sage/blkbrsh(FG)	<u> </u> rabbitbrush(GG)	<u> </u> ALKALI FLAT
<u> </u> bristlecone pine(CD)	<u> </u> grasslands(EA)	<u> </u> bud sagebrush(FE)		<u> </u> FLATS/DRY L
<u>X</u> aspen(CE)	<u> </u> pinyon-juniper(EB)	<u> </u> nat saltbrush(FI)		<u> </u> WASTELAND(K
<u> </u> streamside(CD)	<u> </u> streamside(EC)	<u> </u> stay dolly(FJ)		<u> </u> CULTIVATED
<u> </u> meadow grassland(CG)		<u> </u> streamside(FK)		

(Check COMMUNITY only if association cannot be determined)

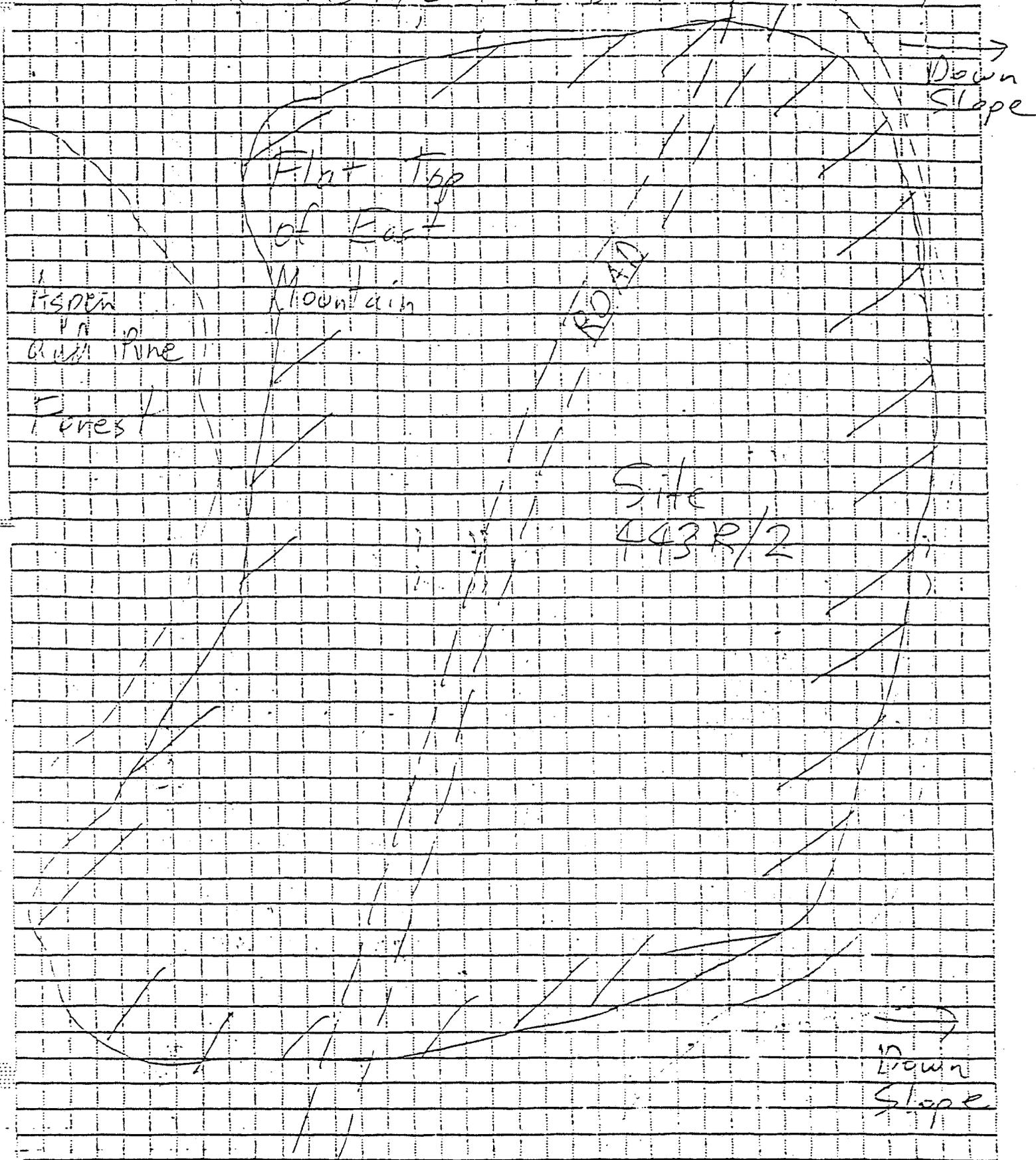
Description: Interface between sage flats and high altitude aspen flats.

31. Next nearest plant association/distance: NA
 32. Photograph Numbers [V/26] : 433R-1 (2 & 3)
 33. Recorded by: E. R. Hanor
 Survey Org. [V/27-28]: AERC Date: 9-9-80
 Assisting Crew Members: V. G. Norman and M. Sloan

SITE NO. 92001200

AERC 443 R/2 UPL 80-1

9-9-80



4. Class: X Prehistoric Historic Paleontologic
 5. Cultural Site Type (interpreted function): Butchering-Hide Preparation
 6. Paleontological Site Type: Invertebrate; Vertebrate; flora
 7. Elevation [I/11-15] 6200 ft. X.3048 = =
 elevation source: MAP CONTOURS
 8. UTM Grid: [I/16-30] zone 12; 486820 m E; 4356100 m N
 9. [II/1-16] SE of NE of SE of Section 8 T. 17S, R. 7E
 10. Map Reference: Hiawatha, Utah Series: 15 Date: 1923
 11. Aerial Photo Data: NA

12. Site Location: Site is situated on the southern edge of a flat which drains to the south into Deer Creek Canyon. The top of East Mountain lies ca. two miles to the west of the site.

13. Land Owner [II/17-18]: Private
 BLK District/Forest [II/19]: NA
 14. Site Name/Previous Designations: NA Forest

15. Description of Site: Site consists of a scatter of flakes and tools and was probably the locus of butchering and hide preparation activities. CRKS:5-3

CLASS	QUANTITY	CLASS	TYPE	QUANTITY
Debitage [II/30]	<u>25+</u>	Ceramics [III/10-21]		
Bifaces [III/1-9]	<u>4+</u>	Proj Pnt [III/1-9]		
Scrapers [III/1-9]	<u>5+</u>	Gnd Stn [II/22-29]		
Utilized Flakes	<u>3+</u>	Glass [II/22-29]		
		Metal [II/22-29]		
		Nails [II/22-29]		
		Cans [II/22-29]		
		Wood [II/22-29]		
		Other [II/22-29]		

Description: Scrapers are all unifacially worked, thin blades with rounded work surfaces.

17. Non-Structural Features: (describe and locate on site map) [III/22-27]
- | | | | |
|--|--|---|---|
| <input type="checkbox"/> hearth/firepit (HE) | <input type="checkbox"/> rubble mound (RM) | <input type="checkbox"/> earthen mound (EM) | <input type="checkbox"/> trail/road (TR) |
| <input type="checkbox"/> midden (MD) | <input type="checkbox"/> stone circle (SC) | <input type="checkbox"/> burial (BU) | <input type="checkbox"/> fill grade (FG) |
| <input type="checkbox"/> depression (DE) | <input type="checkbox"/> rock alignment (RA) | <input type="checkbox"/> pictograph (PI) | <input type="checkbox"/> tram way/road (TW) |
| <input type="checkbox"/> water control (WC) | <input type="checkbox"/> mine tailings (MT) | <input type="checkbox"/> petroglyph (PE) | <input type="checkbox"/> other (OT) |

Description: None

18. Structural Features: (describe and locate on site map) [III/28-IV/6]
- | CLASS | MATERIAL | QUANTITY | CLASS | MATERIAL | QUANTITY |
|-----------------------------------|----------|----------|----------|----------|----------|
| Single <input type="checkbox"/> | | | Tower | | |
| Multiple <input type="checkbox"/> | | | Cairn | | |
| Granary | | | Corral | | |
| Cist | | | Dugout | | |
| Pithouse | | | Kiln | | |
| Kiva | | | Monument | | |
| Well | | | Mine | | |

Description: None

SITE NO. 42Em1309 (AERC 443R/2)

19. Cultural Affiliation [IV/7-14]: Unknown
 How Date Determined? NA
 20. Site Dimensions: 20 m x 20 m; Area [IV/17-21]: 900 sq
 21. Were surface artifacts collected? Yes; X No; [IV/22] is yes,
 attach a continuation sheet describing sampling method used.
 22. Estimated depth of fill [IV/23]: 0 - 5 cm.
 Subsurface test? Yes; X No (include location of test on site map)
 Description:
 23. Site Condition [IV/25]: Excellent; X Good; Fair; Poor
 Agent of Impact: Cattle
 24. Nat. Register Potential [V/1]: X Significant (C); Non-Significant (D)
 Justification: Site is locus of specialized activities and has
marginal depth potential, hence diagnostic points are probably
present.
 25. Research Potential: Moderate
 26. Recommended Mitigation: Avoidance
 27. Direction/Distance to Permanent water [V/5-10]: SW / 150 =
 Type/Name of Water Source [V/11]: Tributary of Deer Creek
 Distance to nearest other Water Source [V/2-4]:
 Type of other water source:
 Distance to Cultivable Soil [V/12-14]:

28. Topographic Location (check one under each heading) [V/15-16]

PRIMARY LANDFORM	POSITION ON LANDFORM	DEPOSITIONAL ENVIRONMENT	SECONDARY POSITION
<input checked="" type="checkbox"/> Mountain spine (A)	<input checked="" type="checkbox"/> Top/crest/peak (A)	<input type="checkbox"/> fan (A)	<input checked="" type="checkbox"/> Top/crest/ridge (A)
<input type="checkbox"/> Hill/butte (B)	<input type="checkbox"/> edge (B)	<input type="checkbox"/> talus (B)	<input type="checkbox"/> edge (B)
<input type="checkbox"/> tableland/mesa (C)	<input type="checkbox"/> slope (C)	<input type="checkbox"/> dune (C)	<input type="checkbox"/> slope (C)
<input type="checkbox"/> ridge (D)	<input type="checkbox"/> toe/foot/bottom (D)	<input type="checkbox"/> stream terrace (D)	<input type="checkbox"/> toe/foot (D)
<input type="checkbox"/> valley (E)	<input type="checkbox"/> saddle/pass (E)	<input type="checkbox"/> playa (E)	<input type="checkbox"/> cutbank (E)
<input type="checkbox"/> plain (F)	<input checked="" type="checkbox"/> bench/ledge (F)	<input type="checkbox"/> shore feature	<input type="checkbox"/> detached monolith (F)
<input type="checkbox"/> canyon (G)	<input type="checkbox"/> rimrock (G)	<input type="checkbox"/> extinct lake (F)	<input type="checkbox"/> interior (G)
	<input type="checkbox"/> interior (H)	<input type="checkbox"/> extant lake (G)	<input type="checkbox"/> step (E)
		<input type="checkbox"/> alluvial plain (H)	<input type="checkbox"/> fissure (I)
		<input type="checkbox"/> calvarium (I)	<input type="checkbox"/> pylon. geo. feature (J)
		<input type="checkbox"/> moraine (J)	<input type="checkbox"/> spring mound/bog (K)
		<input type="checkbox"/> flood plain (I)	<input type="checkbox"/> cave (L)
			<input type="checkbox"/> alcove/shelter (M)
			<input type="checkbox"/> scattered ground (S)

Description: Site lies on a flat along the ridgespine
on east slopes of East Mountain

29. Degree/Aspect of slope [V/19-23]:
 30. Vegetation COMMUNITY and association [V/24-25]:

<input type="checkbox"/> ALPINE GRASSLAND (AA)	<input type="checkbox"/> YELLOW PINE-OAK (DE)	<input type="checkbox"/> COLD DESERT FERNS (FE)	<input type="checkbox"/> SALT DESERT FERNS (GF)	<input type="checkbox"/> CANYON DESERT SE
<input type="checkbox"/> SPRUCE FIR (BE)	<input type="checkbox"/> ponderosa pine (DA)	<input type="checkbox"/> sagebrush (FA)	<input type="checkbox"/> juniperwood (GA)	<input type="checkbox"/> desert saltbush
<input type="checkbox"/> Juniper (BA)	<input type="checkbox"/> oakbrush (DB)	<input type="checkbox"/> small sagebrush (FB)	<input type="checkbox"/> greasewood-sagebrush (G2)	<input type="checkbox"/> creosote bush
<input type="checkbox"/> white fir-spruce (BX)	<input type="checkbox"/> mountain brush (DC)	<input type="checkbox"/> little rabbitbrush (FC)	<input type="checkbox"/> acupymd (GC)	<input type="checkbox"/> creosote/burns
<input checked="" type="checkbox"/> ASPEN DOUGLAS FIR (CE)	<input type="checkbox"/> aspen (DD)	<input type="checkbox"/> shadscale (FD)	<input type="checkbox"/> pickleweed/sagebrush (G3)	<input type="checkbox"/> Joshua tree (E2)
<input type="checkbox"/> limber pine (CA)	<input type="checkbox"/> streamside (DE)	<input type="checkbox"/> heterobrush (FE)	<input type="checkbox"/> saltgrass (G4)	<input type="checkbox"/> PALM COMMUNITY
<input type="checkbox"/> Douglas fir (CB)		<input type="checkbox"/> vinegar-tac (FF)	<input type="checkbox"/> alkali sagator (G5)	
<input type="checkbox"/> lodgepole pine (CC)	<input type="checkbox"/> MEADOW/PRAIRIE (EE)	<input type="checkbox"/> boy-sage/bkbrush (FG)	<input type="checkbox"/> rabbitbrush (G6)	<input type="checkbox"/> ALKALI FLATS/
<input type="checkbox"/> bristlecone pine (CD)	<input type="checkbox"/> grasslands (EA)	<input type="checkbox"/> bad sagebrush (FE)		<input type="checkbox"/> FLATS/DIRT LANE
<input type="checkbox"/> aspen (CX)	<input type="checkbox"/> piñon-juniper (EE)	<input type="checkbox"/> saltbush (FE)		<input type="checkbox"/> WASTLAND (E2)
<input type="checkbox"/> streamside (CE)	<input type="checkbox"/> streamside (EC)	<input type="checkbox"/> gray molly (FD)		
<input type="checkbox"/> meadow grassland (CA)		<input type="checkbox"/> streamside (FE)		<input type="checkbox"/> WASTLAND (E2)

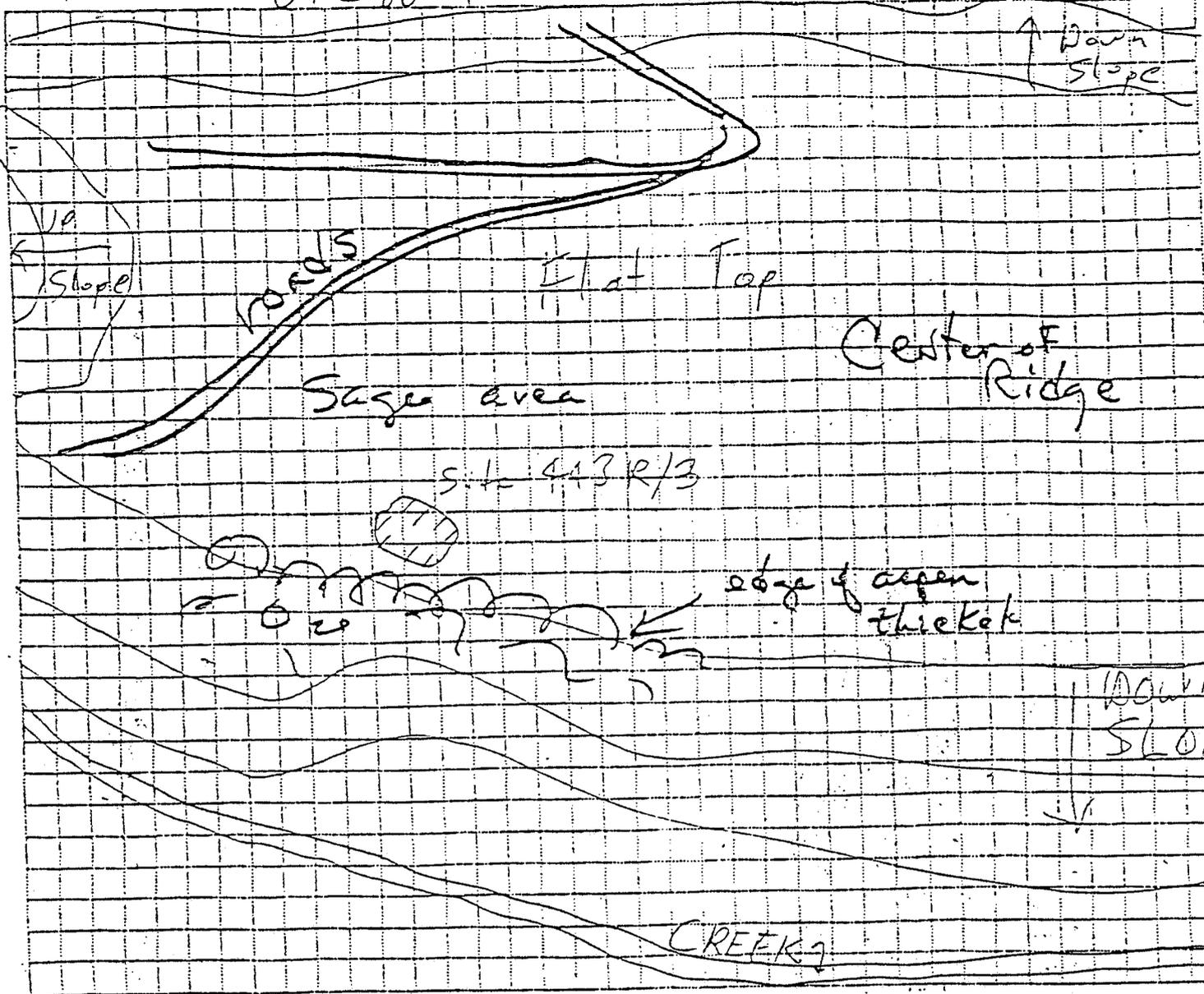
(Check COMMUNITY only if association cannot be determined)
 Description: Site lies in low sage community which covers the
flat. The aspen community begins along south periphery of site
where the slope down into the canyon begins.

31. Next nearest plant association/distance: NA
 32. Photograph Numbers [V/26]: 443R-1 (5)
 33. Recorded by: F. R. Hauck
 Survey Org. [V/27-28]: AERC Date: 9-9-80
 Assisting Crew Members: V. G. Norman, M. Sloan

UPL 80-1

9-9-80

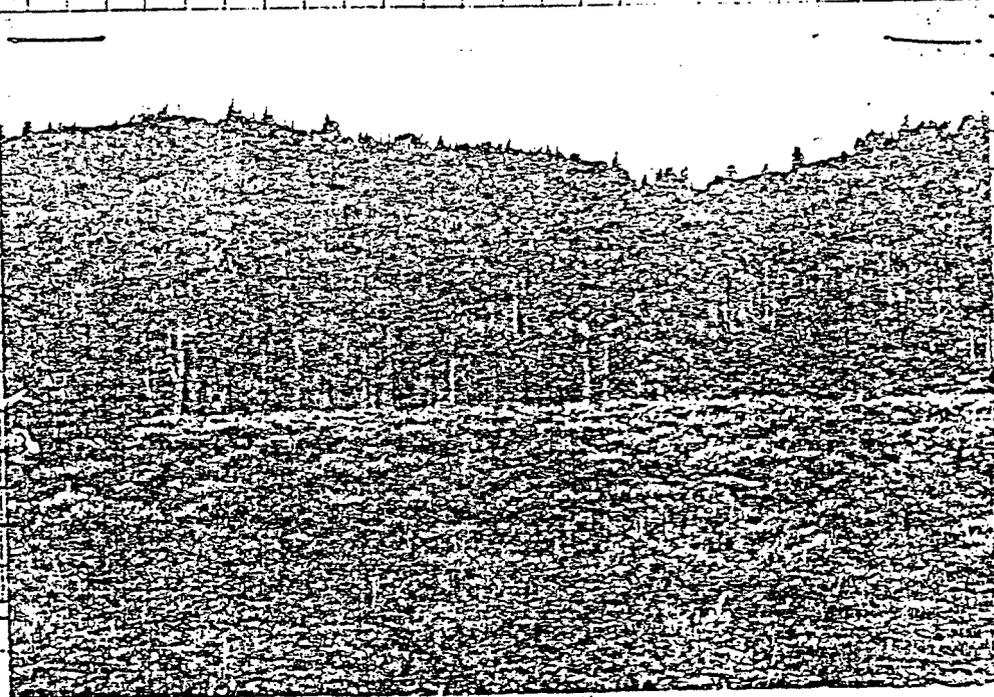
443R/3



35. Encoding Form: (all entries are right justified)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
I	42	EM						1309				9200																				
II	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	D
III	5F2	6G2																														
IV								22																								
V	D							1225																								
VI																																

Form must be accompanied by a site map; photocopy of U.S.G.S. topo map with T., R., scale, and quad name; photographs of the site; and artifact sketches (if applicable).



4. Class: Prehistoric Historic Paleontologic
 5. Cultural Site Type (interpreted function): Lithic Scatter-Hunting
 6. Paleontological Site Type: Invertebrate; Vertebrate; Flora
 7. Elevation [I/11-15] 9050 ft. X: 3048
 elevation source: Contour lines
 8. UTM Grid: [I/16-30] zone 12; 490140 E; 4554260 N
 9. [II/1-16] NE of NE or SE of section 15 T. 17S., R. 7E.
 10. Map Reference: Hiawatha, Utah Series: 15M Date: 1923
 11. Aerial Photo Data: NA

12. Site Location: Site is situated on a low knoll lying at the head of a draw - south fork of Deer Creek. Site lies between forks of drainage and ca. 100 m. south of aspen tree line which extends across (E-W) the draw.

13. Land Owner [II/17-18]: Private
 BLM District/Forest [II/19]: NA
 14. Site Name/Previous Designations: NA

15. Description of Site: Site consists of a sparse scatter of flakes and tool fragments. CRRS:S-3

16. Artifacts: Artifacts		CLASS	TYPE	QUANTITY
should be described/drawn on a continuation sheet and their locations plotted on the site map.		Ceramics [III/10-21]	<u>Northern Side</u>	<u>1</u>
CLASS QUANTITY		Proj Pat [III/1-9]		
Debitage [II/30] <u>20?</u>		Gnd Stn [II/22-29]		
Bifaces [III/1-9] <u>2?</u>		Glass [II/22-29]		
Scrapers [III/1-9]		Metal [II/22-29]		
Utilized Flakes		Nails [II/22-29]		
		Cans [II/22-29]		
		Wood [II/22-29]		
		Other [II/22-29]		

Description: Primary and secondary flakes of chert.

17. Non-Structural Features: (describe and locate on site map) [III/22-27]

- | | | | |
|--|--|---|---|
| <input type="checkbox"/> hearth/firepit (HE) | <input type="checkbox"/> rubble mound (RM) | <input type="checkbox"/> earthen mound (EM) | <input type="checkbox"/> trail/road (TR) |
| <input type="checkbox"/> midden (MD) | <input type="checkbox"/> scope circle (SC) | <input type="checkbox"/> burial (BU) | <input type="checkbox"/> L2 grade (LG) |
| <input type="checkbox"/> depression (DE) | <input type="checkbox"/> rock alignment (RA) | <input type="checkbox"/> pictograph (PI) | <input type="checkbox"/> tram way/road (TW) |
| <input type="checkbox"/> water control (WC) | <input type="checkbox"/> mine tailings (MT) | <input type="checkbox"/> petroglyph (PE) | <input type="checkbox"/> other (OT) |

Description: NA

18. Structural Features: (describe and locate on site map) [III/28-IV/6]

CLASS	MATERIAL	QUANTITY	CLASS	MATERIAL	QUANTITY
Single m			Tower		
Multiple m			Cairn		
Granary			Corral		
Cist			Dugout		
Pithouse			Kiln		
Kiva			Monument		
Well			Mine		

Description: NA

42EM1310 (443R/4)
SITE NO.

19. Cultural Affiliation [IV/7-14]: Archaic
 How Determined? Point typology
 20. Site Dimensions: 50 m x 20 m; Area [IV/11-21]: 600 sq
 21. Were surface artifacts collected? Yes; No; [IV/22] is: yes,
 attach a continuation sheet describing sampling method used.
 22. Estimated depth of fill [IV/23]: unknown - marginal
 Subsurface test? Yes; No (Include location of test on site map)
 Description:
 23. Site Condition [IV/25]: Excellent; Good; Fair; Poor
 Agent of Impact: Erosion
 24. Nat. Register Potential [IV/11]: Significant (C); Non-Significant (D)
 Justification: Site has been displaced due to erosion. Marginal
depth potential.

25. Research Potential: Low
 26. Recommended Mitigation: Avoidance
 27. Direction/Distance to Permanent water [V/5-10]: north / 1 mile
 Type/Name of Water Source [V/11]: Deer Creek
 Distance to nearest other Water Source [V/2-4]: unknown
 Type of other water source: NA
 Distance to Cultivable Soil [V/12-14]: 5 miles
 28. Topographic Location (check one under each heading) [V/15-16]

PRIMARY LANDFORM	POSITION ON LANDFORM	DEPOSITIONAL ENVIRONMENT	SECONDARY POSITION
<input type="checkbox"/> mountain spine(A)	<input type="checkbox"/> top/crest/peak(A)	<input type="checkbox"/> fan(A)	<input type="checkbox"/> top/crest/ridge(A)
<input type="checkbox"/> hill/butte(B)	<input type="checkbox"/> edge(B)	<input type="checkbox"/> talus(B)	<input type="checkbox"/> edge(B)
<input type="checkbox"/> tableland/basa(C)	<input checked="" type="checkbox"/> slope(C)	<input type="checkbox"/> dune(C)	<input checked="" type="checkbox"/> slope(C)
<input checked="" type="checkbox"/> ridge(D)	<input type="checkbox"/> toe/foot/bottom(D)	<input type="checkbox"/> stream terrace(D)	<input type="checkbox"/> toe/foot(D)
<input type="checkbox"/> valley(E)	<input type="checkbox"/> saddle/pass(E)	<input type="checkbox"/> playa(E)	<input type="checkbox"/> cutbank(E)
<input type="checkbox"/> plain(F)	<input type="checkbox"/> bench/ledge(F)	<input type="checkbox"/> shore feature	<input type="checkbox"/> detached conolith(F)
<input type="checkbox"/> canyon(G)	<input type="checkbox"/> rimrock(G)	<input type="checkbox"/> extinct lake(F)	<input type="checkbox"/> interior(G)
	<input type="checkbox"/> interior(H)	<input type="checkbox"/> extant lake(G)	<input type="checkbox"/> step(H)
		<input type="checkbox"/> alluvial plain(H)	<input type="checkbox"/> ripet(I)
		<input type="checkbox"/> coluvium(I)	<input type="checkbox"/> port. geo. feature(J)
		<input type="checkbox"/> moraine(J)	<input type="checkbox"/> spring mound/bog(K)
		<input type="checkbox"/> flood plain(K)	<input type="checkbox"/> cave(L)
			<input type="checkbox"/> alcove/shelter(M)
			<input type="checkbox"/> patterned ground(N)

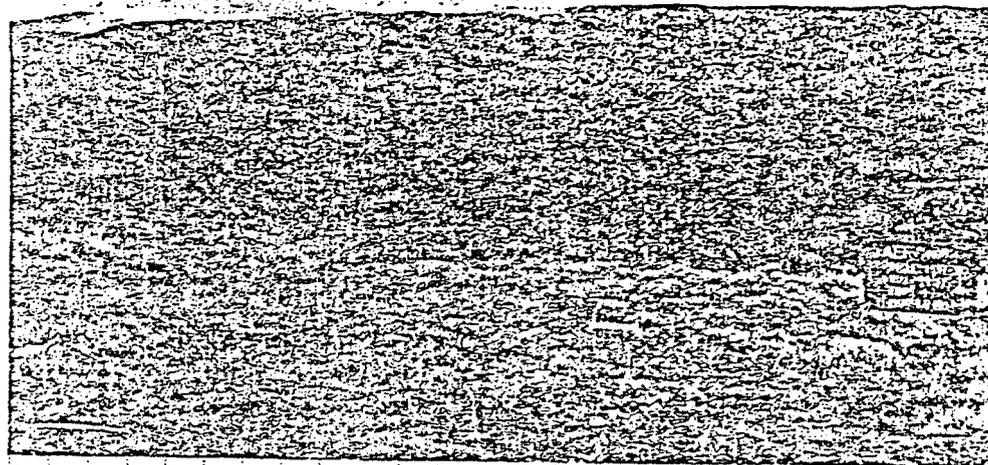
Description: Site is situated on a north-facing
slope in a sage flat which is flanked on the east and west by
tributaries of Deer Creek.

29. Degree/Aspect of slope [V/19-23]:
 30. Vegetation COMMUNITY and association [V/24-25]:

<input type="checkbox"/> ALPINE GRASSLAND(A)	<input type="checkbox"/> YELLOW PINE-OAK(BE)	<input type="checkbox"/> COLD DESERT SCRUB(FE)	<input type="checkbox"/> SALT DESERT SCRUB(GE)	<input type="checkbox"/> WARM DESERT S
<input type="checkbox"/> SPRUCE FIR(BE)	<input type="checkbox"/> ponderosa pine(BA)	<input type="checkbox"/> sagebrush(FA)	<input type="checkbox"/> greasewood(CA)	<input type="checkbox"/> desert saltbr
<input type="checkbox"/> Gambel's(BA)	<input type="checkbox"/> oakbrush(DE)	<input type="checkbox"/> small sagebrush(FB)	<input type="checkbox"/> greewood-shadsal(CB)	<input type="checkbox"/> creosote bush
<input type="checkbox"/> white fir(BE)	<input checked="" type="checkbox"/> Mountain brush(DC)	<input type="checkbox"/> little rabbitbrush(FC)	<input type="checkbox"/> seepweed(CC)	<input type="checkbox"/> creosote/burn
<input type="checkbox"/> ALPINE DOUGLAS FIR(CA)	<input type="checkbox"/> maple(DD)	<input type="checkbox"/> shadsal(FD)	<input type="checkbox"/> pickleweed/sambine(CD)	<input type="checkbox"/> Joshua tree(E
<input type="checkbox"/> timber pine(CA)	<input type="checkbox"/> streamside(DZ)	<input type="checkbox"/> bottlebrush(FE)	<input type="checkbox"/> saltgrass(GF)	<input type="checkbox"/> YARSE COMMUN
<input type="checkbox"/> Douglas fir(CB)		<input type="checkbox"/> wisper-as(FE)	<input type="checkbox"/> alkali sacaton(GF)	
<input type="checkbox"/> lodgepole pine(CC)	<input type="checkbox"/> PAINS/PRAIRIE(H)	<input type="checkbox"/> boy-sage/blackbrush(FC)	<input type="checkbox"/> rabbitbrush(GG)	<input type="checkbox"/> ALPINE PLAIN
<input type="checkbox"/> bristlecone pine(CD)	<input type="checkbox"/> grasslands(IA)	<input type="checkbox"/> bud sagebrush(FE)		<input type="checkbox"/> PLAIN/DRY LA
<input checked="" type="checkbox"/> Aspen(CZ)	<input type="checkbox"/> piñon-juniper(H)	<input type="checkbox"/> nat saltbrush(FE)		<input type="checkbox"/> WASTELAND(IA)
<input type="checkbox"/> streamside(CD)	<input type="checkbox"/> streamside(IC)	<input type="checkbox"/> gray molly(FE)		
<input type="checkbox"/> meadow grassland(CD)		<input type="checkbox"/> streamside(FE)		<input type="checkbox"/> CRESTED B

Description: Site is on sage covered slope with aspen
communities to the west and north.

31. Next nearest plant association/distance: Douglas Fir-Ponderosa to
 32. Photograph Numbers [V/26]: 433R-1 (4)
 33. Recorded by: F. R. Hauck
 Survey Org. [V/27-28]: AERC Date: 9-9-80
 Assisting Crew Members: V. G. Norman and M. Sloan



35. Encoding Form: (all entries are right justified)

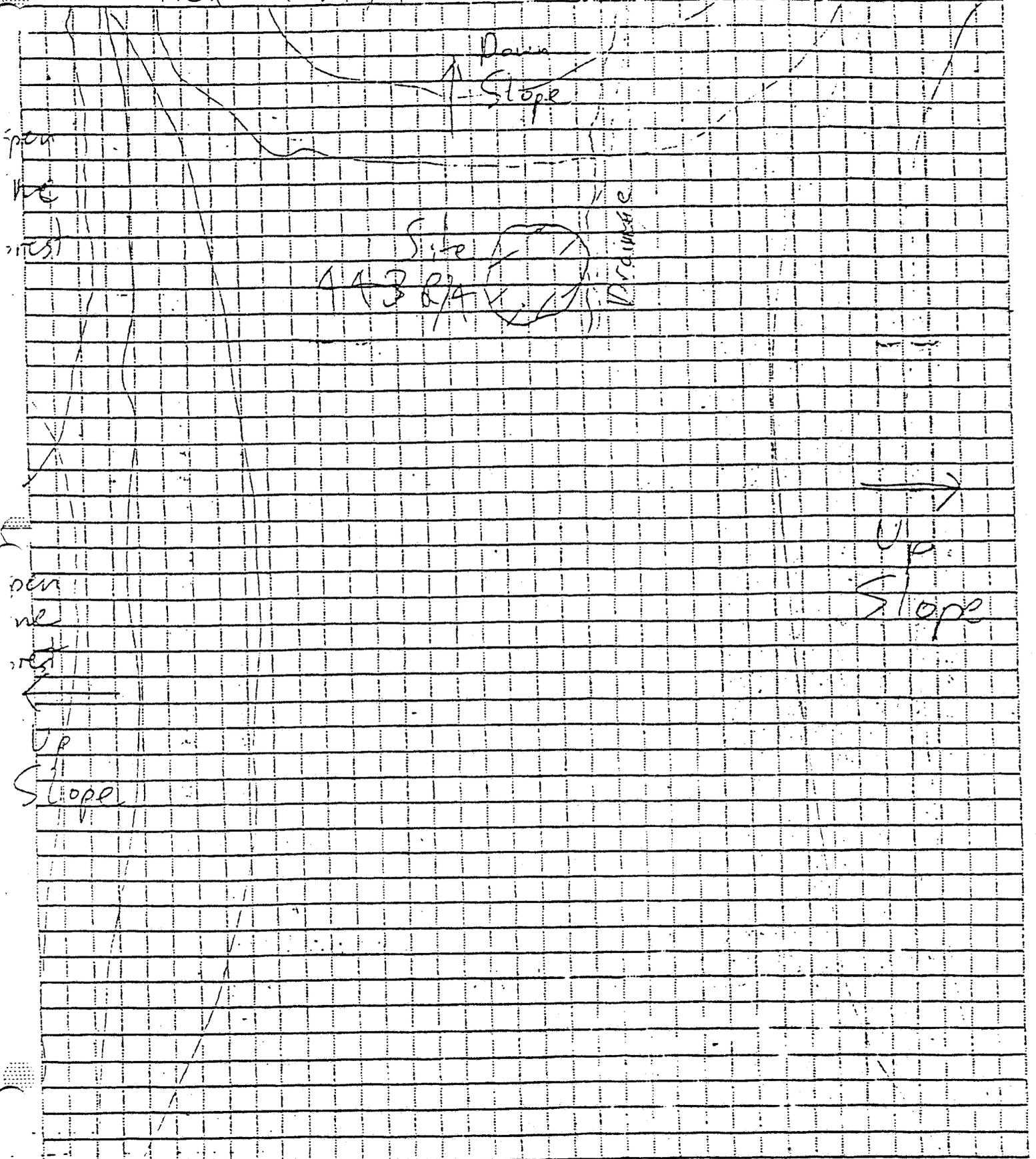
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
I	4	2	E	M	.	1	3	1	P	9	0	5	0	1	2	7	9	0	1	4	0	4	3	5	4	2	6	0				
II	N	E	N	E	S	E	1	5	1	7	S	7	E	P	R																	
III	2	F	2	1	C	B																										
IV							A	R																								
V	D	1	G	.	0	1	6	B	8	0	D	C	-	C																		
VI																																

Form must be accompanied by a site map; photocopy of U.S.G.S. topo map with T., R., scale, and quad name; photographs of the site; and artifact sketches (if applicable).

AERC 443R/4

UPL 80-1

9-9-80



IMACS SITE FORM

Part A - Administrative Data

INTERMOUNTAIN ANTIQUITIES COMPUTER SYSTEM

Form approved for use by
BLM - Utah, Idaho, Nevada
Division of State History - Utah
USFS - Intermountain Region

*1. State No. 42Em1633
*2. Agency No. _____
3. Temp No. AERC 797R/1

4. State Utah County _____
5. Project Utah Power & Light - East Mountain Mine Projects
*6. Report No. _____
7. Site Name Old Johnson Mines
8. Class Prehistoric Historic Paleontologic Ethnographic
9. Site Type Mine Portals and Service Area
*10. Elevation 7250 ft.
*11. UTM Grid Zone 12 483,575 m E 4,351,900 m N
*12. SW of SW of NE of Section 25 T. 17S R. 6E
*13. Meridian Salt Lake B&M
*14. Map Reference Hiawatha, Utah 15 Minute USGS
15. Aerial Photo NA

16. Location and Access The site is situated in Cottonwood Canyon about three miles to the north of the junction of Highway 29 which goes from Orangeville to Joe's Valley. The historic site is on the east slope of the canyon opposite the Trail Mountain Mine.

*17. Land Owner Private
*18. Federal Admin. Units Forest _____ District _____

*19. Planning Units (USFS only) _____

20. Site Description The Johnson Mine is an historic site which was active in mining coal from 1909 until 1948. It included the Twin City, Shumway, and Cottonwood Mines (see Doelling, H. H., 1972 Central Utah Coal Fields Monograph Series No. 3, UGMS, Salt Lake City). At the present the Johnson Mines site includes two walled-in portals, a mine terrace associated with the portals, the remnants of a coal slide or chute, a storage area under a rock walled boulder, an outhouse, and the old weigh house structure.

*21. Site Condition Excellent (A) Good (B) Fair (C) Poor (D)

*22. Impact Agent(s) Road development and slope construction and stabilization above the Cottonwood Canyon road have disturbed some site loci. Vandalis

*23. Nat. Register Status Significant (C) Non-Significant (D) Unevaluated (USFS only) (Z)
Justify Site as an integral unit is significant.

24. Photos Roll 797R-1 (Frames 1-20)

25. Recorded by E. R. Hauck

*26. Survey Organization AERC *28. Survey Date 5-22-83

27. Assisting Crew Members None

Part C - Historic Sites

Site No.(s) 42Em1633
797R/1

*11. Glass	QUANTITY	MANUFACTURE	COLOR	FUNCTION

Describe Window pane glass-pale green tint, ca. 20 mm. thick.

12. Maximum Density-#/sq m (glass and ceramics) _____

- *13. Non-Architectural Features (locate on site map)
- | | | | |
|---|---|---|---|
| <input checked="" type="checkbox"/> Trail/Road (TR) | <input checked="" type="checkbox"/> Dump (DU) | <input type="checkbox"/> Dam, Earthen (DA) | <input type="checkbox"/> Hearth/Campfire (HE) |
| <input checked="" type="checkbox"/> Tailings (MT, ML) | <input type="checkbox"/> Depression (DE) | <input type="checkbox"/> Ditch (DI) | <input type="checkbox"/> Quarry (QU) |
| <input checked="" type="checkbox"/> Rock Alignment (RA) | <input type="checkbox"/> Cemetery/Burial (CB) | <input checked="" type="checkbox"/> Inscriptions (IN) | <input type="checkbox"/> Other (OT) |

Describe An old mule trail extends from the canyon bottom up above the house to the portal terrace. The only tailing area is situated in the slide zone where the coal shute from the upper terrace in front of the south portal carried the coal down to the weighhouse level. Several support posts are still standing in the tailings-shute zone. Rock alignments are associated with an enclosed overhang which probably served as a storage area and powder house

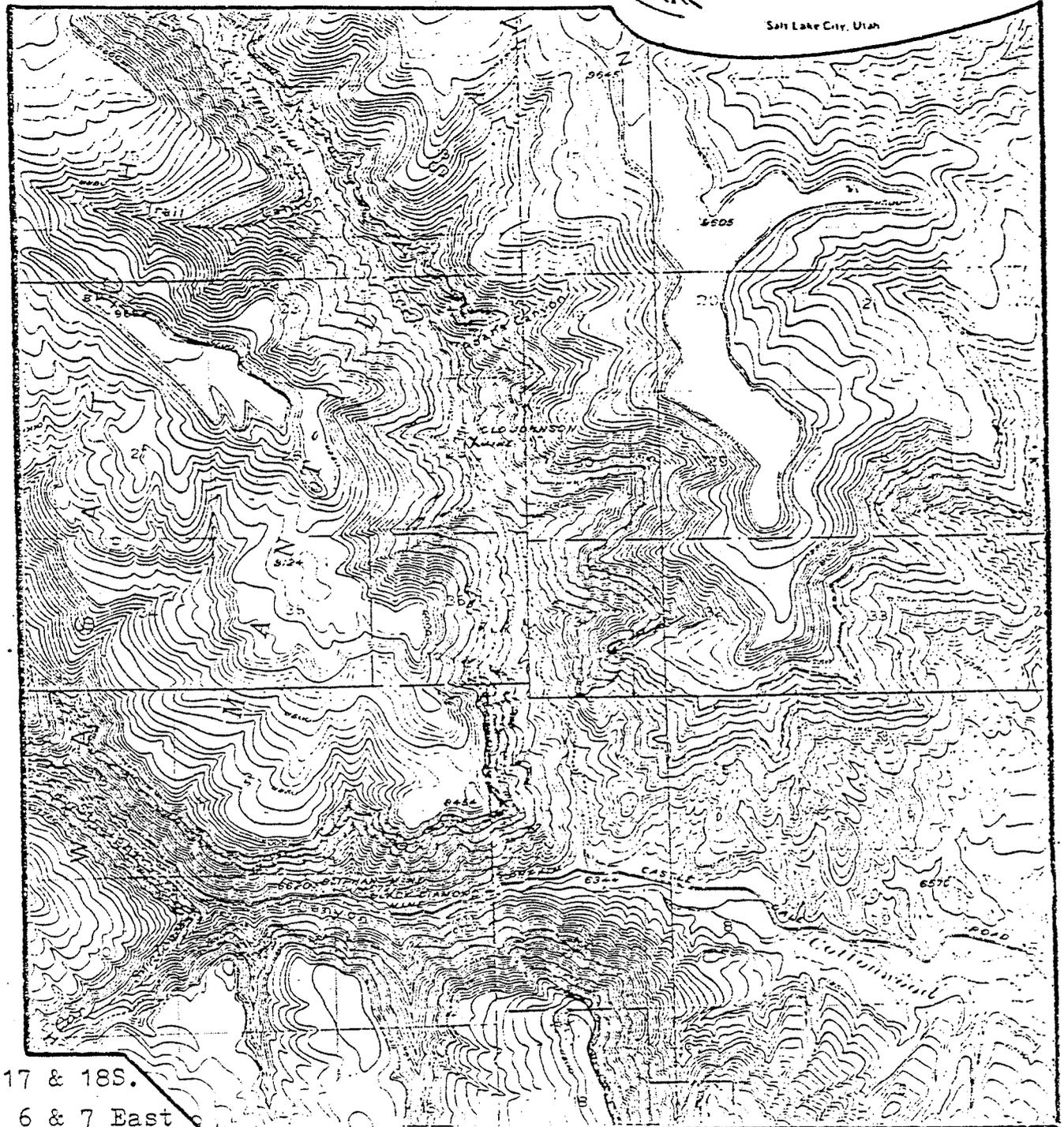
*14. Architectural Features (locate on site map)

QUANTITY	MATERIAL	TYPE	QUANTITY	MATERIAL	TYPE	house
1	Wood	Weighhouse				
1	Wood	Outhouse				
1	Rock Wall	Walled Overhang				
2		Mine Portals				
1	Wood-rock	Root Cellar				

Describe Weighhouse is two story, wooden frame structure featuring a cedar shingle roof, trimmed wood siding, round headed nails and a rock footing foundation. Outhouse is of pine plank construction and contains a concrete floor and seat support. The walled overhang is above the house and outhouse and is adjacent to the coal shute slope below the portal terrace. It may have been used as a storage area and possibly a powder house. The mine portals have both been*

15. Comments/Continuations _____

*14 cont. walled up to prevent entry. The root cellar is of a log super-structure constructed on in situ boulder and rock wall base. The door into the root cellar was cut out after the weighhouse had been constructed. There is in the weighhouse evidence of a fire starting in the roof around the chimney. The roof planking which had been burnt most severely had been replaced and the roof repaired. Weighhouse measures 7 x 5.5 meters. Root cellar is ca. 3.5 x 3 meters. Outhouse is ca. 1.25 x 1.25, also has cedar shingles. The walled-in overhang measures ca. 3 x 12 meters and contains a wooden framed window encased in the loose rock wall.



T. 17 & 18S.

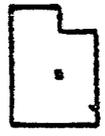
R. 6 & 7 East

Meridian: Salt Lake B. & M.

Quod:

Hiawatha, Utah

15 minute-USGS



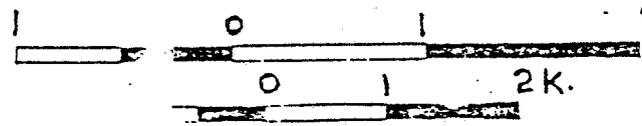
Project: UPL-83-2	Location of the Old Johnson Mines in the Cottonwood Canyon Locality of Emery County, Utah
Series: Central Utah	
Date: 5-26-83	

Legend:

Mine Site
(42Em1633)

x

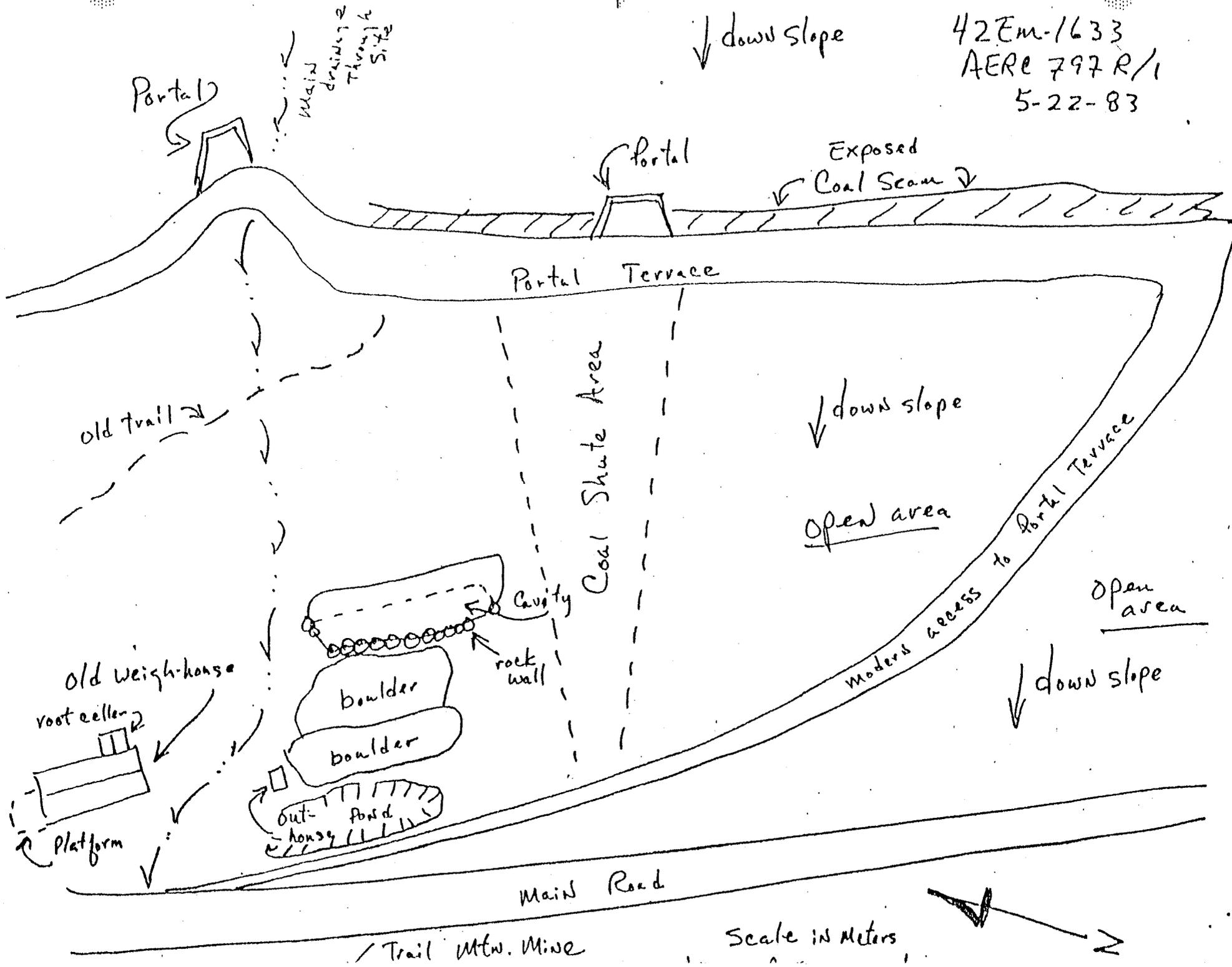
2 M.



Scale

42 Em-1633
AERE 797 R/1
5-22-83

↓ down slope



Exposed Coal Seam

Portal Terrace

↓ down slope

Open area

Open area

↓ down slope

Coal Shute Area

Main Road

Trail Mt. Mine

Scale in Meters



HYDROLOGY AND GEOLOGY GENERAL REQUIREMENTS (783.13)

The Des-Bee-Dove Mine area is located in the central portion of the Wasatch Plateau Coal Field in Emery County, Utah (Figure 2-1). Generally, this area is a flat-topped mesa surrounded by heavily vegetated slopes which extend to precipitous cliffs leading to the valley below. The plateau generally has a vertical relief of up to 2,500 feet, rising from Castle Valley below. The following discussion summarizes the structural geology, stratigraphy, hydrology, and economic coal deposits of the region and the Des-Bee-Dove Mine area.

Data Collection

Utah Power & Light Company has been collecting data regarding the Des-Bee-Dove Mine area and adjacent properties since 1971. As a result, 79 exploration drill holes have been completed from the surface wherein data were collected regarding the coal seams and enclosing strata (see Map 2-1). Nine of these holes were core drilled through the coal zone and all were geophysically logged. Generally, these surface holes are located on about 1/2 to 3/4 mile centers. In addition to these holes, over 90 holes have been drilled from within the mines which provide valuable data on as close as 500 foot centers.

The coal seams exposed on outcrop and within the mine workings have been mapped in detail providing data which is valuable in understanding the coal geology.

Revised 11/21/83

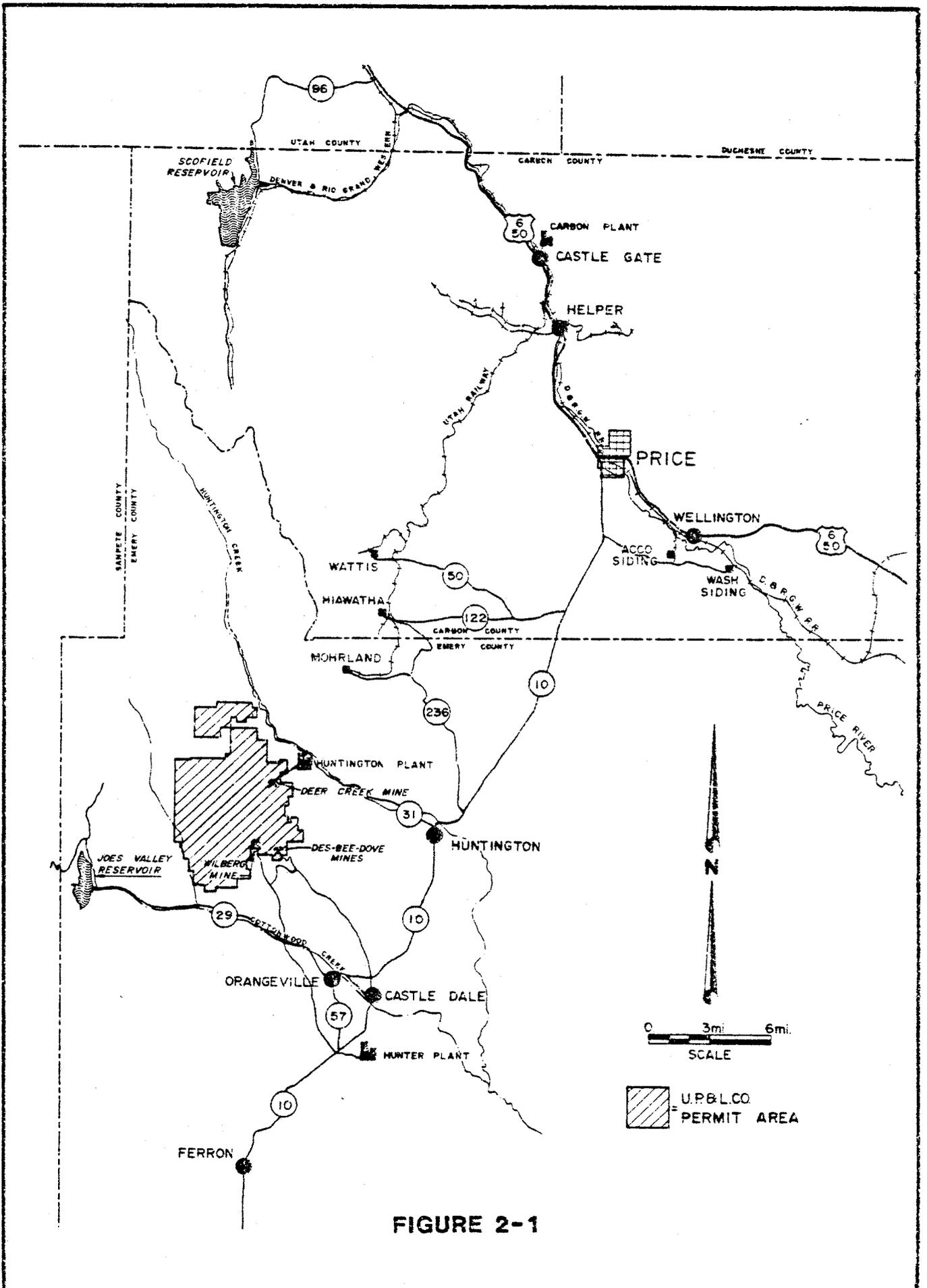


FIGURE 2-1

The interpretations made herein are based on data collected from all of the above sources in addition to the published regional data. All of these data allow the construction of a geologic and hydrologic model which represents the conditions present in the area of the Deer Creek Mine and surrounding areas.

In addition to the data and interpretations submitted herein, similar interpretations have been submitted to the U. S. Geological Survey's Mining Supervisors Office in compliance with #30 CFR 211 and the General Mining Order #1.

The applicant has made a practice of submitting to the BLM, each year, copies of both lithologic and geophysical logs of all drill holes, surface and underground, which are drilled within federal leases or on fee land. At the time the mine permit was completed, copies of all logs had been submitted to the BLM. This practice will continue throughout the lifetime of the Des-Bee-Dove Mine.

Structure

The geologic structure of the Des-Bee-Dove Mine area is fairly simple. The strata are gently down-folded in the area of the Straight Canyon syncline which is present to the northwest of the Des-Bee-Dove Mine area (see Map 2-2). Dips in the syncline range from two to six degrees with the north limb dipping the steepest.

The seams generally strike N20°-30°E and dip one to three degrees in a westerly direction throughout the area of

Revised 11/21/83

the current Des-Bee-Dove Mine workings. However, to the northwest of the Straight Canyon syncline both the Hiawatha and Blind Canyon Seam dip in a southeast direction at three to five degrees. The dip and strike of the coal seams can be better visualized on Maps 2-2 and 2-3 which are included herein.

The strata within the property has been offset by a series of north-south trending fault zones. Generally, these faults are nearly vertical and do not have significant amounts of fault gouge or drag associated with them. The most striking of these faults is the Pleasant Valley Fault which is located one mile west of the Des-Bee-Dove Mines. This fault, which consists of two parallel fractures, has a total displacement of about 140 feet being downthrown on its east side. The Des-Bee-Dove Mines have intersected three north-south trending faults. These are, from west to east, the Deer Creek, Bear Creek Canyon, and Maple Gulch Faults (see Maps 2-2 and 2-3 and Cross Section 2-4).

The Deer Creek Fault forms the western boundary of the Des-Bee-Dove Mine area. Its displacement ranges from 100 to 170 feet with the eastern side being downthrown. The displacement along this fault increases in the northern part of the Des-Bee-Dove Mine area.

The Bear Creek Canyon Fault was intersected by the Little Dove Mine in the northwest quarter of Section 25; Township 17 South, Range 7 East. At that point the fault's displacement was less than three feet. The mining progressed

Revised 11/21/83

through the fault and into the graben formed by the Deer Creek and Bear Creek Canyon Faults. The displacement of the Bear Creek Canyon Fault increases to nearly 200 feet to the north of the Des-Bee-Dove Mine area.

The Maple Gulch Fault forms the eastern boundary of the current workings of the Des-Bee-Dove Mine. This fault has a displacement of about 80 feet with the east side being downthrown.

A fault system has been identified within the Deer Creek Mine area to the northwest which trends in a northeast-southwest direction along the Straight Canyon synclinal axis (see Map 2-2). In the northeast corner of federal lease U-084923, this structure called the Roans Canyon Fault graben, consists of up to six normal faults with displacements up to eighty feet. Within this fault system the displacement has positioned the Blind Canyon Seam in close proximity to the Hiawatha Seam in some cases.

Stratigraphy

The rock formations exposed in the Des-Bee-Dove Mine area range from Upper Cretaceous to Tertiary in age (see Figure 2-2). These formations in ascending order are the Masuk shale member of the Mancos Shale, Starpoint Sandstone, Blackhawk, Castlegate Sandstone, Price River, North Horn, and Flagstaff Formations. The coal deposits are restricted to the lower portions of the Blackhawk Formation.

The Masuk Shale is the upper member of the Mancos Shale. It consists of light to medium gray marine mudstones.

Revised 11/21/83

Figure 2-2
Stratigraphy of East Mountain
(Doelling, 1972)

System	Series	Stratigraphic Unit	Thickness (feet)	Description	
TERTIARY	Eocene	Green River Formation	-	Chiefly greenish lacustrine shale and siltstone.	
		Wasatch Group	Colton Formation	300-1,500	Varicolored shale with sandstone and limestone lenses, thickest to the north.
	Flagstaff Limestone		200-1,500	Dark yellow-gray to cream limestone, evenly bedded with minor amounts of sandstone, shale and volcanic ash, ledge former.	
	North Horn Formation (Lower Wasatch)		500-2,500	Variegated shales with subordinate sandstone, conglomerate and freshwater limestone, thickens to north, slope former.	
	Maestrichthian				
CRETACEOUS	Campanian	Mesaverde Group	Price River Formation	600-1,000	Gray to white gritty sandstone interbedded with subordinate shale and conglomerate, ledge and slope former.
			Castlegate Sandstone	150- 500	White to gray, coarse-grained often conglomeric sandstone, cliff former, weathers to shades of brown.
			Blackhawk Formation <i>MAJOR COAL SEAMS</i>	700-1,000	Yellow to gray, fine- to medium-grained sandstone, interbedded with subordinate gray and carbonaceous shale, several thick <i>coal</i> seams.
			Star Point Sandstone	90-1,000	Yellow-gray massive cliff-forming sandstone, often in several tongues separated by Masuk Shale, thickens westward.
	Santonian	Mancos Shale	Masuk Shale	300-1,300	Yellow to blue-gray sandy shale, slope former, thick in north and central plateau area, thins southward.
			Emery Sandstone <i>COAL (?)</i>	50- 800	Yellow-gray friable sandstone tongue or tongues, cliff former, may contain <i>coal</i> (?) in south part of plateau if mapping is correct, thickens to west and south. <i>Coal</i> may be present in subsurface to west.
	Coniacian		Blue Gate Member	1,500-2,400	Pale blue-gray, nodular and irregularly bedded marine mudstone and siltstone with several arenaceous beds, weathers into low rolling hills and badlands, thickens northerly.
	Turonian		Ferron Sandstone Member <i>MAJOR COAL SEAMS</i>	50- 950	Alternating yellow-gray sandstone, sandy shale and gray shale with important <i>coal</i> beds of Emery coal field, resistant cliff former, thickens to the south.
			Cenomanian	Tununk Shale Member	400- 650
	Albian			Dakota Sandstone	0- 60
			<i>MINOR COAL</i>		

Generalized section of rock formations, Wasatch Plateau coal field.

Usually this formation weathers readily forming slopes which are often covered by debris. This formation is generally devoid of water.

Starpoint Sandstone

Overlying and intertonguing with the Masuk Shale is the Starpoint Sandstone. In this area the Starpoint consists of three or more cliff-forming massive sandstones totaling about 400 feet in thickness. Generally, they are fine to medium-grained and moderately well-sorted. The upper contact of the Starpoint is usually quite abrupt and readily identifiable on the outcrop. Locally, the Starpoint Sandstone exhibits aquifer characteristics.

Blackhawk Formation

The Blackhawk Formation consists of alternating mudstones, siltstones, sandstones and coal. Although coal is generally found throughout the Blackhawk Formation, the economic seams are restricted to the lower 150 feet of the formation. The sandstones contained within the Blackhawk Formation are fluvial and increase in number in the upper portions of the formation. Many of these tabular sandstone channels form local perched water tables. The total thickness of the Blackhawk Formation in the Des-Bee-Dove Mine area is about 750 feet.

Castlegate Sandstone

The Castlegate Sandstone generally caps the escarpment which surrounds the Des-Bee-Dove portal area. The Castlegate consists of about 250 feet of coarse-grained,

Revised 11/21/83

light-gray, fluvial sandstones, pebble conglomerates, and subordinate zones of mudstones. Although this sandstone is very permeable, it lacks water because of insufficient recharge.

Price River Formation

The Price River Formation overlies the Castlegate Sandstone. The formation is about 500 feet thick and forms slopes which extend upward from the Castlegate escarpment. Fine-grained, poorly sorted, sandstones dominate the Price River Formation but some mudstones are present. The Price River Formation generally lacks water.

North Horn Formation

The North Horn Formation is about 850 to 900 feet thick in the Des-Bee-Dove Mine area. Mudstones dominate the rock types present. These mudstones are generally grey to light brown in color. Localized, lenticular sandstone channels are present in this formation throughout. These sandstone beds are more common near the upper and lower contacts of the formation and many times host localized perched water tables.

Flagstaff Formation

The youngest formation exposed in the area of the Des-Bee-Dove Mine but not found within the permit boundary is the Flagstaff Formation. It consists of white to light-gray, lacustrine limestone. An erosional remnant of 100 to 150 feet of this formation remains forming a cap on the highest

Revised 11/21/83

plateaus of the area. The formation is fairly well fractured allowing surface water to percolate down to lower strata.

Economic Coal Occurrences

Two economic coal seams are present within the Des-Bee-Dove permit area : the Hiawatha, and the Blind Canyon Seams. The current workings of the Beehive and Little Dove Mines are located in the upper, or Blind Canyon Seam, while the Deseret Mine is located in the lower, or Hiawatha Seam.

Hiawatha Seam

The Hiawatha Seam is of minable thickness in both the southern and extreme northern portions of the East Mountain property (see Map 2-5). This seam which rests directly on the Starpoint Sandstone ranges in thickness from 16 feet to less than 5 feet. The Hiawatha Seam is not present throughout a major portion of the property. This lack of coal is due to a major distributary river channel which flowed through the coal swamp in an easterly direction. In some areas near the outcrop the Hiawatha Seam has been burned.

Blind Canyon Seam

The second minable seam on the Des-Bee-Dove Mine property is the Blind Canyon Seam. This seam is located from 14 to 140 feet above the Hiawatha Seam (see Map 2-6). The average separation between these seams is 70 to 80 feet but does increase up to 140 feet in the southern portion of the property. The Blind Canyon Seam is of minable thickness throughout all of the Des-Bee-Dove permit area (see Map 2-7).

Revised 11/21/83

This seam ranges in thickness from 16 feet to less than 5 feet. The Blind Canyon Seam has been extensively burned around the outcrop within the permit area in the same manner as the Hiawatha Seam.

Within the area of the Wasatch Plateau, coal seams are known to be present in two formations, the Blackhawk and the Ferron Sandstone member of the Mancos Shale. Coal seams within the Ferron Sandstone outcrop to the southeast and are of economic importance in that region (Emery Coal Field). However, the presence of these seams at depth below East Mountain can only be speculated because no data is available to prove their existence. If coal seams do exist in the Ferron Sandstone they would be present at depths 4,000 to 4,500 feet below the Des-Bee-Dove Mine workings. The future recovery of these speculative coal reserves will, in no way, be influenced by the present or proposed workings of the Des-Bee-Dove Mine.

Overburden

The coal reserves in the Des-Bee-Dove Mine area within the Blind Canyon and Hiawatha Seam are covered by up to 1,600 feet of overburden. Because the topography of these lands displays much relief, the thickness of the overburden is highly variable (see Maps 2-8, and 2-9 and cross sections 2-4). The overburden is the greatest in the central portions of the property where the plateau is capped with the North Horn Formation. In these areas the overburden ranges from

Revised 11/21/83