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 (03F/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.S. Forest Sample Unit	Acreage	Location	Cultural Resource
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 " 13	443R/X8
16	10	T.17S., R.7E., " 7	None
17	10	" " " 18 and " 19	"
18	40	" " " 20 and " 29	443R/X4
19	40	" " " 22	None
20	50	" " " 16	"
21	10	" " " 16	"
22	40	" " " 16	"
23	40	" " " 15	"
24	40	" " " 23	"

Table 1 (cont'd.)

U.S. Forest Sample Unit	Acreage	Location	Cultural Resource
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.)

Private Sample Unit	Acreage	Location	Cultural Resource
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.)

Private Sample Unit	Acreage	Location	Cultural Resource
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

AERC No.	Permanent Site No.	Artifact
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.)

AERC No.	Permanent Site No.	Artifact
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.

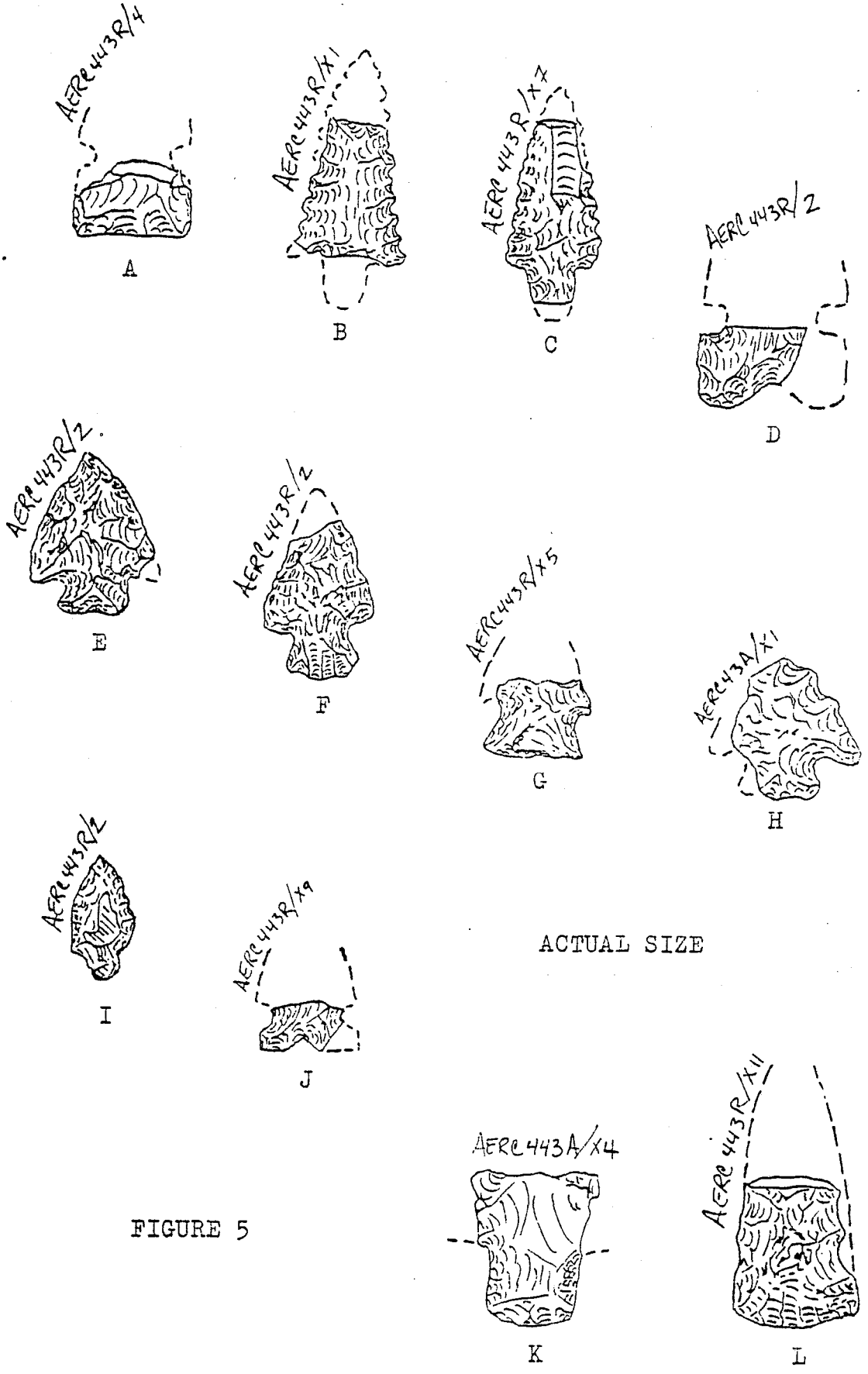

AERC443R/4
A
AERC443R/X1
B
AERC443R/X7
C
AERC443R/2
D
AERC443R/2
E
AERC443R/2
F
AERC443R/X5
G
AERC43A/X1
H
AERC443R/2
I
AERC443R/X9
J
ACTUAL SIZE
AERC443A/X4
K
AERC443R/X11
L

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.

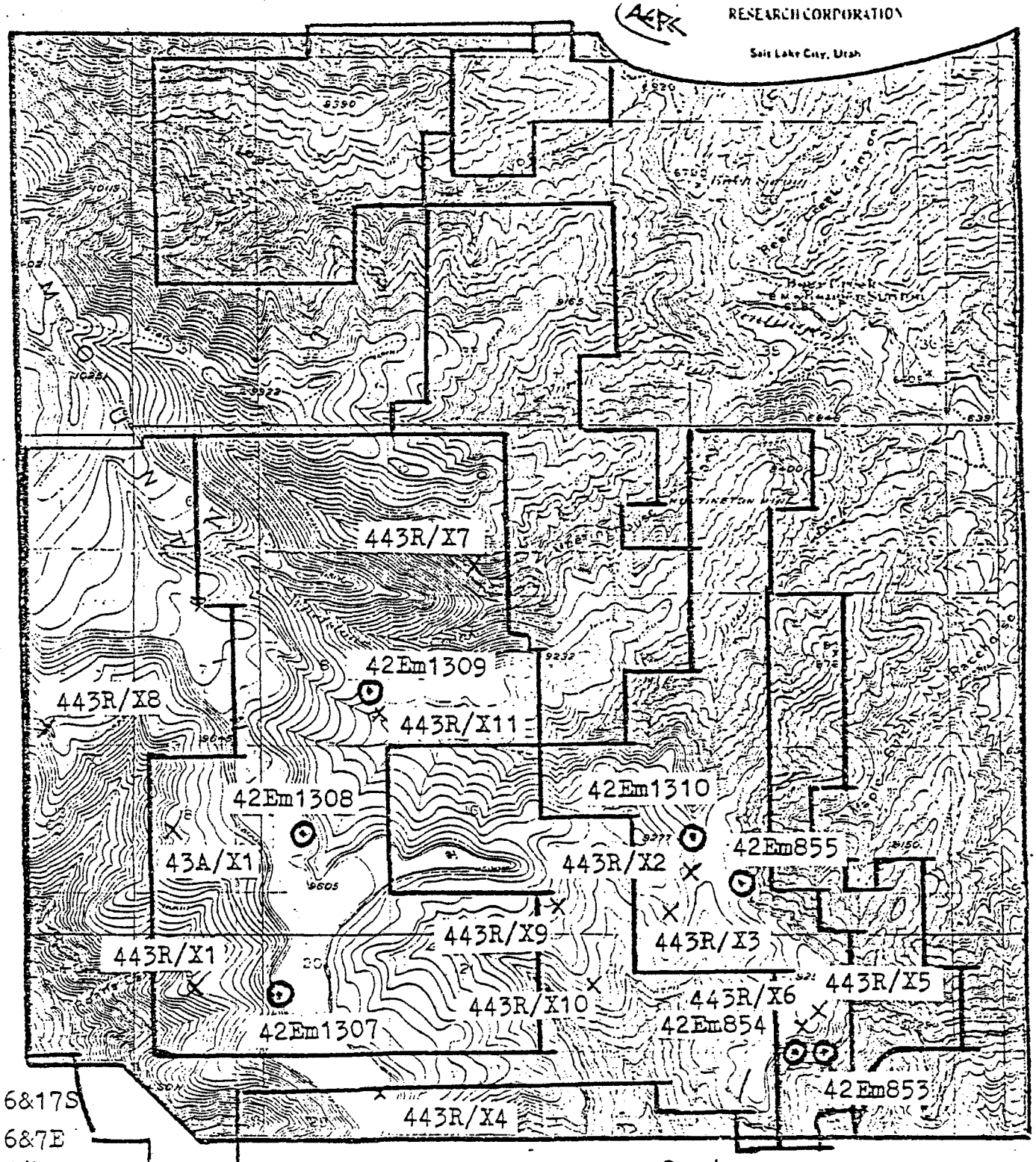
Based on the definitions of cultural resource significance (see Chapter IV), one of the seven cultural resource sites listed in Table 3 is considered eligible for nomination to the National Register of Historic Places (NRHP). Site 443R/2 (42Em1308) is a potential candidate for nomination to the Register 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

AERC Site No.	Permanent Site No.	Site Type	Culture	Land Ownership
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

Quad: 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 x

2K.
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 443R/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

Site	Quality*	Condition	CRRS Value Rating
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 revelant 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

Site	CRRS Status	Direct Impact*	Indirect Impact	Impact Agent
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 42Em1308 (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.

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APPENDIX

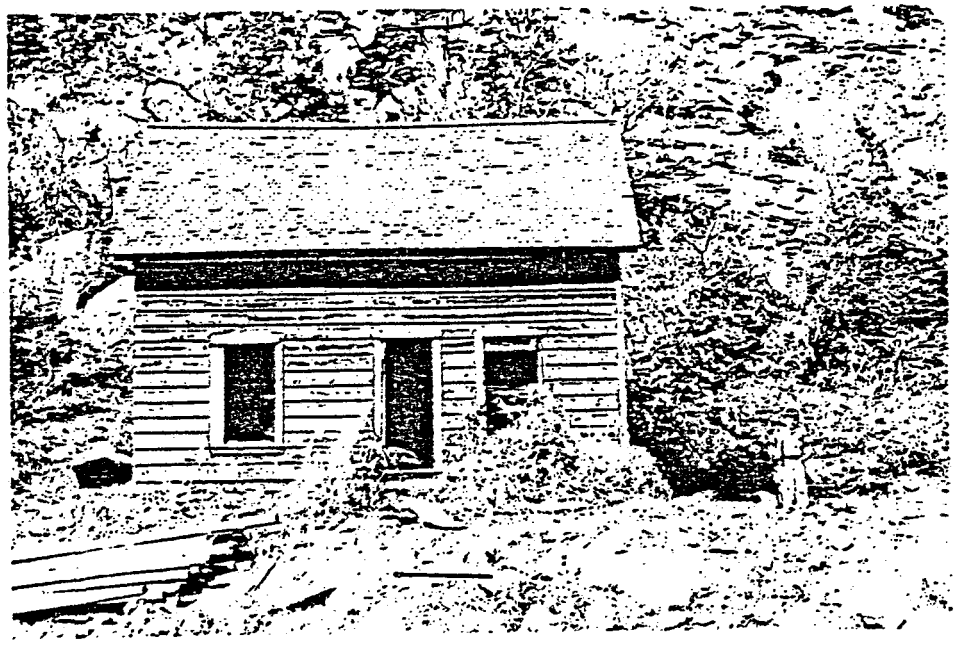
(Site Forms sent under separate
cover to relevant government agencies)

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.

Old Johnson Mines Site



WEIGH HOUSE

WEIGH HOUSE

42EM1655

Old Johnson Mines Site

WEIGH HOUSE & ROOT CELLAR

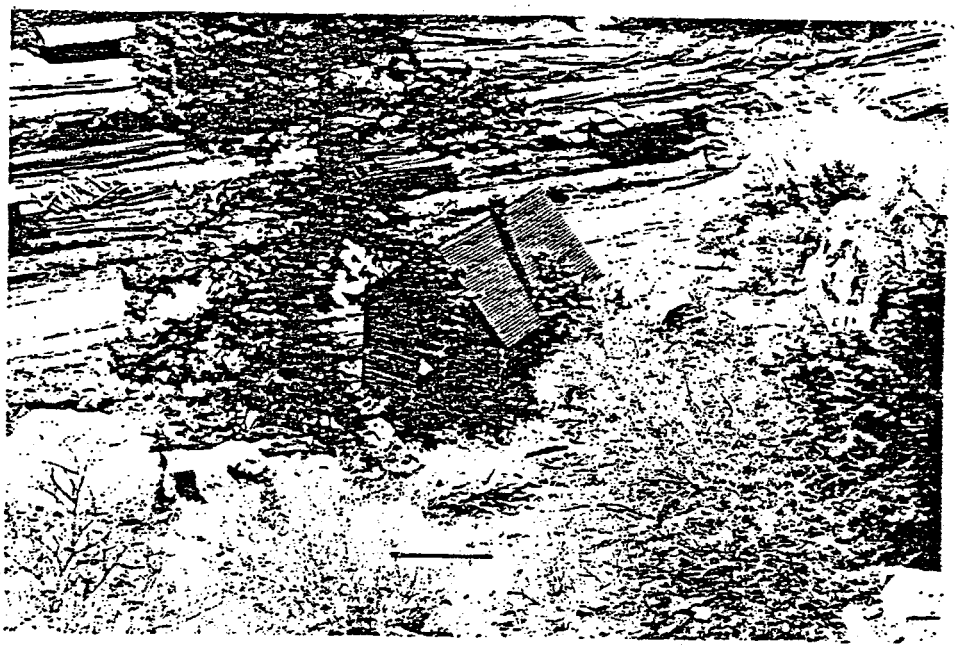
WEIGH HOUSE

WEIGH HOUSE

Front Construction

42EM1699

Old Johnson Mines Site



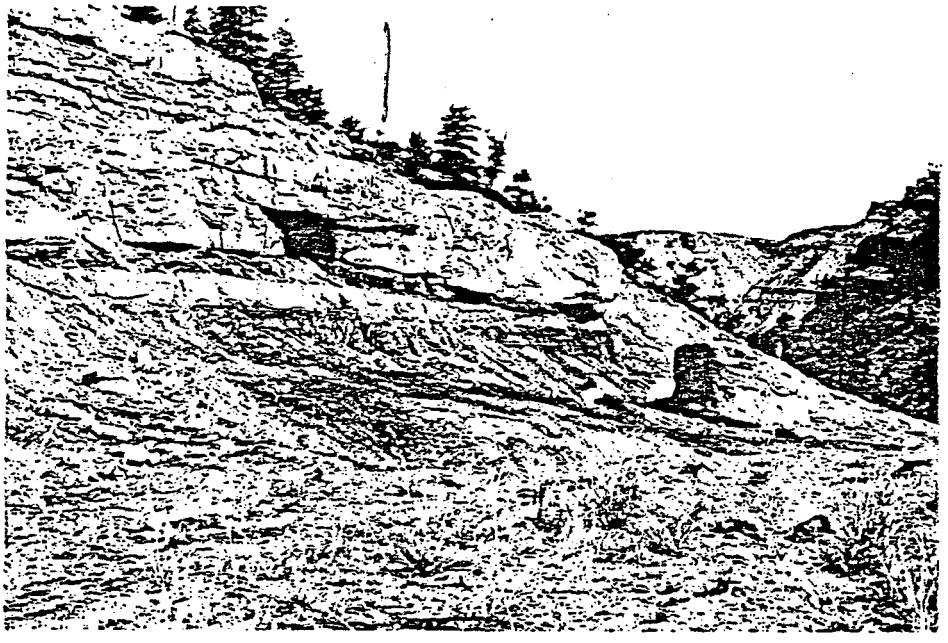
COTTONWOOD CANYON ROAD & WEIGH HOUSE

From the Portal Terrace

42EM1699

Old Johnson Mines Site

PORTAL TERRACE Looking North

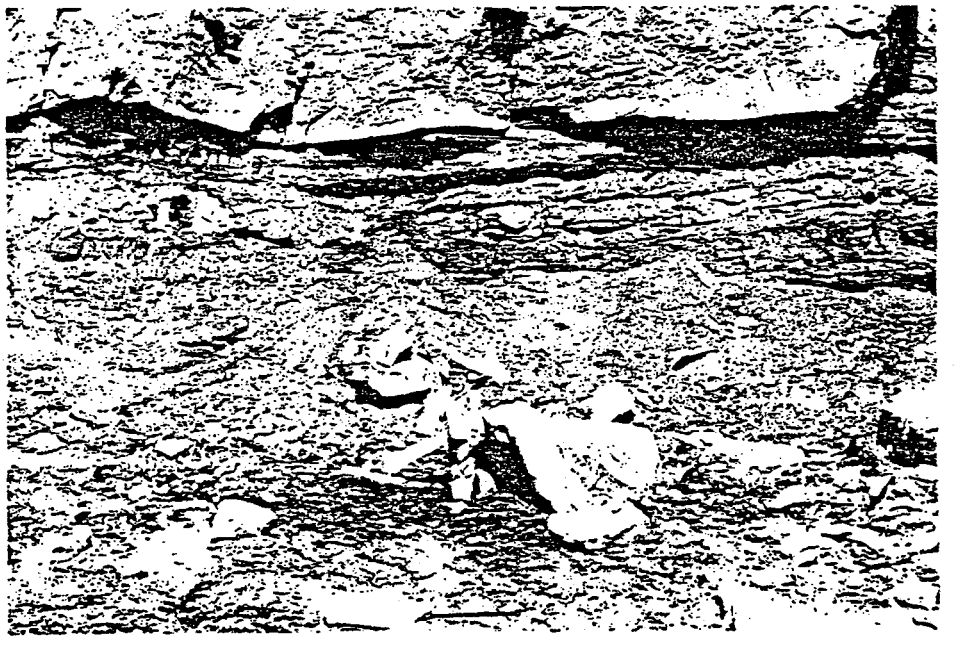


PORTAL TERRACE Looking South

42Em1633

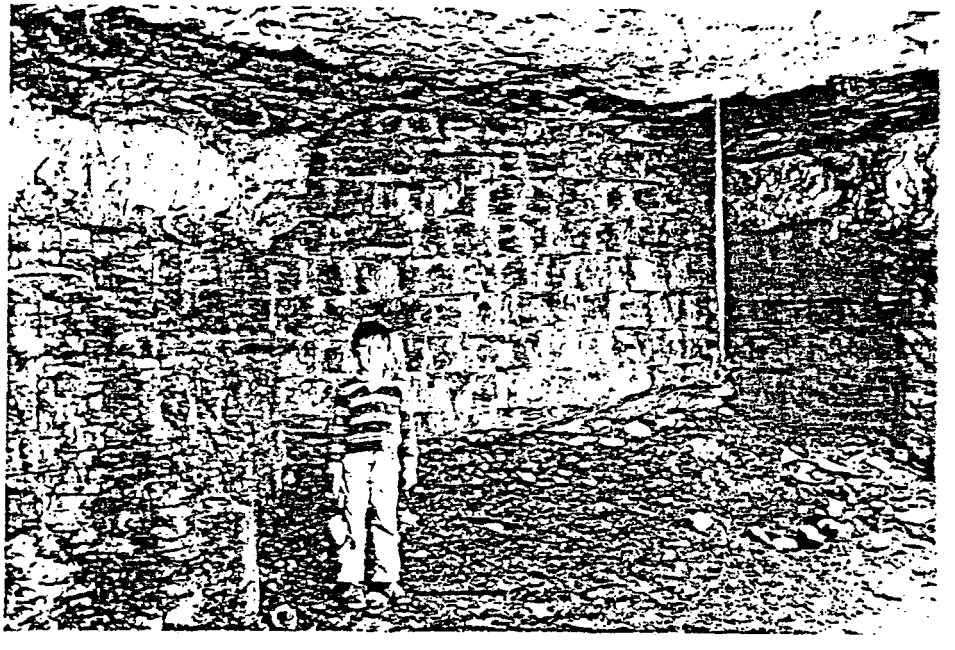
Old Johnson Mines Site

SOUTHERN END OF PORTAL TERRACE



EXPOSED COAL SEAM ON PORTAL TERRACE

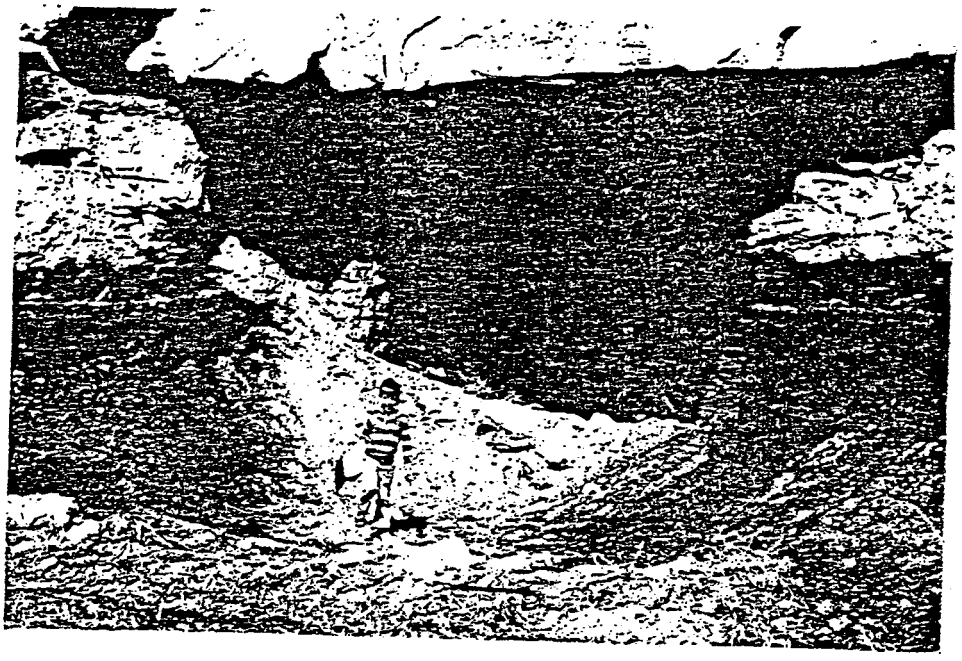
NORTH PORTAL ENTRANCE



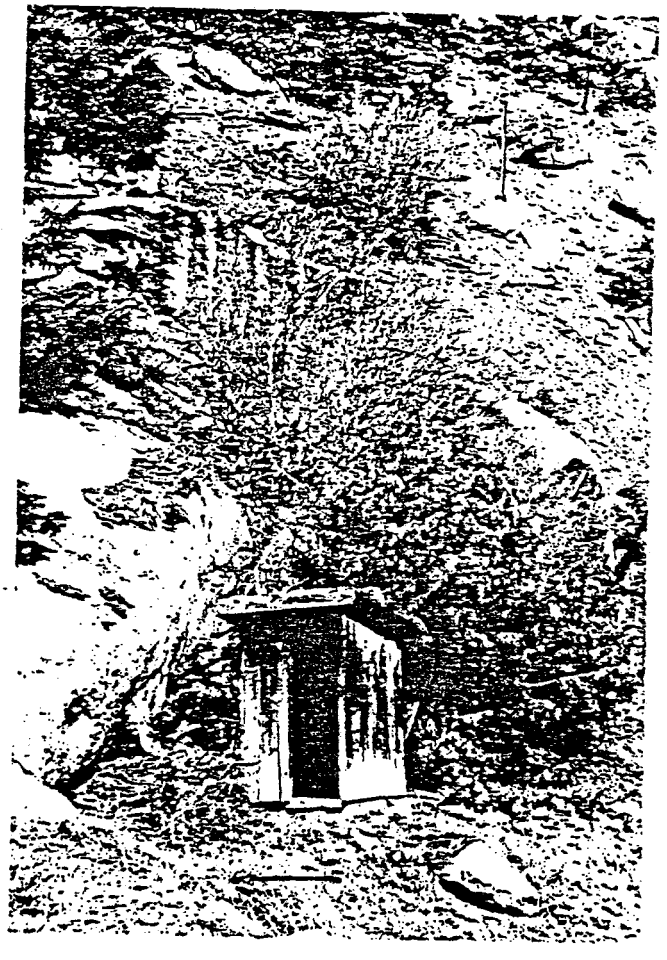
NORTH PORTAL IN DETAIL

42Em1633

Old Johnson Mines Site



SOUTH PORTAL ENTRANCE

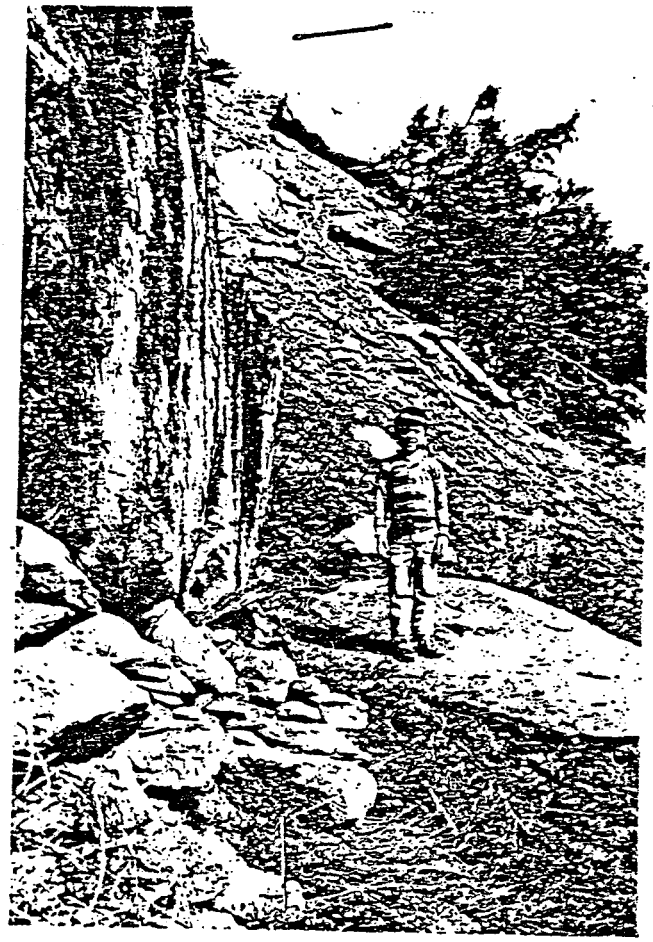


OUTHOUSE

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

42Em1633

Old Johnson Mines Site



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

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 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 actiyely 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—#BB3)

Site No.: 42Em853 AERC 03F/44

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

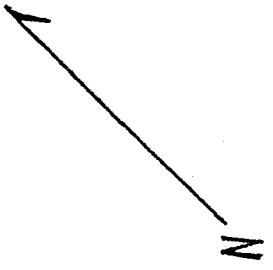
39. Kinds of Artifacts: Lithics

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



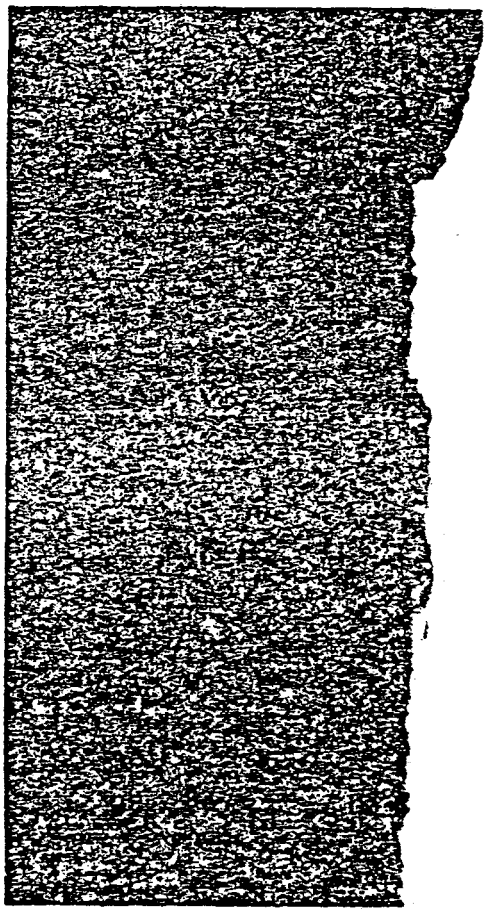
44. Type of Impact Expected: NA

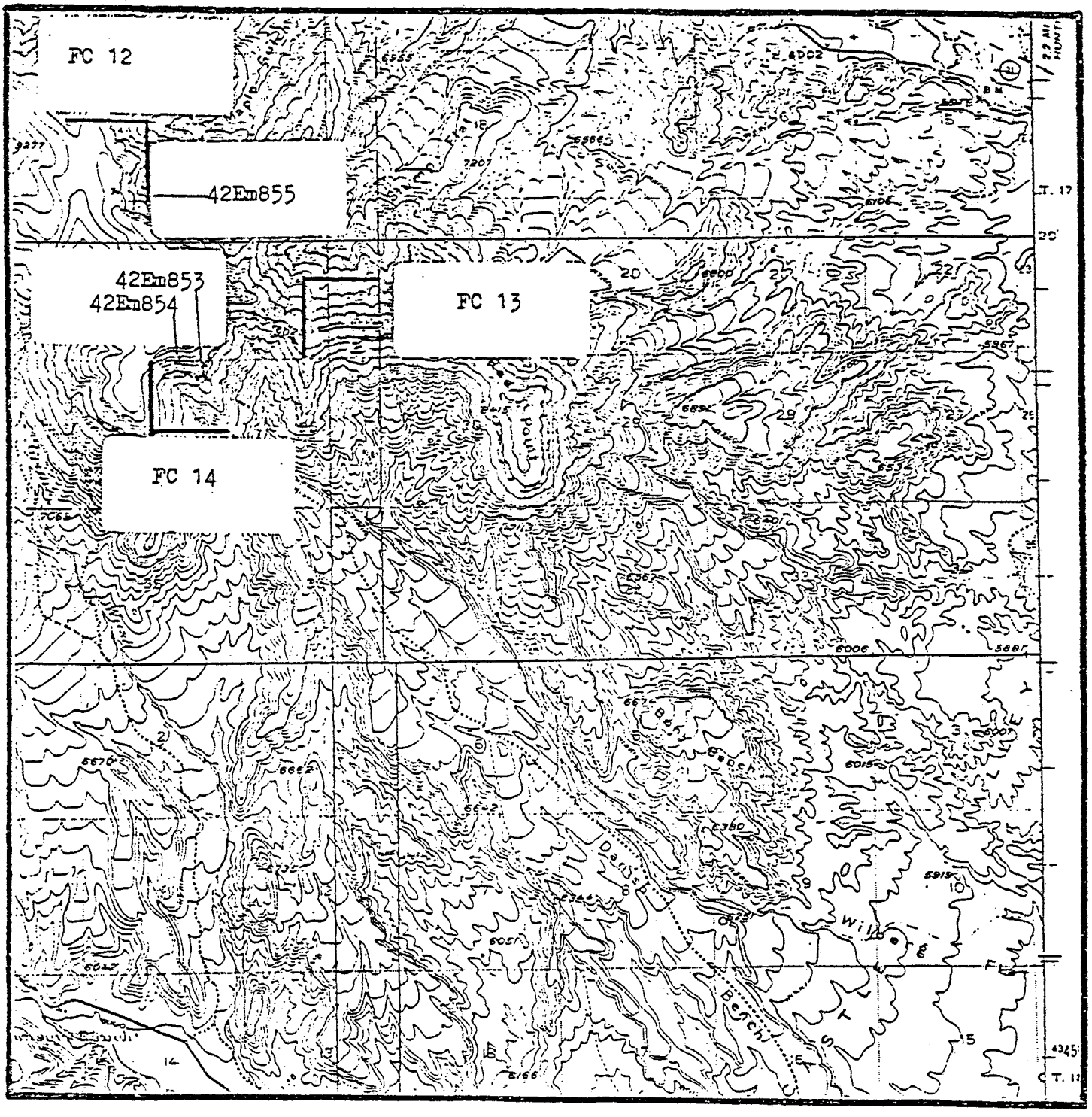
45. Mitigation Procedures Initiated: M-1

46. Mitigation Procedures Recommended: NA

47. Photographs: 03F-3(P)

48. Additional Information Attached: No





Hiawatha
Topographic Quad.
Utah

SCALE in miles

0 .5 1

15 Minute Series

Site No.: 42Em854 AERC 03F/45

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, 2° 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 sparce

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, SW¼, SE¼, SW¼
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.

Site No.: 42Em855 AERC 03F/46

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 3° 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

Site No.: 42Em855 AERC 03F/46

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

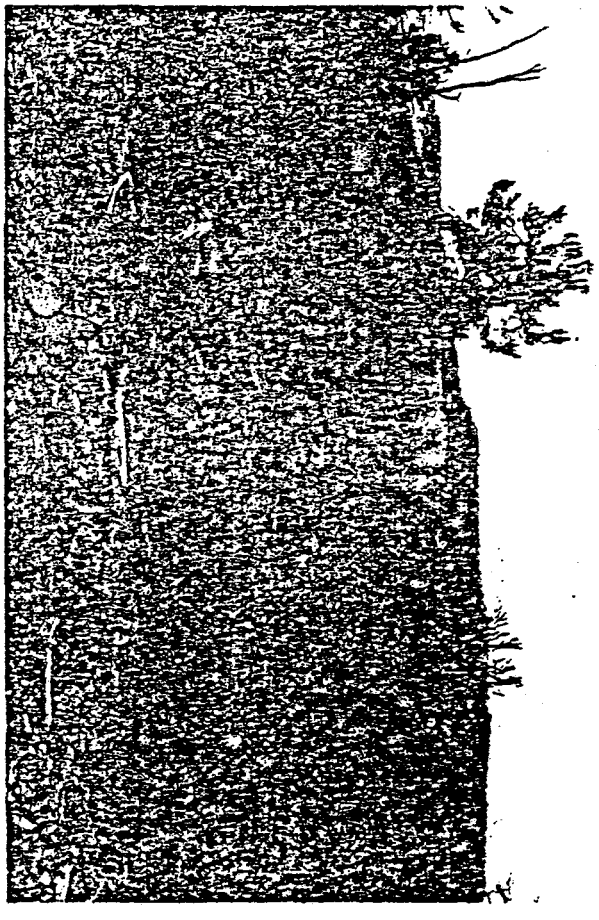
44. Type of Impact Expected: NA

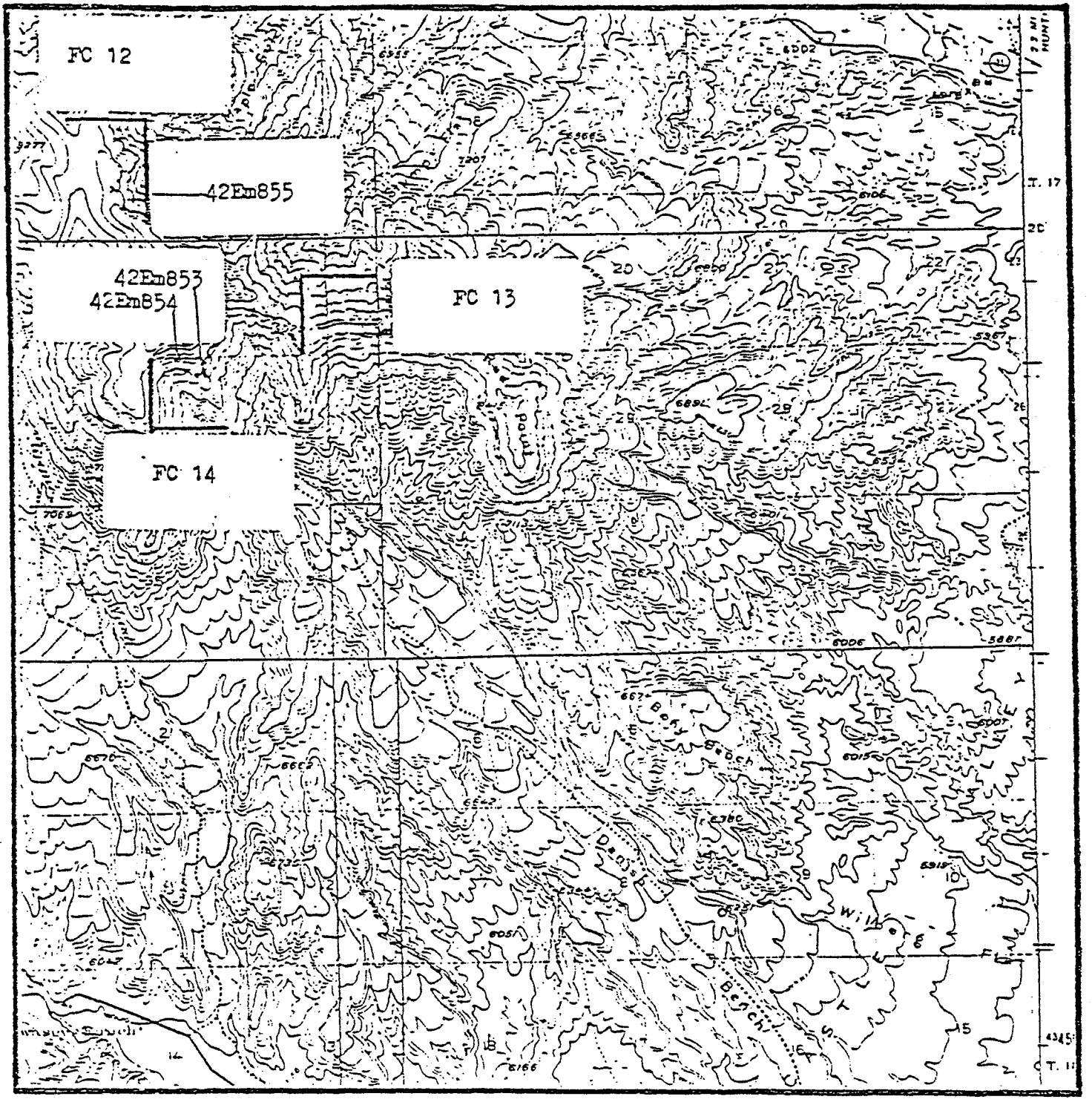
45. Mitigation Procedures Initiated: M-1

46. Mitigation Procedures Recommended: NA

47. Photographs: 03F-3 (11)

48. Additional Information Attached: No





Hiawatha
Topographic Quad.
Utah

N

SCALE in miles

0 .5 1

15 Minute Series

Bureau of Land Management
Division of State History
University of Utah Archeological Center

2. County Emery
3. Temp. No. AERC 443F/1

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] 9600 ft. X.3048= ___ m.
elevation source: Contour
8. UTM Grid: [II/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 Minute: 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

16. Artifacts: Artifacts should be described/drawn on a continuation sheet and their locations plotted on the site map.

CLASS	QUANTITY
Debitage [II/30]	8
Bifaces [III/1-9]	
Scrapers [III/1-9]	
Utilized Flakes	

CLASS	TYPE	QUANTITY
Ceramics [III/10-21]		
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]		

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

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

_hearth/firepit(FE) _rubble mound(RM) _earthen mound(EM) _trail/road(TR)
_midden(MD) _stone circle(SC) _burial(BU) _RR grade(RG)
_depression(DE) _rock alignment(RA) _pictograph(PI) _tram way/tbad(TW)
_water control(WC) _mine tailings(MT) _petroglyph(PE) _other(OT)

Description: NA

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		
Pithouse			Kiln		
Kiva			Monument		
Well			Mine		

Description: NA

SITE NO. 42Em1307 443B-1

19. Cultural Affiliation [IV/7-14]: UNKNOWN
How Determined? NA
20. Site Dimensions : 15 m x 15 m; Area [IV/17-21]: 225 sq m
21. Were surface artifacts collected? __Yes; x No; [IV/22] If yes, attach a continuation sheet describing sampling method used.
22. Estimated depth of fill [IV/23] : 0
Subsurface test? __Yes; X No (Include location of test on site map)
Description:
23. Site Condition [IV/25] : __Excellent; __Good; X Fair; __Poor
Agent of Impact:
24. Nat. Register Potential [V/1]: __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 Cultivatable Soil [V/12-14] : 4 miles
28. Topographic Location (check one under each heading) [V/15-18]

PRIMARY LANDFORM
_mountain spine(A)
_hill/butte(B)
✓tableland/mesa(C)
_ridge(D)
_valley(E)
_plain(F)
_canyon(G)

POSITION ON LANDFORM
✓top/crest/peak(A)
_edge(B)
_slope(C)
_toe/foot/bottom(D)
_saddle/pass(E)
_bench/ledge(F)
_rimrock(G)
_interior(H)

DEPOSITIONAL ENVIRONMENT
_fan(A)
_talus(B)
_dune(C)
_stream terrace(D)
_playa(E)
shore feature
_extinct lake(F)
_extant lake(G)
_alluvial plain(H)
_colluvium(I)
_moraine(J)
_flood plain(K)
_marsh(L)
_landslide/slump(M)
_delta(N)
_island(O)
✓cliff(P)
_outcrop(Q)
_stream bed(R)

SECONDARY POSITION
✓top/crest/ridge(A)
_edge(B)
_slope(C)
_toe/foot(D)
_cutbank(E)
_detached monolith(F)
_interior(G)
_step(H)
_riser(I)
_pert. geo. feature(J)
_spring mound/bog(K)
_cave(L)
_alcove/shelter(M)
_patterned ground(N)

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)
_SPRUCE FIR(BB)
_krummholz(BA)
_white fir-spruce(BB)
✓DOUGLAS FIR(BC)
_limber pine(CA)
_douglas fir(CB)
_lodgepole pine(CC)
_bristlecone pine(CD)
_aspen(CE)
_streamside(CF)
_meadow grassland(CG)

_YELLOW PINE-OAK(DD)
✓ponderosa pine(DA)
_oakbrush(DB)
_mountain brush(DC)
_maple(DD)
_streamside(DE)

_PLAINS/PRAIRIE(EE)
_grasslands(EA)
_pinyon-juniper(EB)
_streamside(EC)

_COLD DESERT SHRUB(FF)
_sagebrush(FA)
_small sagebrush(FB)
_little rabbitbrush(FC)
_shadscale(FD)
_horsebrush(FE)
_winterfat(FF)
_hop-sage/blkbrush(FG)
_bud sagebrush(FH)
_gat saltbrush(FI)
_gray molly(FJ)
_streamside(FK)

_SALT DESERT SHRUB(GG)
_greasewood(GA)
_shadscale-shadscl(GB)
_seepweed(GC)
_pickleweed/samphire(GD)
_saltgrass(GE)
_alkali sacaton(GF)
_rabbitbrush(GG)

_WARM DESERT SHR
_desert saltbrus
_creosote bush(H
_creosote/burnsag
_joshua tree(HD)
_MARSH COMMUNITY

_ALPINE FLATS/M
FLATS/DRY LAKE/
WASTELAND(XX)

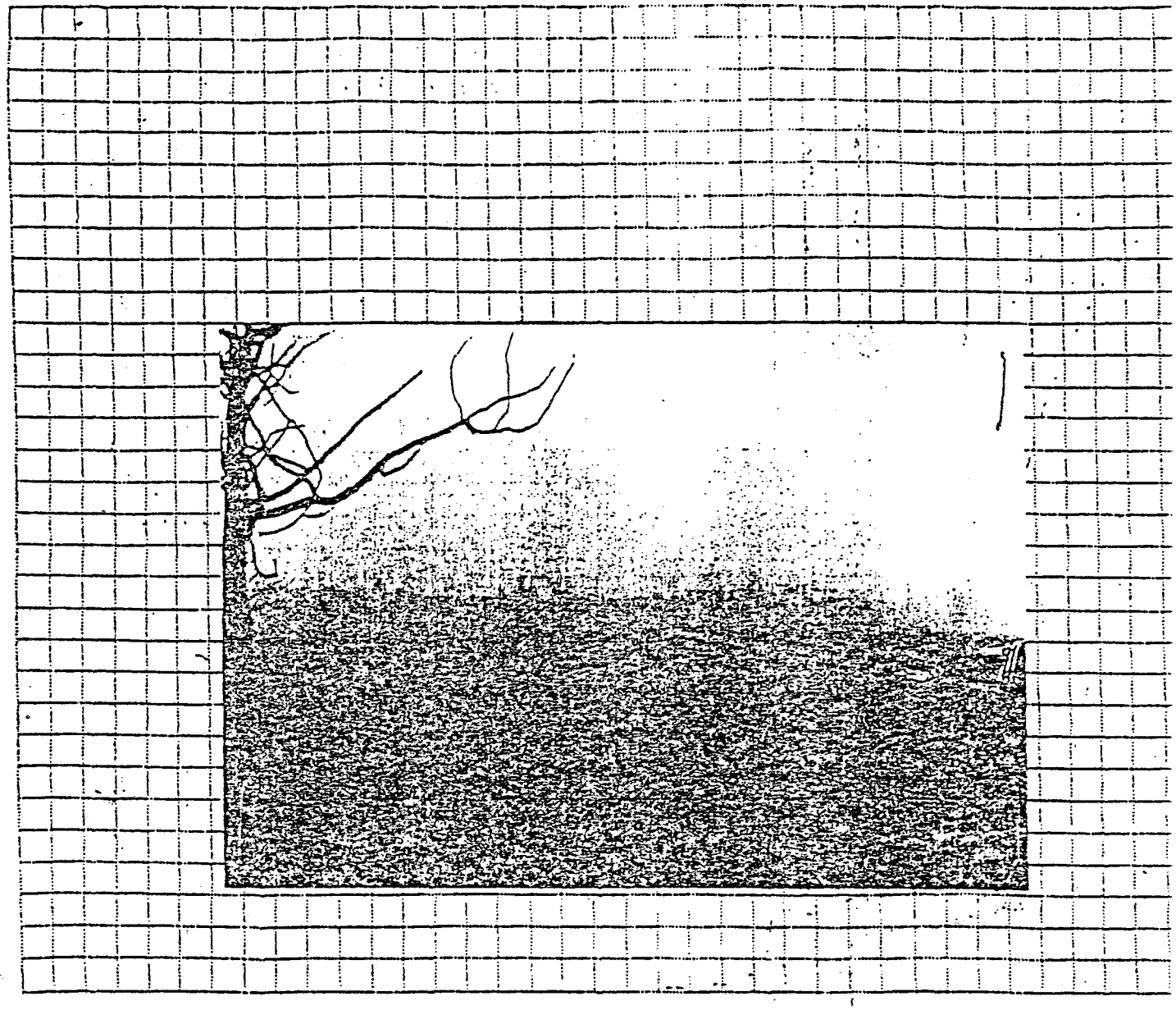
_CULTIVATED LAND

(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] : 443B-1 (1)
33. Recorded by: E. R. Hauck
Survey Org. [V/27-28]: AERC Date: 9-9-80
Assisting Crew Members: V. G. Norman, Michael Sloan

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



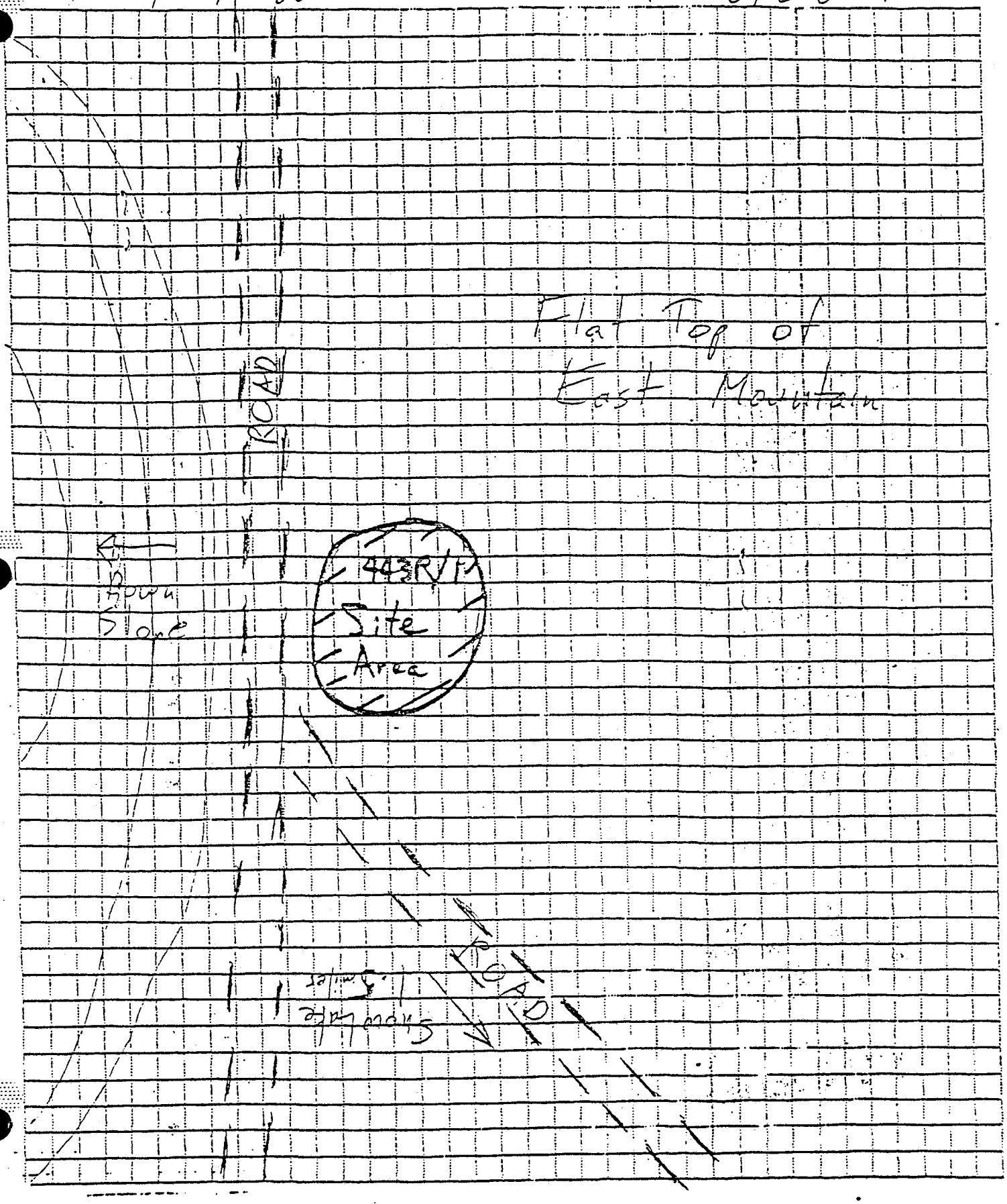
35. Encoding Form: (all entries are right justified)

	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	1	7	S		7	E			P	R					L	S							
III	A	A									A	A	A																		
IV					Z	Z								A			2	2	5				A	B	C	C	M	1		
V	D			0			1	8			A	6	4		C	A	P	A	0			1	9	9	8	C	2	B	A	E
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).

SITE NO. 42Em1307

9-9-80 Aerc 443 R-1 UPL 80-1



Division of State History
University of Utah Archeological Center.

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] 9600 ft. X.3048= ___ m.
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: Hiawatha, 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
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 should be described/drawn on a continuation sheet and their locations plotted on the site map.

CLASS	QUANTITY
Debitage [II/30]	much
Bifaces [III/1-9]	many
Scrapers [III/1-9]	3
Utilized Flakes	many

CLASS	TYPE	QUANTITY
Ceramics [III/10-21]		
Proj Pnt [III/1-9]	various	2
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]		

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]

_hearth/firepit(EF) _rubble mound(RM) _earthen mound(EM) _trail/road(TR)
_midden(MD) _stone circle(SC) _burial(BU) _RR grade(RG)
_depression(DE) _rock alignment(RA) _pictograph(PI) _tram way/road(TW)
_water control(WC) _mine tailings(MT) _petroglyph(PE) _other(OT)

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		
Pithouse			Kiln		
Kiva			Monument		
Well			Mine		

Description: None

SITE NO. 42Gm1300

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] : +o 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/1]: 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 Cultivatable Soil [V/12-14] : 5 miles
28. Topographic Location (check one under each heading) [V/15-18]

PRIMARY LANDFORM
- _mountain spine(A)
- _hill/butte(B)
- ✓tableland/mesa(C)
- _ridge(D)
- _valley(E)
- _plain(F)
- _canyon(G)

POSITION ON LANDFORM
- ✓top/crest/peak(A)
- _edge(B)
- _slope(C)
- _toe/foot/bottom(D)
- _saddle/pass(E)
- _bench/ledge(F)
- _rimrock(G)
- _interior(H)

DEPOSITIONAL ENVIRONMENT
- _fan(A)
- _talus(B)
- _dune(C)
- _stream terrace(D)
- _playa(E)
- shore feature
  - _extinct lake(F)
  - _extant lake(G)
- _alluvial plain(H)
- _colluvium(I)
- _moraine(J)
- _flood plain(K)
- _marsh(L)
- _landslide/slump(M)
- _delta(N)
- _island(O)
- ✓cliff(P)
- _outcrop(Q)
- _stream bed(R)

SECONDARY POSITION
- ✓top/crest/ridge(A
- _edge(B)
- _slope(C)
- _toe/foot(D)
- _cutbank(E)
- _detached monolith
- _interior(G)
- _step(H)
- _riser(I)
- _geo.feature(
- _spring mound/bog(
- _cave(L)
- _alcove/shelter(M)
- _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]:

_ALPINE GRASSLAND(AA)

_SPRUCE FIR(BZ)
- _krummholz(BA)
- _white fir-spruce(BB)

✓ASPEN DOUGLAS FIR(CZ)
- _limber pine(CA)
- _douglas fir(CB)
- _lodgepole pine(CC)
- _bristlecone pine(CD)
- ✓aspen(CE)
- _streamside(CF)
- _meadow grassland(CG)

_YELLOW PINE-OAK(DZ)
- _ponderosa pine(DA)
- _oakbrush(DB)
- _mountain brush(DC)
- _maple(DD)
- _streamside(DE)

_PLAINS/PRAIRIE(EZ)
- _grasslands(EA)
- _pinyon-juniper(EB)
- _streamside(EC)

_COLD DESERT SHRUB(FZ)
- _sagebrush(FA)
- _small sagebrush(FB)
- _little rabbitbrsh(FC)
- _shadscale(FD)
- _horsebrush(FE)
- _winter-fat(FF)
- _bop-sage/blkbrsh(FG)
- _bud sagebrush(FH)
- _mat saltbrush(FI)
- _gray molly(FJ)
- _streamside(FK)

_SALT DESERT SHRUB(GZ)
- _greasewood(GA)
- _greasewood-shadscl(GB)
- _seepweed(GC)
- _pickleweed/samphire(GD)
- _saltgrass(GZ)
- _alkali sacaton(GF)
- _rabbitbrush(GG)

_WARM DESERT
- _desert salt
- _creosote bu
- _creosote/bu
- _joshua tree
- _MARSH COMMU

_ALKALI FLAT
_FLATS/DRY L
WASTELAND(X

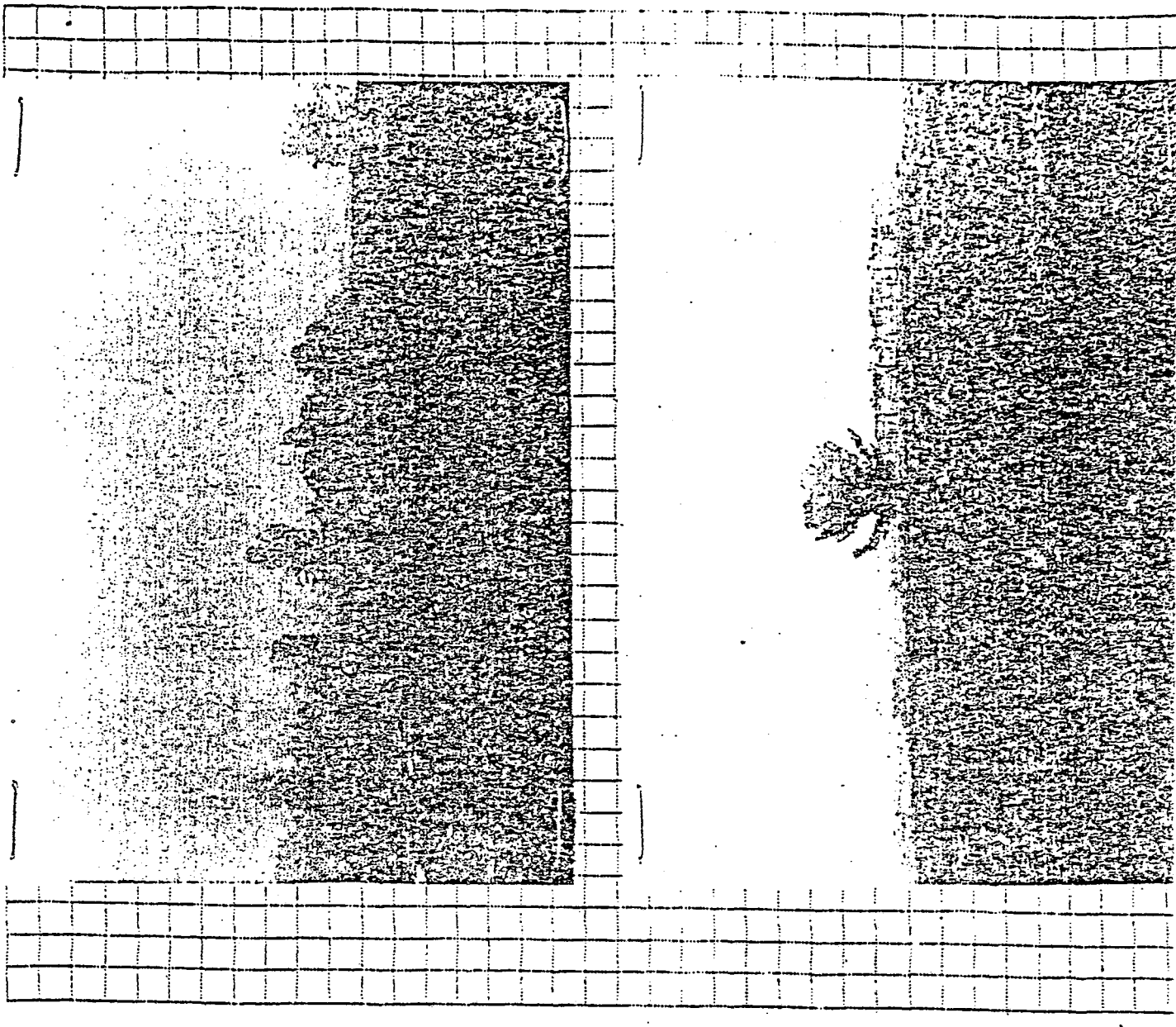
_CULTIVATED

(Check COMMUNITY only if association cannot be determin

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: F. R. Hauck
Survey Org. [V/27-28]: AERC Date: 9-9-80
Assisting Crew Members: V. G. Norman and M. Sloan

443K/2



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

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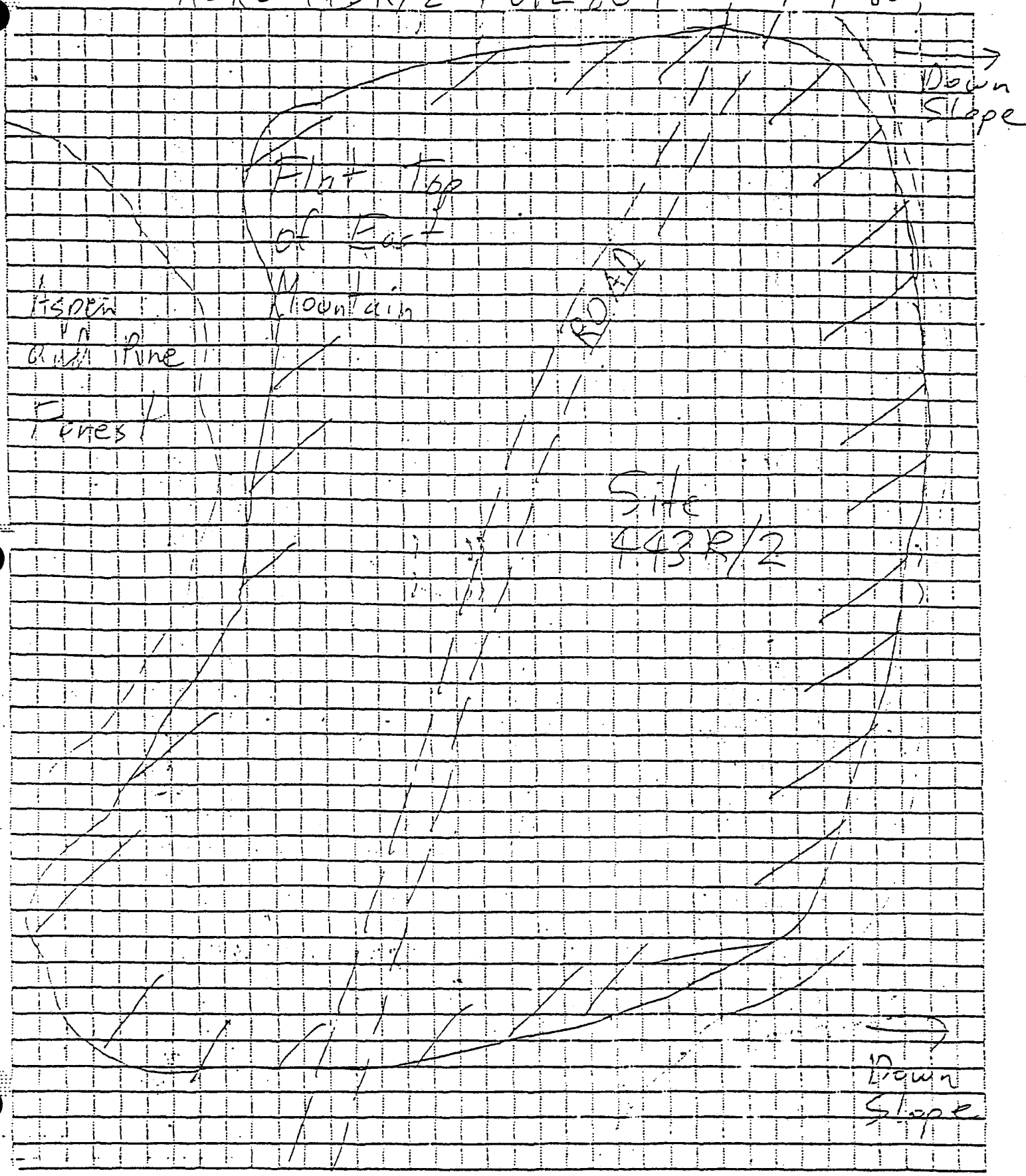
I	42	E					1	3	0	8		9	6	0	0		1	2	4	8	6	1	4	0	4	3	5	4	6	0	0
II	NA	NE	SW		1	7	1	7	S		7	E		PR								LS								E
III	9F	29	6Z		1	D	C	2	C	A																				
IV							F	R	A	R							3	7	5	0	0	B	B	C	A	E	R			
V	C		1	0	3	1	0		1	0	A		8	0	E	A	P	A		0		0		C	2	B	A	E		
VI																															

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).

SITE NO. 42Em1308

AERC 443R/2 ; UPL 80-1 9-9-80;



Developed by cooperative agreement of:
Bureau of Land Management
Division of State History
University of Utah Archeological Center

1. Site No.[I/1-10] 42Em1509

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

4. Class: X Prehistoric ___Historic ___Paleontologic
5. Cultural Site Type (interpreted function): Butchering-Hide Preparat
6. Paleontological Site Type: ___Invertebrate; ___Vertebrate; ___Flora
7. Elevation [I/11-15] 9200 ft. X.3048= ___m.
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 or 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 whi 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
BLM 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. CRRS:S-3

16. Artifacts: Artifacts should be described/drawn on a continuation sheet and their locations plotted on the site map.

CLASS	QUANTITY
Debitage [II/30]	25+
Bifaces [III/1-9]	4+
Scrapers [III/1-9]	5+
Utilized Flakes	2+

CLASS	TYPE	QUANTITY
Ceramics [III/10-21]		
Proj Pnt [III/1-9]		
Grnd 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]		

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]

_hearth/firepit(FR) _rubble mound(RM) _earthen mound(EM) _trail/road(TR)
_midden(MD) _stone circle(SC) _burial(BU) _ll grade(RG)
_depression(DE) _rock alignment(RA) _pictograph(PI) _tram way/road(TW)
_water control(WC) _mine tailings(MT) _petroglyph(PE) _other(OT)

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		
Pithouse			Kiln		
Kiva			Monument		
Well			Mine		

Description: None

SITE NO. 42Em1309 (AERC 443R/5)

19. Cultural Affiliation [IV/7-14]: Unknown
How Determined? NA
20. Site Dimensions : 30 m x 30 m; Area [IV/17-21] : 900 sq m
21. Were surface artifacts collected? __Yes; x No; [IV/22] If 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/3-10] : SW / 150 m.
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 Cultivatable Soil [V/12-14] :
28. Topographic Location (check one under each heading) [V/15-16]

PRIMARY LANDFORM	POSITION ON LANDFORM	DEPOSITIONAL ENVIRONMENT		SECONDARY POSITION
✓mountain spine(A)	✓top/crest/peak(A)	_fan(A)	_marsh(L)	_top/crest/ridge(A)
_hill/butte(B)	_edge(B)	_talus(B)	_landslide/slump(M)	_edge(B)
_tableland/mesa(C)	_slope(C)	_dune(C)	_delta(N)	_slope(C)
_ridge(D)	_toe/foot/bottom(D)	_stream terrace(D)	_island(O)	_toe/foot(D)
_valley(E)	_saddle/pass(E)	_playa(E)	_cliff(P)	_cutbank(E)
_plain(F)	✓bench/ledge(F)	shore feature	_outcrop(Q)	_detached monolith(F)
_canyon(G)	_rimrock(G)	_extinct lake(F)	_stream bed(R)	_interior(G)
	_interior(H)	_extant lake(G)		_step(H)
		_alluvial plain(H)		_river(I)
		_colluvium(I)		_pert.geo.feature(J)
		_moraine(J)		_spring mound/bog(K)
		_flood plain(K)		_cave(L)
				_alcove/shelter(M)
				_patterned ground(N)

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]:

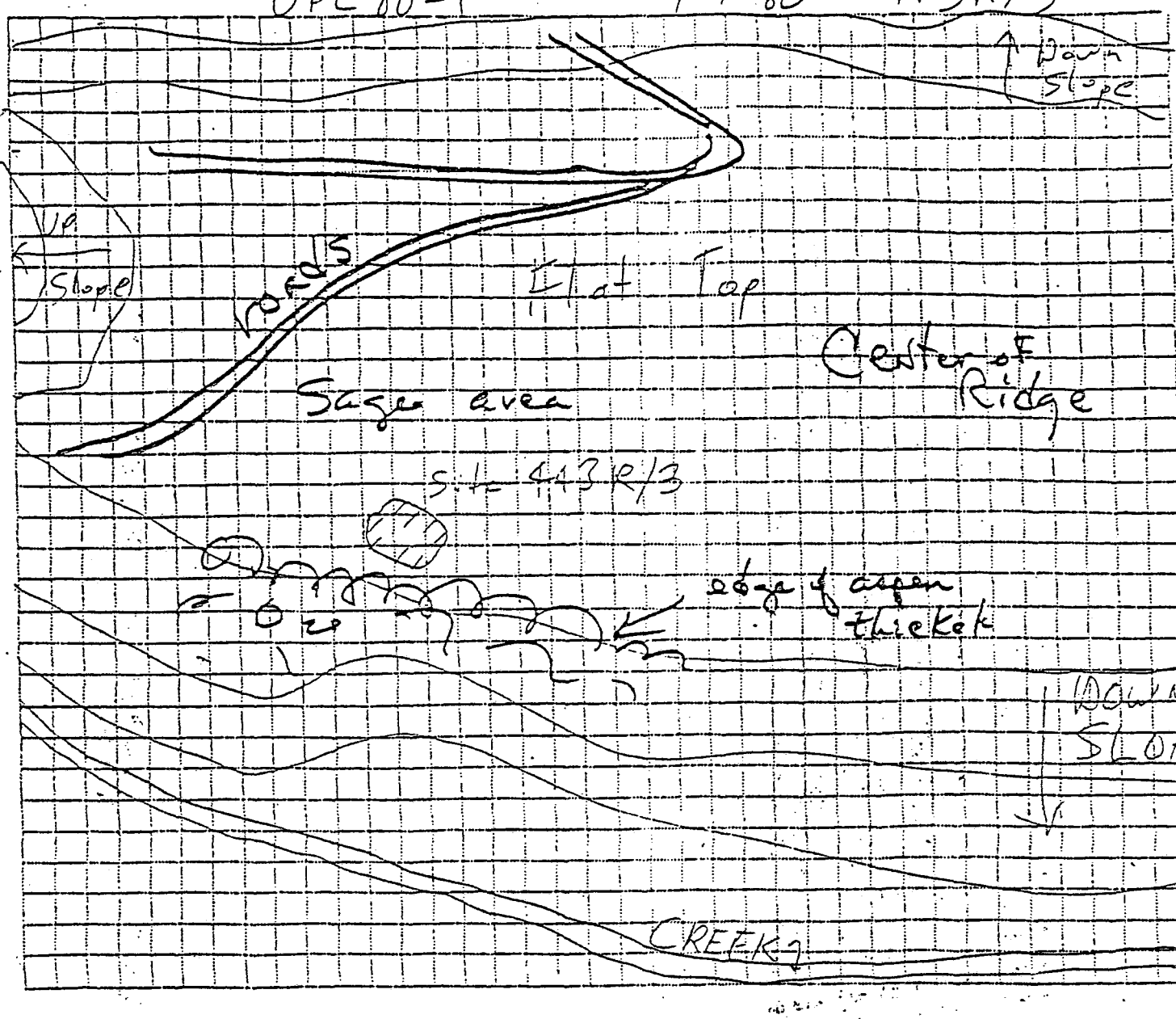
_[illegible](AA)	_yellow pine-oak(BE)	_cold desert shrub(FE)	_salt desert shrub(GE)	_dark desert sh
	_ponderosa pine(BA)	_sagebrush(FA)	_greasewood(GA)	_desert saltbr
_[illegible](AE)	_oakbrush(BB)	_small sagebrush(FB)	_[illegible]-shadscl(GB)	_creosote bush(
_[illegible](AA)	_mountain brush(BC)	_little rabbitbrush(FC)	_[illegible](GC)	_creosote/bursa
_white fir-spruce(BE)	_maple(BD)	_shadscale(FD)	_pickleweed/samphire(GD)	_joshua tree(GE
✓[illegible] Douglas fir(BF)	_streamside(BE)	_horsebrush(FE)	_saltgrass(GF)	_[illegible]
_limber pine(CA)		_winterfat(FF)	_alkali sacaton(GG)	
_douglas fir(CB)		_hop-sage/bikbrsh(FG)	_rabbitbrush(GG)	
_bristlecone pine(CC)	_[illegible]/prairie(HA)	_bud sagebrush(FH)		_alkali flats/
_aspen(CE)	_grasslands(HB)	_mat saltbrush(FI)		flats/dry lake
_streamside(CD)	_pinyon-juniper(HB)	_gray molly(FJ)		saltland(HA)
_meadow grassland(CE)	_streamside(HC)	_streamside(FK)		_[illegible]

(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



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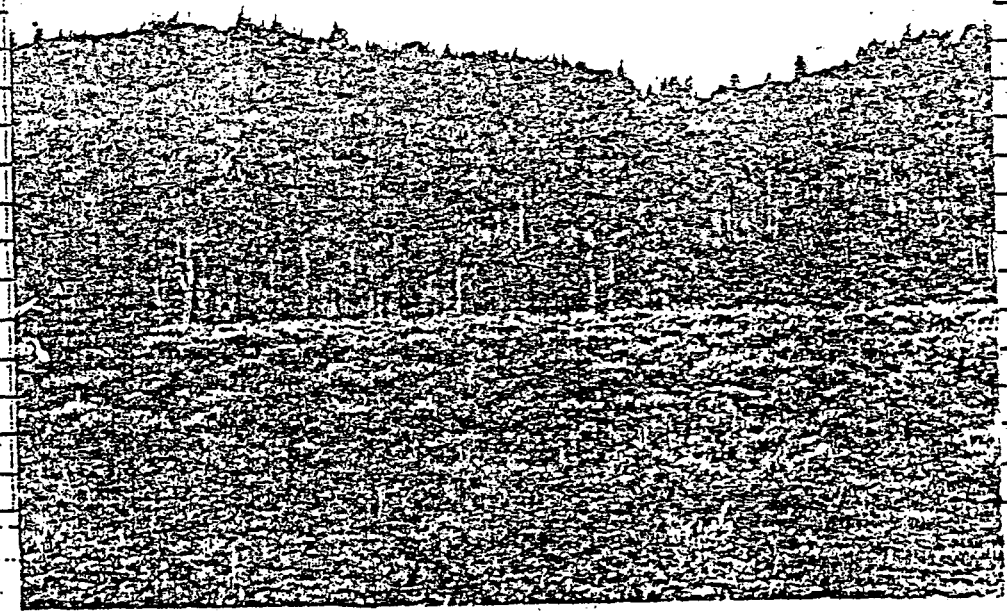
I	42	EM				1	3	0	9			9	2	0	0	1	2	4	8	G	8	2	0	4	3	5	6	1	0	0	
II	5	E	V	E	S	E		8	1	7		S		7	E	P	R					L	S							D	
III	5	F	2		6	G	2																								
IV							2	2											9	0	0	A	B	C	B	B	R	A	T		
V	D		4	2	5	T		1	B	9	9	9	A	F	-	A								C	2	B	H	E			
VI																															

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).

SITE NO. _____



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Division of State History
University of Utah Archeological Center

1. Site No.[I/1-10] 42EM1910
2. County Emery
3. Temp. No. AERC 443R/4
4. Class: x 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 = ___ m.
elevation source: Contour lines
8. UTM Grid: [I/16-30] zone 12 ; 490140 m E; 4354260 m N
9. [II/1-16] NE of NE of 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]: ___
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 should be described/drawn on a continuation sheet and their locations plotted on the site map.

CLASS		QUANTITY
Debitage	[II/30]	20?
Bifaces	[III/1-9]	2?
Scrapers	[III/1-9]	
Utilized Flakes		

CLASS		TYPE	QUANTITY
Ceramics	[III/10-21]		
Proj Pnt	[III/1-9]	Northern Side	1
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]		

Description: Primary and secondary flakes of chert.

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

_hearth/firepit(HE) _rubble mound(RM) _earthen mound(EM) _trail/road(TR)
_midden(MD) _stone circle(SC) _burial(BU) _ATV trail(AT)
_depression(DE) _rock alignment(RA) _pictograph(PI) _tram way/road(TW)
_water control(WC) _mine tailings(MT) _petroglyph(PT) _other(OT)

Description: NA

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		
Pithouse			Kiln		
Kiva			Monument		
Well			Mine		

Description: NA

SITE NO. 42Em1310 (443R/4)

19. Cultural Affiliation [V/7-14]: Archaic
How Determined? Point typology
20. Site Dimensions: 30 m x 20 m; Area [V/15-21]: 600 sq
21. Were surface artifacts collected? x Yes; __No; [V/22] If yes, attach a continuation sheet describing sampling method used.
22. Estimated depth of fill [V/23]: unknown - marginal
Subsurface test? __Yes; x No (Include location of test on site map)
Description:
23. Site Condition [V/25]: __Excellent; __Good; x Fair; __Poor
Agent of Impact: Erosion
24. Nat. Register Potential [V/1]: X 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 Cultivatable Soil [V/12-14]: 5 miles
28. Topographic Location (check one under each heading) [V/15-16]

PRIMARY LANDFORM
_mountain spine(A)
_hill/butte(B)
_tableland/mesa(C)
✓ridge(D)
_valley(E)
_plain(F)
_canyon(G)

POSITION ON LANDFORM
_top/crest/peak(A)
_edge(B)
✓slope(C)
_toe/foot/bottom(D)
_saddle/pass(E)
_bench/ledge(F)
_rimrock(G)
_interior(H)

DEPOSITIONAL ENVIRONMENT
_fan(A)
_talus(B)
_dune(C)
_stream terrace(D)
_playa(E)
_loess feature
_extinct lake(F)
_extant lake(G)
_alluvial plain(H)
_colluvium(I)
_moraine(J)
_flood plain(K)
_marsh(L)
_landslide/slump(M)
_delta(N)
_island(O)
_cliff(P)
_outcrop(Q)
_stream bed(R)

SECONDARY POSITION
_top/crest/ridge(A)
_edge(B)
✓slope(C)
_toe/foot(D)
_cutbank(E)
_detached monolith(F)
_interior(G)
_step(H)
_riser(I)
_portion of feature(J)
_spring mound/bog(K)
_cave(L)
_alcove/shelter(M)
_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]:

_ALPINE GRASSLAND(AA)
_SUBALPINE FIR(AB)
_KRUMMHOLZ(AC)
_white fir-spruce(AD)
_LATE DOUGLAS FIR(AE)
_limber pine(AA)
_douglas fir(CB)
_lodgepole pine(CC)
_bristlecone pine(CD)
✓aspen(CE)
✓streamside(CF)
_meadow grassland(CG)

_YELLOW PINE-OAK(DA)
_ponderosa pine(DA)
_oakbrush(DB)
✓mountain brush(DC)
_maple(DD)
_streamside(DE)

_PINYON/PINYON(EA)
_grasslands(EB)
_pinyon-juniper(EC)
_streamside(ED)

_COLD DESERT SHRUB(FA)
_sagebrush(FA)
_small sagebrush(FB)
_little rabbitbrush(FC)
_shadscale(FD)
_horsebrush(FE)
_winterfat(FF)
_bog-sage/bitterbrush(FG)
_bud sagebrush(FH)
_mat saltbrush(FI)
_gray molly(FJ)
_streamside(FK)

_SALT DESERT SHRUB(GA)
_greasewood(GA)
_juniper-shadscale(GB)
_seepweed(GC)
_pickleweed/samphire(GD)
_saltgrass(GE)
_alkali sacaton(GF)
_rabbitbrush(GG)

_PALM DESERT SH
_desert saltbr
_creosote bush
_creosote/bur
_joshua tree(H
_MIXED COMMUN

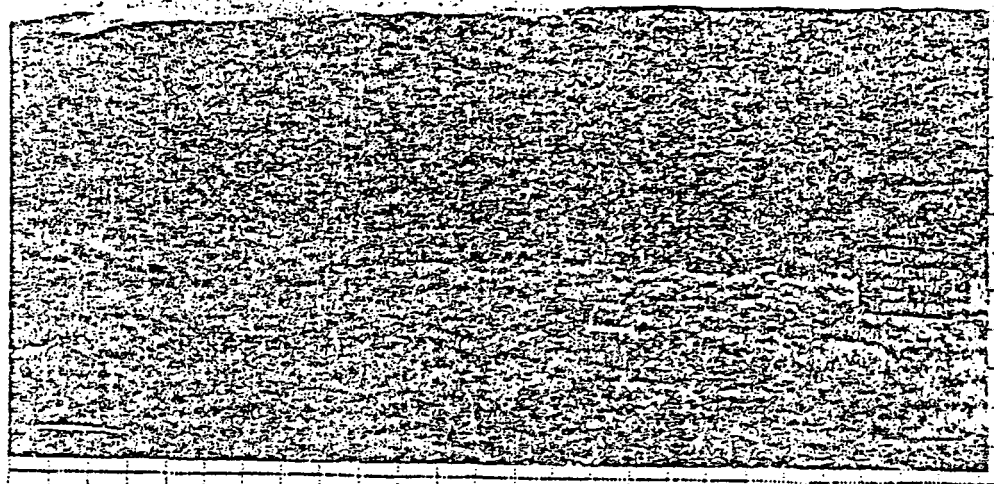
_ALPINE TUNDRA/
TUNDRA/DRY LIT
_BARRENLAND(IA)

_CULTIVATED LA

(Plant community or association cannot be determined)

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 N
32. Photograph Numbers [V/26]: 443R-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



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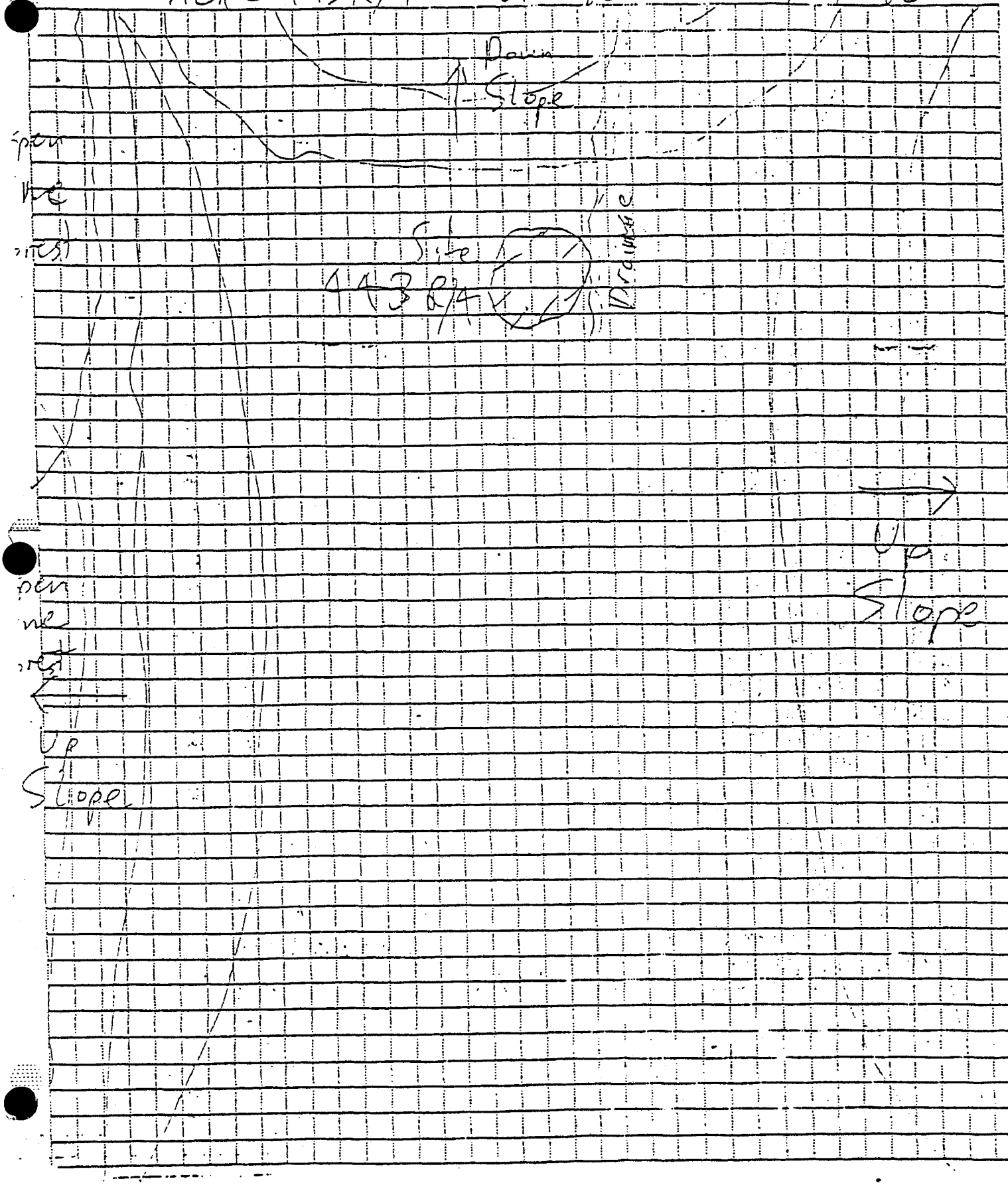
I	42	EM						1	3	10		90	50	1	2	49	01	40	43	54	2	60									
II	NE	NE	SE	1	5	1	7	5		7		E	PR								1	5								C	
III	2	FZ	1	CB																											
IV							AR													60	DB	BC	C	E	R						
V	D	16		0		16	B		80	DC	-	C											CZ	B	AE						
VI																															

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).

SITE NO. _____

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 shute, 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

*Encoded data items

BLM 8100-1
FS R-4 2300-2
5/82

Part A - Environmental Data

Site No.(s) 42Em1633

797R/1

*29. Slope 0 to 50 % Slope 250° Aspect (Degrees)

*30. Direction/Distance to Permanent Water 250° Bearing (Degrees) 1 x 100 Meters

*Type of Water Source ☐ Spring/Seep (A) ☒ Stream/River (B) ☐ Lake (C) ☐ Other (D)

Name of Water Source Cottonwood Creek

Distance to Nearest Other Water Source/Type NA

*31. Geographic Unit Basin and Range - Colorado Plateau: Wasatch Plateau

*32. Topographic Location (check one under each heading)

PRIMARY LANDFORM
- ☐ mountain spine(A)
- ☐ hill(B)
- ☐ tableland/mesa(C)
- ☐ ridge(D)
- ☐ valley(E)
- ☐ plain(F)
- ☒ canyon(G)

PRIMARY POSITION
- ☐ top/crest/peak(A)
- ☐ edge(B)
- ☒ slope(C)
- ☐ toe/foot/bottom/mouth(D)
- ☐ saddle/pass(E)
- ☐ bench/ledge(F)
- ☐ rimrock(G)
- ☐ interior(H)

SECONDARY LANDFORM
- ☐ alluvial fan(A)
- ☐ alcove/rock shelter(B)
- ☐ arroyo(C)
- ☐ basin(D)
- ☐ cave(E)
- ☐ cliff(F)
- ☐ delta(G)
- ☐ detached monolith(H)
- ☐ dune(I)
- ☐ floodplain(J)
- ☐ ledge(K)
- ☐ mesa/butte(L)
- ☐ playa(M)
- ☐ port.geo.feature(N)
- ☐ plain(O)
- ☐ ridge/knoll(P)
- ☐ slope(Q)
- ☒ terrace/bench(R)
- ☐ talus slope(S)
- ☐ island(T)
- ☐ outcrop(U)
- ☐ spring mound/bog(V)
- ☐ valley(W)
- ☐ cutbank(X)
- ☐ riser(Y)

SECONDARY POSITION
- ☐ top/crest/peak(A)
- ☐ edge(B)
- ☐ slope(C)
- ☒ toe/foot/bottom/mouth(D)
- ☐ interior(G)
- ☐ step(H)
- ☐ riser(I)
- ☐ patterned ground (N)
- ☐ face(O)
- ☐ saddle/pass(P)

Describe The old mine site is situated on the southwest facing slope of East Mountain near the Canyon floor.

*33. On-site Depositional Context
- ☐ fan(A)
- ☐ talus(B)
- ☐ dune(C)
- ☐ stream terrace(D)
- ☐ playa(E)
- ☒ outcrop(O)
- ☐ extinct lake(F)
- ☐ extant lake(G)
- ☐ alluvial plain(H)
- ☒ colluvium(I)
- ☐ morraine(J)
- ☐ flood plain(K)
- ☐ marsh(L)
- ☐ landslide/slump(M)
- ☐ delta(N)
- ☐ desert pavement(P)
- ☐ stream bed(R)
- ☐ aeolian(S)
- ☐ none(T)
- ☐ residual(U)

34. Vegetation

*a. Life Zone ☐ Arctic-Alpine(A) ☐ Hudsonian(B) ☒ Canadian(C) ☐ Transitional(D) ☐ Upper Sonoran(E) ☐ Lower Sonoran(F)

*b. Habitat 1 - Primary On-Site 2 - Secondary On-Site 3 - Surrounding Site
- ☐ Aspen(A)
- ☐ Spruce-Fir Forest(B)
- ☒ Douglas Fir Forest(C)
- ☐ Alpine Grassland(D)
- ☐ Ponderosa Forest(E)
- ☐ Lodgepole Pine Forest(F)
- ☐ Other/Mixed Conifer Forest(G)
- ☐ Pinyon-Juniper Woodland(H)
- ☐ Wet Meadow(I)
- ☐ Dry Meadow(J)
- ☐ Shrub Woodland(K)
- ☐ Riparian(L)
- ☐ Grassland/Steppe(M)
- ☐ Desert Lake Shore(N)
- ☐ Salt Desert Shrub(O)
- ☐ Big Sagebrush(P)
- ☐ Little Sagebrush(Q)
- ☐ Barren(R)
- ☐ Marsh/Swamp(S)
- ☐ Lake-Reservoir(T)
- ☐ Agricultural(U)

Describe Predominant species on site include Douglas fir, Aspen, Juniper, Wild rose, Buckbrush.

*35. Miscellaneous Text

36. Comments/Continuations

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

Part C - Historic Sites

Site No.(s) 42Em1633

797R/1

1. Site Type Historic Coal Mine Site

*2. Historic Theme(s) Coal Mine (mn)

*3. Culture

AFFILIATION	DATING	AFFILIATION	DATING
Euro/American	1909-1948		

*4. Oldest Date 1909 Recent Date 1948

How Determined? Reference in Doelling, H. H., 1972 Central Utah Coal Fields

5. Site Dimensions 400 (NW-SE) m X 300 (NE-SW) m *Area 120,000 sq m

*6. Surface Collection/Method

- ☒ None (A)
- ☐ Grab Sample (B)
- ☐ Designed Sample (C)
- ☐ Complete Collection (D)

Sampling Method

*7. Estimated depth of fill

- ☒ Surface (A)
- ☐ 0-20 cm (B)
- ☐ 20-100 cm (C)
- ☐ 100 cm + (D)
- ☐ Fill noted but unknown (E)

How Estimated

(If tested, show location on site map.)

*8. Excavation Status

- ☐ Excavated (A)
- ☐ Tested (B)
- ☒ Unexcavated (C)

*9. Summary of Artifacts and Debris

- ☐ Glass (GL)
- ☒ Metal (ME)
- ☒ Nails (NC, NW)
- ☐ Bone (BO)
- ☐ Ceramics (CS)
- ☐ Fabric (FA)
- ☐ Leather (LE)
- ☐ Wire (WI)
- ☒ Tin Cans
- ☐ Ammunition (AM)
- ☐ Wood (WD)
- ☐ Rubber (RB)

Describe Round-headed nails; siding is of basic groove-overlap type wire mesh screen on windows; modern style glass panes with a pale green tint; brick chimney on wooden supports; door and window hardware is missing; wall covering includes cardboard boxes, cotton cloth, tar paper; a thick paper was used to line the outer walls before the siding was nailed to the wooden frame. There are no evidences of plumbing or wiring for electricity.

Names carved in weighhouse walls include Clate Kofford; others are illegible without special preparation.

*10. Ceramic Artifacts

QUANTITY	TYPE	QUANTITY	TYPE

Describe None observed

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)

- ☒ Trail/Road (TR)
- ☒ Dump (DU)
- ☐ Dam, Earthen (DA)
- ☐ Hearth/Campfire (HE)
- ☒ Tailings (MT, ML)
- ☐ Depression (DE)
- ☐ Ditch (DI)
- ☐ Quarry (QU)
- ☒ Rock Alignment (RA)
- ☐ Cemetery/Burial (CB)
- ☒ Inscriptions (IN)
- ☐ 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
1	Wood	Weighhouse			
1	Wood	Outhouse			
1	Rock Wall	Walled Overhang			
2		Mine Portals			
1	Wood-rock	Root Cellar			

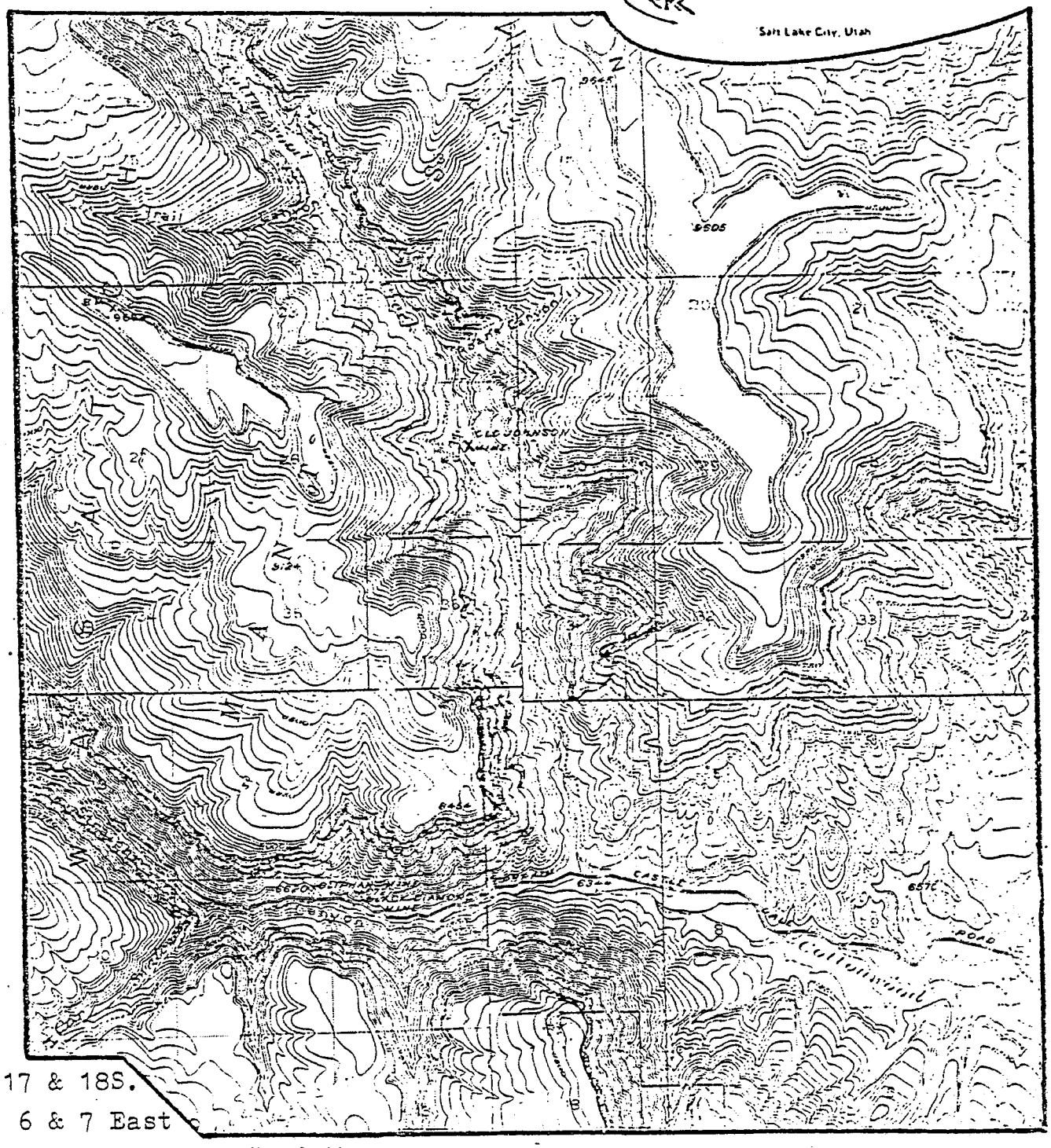
Describe Weighhouse is two story, wooden frame structure featuring a cedar shingle roof, trimmed wood siding, round headed nails and a rock footing foundation. Outhouse is of pine plank construction and contains a concrete floor and seat support. The walled overhang is above the house and outhouse and 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 superstructure 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 burn 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.

ARCHEOLOGICAL-ENVIRONMENTAL RESEARCH CORPORATION

Salt Lake City, Utah



T. 17 & 18S.

R. 6 & 7 East

Meridian: Salt Lake B. & M.

Quad: Hiawatha, Utah

15 minute-USGS

Project: UPL-83-2

Series: Central Utah

Date: 5-26-83

Location of the Old Johnson Mines in the Cottonwood Canyon Locality of Emery County, Utah

Legend:

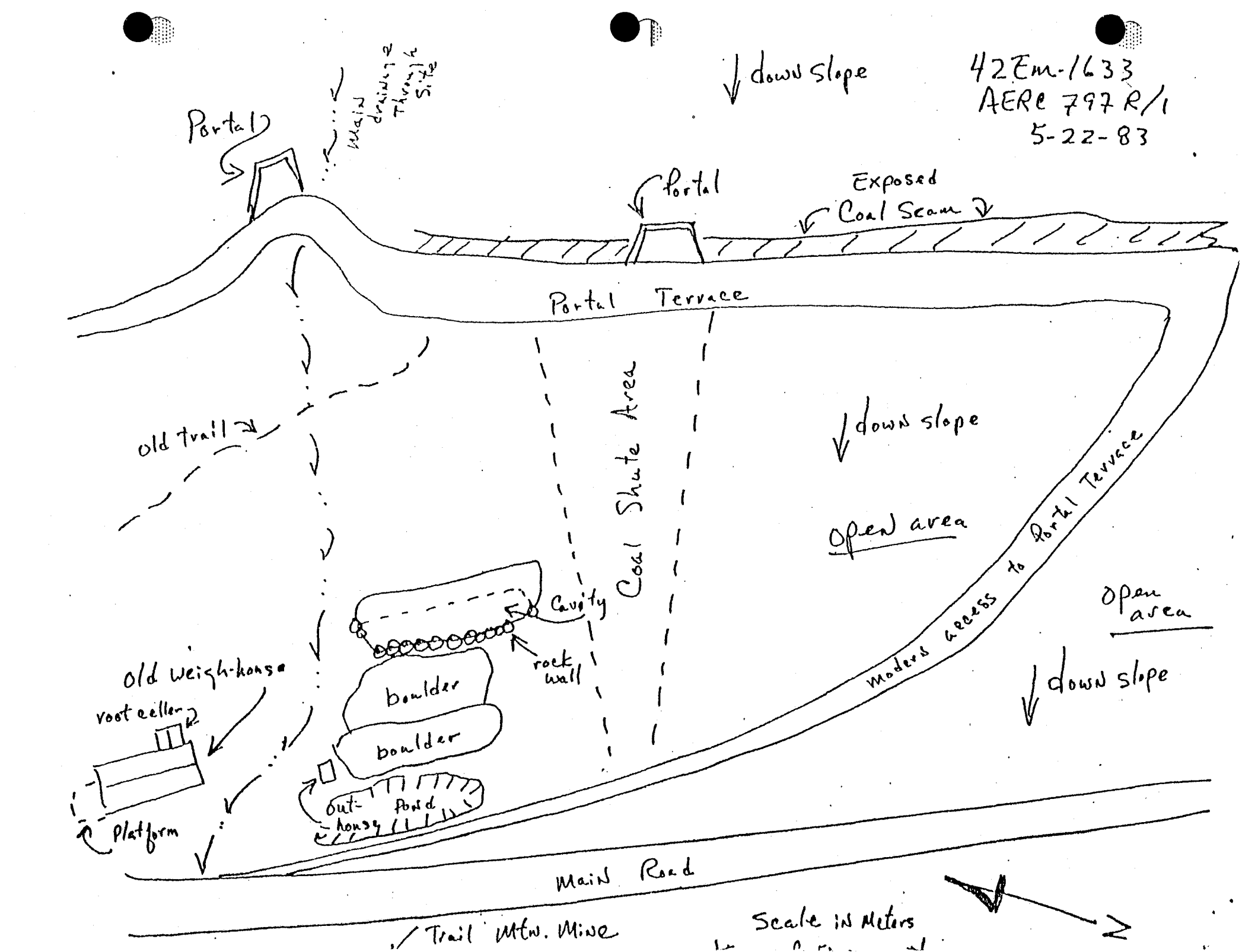
Mine Site (42Em1633) x

N

1 0 1 2 M.

0 1 2K.

Scale


42Em-1633
AERe 797 R/1
5-22-83
down slope
Portal
Main drainage Traverse Site
Portal
Exposed Coal Seam
Portal Terrace
old trail
Coal Shute Area
down slope
open area
Cavity
rock wall
boulder
boulder
Modern access to Portal Terrace
open area
down slope
old weigh-house
root cellar
Platform
Out-house
Pond
Main Road
Trail Mtn. Mine
Scale in Meters

IMACS ENCODING FORM

5/82

To be completed for each site form.
For instructions and codes, see IMACS Users Guide.

F. R. Hauck
Encoder's Name

A

1 [4,2]-[E,m]-[Ø,Ø,1,6,3,3] State Site Number
2 [ ]-[ ] Agency Site Number
6 [ ] Agency Report Number
10 [Ø,7,2,5,Ø] Elevation
11 [1,2] Zone
[4,8,3,5,7,5] Easting
[4,3,5,1,9,Ø,Ø] Northing

12 [S,W] [S,W] [W,E] ¼ ¼ ¼ [2,5] Sec. [1,7] [S] T. [Ø,Ø,6] [E] R.
13 [1] Merid.
14 [H,I,A,W,A,T,H,A, ,U,T,A,H] USGS Map
17 [F,S] Owner
18 [1,Ø] Forest
[4,1] District

19 [ ] Capab. [ ] Anlys. [ ] Mngmt.
21 [D] Cond.
22 [P,R] [E,R] Impacts
[V,A]
23 [C] N.R.
26 [A,F] Organ.
28 [Ø,5]-[2,2]-[8,3] Survey Date
29 [5,Ø] %
[25Ø] Aspect

30 [2,5,Ø] [Ø,W,1] [B] Water: degrees/dist./type
31 [D,A] Geog.
32 [G,C] [R,D] 1st 2nd Location
33 [Q] Dep.
34 [C] [H,C,C] Vegetation
35 [ ] Misc. Text

B

2 [ ] [ ] Culture/Date
3 [ ] Area
4 [ ] Coll.
5 [ ] Depth
6 [ ] Exca. Status
9 [ ] # [ ] [ ] [ ] [ ] Flaking Stages
7 [ ] [ ] [ ] [ ] Artifacts: #/type
8 [ ] [ ] [ ] Lithic Tools: #/type

11 [ ] [ ] [ ] [ ] Ceramics: #/type
13 [ ] [ ] [ ] [ ] [ ] Features: #/type
14 [ ] [ ] [ ] Architecture: #/material/type

C

2 [M,N] Historic Themes [ ] [ ] [ ]
3 [E,A,I] [ ] [ ] [ ] [ ] Cultures/Dating
4 [1,9,Ø,9] [1,9,4,8] Dates
5 [9,9,9,9,8] Area
6 [A] Coll.
7 [A] Depth
8 [C] Exca.

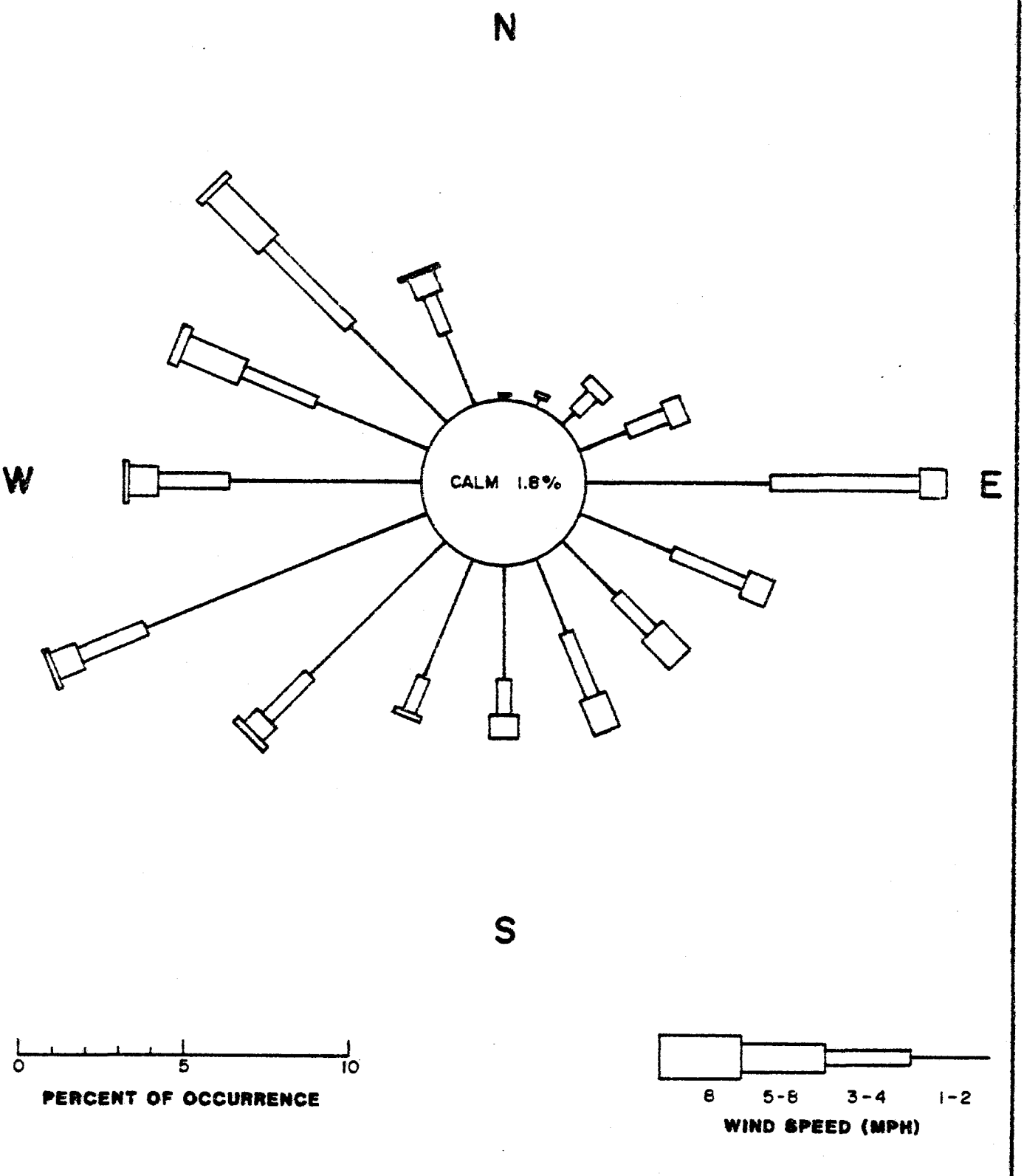
9 [9,H,T] [3,G,L] [2,M,N] [3,F,A] [4,R,R] [2,M,E] [9,P,A] [9,N,W] [9,T,C] [ ] [ ] [ ] Artifacts: #/type
10 [A,A,A] [ ] Ceramics: #/type
11 [B,A,D,I] [ ] [ ] Glass: #/mnft./color/funct.
13 [2,I,N] [3,R,A] [1,M,T] [1,T,R] [1,D,E] [ ] [ ] [ ] Features: #/type
14 [2,I,A,N] [1,C,A,S] [1,C,C,P] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Architecture: #/material/type

Lettering Guide: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 1 2 3 4 5 6 7 8 9 Ø

The information on Pages 2-57 thru 2-100 has been deleted from this section of the permit. This information is now found in Volumes 8 and 9.

Winds

The winds in the area are generally variable. The wind rose presented in Figure 2-9 displays this variability for the Meetinghouse Ridge area for January to December 1978.



MEETINGHOUSE RIDGE JAN.-DEC. 1978

ALL TIMES

FIGURE 2-9

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

350 North 4th East
Price, Utah 84501

October 19,1989

Mr. Val Payne
Utah Power & Light
P.O. Box 310
Huntington, Utah 84528

Dear Mr. Payne:

Here is the summary of the sites that Mr. Davis and I visited. Below is the information that is needed.

Veg.Type	Ecolog Cond.	Present Prod.	Potential Prod.
	DES-BEE-DOVE MINE		
Pinyon-Jun.	Fair	800	1,000
Saltbush	Fair	150	200
	DEER CREEK MINE		
Mixed Conifer	Good	2,000	2,500
Pinyon-Jun.	Good	800	900
Riparian	Fair	1,800	3,000
	COTTONWOOD WILBERG		
Pinyon-Jun. (Fan Portal)	Good	1,800	1,800
Pinyon-Jun. (Wasterock Storage)	Fair	700	1,200
Pinyon-Jun. (Wasterock Storage)	Fair	400	1,200
Pinyon-Jun.	Good	600	900
Black Sage (Wasterock Storage)	Fair	250	500
Saltbush (Wasterock Storage)	Good	125	150

Vegetation Information for the Des-Bee-Dove Mines

Report Prepared for

Utah Power & Light Company

by

Jerry R. Barker, Ph.D.
Range Ecologist
Bio-Resources, Inc.
P.O. Box 3447
Logan, Utah 84321

July 1982

VEGETATION INFORMATION FOR THE DES-BEE-DOVE MINES

This reports the vegetation information for the Des-Bee-Dove Mining area. The Des-Bee-Dove Mines were existing at the time of vegetational sampling. No new disturbances are planned within the permit area.

Methodology

Six vegetation types were identified within the permit area and adjacent areas and mapped (scale 1:24,000). Aerial photography (scale 1: 24,000) and field reconnaissance were utilized to construct the vegetation map. Aerial photography (taken in 1962) and the vegetation of adjacent canyons and areas were used to infer what species composition and aerial cover were before the present disturbance occurred at the Des-Bee-Dove mining site (see May 2-12).

Reference sites to represent vegetation types disturbed by mining were located as close to the disturbed areas as feasible. Differences in species composition, total plant cover, aspect, soil and geology were minimized between the disturbed area and reference site. The reference sites were marked in the field with metal T-posts and located on the vegetation map (Maps 2-12 and 2-16 in Soils Section). Pinyon-juniper and salt desert shrub were the only two vegetation types disturbed by mining activities.

Vegetation analyses of the reference sites consisted of developing a list of plant species by life form, measuring total plant cover, and determining shrub density and composition. Also, tree density by size class was determined.

Total plant cover was measured by the step-point method. Plant species, litter, rock or bare ground was determined every third pace along a 20 point transect. The starting point and direction of each transect was randomly selected.

The point-center quarter method was used to measure shrub density. At each sampling point two perpendicular lines were inscribed to delineate four quarters centered over the sampling point. The distance from the nearest shrub in each quarter to the sampling point was measured and then the shrub was identified. Shrub density was determined by the following equations:

$$A_j = (Y_1 + Y_2 + Y_3 + Y_4/4)^2$$

$$D = U(\Sigma A_j/N)$$

Revised 11/21/83

where:

Y_i = distance from point to nearest shrub in ith quarter,

A_j = mean area per sampling point,

N = sample size,

D = density, the number of shrubs per unit area,

U = unit area.

Five sampling points were placed 15 paces apart along a transect. The starting point and direction of each transect was randomly located.

Tree density was obtained by a complete enumeration by species within each reference site. Tree size class was determined by measuring diameter at breast height (DBH) for all tree species except pinyon pine and Utah juniper which were measured at the base.

Statistical adequacy for sample size for aerial plant cover and shrub density was determined by the following formula:

$$N_{min} = t^2 s^2 / (d\bar{x})^2$$

where:

N_{min} = minimum sample size,

t = t-value for a 2-tailed test,

s = standard deviation,

d = allowable change in sample mean,

$\bar{x}$ = sample mean.

Sample size for aerial cover was tested at the 90 percent confidence level ($t_{0.10,\infty}$ =1.645) with a 10 percent error of the mean (d=0.10). Shrub density sample size was tested at the 80 percent confidence level ($t_{0.20,\infty}$=1.282) with 10 percent error of the mean (d=0.10). Adequacy for aerial cover and shrub density was calculated after 10 and 20 samples, respectively. Table 1 gives the minimum sample size and observed sample size for the reference areas. Data presented hereafter are based on the overall sample size.

Shrub composition based on density was determined by the following formula:

$$C = S_i / T$$

$$T = \Sigma S_i$$

where: S_i = total individuals of the ith species,

T = total number of shrubs sampled,

C = shrub composition.

Jaccard's Community Coefficient was used to quantify the similarity in plant species between the reference and disturbed area. The equation is:

$$I.S. = (C/A+B-C)100\%$$

where: I.S. = index of similarity,

A = total species in community a,

B = total species in community b,

C = number of species common to both.

The Shannon Index was used to calculate species diversity for the reference areas. The index is:

$$H'=\Sigma P_i \ln P_i$$

where: H'=species diversity index,

P_i=proportion of the observations found in category i.

Diversity calculations are based on ground cover by species. The maximum possible diversity for a reference area is:

$$H'_{max}=\ln K$$

where: H'_{max}=maximum diversity,

K=the number of categories, i.e., species.

The ratio between H' and H'_{max} is referred to as species evenness. This is calculated as:

$$J=H'/H'_{max}$$

where: J=species evenness.

Data for aerial cover, species list by life form, and tree density for the Des-Bee-Dove Mines were collected August 12-15, 1980 and analyzed September 8 and 9, 1980. Shrub density was measured April 16, 1982 with data analyzed April 21, 1982.

United States Forest Service and Utah Division of Wildlife Resources personnel located in Price, Utah were consulted on August 15 and 16, 1980 with regards to livestock and big game vegetational use within the permit area.

Personnel involved with vegetational sampling, data analysis, and report writing:

Jerry R. Barker
Bio-Resources, Inc.
P.O. Box 3447
Logan, Utah 84321

Marianne Barker
Bio-Resources, Inc.
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Logan, Utah 84321

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Personnel consulted in preparation of the information:

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Christian Shingelton
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P.O. Box 899
Salt Lake City, Utah 84110

Larry Dalton
Wildlife Biologist
Division of Wildlife Resources
Price, Utah 84501

Bob Graves
Range-Wildlife Specialist
United States Forest Service
Price, Utah 84501

Permit Area Vegetation

The mine property permit area is 2,800 acres. Six major vegetation types were identified within the permit area and adjacent land (see 2-12, Vegetation Map). Mixed conifer, pinyon-juniper, sagebrush, grass, riparian and salt desert shrub are the six vegetation types (Table 2). The mixed-conifer type occurs primarily at the higher elevations (above 9,000 ft.) or at lower elevations with a northern exposure. The pinyon-juniper vegetation type is found on the steep, rocky slopes with a southern exposure and the relatively flat ground at lower elevations (7,000 ft.). At the higher elevations and on north-facing slopes, it is common for the pinyon-juniper community to inter-mix with the mixed-conifer community. Elevation for this vegetation type varies from 7,000 to 9,000 feet. The sagebrush and grass vegetation types also occur at the high elevations, but are restricted to the drier sites than the mixed conifer. The riparian vegetation type is located along Deer Creek, Cottonwood and Grimes Wash. This vegetation type is better developed along Deer Creek below the mine, than along Cottonwood and Grimes Wash. The salt-desert shrub vegetation type is not found within the permit area, but is located on adjacent land. It has a southern exposure and elevation varies from 6,600 to 7,600 feet.

Productivity

Productivity measurements for the pinyon-juniper range type on steep slopes is not available. Data collection has been confined to the benches below these slopes because of their value to livestock. Very little if any livestock grazing occurs on these steep slopes, most of the forage use is by wildlife.

The current range condition of the mine reference area is judged as fair when correlated with BLM's assessment of the Grimes Allotments (BLM letter, June 1982). The opportunity for improvement is very limited because of the inherent characteristic of the pinyon-juniper overstory to inhibit understory development. Also these steep sites are limited by the lack of soil and numerous rock masses.

Pinyon-Juniper Productivity[1]

1. Soil Conservation Service, Soil Survey Carbon-Emery Area 1970

   a. Kenilworth very stony sandy loam, Lower Grimes Wash Wood Hill Range Site, Price, excellent condition (understory intact) 900-1,250 lbs./acre (dry weight).

   b. Deseret Shale Range Site, Deseret Shrub fair condition 100-285 lbs./acre (dry weight).

2. U. S. Forest Service, Ferron Ranger District
   John Healy, Range Conservationist
   East Mountain Allotment, two pinyon-juniper bench sites rated in 1982, fair condition 300-324 lbs./acre (dry weight).

3. Bureau of Land Management, San Rafael Planning Unit East and West Grimes Allotments, fair condition current stocking rates 600-100 lbs./acre (dry weight)[2].

The productivity for the pinyon-juniper reference site on the steep slopes is estimated at 25-100 lbs./acre (dry weight). This is inferred from the data on the benches and comparisons of the sites.

1. Fifty percent of the total forage production is the annual growth of the pinyon and juniper trees.

2. Based on 800 lbs. forage per AUM.

United States Department of the Interior

IN REPLY REFER TO
4190/3400
(U-067)

BUREAU OF LAND MANAGEMENT
Moab District
San Rafael Resource Area
P. O. Drawer AB
Price, Utah 84501

June 24, 1982

Mr. Jerry Barker
c/o Bio Resources
P. O. Box 3447
Logan, Utah 84321

Dear Mr. Barker:

You have requested information concerning Sections 34 and 35 of T. 17 S., R. 7 E.

The two sections are made up of three range sites:

1. Waste - Comprised mainly of cliff and rock outcrop areas.

2. Pinyon-Juniper - Made up of varying amounts of pinyon-juniper, saltbush, bitterbrush, Morman tea, blacksage, mahogany and several grass species. Plant density is between 5-18% and plant vigor is considered weak for most forage species.

3. Desert saltbush - Made up of shadscale, mat saltbush, castle valley clover, Morman tea, blacksage, and seven grass species including curlygrass, sandsage, Indian ricegrass, bull grass, and blue gramma. Plant density is between 0 and 20%.

Range condition could be estimated between fair and good. Vegetative production is low due to range site characteristics. Presently we have no current production or condition figures. There has not been any significant livestock use in the area for the last few years, due to the lack of water.

Our range survey, which was prior to 1966 indicates that Section 34 comprises 640 acres and has a carrying capacity of 9.7 AUM's. Section 35 comprises 640 acres and has a carrying capacity of 18.2 AUM's.

We hope this is the information you need.

Sincerely yours,

Neil A. Simmons

Acting Area Manager

Area Disturbed by Mining

Table 3 lists the vegetation types and acres disturbed by mining activities.

Des-Bee-Dove Mines

The disturbed area of the Des-Bee-Dove Mines totals about 20 acres. Elevation is 7,500 ft. The general slope varies from 33-36°. Average annual precipitation is 6-8 inches. A southern exposure dominates the topography. The vegetation type disturbed within this area was a pinyon-juniper (Table 4). Important woody plants were Utah juniper, pinyon pine, curlleaf mountain mahogany, saskatoon serviceberry and Cutler ephedra. Bluebunch wheatgrass, salina wildrye, and Indian ricegrass were the important grasses. Total aerial plant cover varied from 25 to 30 percent. The soil was probably a Torriorthent.

Deseret Pond & Des-Bee-Dove-Wilberg Junction Road

The disturbed area of the Deseret Sedimentation Pond is 4.5 acres. Elevation is 6,800 feet. Average annual precipitation is 6 inches. A southern exposure dominates the topography. Slope varies from 5-15°. The vegetation type disturbed within this area was dominated by cuneate saltbush, greasewood and salina wildrye (Table 5). Total aerial cover was about 25 percent. The soil was probably a Torriorthent. The disturbed area of the road (50 acres) is within this regime.

Reference Sites

Two reference sites were established to represent the vegetation types disturbed by mining activities (Table 6, Maps 2-13 and 2-16).

Des-Bee-Dove Mines

The reference site (2,700 m^2) for the pinyon-juniper vegetation type has a southwestern exposure and an elevation of 7,800 feet. Slope varies around 33°. Important plants include Utah juniper, pinyon pine, Saskatoon serviceberry, curlleaf mountain mahogany, saline wildrye and bluebunch wheatgrass (Table 7). Aerial plant cover is 30 percent with trees providing the majority of cover (Table 8). Shrub density is 147 plants per acre (Table 9). Curlleaf mountain mahogany is the most common shrub while low rabbitbrush is the least common. Tree density is 23 plants per acre (Table 10). Pinyon pine is more common than Utah juniper. The species diversity index is 1.71. The soil belongs to the Sunup series of the loamy-skeletal mixed mesic Lithic Ustic Torriothent.

Deseret Pond

The reference site (3,096 m^2) for the salt desert shrub vegetation type (Deseret Pond) has a southwestern exposure with an elevation of 6,900 feet. Slope varies from 5-15°. Dominant plants include cuneate saltbush, salina wildrye, greasewood, and shadscale (Table 11). Total aerial plant cover is 26 percent with shrubs providing most of the cover (Table 12). Shrub density is 2,578 plants per acre (Table 13). Cuneate saltbush is the most common and greasewood the least common. Only two Utah juniper trees occur in the plot (Table 7). The species diversity index is 1.54. The soil belongs to the Chipeta soil series of the clayey mixed calcaeous mesic Typic Torriorthent.

Wildlife and Livestock

The mining permit area is located within the Ferron Ranger District of the Manti-LaSal National Forest managed by the United States Forest Service. Both wildlife and livestock utilize the permit for grazing. However, wildlife and livestock grazing is limited to the higher elevations. Very little wildlife and livestock grazing occurs on the steep slopes where the mine is located.

Deer, elk, and moose utilize the area for grazing (Table 14). Deer have a greater impact on the vegetation than elk or moose because of their high numbers.

Besides wildlife use, the area provides summer grazing for cattle (Table 15). Cattle grazing occurs on the East Mountain allotment of the Ferron Ranger District. For the past several years, there has been a 10 percent non-use of the available AUM's. During 1980, all AUM's were utilized. Overall range condition is fair.

Endangered or Threatened Plants

During the vegetation sampling, no endangered or threatened plant species were identified.

Table 1. Sample adequacy for total plant cover and shrub density for the pinyon-juniper and salt desert reference areas at Des-Bee-Dove Mines.

Reference Site	Parameter	$N_{min.}$[1]	$\bar{x}$	S.D.	$N_{obs.}$
Pinyon-juniper	Plant cover	20	31.00	8.43	20
	Shrub density	42	31.16[2]	15.78	50
Salt-desert shrub	Plant cover	13	26.00	5.68	15
	Shrub density	45	2.25[2]	1.17	50

[1]Determined after 10 and 20 samples for aerial cover and shrub density, respectively.

[2]Sample mean of mean area per plant (m^2).

Table 2. Vegetation types and size of each that are found within the permit area and adjacent land.

Vegetation Type	Total Acres	% of Permit Area
Mixed-conifer	9,037.1	50.2
Pinyon-juniper	4,524.4	25.1
Sagebrush	4,053.0	22.5
Grass	301.5	1.7
Riparian	84.0	0.5
TOTAL	18,000.0	100
Salt-desert shrub[1]	281.7	0

[1]The salt-desert shrub type is located on land adjacent to the permit area. It is influenced by the Des-Bee-Dove Pond (see vegetation map).

Table 3. Vegetation types, number of acres, and percent of vegetation type disturbed by mining at the Des-Bee-Dove Mining Area.

Vegetation Type	Acres Disturbed	% of Vegetation Type
Pinyon-juniper	20	0.4
Salt-desert shrub	54.5	19.3

Table 4. Plant species that were inferred to have grown within the disturbed portion of the pinyon-juniper vegetation type at the Des-Bee-Dove Mines.

Scientific Name	Common Name
Trees	
Juniperus osteosperma	Utah juniper
Pinus edulis	Pinyon pine
Shrubs	
Amelanchier alnifolia	Saskatoon serviceberry
Cercocarpus ledifolius	Curlleaf mountain mahogany
Chrysothamnus viscidiflorus	Low rabbitbrush
Ephedra cutleri	Cutler ephedra
Forbs	
Cryptantha sp.	Cryptantha
Grasses	
Agropyron spicatum	Bluebunch wheatgrass
Elymus salinus	Salina wildrye
Oryzopsis hymenoides	Indian ricegrass

Table 5. Plant species that were inferred to have grown within the salt-desert shrub vegetation type at the Des-Bee-Dove Pond.

Scientific Name	Common Name
Trees	
Juniperus osteosperma	Utah juniper
Shrubs	
Atriplex confertifolia	Shadscale
A. cuneata	Cuneate saltbush
Sarcobatus vermiculatus	Greasewood
Forbs	
Atriplex patula	Fat-hen saltbush
Petradoria pumila	Rock goldenrock
Grasses	
Elymus salinus	Salina wildrye

Table 6. Similarity between the pinyon-juniper and salt-desert shrub reference areas and their respective disturbed areas at Des-Bee-Doves Mines.

	Pinyon-juniper		Salt-desert shrub	
Parameter	REFERENCE	DISTURBED	REFERENCE	DISTURBED
Cover, %	30.4	25-30	26	23-27
Density, No/acre				
Shrub	147	-	2578	-
Tree	23	-	4	-
Species composition, s[1]	12	10	9	7
Aspect	Southwest	Southwest Southeast	Southwest	Southern
Elevation, ft.	7,800	7,500	6,900	6,800
Slope, °	33-36	33-36	5-15	5-15
Soil	Torriorthent	Torriorthent	Torriorthent	Torriorthent
Geology	Colluvium	Colluvium	Alluvium	Alluvium
H'	1.71	-	1.54	-
H'_{max}	2.39	-	2.19	-
J	0.72	-	0.70	-
Index of Similarity, %	83.3		87.5	

[1]s = total plant species

Table 7. Plant species occurring within reference site of the pinyon-juniper vegetation type at the Des-Bee-Dove Mines.

Scientific Name	Common Name
Trees	
Juniperus osteosperma	Utah juniper
Pinus edulis	Pinyon pine
Shrubs	
Amelanchier alnifolia	Saskatoon serviceberry
Atriplex confertifolia	Shadscale
Cercocarpus ledifolius	Curlleaf mountain mahogany
Chrysothamnus viscidiflorus	Low rabbitbush
Ephedra cutleri	Cutler ephedra
Forbs	
Cryptantha sp.	Cryptantha
Salsoli kali	Russian thistle
Grasses	
Agropyron spicatum	Bluebunch wheatgrass
Elymus salinus	Salina wildrye
Oryzopsis hymenoides	Indian ricegrass

Table 8. Ground cover by species for the pinyon-juniper reference area at the Des-Bee-Dove Mines.

Item	Percent Cover	
Trees	11.6	
Pinyon pine		8.3
Utah juniper		3.3
Shrubs	5.4	
Curlleaf mountain mahogany		3.3
Cutler ephedera		1.0
Low rabbitbrush		0.8
Shadscale		0.3
Forbs	0.6	
Cryptantha		0.3
Russian Thistle		0.3
Grasses	12.8	
Bluebunch wheatgrass		6.0
Salina wildrye		5.3
Indian ricegrass		1.5
Total plant cover	30.4	
Litter	5.0	
Rock	30.5	
Bare ground	34.5	

Table 9. Shrub density and composition for the pinyon-juniper reference area for the Des-Bee-Dove Mines.[1]

Species	Composition, %	Density, No./Acre
Curlleaf mountain mahogany	61	90
Cutler ephedra	36	53
Low rabbitbrush	3	4
	100	147

[1]Based on 50 observations. The mean area per plant was 27.5 m^2.

Table 10. Tree size class (DBH) and number of trees found within each size class by species for the pinyon-juniper and salt-desert shrub vegetation type reference areas for the Des-Bee-Dove Mines.

	Diameter at Breast Height CM				
Vegetation Type	0 - 10	10 - 25	25 - 50	> 50	% of Total
Pinyon-juniper					
Pinyon pine	9	8	5	0	65
Utah juniper	3	5	4	0	35
% of Total	35	38	27	0	
Salt-desert shrub					
Utah Juniper	2	0	0	0	100

Table 11. Plant species occurring within the reference site of the salt desert shrub vegetation type at the Deseret Pond.

Scientific Name	Common Name
Trees	
Juniperus osteosperma	Utah juniper
Shrubs	
Atriplex Canescens	Fourning saltbrush
Atriplex confertifolia	Shadscale
A. cuneata	Cuneata saltbush
Sarcobatus vermiculatus	Greasewood
Forbs	
Atriplex patula	Fat-hen saltbush
Eriogonum corymbosum	Corymbed eriogonum
Petradoria pumila	Rock goldenrod
Grasses	
Elymus salinus	Salina wildrye

Table 12. Ground cover by species for the salt desert shrub reference area at the Deseret Pond.

Item	Percent Cover	
Trees	0.3	
Utah juniper		0.3
Shrubs	11.8	
Cuneate saltbush		8.7
Shadscale		1.7
Greasewood		1.1
Fourning saltbush		0.3
Forbs	3.6	
Corymbed eriogonum		2.0
Fat-hen saltbush		1.3
Rock goldenrod		0.3
Grasses	10.3	
Salina wildrye		10.3
Total plant cover	26.0	
Litter	3.0	
Rock	13.3	
Bare ground	57.7	
	100.0	

Table 13. Shrub density and composition for the salt-desert shrub reference area for the Des-Bee-Dove Mines.[1]

Species	Composition, %	Density, No/acre
Cuneate saltbush	70	1805
Shadscale	29	747
Greasewood	1	26
	100	2578

[1]Based on 50 observations. The mean area per plant was 1.57m^2

Table 14. Deer, elk and moose vegetation utilization on the Ferron Ranger District of the Manti-LaSal National Forest

Wildlife	Unit	High Priority[1] Summer Range	Winter[2] Range	AUM[3]	No.[4]
Deer	34 N	6,500	-	274	289
	35 S	5,450		282	297
			3,055	73	65
Elk	Manti Range	12,685		365	126
			2,320	27	8
			Critical 1,040	120	35
Moose	Entire Allotment (Year long)		15,005	130	13

[1]Total acres
[2]Total acres
[3]Animal unit month
[4]Total animals

Table 15. Cattle vegatation utilization on the East Mountain allotment of the Ferron Ranger District, Manti-LaSal National Forest.

Total Acres	Land Ownership	AUM
1,959	Private[1]	845
19,328	USFS	1,710

[1]Private land but still managed by the USFS.