# UNDERGROUND COAL MINE PERMIT

## ACT 007/007

**Sunnyside Coal Company**

## SUNNYSIDE MINES

## CARBON COUNTY, UTAH

## BOOK 2

CHAPTER 4.0 LAND

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Chapter 4

# Land Use and Air Quality

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### Regional Land Use

Regional land use has been fully discussed in the U.S. Geological Survey's "Final Environmental Statement, Development of Coal Resources in Central Utah, Part 1 - Regional Analysis" (1979).

In the seven-county region, Federal lands, including those of the National Forest and National Park systems, account for 76% of the land surface. Only about 7% was irrigated farm acreage. Prime farmlands have not been identified in areas affected by the proposed mine activities.

Land use management plans for Public and National Forest lands generally allow for mine and mine-related activities, with the exception of lands set aside for research or as road less, primitive wilderness areas, and wild and scenic rivers.

The livestock industry, mostly cattle and sheep grazing, has been part of the region's historical economy. The timber industry only has a few small saw mills still operating mostly to supply fence posts, and lumber.

### Land Use in Mine Plan Area

Land use consists primarily of mining, fish and wildlife, habitat, recreation, minor crop land, limited livestock grazing, and developed water resources (see Plate 4-4).

The land within the mine plan area has not historically been used as cropland because of the mountainous terrain, steep slopes and rocky surface. Farming is limited to small areas on canyon bottoms. About four acres of alfalfa, irrigated with mine water, is being farmed adjacent to the surface facilities of the mine.

Productivity of the land use in the permit area has been rated by the U.S. Soil Conservation Service as "Fair to Poor" and its study of the mine plan area did not show any units designated as prime farmland (see Figure 2-1).

Zoning for the permit area is M & G-1. A copy of the Carbon County Utah zoning regulations pertaining to this zone designation is included:

Regulations for Zoning M & G-1 Mining and Grazing Zone Carbon County, Utah:8-6

## 8-6 M & G-1 Mining and Grazing Zone

### 8-6-1 Objectives and Characteristics of Zone

The M & G-1 Mining & Grazing Zone has been established as a district in which the primary use of the land is for mining and for livestock grazing purposes. This zone is characterized by large tracts of desert and open-range land and with an occasional mine, cabin, dwelling and/or corral incidental to livestock operations. In order to accomplish the objectives and the purposes of this ordinance and to stabilize and protect the essential characteristics of this zone, the following regulations shall apply in the M & G-1 Mining & Grazing Zone. (Added by Ord 120: July 6, 1972)

### 8-6-2 Use Requirements

The following buildings, structures, and uses of the land shall be permitted in the M & G-1 Mining & Grazing Zone upon compliance with requirements as set forth in this ordinance:

1. Open-pit mines and mine waste dumps and underground mines and buildings and structures associated with mines and mine dumps.

2. Agriculture and the raising, handling, and processing of livestock, poultry, and agricultural products and buildings and structures therefor.

3. Animal byproducts plants, when located at least one mile from any dwelling or a state or federal highway.

4. Clay pits, rock pits, gravel quarries, rock crushers, public dump grounds; manufacturing, processing, storage, and testing of explosives, provided all activities and storage are located at least three hundred (300) feet from any public street or building used for human occupancy.

5. Mineral reduction and processing plants.

6. Shooting range, rifle and trap shooting.

7. Sewerage treatment plants subject to approval by the Board of Adjustment and State Department of Health.

8. Reservoirs, dams, pumping plants, and water facilities.

9. Parks and playgrounds.

10. Caretaker dwellings, when incidental to and located on the same lot parcel of land as principle use permitted in the zone.

11. Hunting preserves, hunting lodges, and dude ranches.

12. Other uses ruled by the Board of Adjustment to be similar to uses specifically permitted in the zone and which will harmonize with the objectives and characteristics of the M & G-1 Mining & Grazing Zone.

(Added by Ord 120: July 6, 1972)

8-6-3 Area Requirements

For hunting lodges, dude ranches, and other permitted uses intended or used for human occupancy (except caretaker dwellings) the minimum lot or building site area shall be not less than twenty (20) acres. For other buildings or uses there shall be no minimum area requirements. (Added by Ord 120: July 6, 1972)

8-6-4 Width Requirements

For hunting lodges, dude ranches, and any other use permitted in the zone, intended or used for human occupancy (except caretaker dwellings) the minimum width of any lot or building site shall be no minimum requirement. (Added by Ord 10: July 6, 1972)

8-6-5 Location, Height, and Size of Building Requirements

There shall be no location, height, and size of building requirements, except that the buildings shall be located at least thirty (30) feet back from any public street or sixty-five (65) feet back from the center line of any public street, whichever is the greater distance, except that all buildings situated adjacent to a state or federally designated highway shall be set back at least fifty (50) feet. (Added by Ord 120: July 6, 1972)

Land use During Operations

Land use during operation will continue to be mining, fish and wildlife habitat, recreation, limited livestock grazing and minor cropland. The effect of this underground coal mining operation on such land use is not expected to change during the permit period.

4.12 Cultural and Historic Resources

The requirements for this section is being met with a complete report included with the Exhibits as Appendix 4-1 at the end of the chapter.

because of better roof conditions and a better quality of coal. Extraction in those early days was erratic and created poor mining conditions in the Lower Sunnyside seam. The advent of longwall mining, with its almost complete extraction, will enable future lower seam mining to be accomplished with a much greater degree of success.

The mines have been operated from the late 1890's thru May 1988 from May 1988 thru February 1989 the mines were idle. Since then the mine has been producing. Over 60 million tons of coal have been recovered.

Land usage preceding mining was probably limited to wildlife habitat, and livestock grazing. The region encompassed by the Mine Plan Area is very mountainous, intersected by steep canyons. Potential for farming would be extremely limited, confined to small areas in the canyon bottoms. Undoubtedly some dry farming such as alfalfa for stock feed took place in the area, mostly in the flat areas west of the Book Cliffs range.

4.14 Post-Mining Land Use

Since the post-mining land use will be the same as the pre-mining land use, the removal of structures, re-grading, and top soil placement become important to achieve the proposed land use. As most of the area is for grazing, the re-establishment of vegetation then must be achieved. Some area may become desirable for use as minor cropland (alfalfa fields). This use would be compatible with pre-mining land use.

The surface landowner of all surface disturbed areas of the permit is Sunnyside Coal Company.

4.20 Air Quality

Sunnyside Coal Company will comply with requirements of the Clean Air Act and other applicable air quality laws.

Most of the region around the Sunnyside Mines permit area has been designated a Class II area for purposes of determination of significant air quality deterioration. Deterioration of the air quality is not expected during the permit period with the exception of short high wind periods when sand and smaller grained particles are picked up outside of the permit area and added to the air in the permit area.

The Sunnyside Mines is an underground mining operations. The coal is cleaned in a washing plant and no thermal drying of the coal is used. Any effect of the mining operation on air quality would be minimal and would be confined primarily to the surface facilities.

The Utah Bureau of Air Quality periodically inspects 2 coal fired boilers for heating prep plant buildings and providing hot water for the bathhouse.

Air pollution control is presently practiced as follows:

Most of the parking areas and roads are paved. The main public road through the property, the one most used, is owned and maintained by the county. This road is partially paved. The haul road used by the refuse trucks is partially paved to the disposal area. There are several access roads to portal and/or fan locations which receive limited usage, mainly for inspection purposes. Roads around the main complex are treated with calcium chloride and other similar chemicals sprayed with water to control fugitive dust.

# List of Exhibits

## 4.12 HISTORICAL AND CULTURAL RESOURCES

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# 1.0 Scope

## 1.1. Introduction

The consulting Services Branch of the Antiquities Section, Division of State History, conducted a cultural resource inventory for Kaiser Steel Corporation of Oakland, California. The survey is part of the requirements for a mine permit application required by the Department of Natural Resources Division of Oil, Gas and Mining, State of Utah (hereafter D.O.M.G.). The mine permit application is for the Sunnyside Coal Mine Lease Area, near Sunnyside, Carbon County, Utah (Figure 4-1). The survey consisted of a 10% stratified, random sampling of the lease area and three site specific examinations of future mine surface expansion locations. This document includes the results of the Class I literature search of all prehistoric cultural resource values, historic windshield survey, the Class II (10% sample) and the Class III intensive (site specific) survey. The format followed is a modified version of the Permit Applications-General Guidelines For Organizational Format and Content, revised November 3, 1980, published by D.O.G.M. The modification was necessary in order to adequately section all of the requirements of D.O.G.M. and of the Federal Office of Surface Mining in Denver. Historical and Cultural Resources is Chapter 4 and its appropriate sub-sections.

## 1.2. General Information and Legal Background

The Consulting Services Branch was contracted by Dr. Hon C. Lee, Manager of Mineral Processing, of Kaiser Steel Corporation. Contract negotiations were finalized on December 30, 1980. Field work was carried out during January 19-24, 1981, and February 27-28, 1981. The literature search and the field survey was organized and conducted under the direction of Asa S. Nielson, Director of the Consulting Services Branch. Mr. Nielson was assisted in the field and in the report production by Jack Oviatt, David A. Merril and James Kirkman. A total of 36 person days was required for the field work. The field work was completed under a Bureau of Land Management (B.L.M.) Antiquities Permit (81-UT-013) which expires October 6, 1981. Bruce Hawkins, staff historic archeologist of the Antiquities Section examined and identified the historic artifacts collected during the survey. The drafting and photography were accomplished by Toni Ray, Debbie Truell-Seward and James Kirkman. The Report was typed by Amy Pringle, Rachael Olschewski, and Renae Hendry. The staff of the Sunnyside Mine, Lynn Huntsman, Manager of Engineering, John Huefner and Doug Pearce, staff engineers, provided invaluable maps, field access information and numerous important documents for the report.

All field and literature notes, correspondence, maps and site data are on file at the Antiquities Section in Salt Lake City. The artifacts collected during the survey were analyzed at the Section and are being curated at the Museum of Natural History, University of Utah, in Salt Lake City. This report, site records and maps is being distributed to Kaiser Steel Corporation and all appropriate state and federal agencies. To our knowledge, this is the first cultural resource study conducted on the Kaiser Steel, Sunnyside Mine Lease Area. The study is required for Kaiser Steel Corporation to comply with pertinent government legislation. First, the study particularly fulfills requirements of the Utah Coal Mining and Reclamation Act of 1979. The study also helps Kaiser Steel to comply with federal legislation, i.e., Exectutive Order 11593 "Protection and Enhancement of the Cultural Environment" (Federal Register, Vol. 36, No. 95, May 15, 1971), "The National Historic Preservation Act of 1966 (80 Stat. 915) as ammended in 1976, The Archeological and Historical Data Preservation Act of 1974", which is an amendment of "The Reservoir Salvage Act of 1960' (74 Stat. 220), and finally, the "Archeological Resources Protection Act of 1979".

In general, these laws recognize the fragile, non-renewable nature of historic and prehistoric cultural resources. The legislation has been enacted in order to identify, report and evaluate these resources prior to any proposed impacting action.

### 1.2.1. General Goals

This study has three principle goals. The first is to identify and evaluate the cultural resource values within the mine lease area. The second goal is to ascertain site density within certain environments in order to facilitate future development of the mine lease. As an example, if a particular environment could be demonstrated to have a low site density, then this area could be released from future culture resource inventory as mine development expands. Studies of this type have become more prevalent on federal resource lands (Reed and Nickens 1980; Holmer 1979; and Wikle 1979) and on mining plan applications in Utah (Hauck 1980). The third goal is to examine what types of impacts will likely occur to known culture resources in the future. Mine expansion plans in the next five years call for the possible development of two mine vent systems and a sedimentation pond (Plate 4-2). An additional concern is the potential for impact to cultural resources resulting from land subsidence caused from longwall coal extraction and the subsequent collapse of the mine surface. All of the various impacts will be addressed in Section 5.9.

### 1.2.2. Location

The mine lease area is approximately 34 km southeast of Price, Utah, and about 3 km north of East Carbon City, Carbon County, Utah, (Figure 4-1). The survey area includes all parts of Sections 1, 12, 13, 24, and 25, T14S, R13E, Sections 6, 7, 8, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, T14S, R14E and Sections 3, 4, 5, 6, 9, 10, 15, 16, 17 of T15S, R14E. The majority of the land is the private property of Kaiser Steel Corporation with small portions of private and B.L.M. (Price River Resources Area) Carbon County coal lease lands (Plate 4-1).

## 1.3. Environmental Overview

### 1.3.1. Physical Features of the Site Area: Topography, Drainage and Elevation

The topography of the Kaiser Steel permit area is rugged and precipitous, as in typical of the maturely-dissected Book Cliffs area in general. Local relief approaches 700 meters in approximately 3.2 kilometers in rising from the town of Sunnyside (1980 meters) in rising from the town of Sunnyside (1980 meters) to the crest of the West Ridge (about 2680 meters). Patmos Ridge, to the east of the permit area, reaches altitudes of 2925-3050 meters. Eighty to 90 percent of the permit area ranges in altitude from 2010 to 2620 meters and consists to steep, unstable colluvial slopes and bedrock cliffs.

Numerous short, steep canyons having dendritic patterns drain the west-facing slopes of the Book Cliffs north of the town of Sunnyside. The extreme southern part of the permit area is drained by Water Canyon and the North Fork of Horse Creek. The major part of the permit area, however, is drained by Grassy Trail Creek, which flows southward through the north to the northwest-trending Whitmore Canyon. West Ridge forms the Grassy Trail Creek drainage divide on the west, and Patmos Ridge forms the drainage divide on the east. Grassy Trail Creek heads north of the permit area in the Book Cliffs, and empties into the Price River about 15 miles southwest of Sunnyside.

Whitmore Canyons has a flat alluvial floor rising abruptly in colluvial or bedrock slopes along its sides. Its tributary canyons, all of which enter from the east, have distinct V-shaped cross-profiles, and lack flat floors except near their junctures with Whitmore Canyon.

### 1.3.2. Soils

The steepness of the slopes in the permit area prevents well-developed soils from forming. Organic matter builds up under forest or brush vegetation, and along the former floodplain of the now-entrenched Grassy Trail Creek; but even in these areas

the soils appear to be thin. Most of the soils in the site area are sandy and are probably entislos, inceptisols, and aridisols.

Stable ridge tops, and the pediment surfaces at the base of the Book Cliffs, probably possess the oldest soils. Most other areas are too geomorphically active for soil-forming processes to be effective for long periods of time. Mancos Shale outcrops erode quickly into soil-free badlands. Landslide deposits often are heavily vegetated so that their soils have a thick "A" horizons, but the soils are probably quite young. Colluvial slopes are far to steep and active for mature soils to develope. Soils suitable for agriculture are limited except along Grassy Trail Creek at Sunnyside and along the flat bottom of Whitmore Canyon. The generally high altitude of the area, however, probably prevented prehistoric people from growing frost-sensitive crops.

### 1.3.3 Bedrock Geology

The Book Cliffs form an impressive retreating erosional escarpment extending from Price, Utah on the west to near Grand Junction on the east. This escarpment constitutes the boundary between the Uinta Basin Section and the Canyonlands Section of the Colorado Plateau Physiographic Province (Stokes 1977). Relatively resistant Cretaceous and Tertiary sandstones and mudstones dipping at gentle to the north and northeast overlie the easily eroded Mancos Shale. An abrupt topographic break thus results between the relatively flat Mancos Shale lowlands and the high rugged sandstone cliffs and slopes of the Book Cliffs.

Rocks in the Sunnyside area (Figure 4-2) are similar in character to the rocks along most of the length of the Book Cliffs (Fisher et al 1960). The alternating sandstones, shales, and coals of the Blackhawk Formation represents cyclic transgressions and regressions of nearshore marine and lagoonal environments at the close of the occupation of the area by the Mancos Sea (Young 1966). The overlying Cretaceous and Tertiary rocks were deposited (commonly called rock asphalt) crop out in the uppermost Wasatch and lowermost Green River formations just east of the permit area (Holmes and Page 1956).

Two major sets of faults, at right angles to each other, cross the permit area (Osterwald and Dunrud 1962). One of the fault sets trends north-northwest (Osterwald and Dunrud 1966). The Sunnyside fault zone parallels the trend of Whitmore Canyon and probably was responsible for a zone of weakness in the bedrock along which Grassy Trail Creek downcut.

The Kaiser Steel Sunnyside mines exploit the upper and lower Sunnyside coal seams (Scheibner 1979). The upper coal seam averages 1.2 to 2.1 meters in thickness, and the lower seam averages 1.67 to 3.65 meters in thickness (see Section 3.3.1.1.).

They are separated by 1 to 12 meters of shale or siltstone (Doelling 1972). Coal mining was initiated at Sunnyside in 1898, and in 1979 there were approximately 80 kilometers of underground tunnels covering an area of 39 square kilometers (Scheibner 1979).

Although subsidence cracks related to the underground mining at Sunnyside have been mapped by Osterwald (1962), there is presently no obvious evidence of these features on the ground surface. According to Osterwald's (1962) map, the subsidence cracks are located above areas where both the upper and lower coal seams have been mined out, and where there is between 90 and 244 meters of cover. Dunrud and Barnes (1972) report major tensional cracks and compressional features related to subsidence in the Geneva Mine area, 16 kilometers south of Sunnyside. The subsidence features in the Geneva area are expressed at the surface, as much as 275 to 305 meters above the mine workings. Although similar geologic relationships may exist in the Kaiser Steel permit area, according to the Kaiser Steel Permit Application (Sections 3.4.8 and 6.6.3.3) little subsidence is expected. Kaiser Steel is now mining at a depth of 365-762 meters.

### 1.3.4 Surficial Deposits

Sandstone bedrock cliffs and colluvial slopes dominate the landscape in the permit area. The sandstone cliffs range from several meters to more than 50 meters in height and are generally discontinuous laterally. Talus deposits are not common except below cliffs that are particulary prone to fracturing and rapid disintegration.

Bouldery to sandy and clayey colluvium accumulates on the steep slopes formed on the shale layers interbedded with the cliff-forming sandstones. The colluvium generally has enough fine material for vegetation to be established, but in some areas there is little plant growth and the slopes are very unstable.

Landslide deposits are common along the west side of Whitmore Canyon. Extensive active and inactive mass movements are located in the adjacent to the NE1/4, Sec. 12, T. 14 S., R. 13 E., in the E1/2 Sec. 18, T. 14 S., R. 14 E., and in large area adjacent to, and including Bull Flat (SE1/4, Sec. 19, T. 14S., R. 14 E.).

Three major factors are responsible for the location of mass-wasting on the short, steep west side of Whitmore Canyon as opposed to the highly dissected east side. The factors are: 1. the presence of the Sunnyside fault zone which is responsible for the orientation of Whitmore Canyon parallel to the regional strike of the rocks, and also for fractures and joints parallel to the fault zone; 2. the east to northeast dip ($5^{\circ}$ -$10^{\circ}$) of the rocks; and 3. the presence of alternating layers of hard

sandstones and inherently weak shales, a combination known to be susceptible to mass-wasting (Bloom, 1978). Landsliding is induced by ground waters lubricating the sandstone/shale interfaces, thus encouraging the sliding by gravity of large masses of bedrock down-dip into Whitmore Canyon. Large open cracks marking the initial phases of such landslides can be seen above Bull Flat on the east side of West ridge, and high on the west side of Slaughter Canyon. However, most of the major landslide activity probably ocurred during the effectively moister glacial periods of the Pleistocene.

Sandy to cobbley alluvium in Whitmore Canyon reaches thicknesses of at least 4.5 to 6 meters. There is one major alluvial terrace in Whitmore Canyon resulting from downcutting by Grassy Trail Creek.

Two major Quaternary pediment levels are present within the permit area beyond the mouth of Whitmore Canyon. The upper pediment, across which Grassy Trail Creek flows, stands 85 meters above the lower one, and they are separated by an erosional scarp which runs through Sections 6,7 and 8, T15S, R14E. The contact between the sandy to bouldery pediment gravels and the underlying Mancos Shale is exposed along this alluvial gravels grade upward into coarse bouldery colluvium and mudflow deposits.

### 1.3.5 Flora and Vegetation

Two major vegetation zones (Cronquist et al 1972) are represented in the permit area, the Pinyon-Juniper Zone, and the Montane Zone. Pinyon pine and Utah Juniper dominate vegetation communities on the pediment surfaces, on the lower slopes of the Book Cliffs, and on south-facing slopes, even at higher altitudes (eg. 2440 meters or more). Sagebrush-grass communities are found interspersed with pinyon-juniper stands, and also dominate large areas on the ridge tops (Table 4-1). In slightly moister locations, such as north-facing slopes or landslide deposits, serviceberry-sagebrush communities are common. Mountain mahogany forms pure stands in some places on the ridge tops. Riparian communities along Grassy Trail Creek and its Tributaries contain cottonwood, willow, birch, sagebrush, and rabbitbrush.

The Montane Zone contains douglas fir and aspen communities. Douglas fir dominates north-facing slopes at higher altitudes, and aspen communities are found on landslide deposits, stream bottoms, and on open, well-watered slopes and draws, also at higher altitudes. Because of the sharp differences in such environmental factors as soil moisture, temperature, and sunlight on north- and south-facing slopes, the two zones, Pinyon-Juniper and Montane, are not well-separated altitudinally, rather, the various constituent communities form an intergrading mosaic pattern dependant upon micro-environmental conditions.

### 1.3.6 Fauna

According to Durrant (1952) the Book Cliffs area is transitional between the Canyonlands province of the Colorado Plateau Fanunal Area, and the Uinta Basin Province of the Northern Great Plains Faunal Areas are based on physiographic divisions as they influence the distribution of small mammals.

Droppings and tracks of mule deer are common throughout the area (Table 4-2), although we saw no live deer during the survey. Beaver dams and other evidence of activity of beavers is common in Whitmore Canyon and its tributaries. We encountered a live bobcat caught in a steel trap in the SE/4, SW1/4, Sec. 29, T. 14S., R. 14 E. The skull and skeleton of a ringtail were found near this same trap.

Wintering birds were common in the permit area during the survey, and in the summer, breeding birds are probably also common in the brush, montane forest, and riparian habitats. No reptiles or amphibians were observed during the survey.

### 1.3.7. Present Climate

Figure 4-3 shows climatic data for Hiawatha, Utah, 56 kilometers west of Sunnyside on the eastern slope of the Wasatch Plateau. Despite possibly some differences due to the orographic effect of the Wasatch Plateau at Hiawatha, these data should generally characterize climatic conditions in the Kaiser Steel permit area. Because of the relatively high altitudes in the permit area, the climate is somewhat cooler and moister than on the nearby Mancos Shale lowlands. There are approximately 200 frost-free days per year at Hiawatha (U.S. Dept. Comm., 1965), and similar conditions probably prevail over much of the permit area. The high precipitation peak in August (Figure 4-3) represents moisture from tropical air masses originating over the Golf of Mexico and circulating over Utah as part of the Mexican monsoon. Winter moisture comes primarily from pacific cyclonic storms. Because of the nature of the topography in the permit area, there are sharp contrasts in microclimate between north- and south-facing slopes at the same altitude.

### 1.3.8. Past Climate

Although there have been no detailed studies of Quaternary climates in the Book Cliffs, paleoclimatic studies from surrounding areas can be used to infer past conditions in the Sunnyside area. The last major period of Pleistocene glacial climate (about 22,000 to 13,000 B.P.) had profound effects on nearby areas of Utah. Due to the marked increase in effective moisture there were vast pluvial lakes in the Great Basin and extensive glaciers in the high mountain areas during this period (Morrison 1965).

There were no glaciers or pluvial lakes in the Sunnyside area during the Pleistocene. However, during each of the 19 major world-wide glacial events in the last 700,000 years (Shackleton and Opdyke 1973), the area probably underwent significant environmental changes. These probably included: decreased temperatures and/or increased precipitation, altitudinal lowering of vegetation zones, increased runoff in streams, increased soil moisture and higher ground water tables, increased snow pack, increased colluvial activity on slopes, and an increase in large-scale mass-wasting. Packrat (Neotoma sp.) middens are abundant in the permit area, and are a potential source of paleoecological data (Wells 1976) for future research.

Higher frequency Holocene (10,000 B.P. to the present) climatic change are documented from several nearby places in Utah (e.g. Madsen and Currey 1979; Currey 1976; Currey 1980; Lindsay 1980). The general pattern in the period 13,000 to 8,000 B.P. is of gradual warming with several lesser episodes of cooling following rapid deglaciations in the mountain areas. The Altithermal, or mid-post-glacial warm period, lasted from about 8,000 B.P. to 5,000 B.P. with possibly a short period of cooler or wetter conditions around 6500 to 6000 B.P. Subsequent to 5,000 B.P. there were at least three periods of increased effective moisture (Neoglaciation) leading up to the modern climatic conditions at the end of the "Little Ice Age" (about A.D. 1850). The effects of Holocene climatic fluctuations on the geology and ecology of the Sunnyside area is not known. But, it is likely that the environmental changes had a significant effect on the prehistoric peoples as has been noted in surrounding areas (Benedict 1979: Madsen 1980).

### 1.3.9 Present land use

The area under consideration for the mine permit is owned by Kaiser Steel Corporation, individual land holders, and the B.L.M. (Plate 4-1) and is used for mining, grazing, hunting, trapping, and recreation.

### 1.3.10. Historic Land Use
(See Historic Overview 5.1.5.)

During the historic period, the permit area was used for the following purposes:

Trapping--some local informants report that the mountains to the east and north of the permit area were trapped extensively in the 1820-47 period. No documentary evidence for this claim was uncovered for the area around Sunnyside, although the Westwater Canyon area of the Book Cliff's was a primary route for trappers, such as Antoine Robidoux, going north from the Colorado Plateau into the Roan Mountains and Book Cliffs.

Homesteading--During the late 1870's before agriculture was successfully established along the Price River, early homesteaders obtained a substantial portion of there food by hunting game on a regular basis in Whitmore Canyon.

Stock Raising--Beginning in the late 1880's and continuing through the 1840's Whitmore Canyon and Grassy Trail Creek were used extensively for cattle operations. George C. Whitmore, for whom the canyon is named, operated one of the largest cattle ranches in Carbon County between 1880-1890.

Agriculture--In 1897, Jefferson Tidwell and his extended family built a cabin at the mouth of Number Two Canyon to begin a small farm. Less than a year later, the Tidwells discovered coal, and sold their claims to the Utah Fuel Company.

Logging Operation--One local history reports that timbers for mine shoring and homes were taken from the permit area.

Mining--The Utah Fuel Company, a subsidiary of the Denver and Rio Grande Western Railroad Company mined coal from the current mine permit area. In 1942, this operation was sold to Kaiser Steel because the coal mined from the Sunnyside area was suitable for coking. Two attempts have been made to mine asphalt from the deposits in the north end of the permit area, first in 1907 by the Bowry Asphalt Company and later in the 1920's and 30's by the Utah Rock Asphalt Company.

Residential--Associated with the Sunnyside Mine was the town of Sunnyside, located primarily in T14S, R14E, Sections 32 and 29.

### 1.3.11. Previous Investigations and Known Sites

A literature search of all regional (secondary) archeological and historical literature, as well as essential primary (site specific) literature was made. A partial survey of the Sunnyside mine area was completed by the Utah Historical Society Preservation Office Survey and Planning staff during the summer of 1980. Three sites potentially eligible for the National Register were identified, the coke ovens (Site 42Cb243), the machine gun nest which is now of site 42Cb245, and the Utah Rock Asphaltum company tramway (Site 42Cb247). No prehistoric sites were recorded prior to this study. These sites are under consideration for nomination to the Register, but no official nominations have been made. The Utah State Register of Historic Places has been incorporated into the National Register.

## 1.4. Prehistoric Overview

### 1.4.1 Paleo-Indian

The earliest inhabitants believed to have occupied the region were those of the Paleo-Indian tradition, the Llano, Folsom, and Plano cultures. The Llano or Clovis Culture (ca. 12,500-11,000 B.P. Before Present) (Sellers 1952) is most often associated with kill sites of Late Pleistocene megafauna such as mammoth (Haury 1953; Haury, Sayles, and Wasley 1959). Little else is known about the subsistence base of the Clovis people. The kill sites of Late Pleistocene megafauna such as mammoth (Haury 1953; Haury, Sayles, and Wasley 1959). Little else is known about the subsistence base of the Clovis people. The kill sites are usually associated with former spring, marsh, lake side or riverine environments. There is little doubt that Clovis hunters exploited mammoth but to infer that megafauna kill site are rich in a variety of potential resources (Niering 1966; Odum 1963) that likely were exploited along with other environments.

The clovis point is the single distinctive artifact of the Llano Culture, and is a lancolate, fluted dart point. It has been found in association with megafauna (usually mammoth) at several locations in the Southwest and on the Great Plains (Haury, Sayles, and Wasley 1959). No such association has been found in Utah, although the point type has been recovered from surface sites in the region (Madsen, Currey, and Madsen 1976). Utah mammoth remains are also known from environments similar to classic kill sites elsewhere.

The Llano Culture was followed closely by the Folsom Culture (11,000-9,000 B.P.) (Jennings and Norbeck 1955) and is most often associated with bison (Bison antiquus) kill sites (Frison 1978). As with the earlier Llano Culture, little else is known about Folsom Culture subsistence beyond the demonstrated exploitation. The distinctive Folsum point, the hallmark of the culture, is smaller, and thinner than the Clovis point. It is lancolate, fluted and often eared. Point finds associated with binson remains occur on the High Plains. Isolated surface finds have been reported in Utah (Madsen, Currey, and Madsen 1976). Bison antiquus and other fauna associated with Folsum sites have also been found (Nelson and Madsen 1978; Miller 1976) but not in association with human artifacts.

The Folsom Culture was followed by the Plano Culture (9,000-7,000 B.P.) (Jennings and Norbeck 1955; Frison 1978). Plano Culture groups continued to exploit large fauna, with increased use of jump-kills. Jump-kill sites are known at several locales on the Great Plains (Frison 1978) but none are known in Utah.

The Plano groups developed a wide variety of projectile point types. Most are lancolate, non-fluted and precisely flaked. Isolated Plano style points have been found in Utah (Hauck and Weder 1980; Reed and Nickens 1980).

The Paleo-Indian traditions remain the least studied cultural phenomenon on the Utah portion of the Colorado Plateau and the northeastern Great Basin. Some have argued that the classic Paleo-Indian traditions never existed west of the Rocky Mountains (Jennings 1957). The evidence of projectile points and megafauna (albeit not in association) suggests otherwise. It is not possible that such assemblages as the Pinto Basin Complex (Campbell and Campbell 1935) may in fact be a Great Basin temporal counterpart to the Paleo-Indian times (Madsen, Currey, and Madsen 1976). No evidence of any Paleo-Indian traditions have been located within the mine lease area.

### 1.4.2. Archaic Period

The Archaic Period is viewed by some prehistorians as being contemporaneous in part with the latter Paleo-Indians in the Great Basin (Jennings 1957; Hauck 1977; Irwins-Williams and Haynes 1970) or a follow-up to the Paleo-INdians (Madsen, Currey, and Madsen 1976; Hlomer 1978; and Schroedl 1976). The term archaic was first used to define a non-ceramic assemblage at the Lamoka Site in New York (Ritchie 1932) but later developed into a general, technological stage status for the New World (Willy and Phillips 1958). In the Great Basin and on the Northern Colorado Plateau, the term has developed more specific spatial and temporal meanings. The status of current research favors a combination of technological, temporal and adaptive definitions. The Archaic is viewed as four distinctive periods based upon population changes, statistical groupings of projectile points and regional adaptation to intensive hunting and gathering strategies keyed to specific species of flora and fauna (Schroedl 1976; Holmer 1976).

The Black Knoll Phase (8,300-6,200 B.P.) has been recognized at Cowboy Cave (Jennings et al 1980), Sudden Shelter (Jennings et al 1980), Hells Midden (Lister 1951), Deluge Shelter (Leach 1962) and Joe's Valley Alcove (Schrodel 1976). All of these sites are well stratified rockshelters or caves with good chronological control and preservation. The phase is statistically dominated by Pinto and Northern side-notched points used on spear throwers (atlatls). Populations appear to slowly increase. Cave and shelter deposits indicate that populations tend to select specific resources in each area.

The Castle Valley Phase (6,200-4,500 B.P.) indicates a possible change in environments which may have resulted in a shift in subsistence. The population declines, relative to the Black Knoll Phase and shows an increased dependence on grasses and less

on hunting. A good portion of the Castle Valley Phase is dominated by the Rocker Base and Sudden and Hawken side-notch points. The latter portion of the phase may have witnessed an increase in population and dominance of unnamed lancolate and Humboldt points. Slab-lined firepits are used more extensively during this period as opposed to earlier or later of times. This phase is recognized only at Sudden Shelter (Schroedl 1976).

The Green River Phase (4,500-3,300 B.P.) is recognized by Schroedl at the aforementioned Sudden Shelter, Deluge Shelter and Hells Midden in addition to Pint-Size Shelter (Lindsay and Lund 1976) and Throne Cave (Day 1964). The phase may have a western and eastern variant. The western variant is statistically dominated by the Gypsum point style with later introduction of the San Raphael side-notch point. The eastern variant is marked by the Duncan-Hannah point, which appears to be a Plains style influence. Overall, there is a possible minor increase in population and a return to more reliance on hunting on hunting and less on grass collection.

The Dirty Devil Phase (3,300-1,800 B.P.) is in Schroedl's words "the most tenuous of the four outlined..." (1976:68). Schroedl recognizes the phase at cowboy Cave, Clyde's Cavern (Winter and Wylie 1974) and Deluge Shelter. The principle projectile point is still the Gypsum with the addition of the unnotched triangular point.

Little is known about population or subsistence changes. It is now believed that corn was introduced sometime around 2,100 B.P. Berry (1980). The overall effect of the advent of corn and possibility of the horticulture is still a subject of research. The Dirty Devil Phase is arbitrarily ended near 1,500 B.P. with the introduction of the bow and arrow and the shift to a different subsistence strategy keyed to horticulture.

### 1.4.3. Formative Cultures

The Archaic sequence is followed by incipient Formative Stage cultures (1,500-650 B.P.). Formative groups are usually characterized by a sedentary village life, with widespread use of ceramics and increased reliance upon, and in some cases, complete dependence on horticulture (Lipe 1978; Willey and Phillips 1958). The three Formative groups in Utah are Mesa Verde and Kayenta Anasazi, and the Fremont Cultures (Figure 4-4). The Anasazi occupied the extreme southern and southeastern portion of Utah, the Fremont cultures nearly all of Utah north of Cedar City and Escalante and west of the Colorado River. The principle concern in the mine lease area is the Fremont. The Fremont was defined as typologically distinct from the Pueblo Cultures of the Southwest by Morss (1931). Morss' Fremont was largely confined to the Fremont River drainage of the south-central Utah. Since 1931, the Fremont have been shown to inhabit nearly all of

northern Utah. In addition, the Fremont Culture has been divided and redivided into sub-groups. The boundaries waxed and waned with each additional foray into the field. Sub-groups were most often defined by separate trait lists, a technique that is now viewed as futile (Ambler 1970; Madsen and Lindsay 1977). A recent attempt to divide the Fremont into three groups (the Sevier Culture, Fremont and an unnamed Plains derived) has resulted from review of subsistence data (Madsen and Lindsay 1977). A recent attempt to divide the Fremont into three groups (the Sevier Culture, Fremont and an unnamed Plains derived) has resulted from review of subsistence data (Madsen and Lindsay 1977) and is favorably upheld by statistical analysis of settlement patterns and architecture (Lohse 1980).

The Sevier Culture (1,300-650 B.P.., Figure 4-5) occupies the portion of the state west of the Wasatch Plateau. Large village areas contain semisubterranean pit houses, that are often clay-lined. Surface adobe storage structures are common. Several varieties of coiled gray, corrugated and black-on-white ceramics were manufactured. Settlement patterns favor riverine or marsh habitats. The subsistence base appears to be dependent on horticulture and marsh exploitation. The degree of one over the other probably varied from one village to the next (Madsen and Lindsay 1977; Nielson 1978).

The Fremont Culture (1500-700 B.P.) occupied the region east of the Wasatch Plateau and north of the Colorado River and retains the original name applied by Morss. Small villages of rock-lined semisubterranean pit house and masonry storage structures are common. The fremont were predominantly horticulturist. The degree of dependence on supplemental gathering of natural resources, other than hunting of wild game, has not been fully examined. The ceramic assemblage of the Fremont Culture was greatly influenced from outside, as evidence by high percentages of Kayenta Anasazi pottery types (Madsen and Lindsay 1977; Wilson and Smith 1976; Jennings 1978). The extent of the relationship between the Fremont and Kayenta people evidenced in the ceramics is not understood. If reciprocal trade items exist, originating with the fremont in exchange for Anasazi ceramics, they have yet to be identified.

The unnamed Plains derived (1,300-650 B.P.) is limited to north and northeastern Utah. The group is characterized by shallow saucer-shaped pit houses. It is possible that this area had an influx of Anasazi (Pueblo II) influence as evidenced in masonry styles at Winterrock Village (Shields 1967) around 800 B.P. Much of the Ceramic assemblage is the result of the paddle and anvil technique rather than coiling as in the Sevier and Fremont regions. It is assumed that subsistence centered around horticulture with additional reliance on pre-equestrian Plains style bison hunting (Madsen and Lindsay 1977).

### 1.4.4 Numic Athabascan Period (700-90 B.P.)

Beginning at around 800-750 B.P., the Formative Cultures began to decline. Generally, the eastern Great Basin and northern Colorado Plateau were abandoned, beginning about 800 B.P. in the southwest part of the state. By about 700 B.P. the abandonment was complete. At about the same time, Numic speaking peoples began to spread into Utah from southeastern Nevada (Lamb 1958; Miller, Tanner and Foley 1969). Numic speakers had reached northern Utah by 700-650 B.P. (Madsen 1975; Gruhn 1961). Through time, this language group divided: Utes (Central and eastern Utah into northern Colorado), Piautes (western Utah), Goshiute-Shoshoni (north and northwestern Utah) (Eular 1964; Kelly 1966). Territory often overlapped with trade and intertribal warfare being common.

The Numic groups practiced an Archaic style subsistence round. Steward (1938) describes small family bands that moved from resource to resource, occasionally collecting into larger groups for special hunting or gathering activities. In some southern areas a limited horticulture was practiced in northeastern Utah and into Wyoming and Colorado. The basic nomadic style fostered excellent basketry, but a low quality ceramic technology. Desert side-notch points predominate.

The temporal movement of Athebascan (Navajo) groups into southern Utah is not well documented, but a few Navajo sites have been recorded in San Juan County (Hurst 1976, 1977). Beyond the limited number of sites, little is known in the region about Navajo material culture or subsistence. It is known that the Utes and Piautes considered the Navajo as enemies and often engaged them in warfare. During the early historic pioneering efforts, it is known that Navajo incursions resulted in considerable shrinkage of Ute and Piaute triable lands (O'Neil and Thompson 1980).

It was the Numic and Athabascan people that early explorers and trappers encountered. The first recorded and generally friendly contacts were made by Dominguez-Escalante Expedition in 1776-1777. The expedition crossed the Wasatch Plateau north of the mine lease area. Sometime before the early Spanish fathers made there epic journey, some of the Utes in eastern Utah had obtained horses, which lately caused considerable changes in lifestyle. With the influx of early fur trappers and trade along the old Spanish Trail, depletion of game and food sources began. The early Mormon settlements often displaced Indian bands from better resources and traditional foraging territory. During the 1850-1870's , Moron settlement, Texas and Colorado cattle industry, and early mining efforts resulted in violent clashes such as the Black hawk and Walker Wars. By the late 1880's the Indian population, were fairly well confined to reservations, and

nomadic life style came to an end (O'Neil and Thompson 1980; Miller 1969; McElprang et al 1949).

## 1.5. Historic Overview:

Beginning in late 1877, settlers moved into the Castle Valley area of Carbon and Emery counties from two directions. To the west, across the Wasatch Mountains, was Sanpete County (settled in 1849) and to the northwest, through Daniels Canyon and Soldier Summit pass, lay Utah County (settled in 1848). These areas were part of the original core of settlements along the Wasatch front from which most of the towns of the southeastern Utah drew their early population.

Towns were established in Sanpete and Utah counties as part of the Mormon geopolitical strategy for controlling the Great Basin. Under the direction and stimulus of Mormon leader Brigham Young, who initiated 300 settlements in the 1847-77 period, towns were established along major transportation routes, to take advantage of certain natural resources, and to establish Mormon political and social control throughout the Great Basin.

Stockmen were the first to cross the Wasatch Plateau in the early 1870's and use the Castle Valley for grazing. Gradually, knowledge from their explorations filtered back to Mormon leaders. A resident of Sanpete County, Jefferson Tidwell, was sent by Brigham Young in 1877 to survey the prospects for Mormon settlers in the Carbon County area (Morgan: 1940).

Tidwell reported favorably concerning an area on the Price River, just south of the present site of Wellington. Over the next five years, several attempts were made to establish a community at the site. Problems with the flooding of the irrigation system and other natural disasters produced poor crops, and the settlers hunted primarily in Whitmore Canyon for deer and other game. Several dams were constructed on the Price River in an attempt to control its waters, but it was not until 1883 that a dam was built which survived through an entire growing season and the first crops had enough water to mature (Reynolds: 1948).

Also in 1877, two groups of settlers moved over the Wasatch Plateau and settled along Huntington Creek and Cottonwood Creek in what is now Emery County (Smith: 1979). Orange Seely, after whom Orangeville is named was a leader in this group. Much of the early settlement of Whitmore Canyon area was drawn from the groups who settled Price, Castle Dale, and Huntington.

Whitmore Canyon is named for George C. Whitmore, owner of the Whitmore ranch, which used the canyon for summer grazing, and the water of Grassy Trail Creek for his stock raising operation. Whitmore arrived in Utah from Texas in 1878 (Eastern Utah

Advocate: 1907) and soon ran one of the largest herds in Carbon County and branched out into other economic activities, like banking. The ranch house was located at the mouth of Whitmore Canyon, in the Vicinity of the remaining coke ovens (Section 6, T 15 South, R 14 East) (Robinson: 1973).

The discovery of Carbon County's vast coal resources began in the late 1870's with the opening of the coal mines in Pleasant Valley near the town of Scofield. As the Denver & Rio Grande Western Railroad constructed its line north from Green River toward Salt Lake in 1881-82, blasting done in preparation for laying track revealed a coal seam in Price River Canyon. (Morgan: 1940) Within a few years, other coal deposits had been discovered besides the ones in Pleasant Valley--Castlegate, Sunnyside, and Hiawatha. Arrival of the railroad in Carbon County in 1881-3 provided farmers, stockmen, lumber companies, and mining companies with cheap, east access to markets in Denver and Salt Lake. The D & R G marked the end of the predominance of subsistence/agriculture and the beginning of a long process of integration into the national economy.

In 1897, Jefferson Tidwell, his family, and relatives moved into Whitmore Canyon, building a two room log cabin at the mouth of number Two Canyon (Reynolds: 1948). The Tidwells planned to build a small ranch, but within a year afterwards they discovered an outcropping of coal near the present-day opening of the #2 Mine. Land records in the Carbon County Archives show the Tidwells as owners of most of Sections 32 and 33 in T14S, R14E and as having filed coal mining claims in that area in 1898 (Joseph Seeley, son of Orange Seeley also filed coal claims in the vicinity of Number Two Canyon). The Tidwells and Seeley sold their land and claims to the Royal C. Peabody in 1990, who immediately sold them to the Utah Fuel Company. A George Foster Peabody of New York was Treasurer of the Rio Grande Western Construction Company, parent firm for the Utah Fuel Company. (Salt Lake City Directory: 1900)

In the Spring of 1899, the Utah Fuel Company built twenty houses in a flat area just above the mouth of Number Two Canyon, approximately where the main Kaiser buildings now stand (Figure 4-6). During the summer the Denver & Rio Grande Western Railroad built a line from Mounds up to the mine at Sunnyside. On November 19, 1899 the first coal was shipped from Sunnyside Mine. (Gibson: 1948)

## Sunnyside Historic District (42Cb245)

Contained within Section 32, T 14 South, R 14 East, is a portion of Whitmore Canyon containing, at least, 25 components from the original town of Sunnyside, Utah.

Eight years after the opening of the coal mine, Sunnyside had become the largest coal mine in Carbon County, producing (1907) 2700 tons, and its nearest competititor 1300. (Eastern Utah Advocate: 1907) Because of the suitable coking properties of Sunnyside coal, the mine was the second largest coke producing operation in the United States, with only Pittsburgh producing more. In the peak coke years, 800 "beehive" coke ovens dotted the plain below the mouth of Whitmore Canyon. (Gibson: 1948)

Utah Fuel Company officials came into conflict with George C. Whitmore over the waters of Grassy Trail Creek. Whitmore had appropriated most of the water and asked the exorbitant price of $90,000 for his rights. As the mining operation expanded, the need for water for Sunnyside grew acute. The Company dug a well near the creek and this supplied some of the community. There was a spigot for every four houses (Robinson: 1973) (Richins: 1940).

As with most mining towns in Utah, Sunnyside proved a boon to local farmers, who made regular trips to sell their lifestock and produce to miners. Utah Fuel owned the town and would allow only one company-owned store, the Wasatch Store Company, to operate. Figure 4-7 shows the construction of a wood-frame bunkhouse and store in 1899). Miners were forced by the threat of losing their jobs to purchase goods their (Richins: 1940). Most of the manufactured goods bought by the miners thus came from this facility, although later another privately-owned store called "The Golden Rule Store" (J.C.Penny) opened below the town.

Sunnyside soon grew into a community of 400 homes, with a hospital, liquor store, amusement hall, a large cut-stone school, two churches, an "opera house," and a variety of trades and services (Figure 4-8). Immigrants from all over Europe came to work in the mines, particularly from countries on the Mediterranean littoral, such as Greeks and Italians. There were other nationalities and races as well, American blacks, Austrians, and Japanese. The population would often expand faster than the available housing supply. Many newcomers would live in tents and there was always a "rag town" near Sunnyside. A number of boarding houses were also built to house single men, but generally the immigrant groups were segregated into their own buildings (Richins: 1940).

Sunnyside has a social history, yet to be written, as the various ethnic groups learned to understand and adapt to differing cultures and the new immigrants learned to become Americans. It was, for the ancestors of many Utahns, the first difficult introduction to life in America.

Labor relations in Sunnyside were often troubled, but Utah Fuel's determined resistance to unionization sparked a major strike in 1922. On April 1, 1922, wages in the coal mines were reduced 30%

and miners followed their unionized co-workers in Wyoming out on the national strike called by John L. Lewis and the UMWA. Strikers were forced from their company-owned homes, and allowed to enter town only under guard to visit the post office. Company officials built guard posts on the hillside above the mine portal and tipple to guard against sabatoge. Miners eventually won the strike and a local of the United Mine Workers of America was formed (Powell: 1976).

In 1942, the Kaiser Steel company bought the Sunnyside mine to provide coking coal for its Fontana California mill and closed the coke ovens. Kaiser built homes at the present site for Sunnyside, which in the historic period was called Sunnydale, and put new mine buildings on the original townsite (Robinson: 1973).
Numerous stone foundations exist in the canyon bottom where the original town was. This covers most of the canyon in Section 32 and a portion of the southern end of section 29. In the upper left-hand corner of Figure 4-8, miner's homes can be seen in section 29. One local informat reported, that a stone mason in Sunnyside had perfected the technique of building rock found-ations with mortar. Except in the Gobler's Nob area, no mortor was seen in the rock foundations, although there was occasional patching with mud.

Component #1-Gobler's Nob (east of contemporary Kaiser Engineering building)--Gobler's Nob was a residential area built in 1915 where mine officials lived on the hillside above the town. Concrete stairs led from the original townsite to the eight homes. These homes had cut stone foundations with a cement block structure on top. Cement block houses were considered "modern" at the time, and there construction a real step forward for the community (Richins: 1940). Eight stone foundations mark the location of the homes in that area (see Appendix 1 site forms and photos). The construction of these homes in 1915 was a part of general plan by Utah Fuel officials to improve the town, by modernizing the homes, building a new amusement hall, and planting trees and lawns.

Component #2--Rock retaining wall, east of Gobler's Nob.

Component #3--Road Cut leading to Gobler's Nob from east.

Component #4--Site of Roosevelt School, a cut-stone, two-story school house that educated Sunnyside children as well as those from surrounding communities. Later named the Washington School.

Component #5--Home site, rock foundation.

Component #6--Concrete, stone, and steel beam bridge for original county road.

Component #7--Home sites, three separate foundations.

Component #8--Home site, rock foundation and road behind.

Component #9--Home Site, rock foundation.

Component #10--Home site, rock foundation.

Component #11--Home site, rock foundation.

Component #12--Machine gun nest, steel and rock construction. This emplacement was built during the 1922 miner's strike across from the Sunnyside tipple, boilers, and mine portals.
South of the machine gun nest are dozen rock foundations, and the foundation of two boarding houses, including the Japanese Boarding House. When Kaiser bought the property in 1942, they moved the stream 100 feet north, destroying many of these homes. The change topography is noticeable between Figure 9 and on site form 42Cb245 (photo #) (see Appendix 1). The only structures still in use is this section of the Sunnyside Historic District, are a Seventh Day Adventist Church and home (circa 1901) currently owned by the Massatt family. Adjacent to the Massatt home is the foundation of the Japanese boarding house.

## Sunnyside Coke Ovens 42Cb243

Located in Section 6, Township 15 South, 14 East are approximately 26 coke ovens remaining from the original 800. Coal from the mine was brought down by rail, onto the top of the coke ovens, and the oven was given a "charge" through a hole in the top. After 72 hours the coked coal was removed from an opening on the side and loaded onto another rail car. These coke ovens are the only physical remains from the era when Sunnyside coke was used widely throughout the western United States for smelting.

## Range Creek/Sunnyside Water System (42Cb244)

Located in Section 33, Township 14 S, Range 14 E are the remains of the water system built in 1906 by Utah Fuel Company to supply the growing mining community with culinary water. The pipeline crossed a trestle and was pumped into a storage reservoir. Traces of the pipeline can be seen at various points in number two canyon.

## Asphaltum Mining Tramway (42Cb247)

In Section 17, Township 14 S, Range 14 E in an aerial tramway used to transport rock asphalt from a mine in Section 9, Township 14 S Range 14 E. A mining claim (Carbon County Archives) was filed on portions of Section 9 and Section 4 in January 1917 by the Utah Asphalt Company and the Utah Savings & Trust Company of Salt Lake City. For the first years of the mine's operation, the asphalt was loaded on wagons, and freighted over a precarious road down Water Canyon (Robinson: 1973). In the 1920's, rock asphalt was principally used for road paving. It was crushed,

trucked to the site, and compacted with a steam roller. The naturally volatile oils gradually evaporated, and the asphalt formed a hard surface. This paving process, however, was gradually replaced by the use of gravel and crude oil, which by the late thirties was considerably cheaper than rock asphalt in price. In 1931, the Utah Rock Asphalt Company built this tramway to provide a more efficient means for carrying their product down to the bottom of Whitmore Canyon. (easement, Carbon County Archives). Land records show a series of mortgages to the Federal Reconstruction Finance Corporation during the 1930's, but company did not survive the era of cheap crude oil and by 1952 had abandoned their mining operation.

Bowry Asphalt Company (42Cb234)

A mining claim for S.A. Wood and the Bowry Asphalt Company was filed in Section 6 of Township 14 S, 14 E in 1907. There was a great deal of interest in this period of finding commercial uses for a variety of hydrocarbons in the Uinta Basin and Roan Mountain areas of Utah. Early experiments in the production of gilsonite, elaterite, oil shale, and rock asphalt concentrated on extracting the hydrocarbons contained in these various ores for use as fuel. Asphalt was not as yet used for paving in Utah, so it is unlikely that the Bowry Asphalt Company intended to mine Asphalt for that purpose. Cheap crude oil ended the profitability of most of these experiments.

## 1.6. Previous Archaeological Research

No archaeological work has been done on the mine lease prior to this project. In the region, Montgomery (1894) reported archaeological sites in Nine Mile Canyon north of the lease. Nine Mile Canyon has since been the subject of numerous surveys that have paid special attention to its wide variety of rock art (Beckwith 1931, 1931b; Morss 1931; Reagan 1931, 1931b Gillin 1938; Schaafsma 1971; Seigrist 1972; Hurst and Louthan 1979). The Claflin-Emerson Expedition of the late 1920's and mid-early 1930'3 was the first intensive archaeological investigation in the region. The expedition tested and excavated numerous rockshelters and open structures, but was not reported in detail until 1969 (Gunnerson 1969). At about the same time, Morss (1931) completed his work and named the Fremont Culture, which eventually came to include the mine lease area. The 1950's, 1960's and 1970's witnessed most of the excavations of Archaic rockshelters and caves (see 1.4.2). Caldwell Village (Ambler 1966), Winterocks Village (Shields 1967), and Boundary Village (Ambler 1967) were excavated in the Untia Basin during the late 1960's. All of these sites are now classified as part of the unnamed Plains derived culture (Madsen and Lindsay 1977). Fremont sites in Emery County along Interstate-70 have also been excavated and reported (Madsen 1976; Schroedl and Hogan 1976; Wilson and Smith 1976).

Sampling surveys have been conducted for mineral and range management studies in the region. The most extensive is that of Hauck (1977). This report concludes that the Range Creek Planning Unit, which includes the mine lease area has a high proportion of rockshelters and rock art sites with low percentages of limited activity sites (1977:333). Hawkins and Seward (1980) reported five historic sites related to mining activity in Fiasco, Starpoint and Straight canyons northeast of the mine lease. The University of Utah is currently evaluating the results of an intensive sample survey 5km. east of the lease area at Columbia for Kaiser Steel (Rick Holmer: personal communications 1981). Numerous small-scale surveys have been and are being reported as part of management requirements for mineral exploration. These reports will be summarized on a county by county basis by the Division of State History, but are of little research value due in part to their restricted nature. Regional synthesis of historic events are contained in several reports (Hauck 1977; Hawkins and Seward 1980; Christensen 1980). The preservation Research Section of the Division of State History conducted a partial review and survey of historic values of the lease area, but never complied a report (see 1.5).

## 2. Methodology

### 2.1. Research Design

The field research and evaluation were guided by a general goal-oriented research design. The model is an elaboration of Binford's (1980) ethnoarcheological research among the Nunamiut Eskimo and San Bushman. The model has been expanded and subjected to some statistical verification in the plateau and in the Great Basin a part of the research design for the MX Missile survey. THe reader is encouraged to examine the extended model for all of the theoretical background and specific applications (Fowler et al 1980).

Basically, resource acquisition is perceived as a continuum which ranges from taking the consumer. At the simplest end, residential groups move from one resource patch to another. the more complex groups develop complicated systems of storage and transportation (Fowler et al 1980:15). Figure 4-10 shows graphically this continuum, while Figure 4-11 characterizes subsistence-settlement systems of the continuum. Foragers are viewed as the least complex while agriculturalists are the most complex. In expanding the model, Fowler et al are careful to point out that it may be impossible to place any given culture at any given time into one specific category (1920:20).

Figure 4-12 illustrates the various continuum strategies one might expect in the mine lease area. Archaic foragers/collectors would frequently move and their camps would allow access to a variety of resource patches (1980:25). The locations for special

task camps or residential camps would show great diversity in settlement patterns and food preparation tools for plant processing and hunting.

The harvester/agriculturalist Fremont, on the other hand, should demonstrate a different land-use pattern. A certain amount of sedentism is expected, therefore, sites should be located near a major critical recourse patch (a field or marsh) with close proximity to water. Habitation and/or storage structures should be near. The variety of resources exploited would be much more narrow, and hence, fewer resource zones were used, the greater dependence on the critical resource will greatly diminish the site density in the other zones (1980:27).

### 2.1.2. Goals and Predictions

Given the data at hand from the regional overview and the research model, we should expect the following:

1. the presence of Archaic period sites; and
2. these sites will be distributed through several resource patches; and
3. these site should evidence of plant and hunting tool assemblages; and
4. these sites will be of a temporary nature, lacking architecture; and
5. areas requiring higher energy expenditure for exploitation will exhibit fewer sites

For the Formative Fremont we expect:

1. that residential bases will be located near a critical resource patch; and
2. these bases will have evidence of sedentary life; i.e. habitation structures and/or storage; and
3. they will be located near permanent water; and
4. Fremont residences will occur on a narrower range of environmental situations; and
5. that special collector forays will result in temporary camps in several locations that will not show signs of architecture or prolonged use.

The Historic Period poses a different set of problems. Binford's model can be extended only to groups with a relatively low level of technological sophistication. The complexity of the western market economy and technology will not lend itself to simple ethnographic models. A thorough review of western economy and model construction is beyond the needs of this research. However, a few predictions can be made based on the Historic Overview. We can expect to find sites related to three specific activities:

1. mining, 2. grazing, and 3. hunting.

Mining sites will be:

1. restricted to easy access locations; and

2. directly affected spatially by relatively static geological factors; and

3. will not of necessity be close to secondary resources of water, food or building materials as these may be provided through the complex technological and economic network; and

4. artifact assemblages will show this diverse network by a variety of non-local manufactured goods.

Grazing and hunting sites will show the following:

1. small, single unit farmsteads or homesteads will have permanent architecture; and

2. these sites will be supported from the outside by the complex economy and will show a diversity of cultural remains of non-localized manufactures;and

3. these camps will be located near easy access areas with permanent water; and

4. temporary camps will show no architecture or evidence of prolonged use; and

5. temporary sites will be limited to higher elevations at greater energy expense; and

6. material remains will be few, a wide variety, non-localized manufacture, and of an easily transportable nature.

These predictions are by no means exhaustive, nor on the highest level of abstraction. Historic models should be developed to examine ethnic subgroups as expressed in the material remains.

Models should be developed to examine ethnic subgroups as expressed in the material remains. Models should also be advised to re-examine the material cultural flow between nearby settle- ments. Our specific task here is to generate enough data to be able to predict the occurrence and location of significant cultural resources with research potential.

### 2.1.3. Field Implementations

A 10% random, stratified sample design was implemented to examine the goals and check the predication of the research design. At first, we planned to divide the mine lease area into vegetation zones, based on the assumption that various vegetation zones, (resource patches) could be identified and would reflect vegetation related settlement patterns similar to those found during the MX survey. However, vegetation maps were not avail- able at the time of fieldwork. Our next option was to subdivide (in the lease area) into topographic categories. It was assumed that at a 10% random level, a universe divided into topographic units would evidentially sample all of the vegetation units as well. This assumption was verified by field observation.

The mine lease was divided into five topographic units, utilizing a composite 7.5 minute, U.S.G.S. series map provided by Kaiser Steel. The five units are: 1. the valley pediment beyond the mouth of Whitmore Canyon; 2. primary canyon drainages with permanent water; 3. secondary (tributary) canyons without permanent water; 4. talus and cliff slopes that exceed 20% grade; and 5. high altitude terraces, benches or flats with grades of 0-20%. These units were then divided into 40 acre quadrats were selected over long transacts because of the extreme topographic relief. Long transects are simply less feasible in this region, are too difficult to maintain and given time and monetary res-traints, not efficient. The quadrats are all oriented along the U.S.G.S. cadastral survey lines and were numbered on the field map using the northwest corner, proceeding from left to right. Once the area was divided, the quadrats numbered and the relative percentage of acreages computed, a table of random numbers was used to select thirty-seven quadrats to be examined. Table 4-3 is a written summary of quadrat locations and Plate 4-2 is a visual depiction of the location. In addition, bias windshield surveys were conducted between quadrats and all sites found were recorded. Three areas of proposed mine expansion surface facilities were intensively (100%) examined. A sediment pond of about 15 acres was examined, and two access roads (40 meter corridors) and two, 150 m by 150 m areas of proposed construction locations were examined (Plate 4-2). In total, about 1,460 acres were examined.

The quadrats were surveyed by locating the nearest corner by A.S.G.S. markers or a combination of compass back readings and topographical location. The surveyors were placed 15-20 meters

apart. They walked straight-line transects on north-south, or east-west bearings, guided by a field director using a Brunton compass. When sites were encountered, the crew marked the forward progress of the transect, then began to examine the sites for extent, type and chronological indicators. The sites were documented on the Utah State Antiquities Site Forms, appropriate sketch maps made, photographs taken and recorded and a random grab sample of artifacts was made if the artifacts were unique or required close lab examination. The sites locations were plotted on the U.S.G.S. 7.5 minute series maps and the survey transects were continued. Cultural remains are considered a site when a minimum of three artifacts of any type were found in a definable area. Also considered a site are rock art, initials or names with dates prior to 1930, rock quarries, architectural evidence such as cists, hunting blinds, checkdams, granaries, and all other items listed on the Utah Antiquities Site Form. Historic remains were considered historic if they could be shown to predate 1940.

The straight transects varied only when steep talus or cliff areas made contour transecting more efficient. The number of sweeps per quadrat varied from six to ten, depending on slope and vegetation. Access was usually by vehicle with short hikes on foot. Long hikes were required on occasions, such as finding the quadrats on the east flake of the lease.

All of the quadrats were selected before going into the field. The sample was altered and biased toward the canyon bottoms near the end of the survey when snow covered the surface of some of the higher quadrats and remained on some of the north-facing talus slope/cliff quadrats. However, several quadrats from the high altitude benches and talus/cliff slopes were examined before the snow arrived. In the long run, this worked to our advantage. It allowed us a better look at what turned out to be the area of highest site probability. We are still confident that are chart sensitivity areas and recommendations are valid (Plate V-3).

All of the collected artifacts were transported back to Salt Lake City. Toni Ray organized, cleaned and cataloged the materials. Bruce Hawkins, staff historic arcaelogist, examined the materials and Asa Nielson, field director, examined the prehistoric materials. Current references and collections were used to aid the identification of the artifacts.

## 3 Historic Resources Survey Results

### 3.1. Historic Inventory

42Cb233 is a small historic herding camp or hunting site. It is in a saddle at the head of a tributary to B Canyon (Plate 4-2). There is a small aspen log corral 100 meters east of the main site in a draw. The site is about 20 meters by 20 meters, with a

possible fire heath on the west side of the site. A couple of solder sealed cans and a piece of non-diagnostic iron stone ceramics were observed. The site has a ground view down to Castle Valley through B Canyon and also a view of open sage flats to the north and east.

42Cb234 is in the Right Fork of Whitmore Canyon (Plate 4-2). It is a single stone foundation and log super-structure. The foundation is of fine cut sandstone and mortar. It is rectangular, 4 by 6 meters with 1.5 meter of standing walls. Aspen and pine cribbing with a large pine center post remain inside. The soil outside to the east and north is ash stained. A single piece of pearl-ware ceramics and several types of colored glass suggest a pre-1940's occupation. The site is in the mouth of a tributary to the Right Fork of Whitmore Canyon. Both Whitmore and the small tributary have permanent water. This may be the location of the Bowry Mine Claim (see 1.5.) but there is no evidence of mining activity in the area.

42Cb235 is a small, stone lined depression 40 meters south and across the creek from 42Cb234. The depression is about 2 meters in diameter and 1 meter deep. The stone is rough shaped basalt and sandstone from the immediate area. There is a small entry-way on the north side. No artifacts were observed. The depression may be a spring or well house associated with the cabin at 42Cb234.

42Cb236 is a turn of the century community located north of the Grassy Trail Reservoir (Plate 4-2). It consists of at least nine buildings, of which six are possibly habitation, one small log shed and two outhouses. There is a corral of about 20 meters in diameter. The center site is 100 by 100 meters. One stone structure is being washed away by the creek. The site sits on the edge of an aspen/sage flat on the flood plain of the creek. Ceramics, glass, and metal are clustered around the stone structure near the creek. This site may have been the support base camp for the Bowry Asphalt Company, whose mine claim was somewhere in Section 6,, T14S, R14E (see 1.5.)

Site 42Cb237 is probably a small (10 by 10 meter) hunting or historic herding camp. It is on a ridge (Plate 4-2) between Whitmore Canyon and Patmos Ridge. Its isolation suggest that the occupant likely followed cattle or deer down from Patmos Ridge. It consists of a handful of iron stone and porcelain ceramics. It is on the edge of a heavy mountain mahogany/aspen stand looking north into are open sage flat. large boulders at the site would provide some shelter from the wind. Initials cut into the aspens have now overgrown and are very hard to read. There is no evidence of structures.

42Cb239 is about 40 meters southwest of the rodeo grounds (Plate 4-2). The existing highway cuts into the east side of the site. It occupies the level sage flood plain and is about 130 meters east/west by 200 meters north/south. The whole site has been leveled and planted with crested wheat. A midden deposit of ash, glass, metal, and ceramics is at least 75 centimeters deep at a cut-bank on the creek. There are several structure foundations on the west side of the site. All but one has been recently leveled by a bull dozer. The remaining 4 by 4 meter structure is of rough shaped sandstone blocks and historic sand mortar. The artifacts suggest a late 1800's to early 1900's occupation. This site was likely a north most extension of Old Sunnyside Town (42Cb245).

42Cb243 in the old Kaiser Steel Sunnyside Coking Ovens (see 1.5). They are located about 400 meters east of Sunnyside on the edge of the coal tailing dump (Plate 4-2). At the present time, twenty-five of the ovens remain. Several have been destroyed in the north end to accommodate the expansion of the tailing pile. The ovens are beehive shaped, with level roofs for "charging" function (see 1.5. for details). The door openings, which all face east, are large enough to walk into a cavern about 2.3 meters high and 3 meters in diameter. Old coke still remains on the floors. The ovens are being vandalized for brick and are in various states of stability.

42Cb244 is the remaining section of the old Sunnyside water system (1.5.). It consists of pipes and an aqueduct trellis above Number 2 Canyon (Plate 4-2) and a large, concrete reservoir. The reservoir is about 10 meters in diameter and four meters deep. The concrete and brick building at the reservoir has been vandalized for building material. The system was built to bring water from Range Creek to Old Sunnyside. It had been cut into the side of the talus slope in heavy oak and sage vegetation.

42Cb245 is the old city and mine portion of Sunnyside, Utah. The city is located just inside the mouth of Whitmore Canyon (Plate 4-2). The vast majority of the city has been cleared away for mine expansion. Dozens of the old foundations of a wide variety of construction still exist (1.5.). The old mine portal is no longer used. A portion of the city referred to "Rag Town" has been totally leveled for the present coal tipple and stock pile. House foundations are limited to the southwest and northeast corners of the 1.3km long town (see 1.5. and Appendix 1 for details). The site occupied the canyon bottom with small portions extending up the canyon walls. Grassy Trail Creek has been re-channeled in recent time for flood control and this action removed a large portion of the town.

42Cb248 is the Utah Asphaltum Company Tramway. It follows Water Canyon for about 4 km up to the asphalt/tar sand mines (42Cb248). There are about 30 tower structures remaining in the tramway, which is easily viewed from the road to Patmos Ridge in Water Canyon (Plate 4-2). Cable and buckets still hang from the towers. The towers of concrete base, wood and iron frames and are all in disrepair. The tramway ends in Whitmore Canyon at a large structure used for turn around and transfer to wagons (1.5.). Some vandalism has occurred for building materials.

42Cb248 is the location of the Utah asphaltum Tram Mines. They are not in the mine lease area (Plate 4-2) but the Tramway (42Cb247) was constructed as part of the mines. Access to the old mine was along a steep wagon trail up Water Canyon. The mine area has a few structures still in various state of repair (see Appendix 1). The area is divided into two mine areas, each about 100 meters by 100 meters. No artifacts were collected as snow covered most of the mine at the time of our survey. At the present time Atlantic-Richfield Oil Company holds the mineral lease and may develop the mine area for shale-oil recovery.

### 3.1.1. Historic Artifacts

A representative collection was made of historic artifacts from site 42Cb239. The sample included ceramic, glass, clothing-related items, toys, games, and miscellany.

#### Ceramics

Porcelain

Fragment representing 4 vessels of Japanese porcelain were collected (Figure 4-13). These represent 1 saucer, or small plate and 3 unidentified vessels. The vessels are decorated with designs of underglaze blue on white. Designs include dragons, fish and floral elements.

Fragments representing 3 other porcelain vessels are represented in addiction to Japanese porcelain (Figure 4-13). Vessel types include 1 plate and one cup or bowl. The plate is decorated with green leaves and stalks of pink flowers painted overglaze. The cup or bowl is decorated with and underglaze purple band running around the outside rim and glided bands beneath.

Stoneware

All stoneware from the site is Ironstone/White Granite. Five plates, 1 saucer, and 4 unidentified vessels represent the collected sherds (Figure 4-14). Two of these vessels are decorated with transfer print designs. Three are decorated with flown colors. Two are decorated with decals around the rim. One of

the vessels decorated with flown colors also exhibits a molded edge with overglaze gilding. Trademarks include:

(1) "...GE"
"IRIS" (script)

(2) "T.S.T."
"Penova"
"CHINA"

(3) "THE ..."(script)

(4) ...H. GRINDLEY"

Only "T.S.T. Penova CHINA" and ...H. GRINDLEY" were identified. "T.S.T. Penova CHINA was manufactured by the firm of Taylor, Smith and Taylor of East Liverpool, Ohio probably after 1904 as the mark fails to appear in The Pottery & Porcelain of the United States & Marks of American Potters by Barber. " H. GRINDLEY" was manufactured by W.H. Grindley & Co. of Tunstall, England. The mark was used on wares manufactured from 1914 to 1925 (Godden 1964).

## Glass

### Bottles

One complete and fragments of 2 bottles were collected. These represent a beer bottle, and the finishes of a preserve bottle and an unidentified bottle(Figure 4-15) (Berge 1980). The beer bottle is brown, measures 9 1/4 inches by 2 3/8 inches and is manufactured by the firm of William Frazen and Son which operated out of Milwaukee, Wisconsin from 1900 to 1921 (Tolouse 1971).

The preserve finish is clear with manganese which indicates that the bottle was probably manufactured before 1917 (Berge 1980).

The third bottle exhibits a finish which has been manufactured by an automatic bottle machine. The glass is clear with manganese. Date of manufacture was probably between 1903 and 1917 (Berge 1980).

### Other Glass

One finish of a pressed glass vessel was collected from the site. The vessel was manufactured with a 3 piece mold. Finish is similar to champagne with an opening of 1 1/8 inches. The neck is decorated with 9 fluted panels topped with a diamond band. The glass is clear with manganese which indicates the vessel was probably manufactured before 1917 (Figure 4-15) (Berge 1980).

## Clothing Related

### Buttons

Two buttons were recovered from the site (Figure 4-16). One button is made of shell, is 4 hole and measures 1 1/8 inches in diameter. The other is made of glass, has 2 holes and measures 1/2 inch in diameter.

## Toys, Games, and Miscelany

### Doll Parts

Fragments from 2 bisque dolls were recovered from the site (Figure 4-16).

### Beads

One monochrome tube bead was collected. The bead is bright navy blue and measures 6mm in diameter by 4mm long (Kidd & Kidd: 1970).

A representative sample collection made from site 42Cb236 includes ceramics and glass.

## Ceramics

### Earthenware

A fragment from 1 salt glazed gray earthenware crock was collected Figure 4-17).

### Stoneware

Fragments from 4 Ironstone/White Granite vessels were collected from site (Figure 4-17). The vessels include 2 plates and 2 saucers. Molded edges and gilding comprise the decoration for the plates. Decoration from the saucers is unknown, however both saucers contain the trade mark "Homer Laughlin, Sunrise Dinnerware". These wares were manufactured by the Holmer Laughlin China Co. of East Liverpool, Ohio, and probably date after 1904 as they are not illustrated in Barber (1904).

## Glass

### Bottles

One finish, neck and shoulder from amber Medical/Chemical bottle was collected from sites (Figure 4-18). It was manufactured in an automatic bottle machine which dated its use after 1909 (Berge 1980).

3.2. Mining Impacts to Historic Sites (see 5.7.)

## 4. Prehistoric Resource. Survey Results

### 4.1. Prehistoric Inventory

Site 42Cb232 is light scatter of lithics and a single quartzite, rectangular mano. The site is on a knoll, about 120 meters northeast of 42Cb234 (Plate 4-2), on West Ridge. The area is on open sage plain with aspen grooves south and north of the site. There were no diagnostic artifacts. The site area is about 40 by 40 meters in a rocky sand. No structures, fire hearths or other evidence of depth were noted.

42Cb238 is a small petroglyh panel. It is about 150 meters south of the canyon rodeo grounds on the rock outcrop. The cliff faces west and is abutted by the floodplain of Grassy Trail Creek. It consists of one set of horizontal, pecked lines, one set of undulating lines and single arching pecked line (see Appendix 1). The panel has been vandalized and used for historic target Mactico. Historic rubbish from 42Cb239 is found at the base of the outcrop. The whole glyph is about 75 centimeters and is not diagnostic. No prehistoric artifacts were observed.

42Cb240 is a rockshelter with a good amount of undisturbed cultural deposits. It is on the west side of Whitmore Canyon, directly across (west of) the rodeo grounds. Vandalism has exposed at least 1 meter of cultural deposit and small, rock lined cist that is about 40 centimeters in diameter. The front of the shelter extends about 15 meters north-south. and is about 4 meters above the Grassy Trail floodplain. Several Emery Gray sherds, lithics and bone were observed on the surface. Ash motting is continuous throughout the full.

Associated with the shelter are 4 panels of pictographs and petroglyphs. These include red and yellow painted anthropomorphs, and pecked zoomorphs. Two large figurine type glyphs are on the north end of the site. One shows evidence of coloring in the pecked surface. Samples of yellow ochre nodules were found at the site.

This shelter contains a known Fremont occupation. Its observed depth may also be in part due to possible Archaic occupation. It ia stratified, and it has excellent research potential.

42Cb241 is an open structure site of Fremont origins. It consists of a scatter of ceramics (Sevier Gray), lithics and oriented terrace above Whitmore Canyon (Plate 4-2). The terrace is the second up from the flat below. 42Cb242 is 15 meters west and below the site.

There are two structures on opposite sides of the site. The first structure is on the south end. It is roughly square, about 1.5 by 1.5 meters, with a shaped sandstone rock outline. The structure on the north end is roughly circular, 2 meters in diameter and outlined by rough, unshaped upright slabs. Sevier Gray ceramics were found in an area discolored by ash 3 meters south of the round structure. There is no evidence of any vandalism. It is assumed that the structures and the ash stained area may have some depth. The soil at the site is a light gray sand on top of eroded talus.

42Cb242 is a small scatter of lithics just below (west) of 42Cb241. It is on the first level terrace above the valley floor. The area has been used as an historic rock quarry. An access road extends to the south of the site area. A few pieces of gray chert flakes were noted. A small side-notched point and biface blade were collected. A rectangular quartzite mano was also noted. No structures, hearths or midden were observed. It is possible that the site has been nearly obliterated by the historic quarry.

The historic components is a 10 meter long face of quarry rock. The evidence for historic use are fragments of rock that contain evidence for historic use are fragments of rock that contain bore holes for expanding wood wedges. No historic artifacts were observed. Modern names have been spray painted on the quarry face. The date and use of the quarry could not be documented. It is assumed that the stone was used for building foundations in the town of Sunnyside.

### 4.1.1. Prehistoric Artifacts

A total of twenty-one prehistoric artifacts were collected during the survey. This includes seven pieces of ceramic, two arrow points, a biface knife fragment, a rectangular mano, eight pieces of bone, one fragment of fresh water shell and one piece of yellow orche (limonite).

42Cb240. All of the bone, shell, ochre, and four pieces of ceramic were collected from the rockshelter.

Ceramics. Three body sherds and one handle fragment are all classified as Emery Gray following Madsen (1977). the body sherds are light gray and have been scraped and polished. Temper in the fine texture paste includes small amounts of crushed basalt and some quartz sand. A couple of flecks of mica are present on one sherd's surface. The average thickness is 3.5 millimeters. The fourth piece is identical in paste, temper and surface treatment. It is a lug handle that appears to have broken away from the rim of the jar shaped vessel. The lug diameter is 17.5 millimeters.

Tentative identification of five fragments of deer bone (Odocoileus hemionus) includes one fragment of long bone, one fragment of the scapula, two phalange fragments and a molar. Also tentatively identified is the distal end of a rabbit humerus, a fragment of fresh water mullusk shell, and two fragments of dense, unidentified burned bone.

The fragment of limonite ($Fe_2O_3$) weighs 2 grams. Its color is identical to the yellow-red color of the pictograph panel on the north end of the rockshelter.

42Cb241. This collection includes a mano, a projectile and one biface fragment (Figure 4-19). The mano is rectangular with round corners. One surface is covered with a heavy deposit of calcite. The other shows evidence of pecking. Impact scars are prevalent on one end. The grinding surfaces are rounded, lending the whole mano a convex cross-section. The material is a purple-brown colored, dense quartzite. It measures 15 centimeters wide and 4.5 centimeters thick. It weighs 943 grams.
The small projectile point (Figure 4-19) is tentatively identified as an Elko side-notched point after Hester and Heizer (1973) and Holmer (1978). It is slightly convex in cross-section, of gray chert with a weight of .7 grams. The length is 2 centimeters; the width is 1.1 centimeters with thickness of 4 millimeters.

The biface fragment is probably the remains of a knife (Figure V-19). It is slightly convex in cross-section and appears to be thinned primarily by percussion reduction with pressure flecking along the edges. Maximum width is 4.2 centimeters with the thickness of 3 millimeters. It is made from a light gray chert material.

42Cb242. Collections from this site include three ceramic pieces and an unidentified triangular projectile.

The ceramics are all identified as Sevier Gray after Madsen (1977). Two are from the same bowl with an estimated diameter of 11 centimeters. The sherds have been scraped and polished. Temper includes heavy course basalt and some sand in a fine paste. Average thickness is 4 millimeters.

The third sherd is a neck piece from an olla. The estimated neck diameter is 6 centimeters. The exterior surface has been scraped but not polished. Tempering includes heavy amounts of course basalt and sand in a fine paste.

The projectile is an unidentified, triangular point. It is made from a dark gray chert. Maximum width at the base is 1.6 centimeters. The cross-section is convex with a maximum thickness of 3 millimeters.

Summary. The ceramics from the two sites indicate a Fremont Culture origin with the Sevier Gray being a likely product of trade. Both types were manufactured between 1,150-700 B.P. (Madsen 1977). The Elko side-notched point has a wide temporal span of nearly 7,500 years (Holmer 1978). However, its lack of association with other diagnostics prevents a better estimate of cultural affiliation. The deer bone from 42Cb240 is a strong indicator of at least a temporary hunting camp function for the site.

### 4.2. Effect of Mining on Archeological Sites (see 7.)

## 5. Paleontological Resource Survey Results

### 5.1. Paleontological Inventory

42Cb231p is a fossiliferous limestone outcrop west of Slaughter Canyon (Plate 4-2). The outcrop can be reached by walking down the west finger of the south end of West Ridge. Numerous well preserved gastropods and 2 or 3 bivalue mollusk were recorded. The literal continuity of the deposit is not known. The formation is likely upper Price River or perhaps lower North Horn.

### 5.2. Effects of Mining on Paleontological Sites (see 7.)

## 6. Survey Results (Table 4-4)

### 6.1. Relationship of the Results to the Research Design

Two of the principle goals or predictions of the research design were to identify the presents of Archaic and Fremont culture sites in relationship to the natural resources available in the lease area. No Archaic affiliated sites were positively identified, nor were isolated Archaic style artifacts found. One site, 42Cb240 could possibly contain an Archaic component. Without testing the site to assure this, any statements about Archaic settlement or exploitation of the area would be conjectural.

Two sites have known Fremont Culture affiliations, 42Cb240 and 42Cb241. Both of these sites have evidence of prolonged use, i.e., deep deposits, storage structures or possible habitation structures such as the one at 42Cb241.

42Cb240 likely represents a short term, perhaps seasonal site used primarily for hunting and gathering. The large amount of animal bone, the hunting scene on the petroglyph, and the exposed slab-lined cist are evidence of such activity. The site could be reached from permanent habitation in the valley. During the spring and summer, a variety of seeds and seasonal berries should be available; while in the winter, deer or mountain sheep would be concentrated in the canyon bottom. 42Cb240 and 42Cb238 are

probably evidence of short term hunting forays beyond the primary resource base for the Fremont model.

42Cb241 is a habitation and storage site. This site is predicted by sections 1-3 of the Fremont model. Fremont and Sevier culture habitations in similar environments have been recorded on both sides of the Wasatch Plateau (Nielson 1977, 1978; Madsen 1980). The stream and flat provide a critical resource patch for crop production. Grassy Trail Creek provides the essential permanent water supply. A larger village is reported to exist at the town of modern Sunnyside (Don Berge personal communication 1981). Mr. Berge, Curator of the College of Eastern Utah Prehistoric Museum in Price, has reported another large village at the mouth of Price Canyon. The environment is identical at that location.

Section 5 of the Archaic model could also be applied to the Fremont. Those areas which would require higher energy expenditure for obtaining a given resource likely will have fewer, smaller sites,. Site 42Cb233 is the only one that may fulfill this prediction. The area of West Ridge is difficult to gain access to. Heavy amounts of snow cover the ridge during normal winters, reducing even more the resource base on the ridge. The mano found at 42Cb233 is evidence of some collecting activity, but what the resource was is not known. Other high elevations lacked sites all together. It appears that areas such as West Ridge lacked the type of resources that would be constantly sought after. The few resources that did exist probably were ignored due to the disproportionate expenditure of energy required for acquisition.

The model for the historic sites appears to hold true for all but one section. In general, historic sites are keyed to relatively static geological factors. In this case, the east dipping strata of the Black Hawk Formation exposed the major coal seams near ground level at the present mine facilities. This same situation is true of the coal seams in Price Canyon, Columbia, Wattis, Hiawatha, and Standardville. Mining technology at the turn of the century would not allow for detection of deep coal. As a result, mines were placed on exposed seams.

The larger sites (42Cb236 and 42Cb245) demonstrate the dependance on outside support in that no artifacts noted or examined are known to be of local manufacture. That water was important is demonstrated in the water system which brought this resource over Patmos Ridge <u>via</u> aquaduct.

The single exception to the model is 42Cb248. This site is a considerable distance from easy access and appears to be in contradiction to Section 3 of the historical model. To solve the access problem, 42Cb247 was constructed to transport asphalt into the canyon. This indicates that limiting factors can be overcome by economic interest.

Historic hunting and herding sites were adequately predicted by the model. 42Cb234 is a possible homestead with permanent habitation. The artifacts are all imported to the site. A lack of good crop land would necessitate transportation of food to the site. The homestead is near two sources of permanent water and efforts were made to develope a spring or well (42Cb235). The two temporary camps are both on the high ridges, lack any evidence of permanence, and all of the artifacts are easily transported to the site from elsewhere.

The generalization drawn from the models are not on a high statistical level. It was originally planned to subject the data to statistical verification, but the nature of the results is not amenable to such manipulation. Finding a single example of certain type of site in a given universe, such as 42Cb243 in the valley pediment will not lend itself to predictive statistics (Richard Holmer, personal communications 1981).

## 7. Site Density, Mining Impacts to Cultural Resources and Sensitivity

### 7.1. Site Density

One of the purposes of this research is to ascertain potential site density for use in future mine development. Since we are dealing with all cultural resources as a group, historic and prehistoric are considered as a single category.

The most surprising result in the relatively low site density in the mine lease area as whole. The mine lease contains about 22.3 square miles, in which sixteen sites were inventoried. 42Cb248 is not considered as it is out of the lease area. This averages out to only .72 sites per square mile, much lower than many other areas. For comparison, site density figures for other areas are listed below:

| Area | Reference | Sites Predicted (Per Sq. Mi) |
|---|---|---|
| BLM Indian Creek Planning Unit | Thompson 1979 | 19 |
| BLM Castle Valley Planning Unit | Thompson 1979 | 13 |
| BLM Dolores Planning Unit | Thompson 1979 | 5 |
| BLM Beef Basin Planning Unit | Thompson 1979 | 32 |
| Cedar Mesa Area, SE Utah | Fike and Lindsay 1976 | 6-30 |
| White Mesa Area, SE Utah | Fike and Lindsay 1976 | 9 |

(cont.)

| | | |
|---|---|---|
| White River Area, NE Utah | Berry and Berry 1976 | 1.3 |
| Natural Buttes Area, NE Utah | Hauck et al 1979 | 1.5 |
| Red Wash Area, NE Utah | Larralde and Nickens 1979 | 1.3 |
| Moon Lake Project Area, NE Utah | Chandler and Nickens, 1979 | 2.58 |
| Cisco Resource Area, Eastern UT | Reed and Nickens, 1980 | 2.4 |

(After Reed and Nickens 1980)

However, when viewed in a different way, the density changes significantly. The lease area was originally divided in to five sample universes based on topography. Table 4-5 is a summary of the sites inventoried on the five universes. The results of this analysis are listed below:

| Universe | Total Sq. Mi. | No. of Sites | Sites per sq. mile |
|---|---|---|---|
| Primary Canyons | 2.3 | 7 | 3.05 |
| Secondary Canyons | 5 | 1 | .20 |
| Valley Pediment | .75 | 1 | 1.3 |
| Upper Flats/Benches | 3.4 | 4 | .85 |
| Talus/Cliff Slopes | 11 | 2 | .18 |

432Cb247 (the tramway) was not included in the above tabulation. It ends on the floor of a primary canyon, crosses talus/cliff slopes, proceeds up a secondary canyon and ends on a small flat. This particular site is one of a kind in Utah, and hence, of no predictive value.

The difficulty in separating the universe into precise units has been noted in Section 5. The arbitrary division and its attendant problems was reinforced with 42Cb241 and 42Cb242. These sites occur in one of the valley pediment units, but in reality, are located in the talus/cliff slope environment. For that reason, these sites were tabulated under the talus/cliff classification. The valley pediment then contains only 42Cb243, the coking ovens.

If the two canyon universes are combined, it will be noted that 53% of the sites are located in them, for an average of 1.54 sites per square mile. The remaining universe contains 47% of the sites, but only .46 sites per square mile, or less than 1/3 the number of the sites in the canyon universe.

## 7.2. Mining Impact to Cultural Resources

### 7.2.1. Types of Impacts to Cultural Resources.

There are four potential types of impacts that could affect the cultural resources in the mine lease area. The first type includes naturally occurring events of erosion, flooding, fire, landslides, earthquakes, etc. As an example, natural erosion is removing part of 42Cb236. Natural weathering is impacting the rock art at sites 42Cb238 and 42Cb240. Little or nothing can be done to prevent these occurrences, hence, no mitigation plan can be implemented.

The second type is vandalism. This occurs in the form of illegal excavations (relic hunting), destroying standing walls, defacing rock art or architecture with paint, target practice, etc., or illegally removing surface artifacts. Vandalism cannot be totally prevented but can be curbed. We would suggest that Kaiser Steel be constantly on the alert for, and remove people from, the sites that are of National Register quality. Vandalism to cultural resources can be prosecuted under existing state law that protects private property.

A third type of impact occurs to any part or all of the site during construction, gaining access to specific areas (roads and trails) or any other human related ground disturbance. Kaiser Steel should either avoid the National Register quality sites or undergo specific mitigation procedures (see 7.3.) ^R prior to the impact of the site. At the present time, planned ground disturbance within the mine lease area will not impact any known cultural resources.

The fourth type of impact is the most difficult to assess-subsidence. When subsidence does occur, it can cause irreversible damage to site surfaces, subsurface deposits and cliff faces containing architecture or rock art. At the present time, there is no adequate evidence of subsidence on the mine lease area nor is any expected (see 1.3.4.). If in the future, impact to cultural resources can be directly attributed to subsidence, then an appropriate mitigation plan should be completed (see 7.3.).

## 7.3. Sensitivity Zones

The application of predictive models to develop sensitivity maps for cultural resource management has been successful. The long term purpose of such maps is to release some areas from further

requirement under federal cultural resource laws while concentrating concern on high probability areas (Reed and Nickens 1980: Holmer 1980). The result of such an attempt for this project is Plate 4-3.

Three zones are outlined on Plate 4-3. The zones are designated as "high", "medium", and "low." The high density areas are limited to the primary canyon bottom and the first or second contour (12 to 13 meters) above the canyon floor, plus the valley pediment. High sensitivity areas have deep soils (relative to the mine lease area as a whole), open sage parks, and are at least 30-40 meters wide. Site density is about 1.12 sites per square mile. If the two sites (42Cb241), 42Cb242) on the talus area above the valley pediment are included under the contour specification, site density increases to 1.37 per square mile. Medium sensitivity areas are limited to high altitude (2280 meters a.s.l.) flats benches. Medium sensitivity areas would average about .85 sites per square mile. The remaining area is classified as low density and includes the talus\cliff slopes and the narrow (30 meters or less) secondary canyons. Average site density would be less than .10 sites per square mile. This classification is not without problems. One of the best prehistoric sites (42Cb241) is in the talus\cliff areas, which are considered a low density zone. We examined other potential areas similar to the location of that site ( a bench, above the valley near water) and found no other sites. It should also be noted that all of the sites in the medium density area are listed as non-significant (see 5.8). Based on the existing data, we would recommend the following for future management purposes:

1. That all sites listed as eligible for nomination to the National Register of Historic Places be protected from future mining impacts.

2. Should eligible sites be threatened by future mining impacts, that a program of adequate mitigation be undertaken prior to impact as negotiated with the State Historic Preservation Officer.

3. Areas of low and medium site density be released from future cultural resource requirements. In addiction, a large portion of the pediment area has been impacted for modern tailing expansion. Areas already impacted should be exempt from further cultural resource requirements.

4. Areas within the high sensitivity zone be examined on an intensive (100%) site specific level prior to any future development.

## 8. National Register Consideration

### 8.1. National Register Evaluations.

Most federal and state agencies require archeologists to determine site significance and eligibility of sites for nomination to the National Register of Historic Places. This is done in compliance with the U.S. Federal Code of Regulations (30 Cfr 60). The criteria stated in 36 CFR read:

National Register criteria for evaluation. The quality of the significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) That are associated with the lives of persons significant in our past; or

(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) That have yielded, or may be likely to yield, information important in prehistory or history.

The criteria listed under the law are subject to a great deal of subjectivity. Reed and Nickens have eloquently outlined some of the inherent problems in the law and will be quoted at length:

It is evident that the criteria above allow for a consider able degree of subjectivity in the determination of site significance. In one sense, it can be viewed as beneficial to declare virtually all sites whose integrity has not been destroyed by construction, vandalism, agriculture, or natural agents as significant, as there exists the potential that they contain information important in prehistory and history. Seldom can an archaeologist be confident that a site is insignificant prior to its excavation.

To consider all sites as inviolate, however, is wholly impractical in areas where multiple-use of lands is necessary. Some kinds of trade-off must be established, for to provide the protection that eligibility to the National Register of Historic Places offers would likely destroy the Register as a tool for protecting truly remarkable cultural resources. There exist too many archaeological sites and too many demands on federal land in

the western United States for such an approach to work. Hypothetical "scales" for weighing the relative importance of each site must therefore be constructed.

Different types of significance can be determined. Type may include scientific (research) significance, historical significance, ethnic significance, monetary significance, or significance as a public educational facility. Most prehistoric and historic sites in the Cisco project area can best be viewed in terms of scientific significance. Criteria for scientific significance may include how unique a particular site is, or how well it typifies a large number of similar sites. Depth of cultural deposits, horizontal extent, and the condition (preservation) of deposits may be criteria. Criteria may also pertain to the potential of a particular site to answer regional or cultural research questions (Nickens and Reed 1980).

The sites in the mine lease area typify a wide range of cultural resources in the region. Some are deserving of protection for future study; others simply are not. Table 4-6 summarizes the sites and their eligibility for nomination to the National Register.

## Conclusions

This survey has examined an area that has never been surveyed. It is unique in that to date, no other survey of its type or intensity has been accomplished and reported on the west side of the Book Cliffs. The survey demonstrated that during prehistoric times, the talus and cliffs between the valley and the crest of the Book Cliffs were little used. Site density is lower than most areas. It is apparent that the costs in energy for exploiting the rugged west side simply outweigh the potential benefits. If other surveys should repeat this pattern, perhaps a large region could be exempted from future cultural resource requirements. Canyon bottoms with live water appear to have provided excellent hunting and gathering for permanent settlements elsewhere. The canyons probably functioned as a natural corridor to higher areas as well.

There remain far more questions than answers about the prehistory of the area. The total lack of Archaic sites is puzzling. Little is known of Archaic patterns in the area. It is possible that the future test or excavation of sites, like 42Cb240, could yield valuable data on the Archaic. It is also interesting that in the immediate Price to Green River area, not a single Fremont open village has ever been excavated. Site 42Cb241 is in a unique position, close to water, near land for cultivation and in a montane gathering zone. The interface of these environments by the Fremont could result in very significant research contributions.

The principle weakness of the survey was the lack of a general research design-predictive model for historic sites. Historic sites are as important as prehistoric sites under the law, yet no research designs for historic sites have been proposed for the region. Reports abound in recitations of historic names, places and events. However, next to nothing is known about historic material culture on the Plateau. It is hoped that future survey and research will result in more than a mere description of events.

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# APPENDIX 1

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

1. Site No.[I/1-10] 42Cb231p
PALEONTOLOGY-001

2. County Carbon
3. Temp. No. K-1

4. Class: Prehistoric Historic XX Paleontologic
5. Cultural Site Type (interpreted function):
6. Paleontological Site Type: XX Invertebrate; Vertebrate; Flora
7. Elevation [I/11-15] 7920 ft. X.3048= 2414 m.
elevation source: U.S.G.S. topographic
8. UTM Grid; [I/16-30] zone 12 ; 550550 m E; 4380850 m N
9. [II/1-16] NE of NW of SE of Section 30 T. 14S , R. 14E
10. Map Reference: Sunnyside, Utah Series: 7.5 Date: 1972
11. Aerial Photo Data:

12. Site Location: On ridge crest, just north of prominent saddle, in Book Cliffs.

13. Land Owner [II/17-18]: Private: Kaiser Steel Corp.
BLM District/Forest [II/19]:
14. Site Name/Previous Designations: None

15. Description of Site: Poorly-exposed outcrop of highly fossiliferous limestone. Several species of gastropods & at least one bivalve mollusk species, represented as well-preserved fossils. Limestone unit is of unknown thickness; lateral continuity of the limestone bed, or of the outcrop(s) is also unknown. The limestone is probably in upper Price River Formation, or lower North Horn Formation.

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

| CLASS | QUANTITY |
|---|---|
| Debitage [II/30] | |
| 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: None

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) _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

19. Cultural Affiliation [IV/7-14]: _____
How Determined? _____
20. Site Dimensions : 10 m X 10 m; ? Area [IV/17-21]; 100 sq m
21. Were surface ~~xxxxxxxx~~ fossils collected? XX Yes; __No; [IV/22] If yes, attach a continuation sheet describing sampling method used. (not emai
22. Estimated depth of fill [IV/23] : _____
Subsurface test? __Yes; __No(Include location of test on site map)
Description: _____
23. Site Condition [IV/25] : XX Excellent; __Good; __Fair; __Poor
Agent of Impact: _____
24. Nat.Register Potential[V/1]: __Significant(C); XX Non-Significant(D)
Justification: _____

25. Research Potential: Unknown
26. Recommended Mitigation: _____
27. Direction/Distance to Permanent Water [V/5-10] : _____/_____m
Type/Name of Water Source [V/11] : _____
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/15-18]

SITE NO. _____

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)
_coluvium(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(E)
_riser(I)
_port.geo.feature(J)
_spring mound/bog(K)
_cave(L)
_alcove/shelter(M
_patterned ground(

Description: _____

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

_ALPINE GRASSLAND(AA)

_SPRUCE FIR(BZ)
_krumholz(BA)
_white fir-spruce(BB)
_ASPEN DOUGLAS FIR(CZ)
_limber pine(CA)
_douglas fir(CB)
_lodgepole pine(CC)
_bristlecone pine(CD)
_aspen(CE)
_streamside(CD)
_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)
_hop-sage/blkbrsh(FG)
_bud sagebrush(FH)
_mat saltbrush(FI)
_gray molly(FJ)
_streamside(FK)

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

_WARM DESERT SHR
_desert saltbru
_creosote bush(H
_creosote/bursag
_joshua tree(HD)
_MARSH COMMUNITY(LA

_ALKALI FLATS/MUD FLATS/DRY LAKE/ WASTELAND(KZ)

_CULTIVATED LAND( )

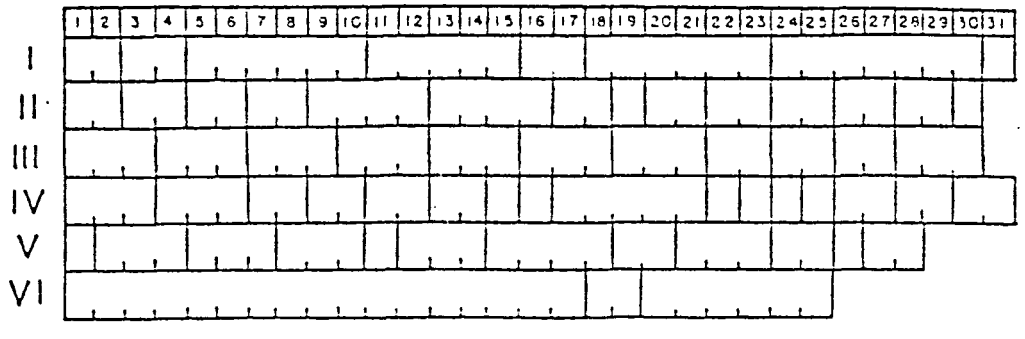
(Check COMMUNITY only if association cannot be determined)

Description: _____

31. Next nearest plant association/distance: _____
32. Photograph Numbers [V/26] : No Photo
33. Recorded by: Jack Oviatt
Survey Org. [V/27-28]: Antiquities Date: 1/20/81
Assisting Crew Members: J. Kirkman, A. Nielson

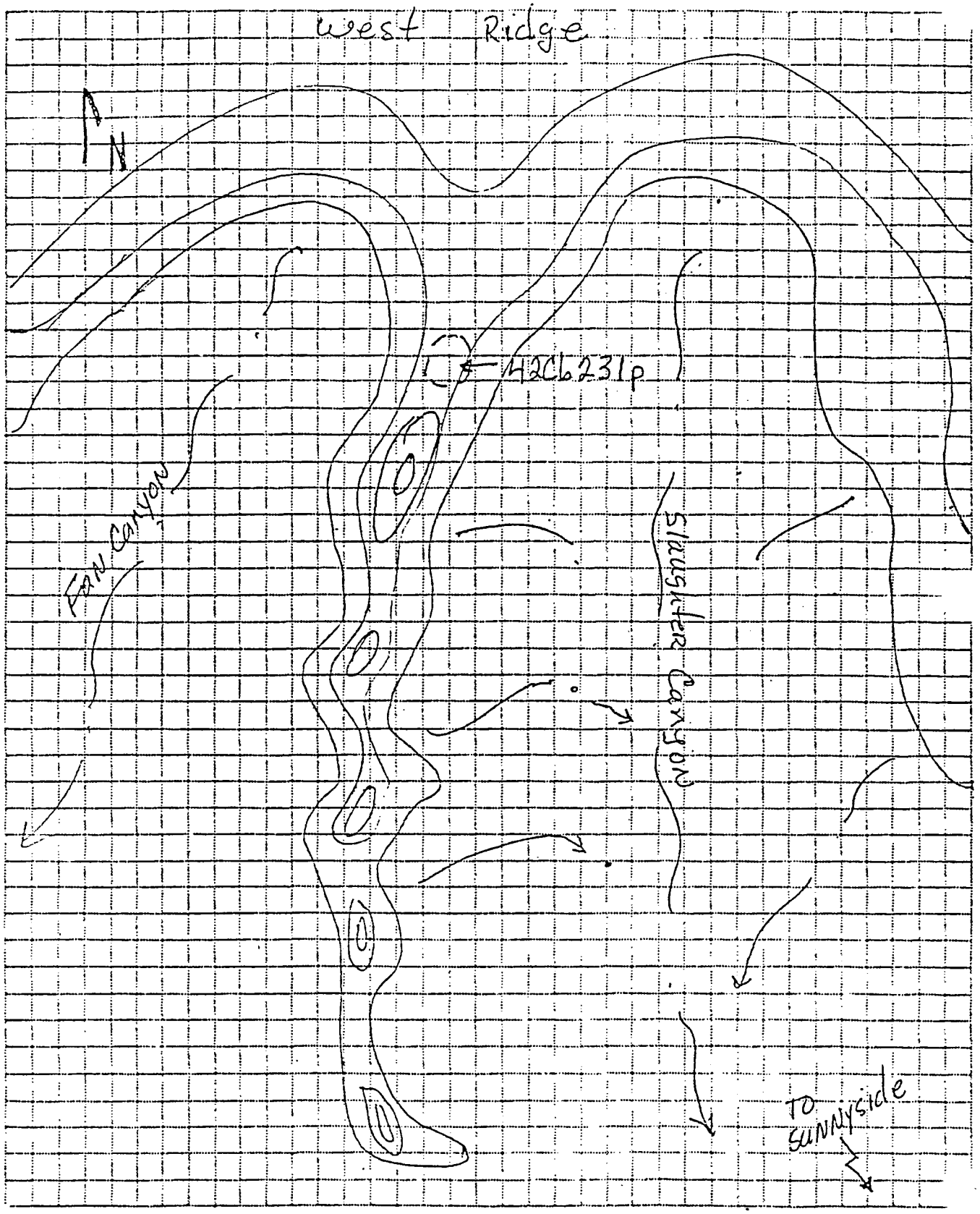
SITE NO. _____

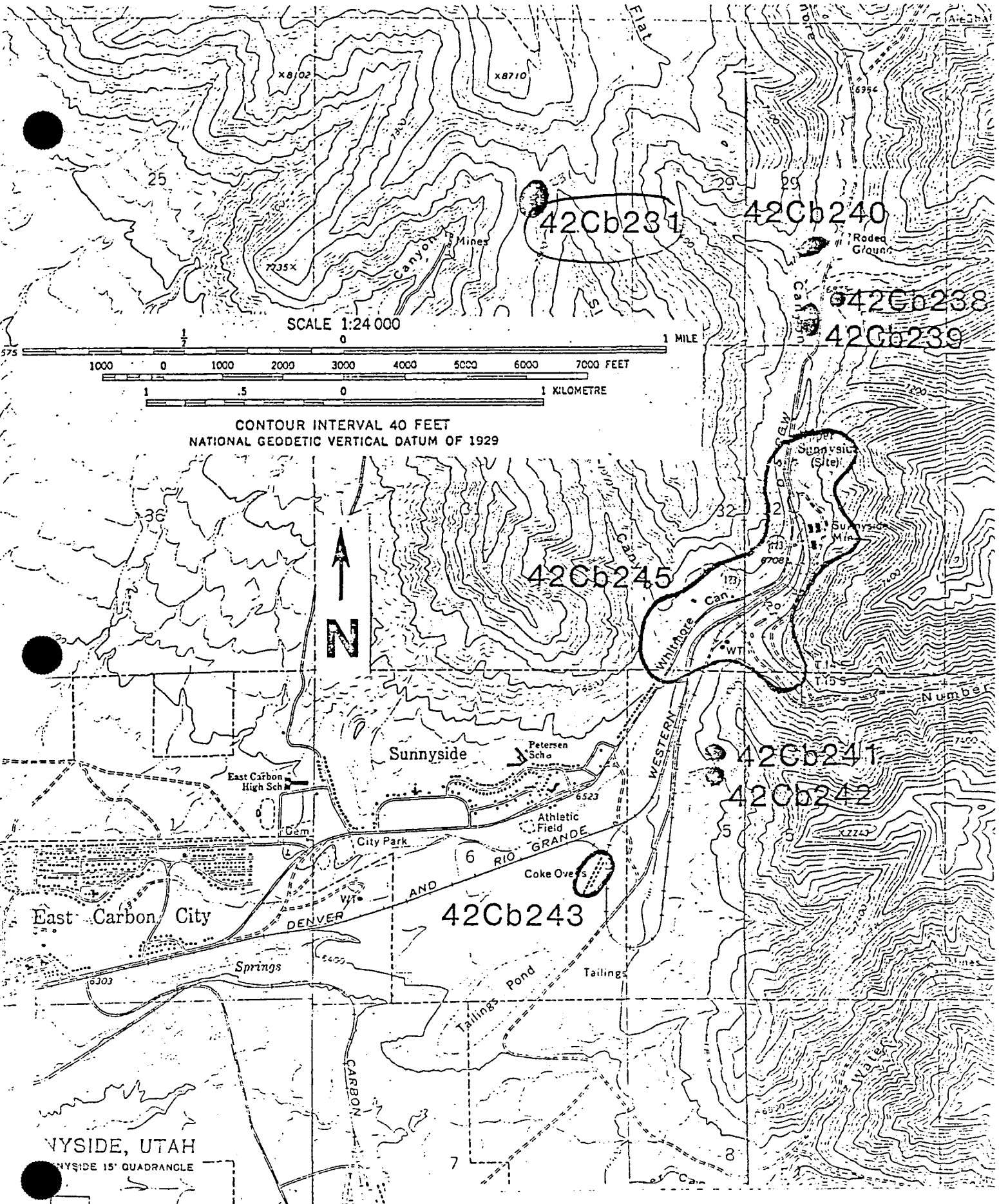
35. Encoding Form: (all entries are right justified)




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. 42Cb23.p




42Cb231
42Cb240
42Cb238
42Cb239
42Cb245
42Cb241
42Cb242
42Cb243
SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETRE
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
N
Sunnyside
East Carbon City
Petersen Sch
East Carbon High Sch
City Park
Athletic Field
Coke Ovens
Tailings
Tailings Pond
Springs
Sunnyside (Site)
Whitmore Can.
WESTERN
DENVER AND RIO GRANDE
CARBON
Roded Ground
Flat Canyon Mines
UTAH
QUADRANGLE LOCATION

UTAH ANTIQUITIES SITE FORM
developed by cooperative agreement by:
Bureau of Land Management
Division of State History
University of Utah Archeological Center

1. Site No.[I/1-10] 42Cb232
2. County Carbon
3. Temp. No. K-2
4. Class: XXPrehistoric ___Historic ___Paleontologic
5. Cultural Site Type (interpreted function): Open camp
6. Paleontological Site Type: ___Invertebrate; ___Vertebrate; ___Flora
7. Elevation [I/11-15] 8620-8640 ft. X.3048= 2627-2633 m.
elevation source: contour
8. UTM Grid: [I/16-30] zone 12 ; 551110 m E; 4385250 m N
9. [II/1-16] NE of SW of SE of Section 12 T. 14S , R. 13E
10. Map Reference: Sunnyside, Utah Series: 7.5 Date: 1972
11. Aerial Photo Data:
12. Site Location: Located on west ridge, west of Whitmore Canyon. Take jeep trail opposite Bear Canyon up west ridge, pass Bull Flat, up to top, proceed north about 2.5 miles. Site just north of saddle and an historic camp.
13. Land Owner [II/17-18]: Private: Kaiser Steel Corp.
BLM District/Forest [II/19]:
14. Site Name/Previous Designations: None
15. Description of Site: A light lithic scatter with a couple of gray lithic flakes and a round, uniface sandstone mano. Occupies a small knoll top & rocky slope southeast of the knoll. Overlooks a natural pass or saddle overlooking Bear Canyon.

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

| CLASS | QUANTITY |
|---|---|
| Debitage [II/30] | 2 |
| 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] | Mano- Round | 1 |
| 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: Gray/white chert flakes. Mano is of pink, fine grained sandstone.

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) _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 observed.

18. Structural Features:(describe and locate on site map)[III/28-IV/5]

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

Description: None observed.

19. Cultural Affiliation [IV/7-14]: Unknown
How Determined?
20. Site Dimensions : 40 m X 40 m; Area [IV/17-21]: sq m
21. Were surface artifacts collected? Yes; XX No; [IV/22] If yes, attach a continuation sheet describing sampling method used.
22. Estimated depth of fill [IV/23] : Unknown
Subsurface test? Yes; XX No (Include location of test on site map)
Description:
23. Site Condition [IV/25] : Excellent; Good; Fair; XX Poor
Agent of Impact: Erosion
24. Nat.Register Potential [V/1]: Significant(C); XX Non-Significant(D)
Justification: No diagnostics, very sparce, bad erosion.

25. Research Potential: None
26. Recommended Mitigation: None
27. Direction/Distance to Permanent Water [V/5-10] : East / 600 m
Type/Name of Water Source [V/11] : Grassy trail creek
Distance to nearest other Water Source [V/2-4]: Unknown
Type of other water source:
Distance to Cultivatable Soil [V/12-14] : 600 m
28. Topographic Location (check one under each heading) [V/15-18]

SITE NO.

| PRIMARY LANDFORM | POSITION ON LANDFORM | DEPOSITIONAL ENVIRONMENT | | SECONDARY POSITION |
|---|---|---|---|---|
| _mountain spine(A) | XX_top/crest/peak(A) | _fan(A) | _marsh(L) | XXtop/crest/ridge(A) |
| _hill/butte(B) | _edge(B) | _talus(B) | _landslide/slump(M) | XXedge(B) |
| _tableland/mesa(C) | _slope(C) | _dune(C) | _delta(N) | _slope(C) |
| Xridge(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) | | _riser(I) |
| | | _coluvium(I) | | _port.geo.feature(J) |
| | | _moraine(J) | | _spring mound/bog(? |
| | | _flood plain(K) | | _cave(L) |
| | | | | _alcove/shelter( |
| | | | | _patterned ground |

Description: On a small knoll that is part of West Ridge.

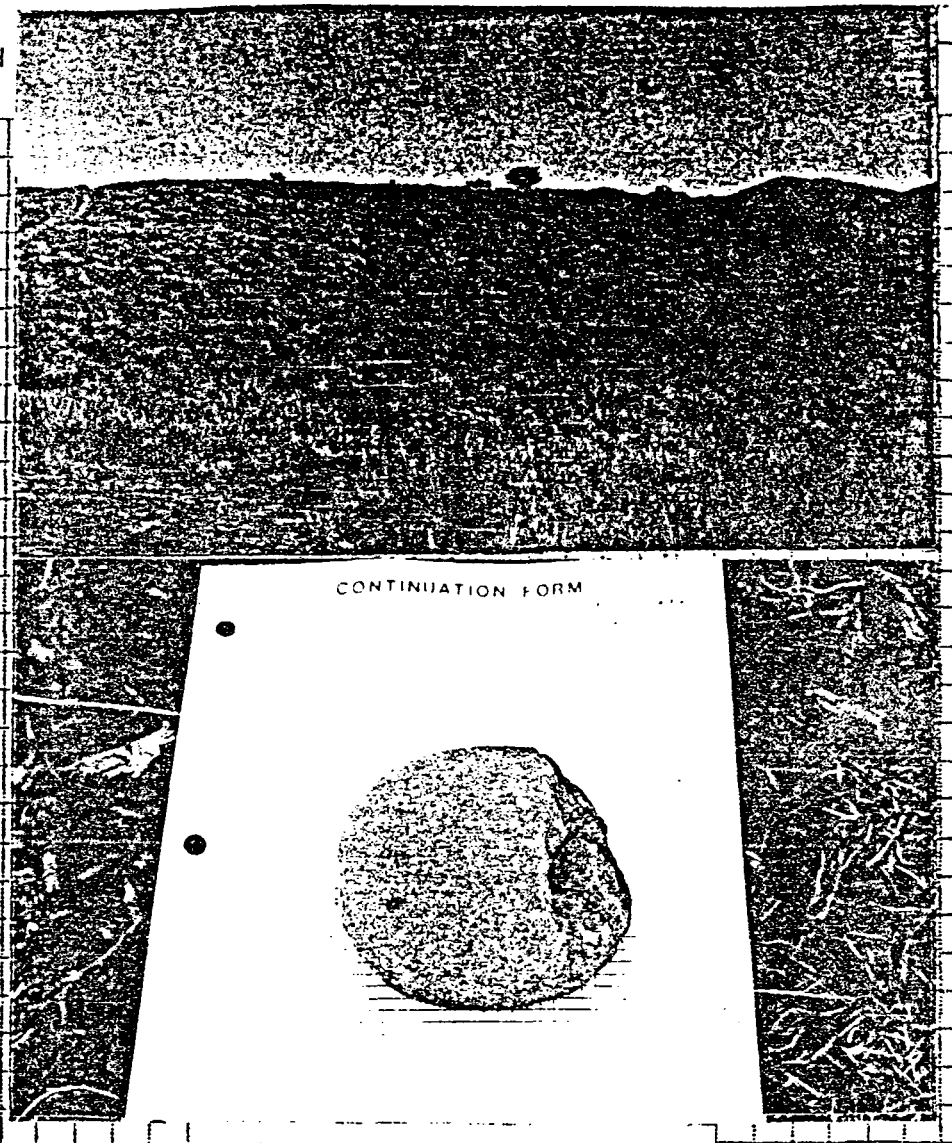
29. Degree/Aspect of slope [V/19-23] : 15% southeast
30. Vegetation COMMUNITY and association [V/24-25]:

| | | | | |
|---|---|---|---|---|
| _ALPINE GRASSLAND(AA) | _YELLOW PINE-OAK(DZ) | _COLD DESERT SHRUB(FZ) | _SALT DESERT SHRUB(GZ) | _WARM DESERT SHRUB |
| | _ponderosa pine(DA) | _sagebrush(FA) | _greasewood(GA) | _desert saltbrush( |
| _SPRUCE FIR(BZ) | _oakbrush(DB) | _small sagebrush(FB) | _grswood-shadscl(GB) | _creosote bush(E |
| _krumholz(EA) | _mountain brush(DC) | _little rabbitbrsh(FC) | _seepweed(GC) | _creosote/bursag |
| _white fir-spruce(BB) | _maple(DD) | _shadscale(FD) | _pickleud/samphire(GD) | _joshua tree(ED) |
| _ASPEN DOUGLAS FIR(CZ) | _streamside(DE) | _horsebrush(FE) | _saltgrass(GE) | _MARSH COMMUNITY(L |
| _limber pine(CA) | | _winter-fat(FF) | _alkali sacaton(GF) | |
| Xdouglas fir(CB) | | _hop-sage/blkbrsh(FG) | _rabbitbrush(GG) | _ALKALI FLATS/MU |
| _lodgepole pine(CC) | _PLAINS/PRAIRIE(EZ) | _bud sagebrush(FH) | | FLATS/DRY LAKE/ |
| _bristlecone pine(CD) | _grasslands(EA) | _mat saltbrush(FI) | | WASTELAND(KZ) |
| _aspen(CE) | _pinyon-juniper(EB) | _gray molly(FJ) | | |
| _streamside(CD) | _streamside(EC) | _streamside(FK) | | _CULTIVATED LAND |
| _meadow grassland(CG) | | | | |

(Check COMMUNITY only if association cannot be determined)

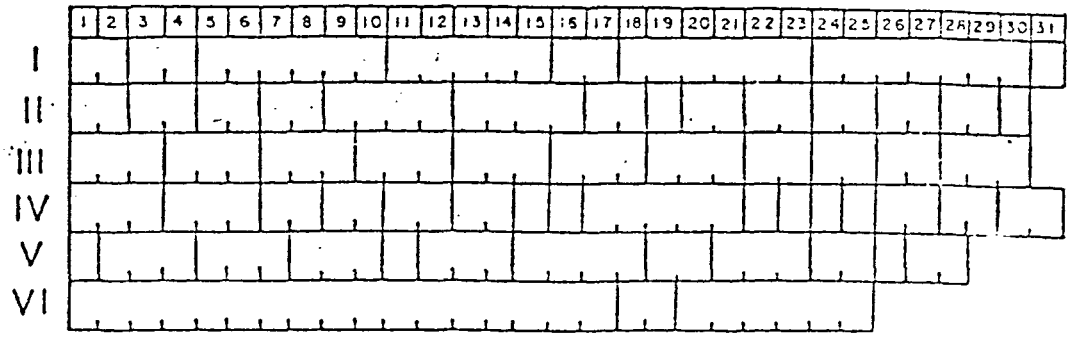
Description: Area rich with Douglass fir, some mahogany, sage, service berry, lupene, grasses

31. Next nearest plant association/distance: CZ 200m southeast
32. Photograph Numbers [V/26] : AN-81-1.2(BW) AN-81-2.2(C/s)
33. Recorded by: Asa Nielson
Survey Org. [V/27-28]: AS-CS Date: 1/21/81
Assisting Crew Members: Jack Oviatt, Jim Kirkman



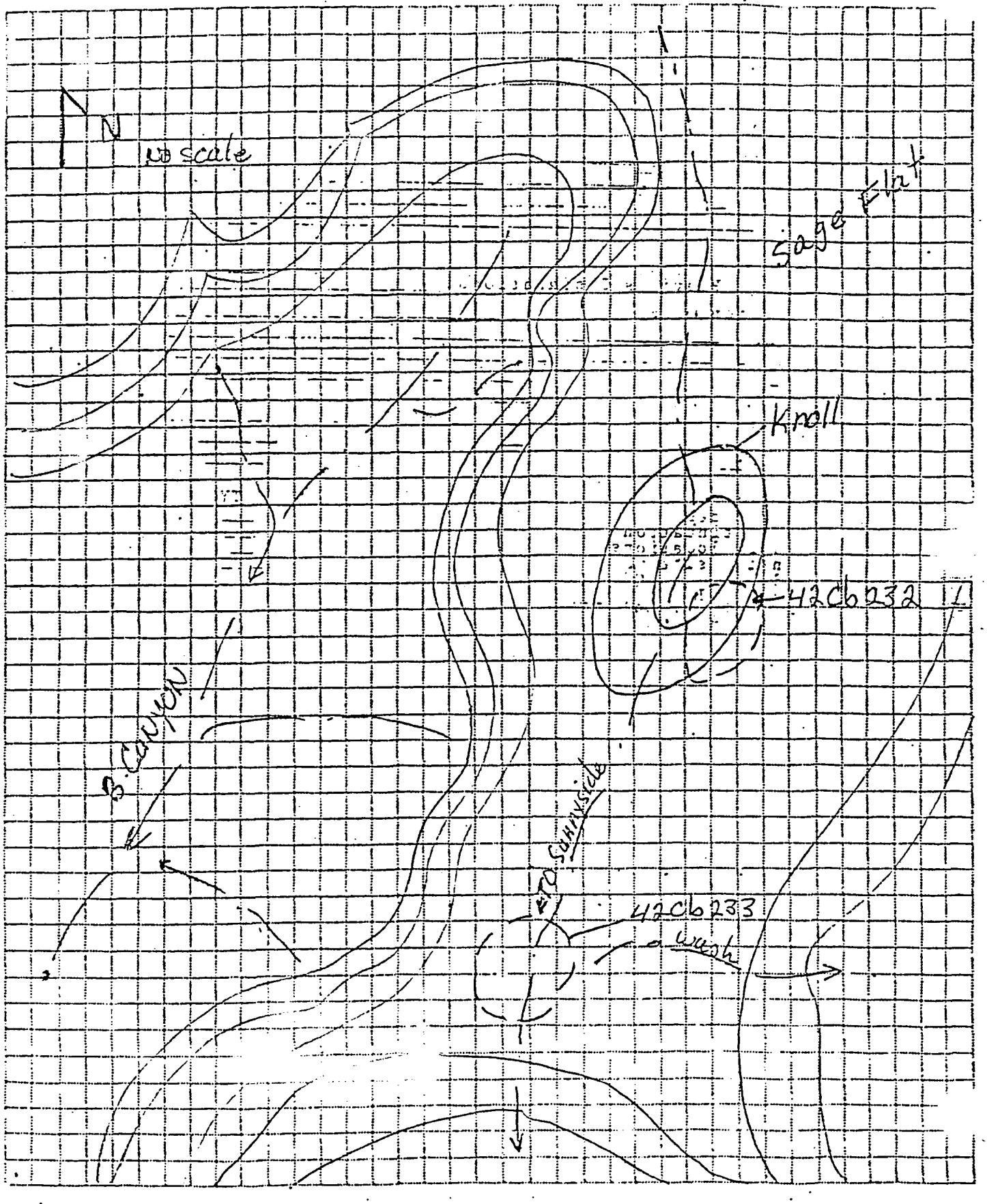

Site 42Cb232
Top: General Site View Looking North.
Bottom: Oval Mano Found at Site

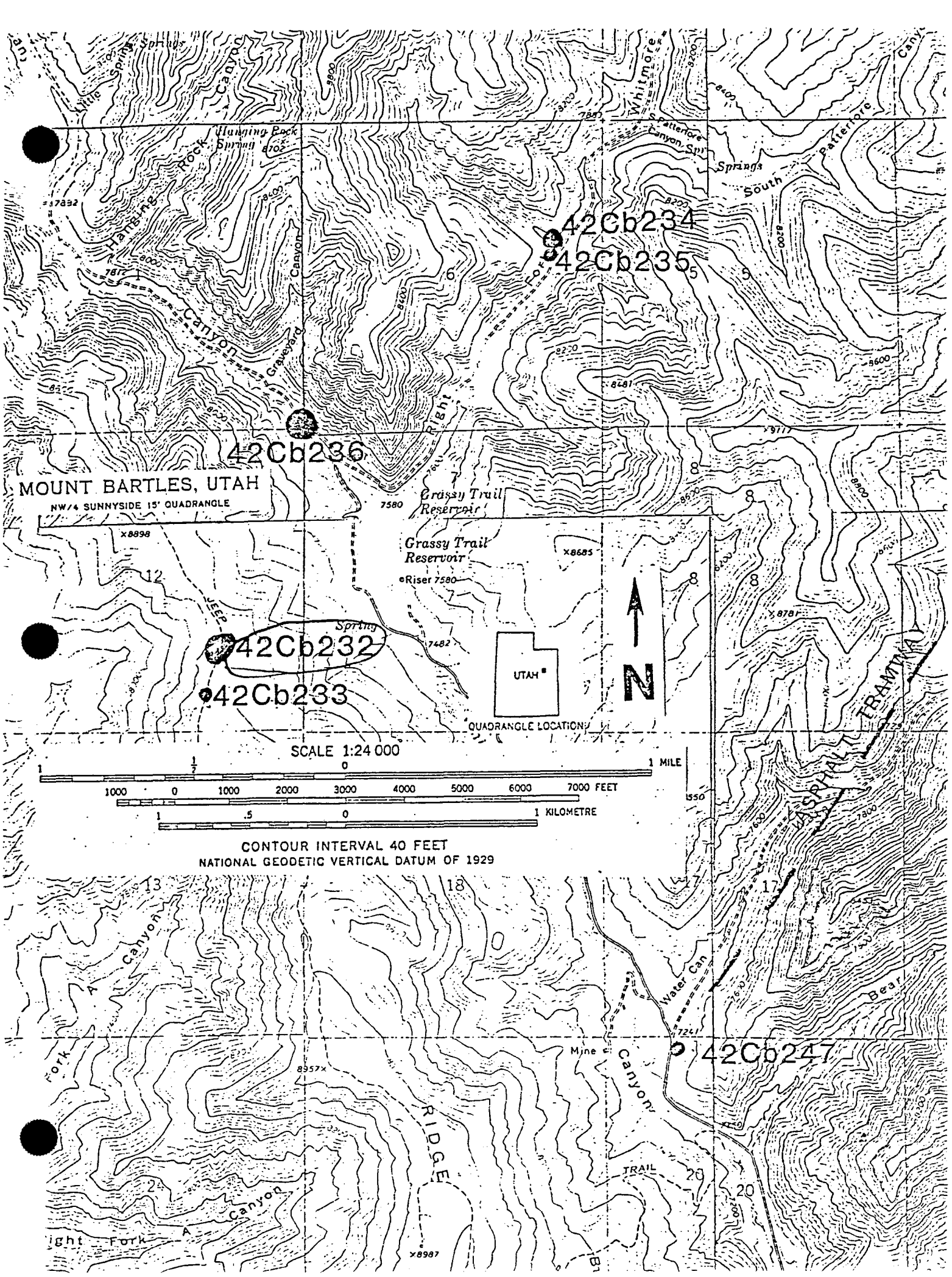
35. Encoding Form: (all entries are right justified)




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. 42Cb232




42Cb234
42Cb235
42Cb236
42Cb232
42Cb233
42Cb247
MOUNT BARTLES, UTAH
NW/4 SUNNYSIDE 15' QUADRANGLE
Grassy Trail Reservoir
Grassy Trail Reservoir
Riser 7580
Spring
JEEP
UTAH
QUADRANGLE LOCATION
N
SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETRE
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
Hanging Rock Spring
Rock Canyon
Hanging Rock Canyon
Graveyard Canyon
Right Fork
Whitmore Canyon
Spatterore Canyon Spr
Springs
South Patterore Canyon
Water Can
Bear
Mine Canyon
RIDGE
TRAIL
WASATCH TRAMWAY
Fork A Canyon
ight Fork A Canyon

UTAH ANTIQUITIES SITE FORM
developed by cooperative agreement by:
Bureau of Land Management
Division of State History
University of Utah Archeological Center

1. Site No.[I/1-10] 42Cb233

2. County Carbon
3. Temp. No. K-3
4. Class: __Prehistoric XX Historic __Paleontologic
5. Cultural Site Type (interpreted function): Camp
6. Paleontological Site Type: ___Invertebrate; ___Vertebrate; ___Flora
7. Elevation [I/11-15] 8690 ft. X.3048 = 2648 m.
elevation source: contour line
8. UTM Grid: [I/16-30] zone 12 ; 550950 m E; 4385150 m N
9. [II/1-16] SE of SW of SE of Section 12 T. 14S , R. 13E
10. Map Reference: Sunnyside, Utah Series: 7.5 Date: 1972
11. Aerial Photo Data:

12. Site Location: On ridge named West Ridge, west of Whitmore Canyon. Take jeep trail opposite Bear Canyon from Whitmore, go up ridge past Bull Flat to top, ca 2.5 miles north to natural saddle & site area.

13. Land Owner [II/17-18]: Private: Kaiser Steel Corp.
BLM District/Forest [II/19]:
14. Site Name/Previous Designations: None
15. Description of Site: A small, historic camp site still in use. Small aspen, corral below (east) site. Consists of recent historic trash plus older cans. Occupies the ridge edge overlooking Bear Canyon to the west. Some ash from camp fires present. No fire ring.

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

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

| CLASS | TYPE | QUANTITY |
|---|---|---|
| Ceramics [III/10-21] | Iron stone | 1 |
| 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] | Bear Canyon Cream Cans | 10-15 |
| Wood [II/22-29] | | |
| Other [II/22-29] | | |

Description: Modern aluminum pop tops, but also 2 solder sealed cans.

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

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

Description: Small ash stain on west side, perhaps a hearth.

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 observed.

SITE NO.

19. Cultural Affiliation [IV/7-14]: Euro. American(?)
How Determined? Modern cans
20. Site Dimensions : 10 m X 10 m; Area [IV/17-21]: _____ sq m
21. Were surface artifacts collected? __Yes; XX No; [IV/22] If yes, attach a continuation sheet describing sampling method used.
22. Estimated depth of fill [IV/23] : Unknown
Subsurface test? __Yes; XX No (Include location of test on site map)
Description: _____
23. Site Condition [IV/25] : __Excellent; __Good; XX Fair; __Poor
Agent of Impact: Erosion
24. Nat.Register Potential [V/1]: __Significant(C); XX Non-Significant(D)
Justification: No good preservation or depth observed; likely a sheep or deer canyon.

25. Research Potential: None
26. Recommended Mitigation: None
27. Direction/Distance to Permanent Water [V/5-10] : East / 600 m
Type/Name of Water Source [V/11] : Grassy trail creek
Distance to nearest other Water Source [V/2-4]: Unknown
Type of other water source: _____
Distance to Cultivatable Soil [V/12-14] : 600 m
28. Topographic Location (check one under each heading) [V/15-18]

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

POSITION ON LANDFORM
_top/crest/peak(A)
_edge(B)
_slope(C)
_toe/foot/bottom(D)
X 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)
_coluvium(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)
X interior(G)
_step(H)
_riser(I)
_port.geo.feature(J)
_spring mound/bog(K)
_cave(L)
_alcove/shelter(M)
_patterned ground

Description: In a natural saddle pass between Whitmore and Bear Canyon.

29. Degree/Aspect of slope [V/19-23] : D-1 west
30. Vegetation COMMUNITY and association [V/24-25]:

_ALPINE GRASSLAND(AA)
_SPRUCE FIR(BZ)
_krumholz(BA)
_white fir-spruce(BB)
_ASPEN DOUGLAS FIR(CZ)
_limber pine(CA)
Xdouglas fir(CB)
_lodgepole pine(CC)
_bristlecone pine(CD)
_aspen(CE)
_streamside(CD)
_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)
_hop-sage/blkbrsh(FG)
_bud sagebrush(FH)
_nut saltbrush(FI)
_gray molly(FJ)
_streamside(FK)

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

_WARM DESERT SHRUB
_desert saltbrush
_creosote bush(EB)
_creosote/bursage
_joshua tree(ED)
_MARSH COMMUNITY( )

_ALKALI FLATS/MUD FLATS/DRY LAKE/ WASTELAND(KZ)

_CULTIVATED LAND(JZ)

(Check COMMUNITY only if association cannot be determined)

Description: Douglass fir, sage, mahogany, grasses present.

31. Next nearest plant association/distance: 200 meters E. (CE)
32. Photograph Numbers [V/26] : AN-81-1.3 AN-81-2.3
33. Recorded by: Asa Nielson
Survey Org. [V/27-28]: ASKS Date: 1/21/81
Assisting Crew Members: Jack Oviatt, Jim Kirkman

34. Sponsoring Agency: Kaiser Steel Contract No. _____